

# МАТЕРІАЛИ



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**Antoniuk O.P.**

**FORMATION OF PHYSIOLOGICAL ATRESIA IN EMBRYOGENESIS OF BILE DUCTS**

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At the 3rd week of embryogenesis from the endoderm of the ventral wall of the initial part of the midgut (the future duodenum) there is a protrusion (diverticulum), located between the leaves of the ventral mesentery. This diverticulum is soon divided into two depressions: cranial and caudal. The cranial deepening is a bookmark of the general hepatic channel and glandular fabric of a liver, and caudal – a bladder channel and a gall bladder.

In embryos of 4.0-5.0 mm of parietal-coccygeal length (PCL), at the 4<sup>th</sup> week of intrauterine development, the germ of the liver is formed by the appearance of individual strands of epithelial cells that grow from the ventral wall of the primary intestine into the mesenchyme of the transverse septum. In embryos of 5.0 mm PCL of fetal development, the number of epithelial cords that form the liver tab increases significantly. Its craniocaudal size reaches  $410 \pm 10$  microns, dorsoventral –  $325 \pm 10$  microns, transverse –  $285 \pm 10$  microns. At the 4<sup>th</sup> week of fetal development from the ventral wall of the primary intestine a protrusion of the endodermal layer in the form of a hepatic diverticulum is formed, which in embryos of 4.5 mm PCL grows into the mesenchyme in the direction of the transverse septum. Leg of the hepatic diverticulum, which connects it to the ventral wall of the duodenum, narrows in the dorsal direction to 100  $\mu\text{m}$  and includes the rudiment of the common bile duct, which is formed by oval epithelial cells that differ from other cells of the hepatic diverticulum due to bending of the rudiment of the duodenum to the right due to the rotation of the stomach.

The beginning of the common bile duct in embryos of 8.0 - 8.5 mm PCL is shifted to the cranial semicircle of the intestine, covering on all sides the rudiment of the liver. The walls of the common bile duct are formed by a single-row cylindrical epithelium, surrounded by mesenchymal cells of the ventral mesogastrium, the lumen of the common bile duct caudally narrows and disappears at the junction with the protrusion of the intestinal wall, which is lined with multi-row cylindrical epithelium.

At the beginning of the 6th week of fetal development in embryos 9.0 - 10.0 mm PCL the common bile duct is in the thickness of the ventral mesogastrium, caudal large papilla enters the right semicircle of the upper bend of the duodenum, from the end of the common bile duct to the right duct of the ventral rudiment of the pancreas. At this stage, the lumen in both the duodenum and the common bile duct is filled with epithelial cells, which is a manifestation of the so-called physiological atresia. At the end of the embryonic period (embryos 11.0 - 13.0 mm PCL) at the junction, the common bile duct and the pancreatic ducts are surrounded by their mesenchymal cells, which begin to acquire a circular direction and differ from the intestinal mucosa. This indicates the beginning of the formation of the sphincter of the common bile duct.

The rudiment of the liver, gallbladder and bile ducts occurs in the form of growth of kidney from the caudal part of the foregut during the 4th week of development. The beginning of the liver or hepatic diverticulum grows into the transverse septum, the mass of the splanchnotic mesoderm between the pericardial cavity and the bile stalk. The transverse septum forms part of the diaphragm in this area of the hepatic diverticulum ventral mesentery as well. The hepatic diverticulum rapidly enlarges and divides into 2 parts. Its large cranial part of the diverticulum is the rudiment of the liver. Proliferating endodermal cells form thick anastomotic strands of liver cells and epithelial lining of the intrahepatic parts of the gallbladder. The hepatic cords are separated from each other by irregular vascular spaces lined with condensed endothelium, which are the rudiments of hepatic sinusoids. These

specialized capillaries of the liver are formed from the capillaries of the transverse septum, they gradually surround the growing strands of hepatoblasts. Sinusoids contain intravascular blood cells: mainly erythrocyte type. Small caudal part of the hepatic diverticulum forms the rudiment of the gallbladder.

**Garazdiuk M.S.**

**TEMPORAL DYNAMICS OF COMPLEX DEGREE MODULE MAPS OF MICROSCOPIC IMAGES MUTUAL POLARIZATION OF BRAIN HISTOLOGICAL SECTIONS TO ESTABLISH THE TIME OF HEMORRHAGES FORMATION**

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One of the most common mechanical injuries in forensic practice is traumatic brain injury and it is very important to make the differentiation diagnose of the time of hemorrhage formation in the human brain (HB), namely ischemic stroke (IS), hemorrhage of traumatic (HTG) and non-traumatic (NTG) genesis, as this eliminates the violent nature of death and narrows the circle of suspects.

The purpose is to develop forensic criteria for the differentiation of the time of hemorrhages formation of different genesis by mapping the distributions of the magnitude of the complex degree of mutual polarization (KDMP) of HB histological sections. Native histological specimens of HB with HTG included (1 group) - 30 samples, 30 samples with HNG (2 group), 35 samples with IS (3 group) and samples from 20 corpses, the cause of death of which was acute coronary insufficiency (4 control group). The following set of studies was performed: 1) temporal monitoring of necrotic and degenerative-dystrophic changes by measuring maps of the KDMP module of a series of microscopic images of histological sections of the brains of the dead of all groups with different hemorrhage formation time (HFT) - from 6 hours up to 168 hours; 2) statistical temporal analysis of objective data of polarization-correlation microscopy of coordinate consistency of types and forms of polarization by calculating a set of statistical moments of the 1st - 4th orders, which characterize the magnitude maps of the KDMP module of digital microscopic images with different HFT; 3) established time duration of linear sections of dependences of statistical moments of the 1st - 4th orders which characterize necrotic changes of maps of the KDMP module of set of points (pixels) of digital microscopic images of samples of histologic sections of the nervous tissue from corpses with various HFT.

Comparative analysis of polarization-correlation mapping data of microscopic images of brain histological sections of the dead from all groups found the time dependence of the magnitude of statistical moments of the 1st - 4th orders, which characterize polarization and azimuthal-invariant Mueller matrix maps, especially dependences of the value of asymmetry and excess distributions of the KDMP modules up to 48 hours from the moment of hemorrhage formations.

The accuracy of determining the time of hemorrhage formation by the method of KDMP - mapping of polarization-inhomogeneous microscopic images of histological sections of the brain is  $45 \text{ min} \pm 15 \text{ min}$ .

**Garvasiuk .V.**

**IMMUNOHISTOCHEMICAL STUDY OF TROPHOBLASTS PROLIFERATIVE PROCESSES IN BASAL DECIDUITIS COMBINED WITH IRON-DEFICIENCY ANEMIA IN GRAVIDAS**

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Morphological manifestations of inflammation of the placenta have been and remain the subject of many studies. Though, in Ukrainian and foreign scientific literature there are insufficient data concerning the processes of proliferation and apoptosis in the chorionic villi in chorioamnionitis and basal deciduitis. The influence of iron-deficiency anemia on the course of these processes in inflammation of the placenta is not sufficiently studied. Even if scientific sources mention that

moderate hypoxia in placental tissues caused by iron-deficiency anemia leads to stimulation of proliferative processes in the trophoblast of the chorionic villi of the placenta, and strongly inhibits proliferation processes.

Objective: to establish quantitative parameters of cell proliferation in the trophoblast of the chorionic villi of the placenta in acute and chronic basal deciduitis in iron-deficiency anemia in gravidas by means of the immunohistochemical method.

The placental tissue was preserved in phosphate buffered neutral 10% formalin solution with further passing the material and preparing paraffin blocks. By means of a sliding microtome the cuts were made 5 micrometers thick keeping to appropriate requirements. Histological examinations were conducted on the base of histological samples stained with hematoxylin and eosin. According to DAKO recommendations by means of immunohistochemical method further detection of antigen Ki-67 expression in nucleus of trophoblast structures was determined (polymeric system of detection with the stain diaminobenzidine). The number of Ki-67-positive nuclei was calculated in per mille. Statistically significant were differences with  $0,05$ . The results are presented in Table.

Research groups	Ki-67 – positive nuclei in trophoblasts of chorionic villi (‰)	
	Observation of inflammation of the manure during pregnancy without anemia ( $n=16$ )	Observation of inflammation of the manure in iron deficiency anemia in gravidas ( $n=15$ )
Acute basal deciduitis	$53\pm 3.1$ $1 < 0.001$ $2 > 0.05$	$56\pm 3.2$ $3 > 0.05$ $4 > 0.05$
Chronic basal deciduitis	( $n=21$ ) $55\pm 2.8$ $1 < 0.001$ $2 > 0.05$	( $n=20$ ) $57\pm 3.7$ $3 > 0.05$ $4 > 0.05$

Note:  $1$  – the probability of difference between the physiological pregnancy and the study group;  $2$  – the probability of difference between the group of placentas with iron-deficiency anemia and the study group;  $3$  – the probability of difference between inflammation and comorbid inflammation in iron-deficiency anemia;  $4$  – the probability of difference between inflammation in combination with IDA and without inflammation in iron-deficiency anemia.

The results of our research can serve as additional criteria for making pathological diagnosis of acute and chronic forms of basal deciduitis with determination of morphological differences caused by iron-deficiency anemia in gravidas out of inflammatory foci. Iron-deficiency anemia in gravidas leads to the intensification of proliferative processes in the trophoblast of the chorionic villi of the placenta relative to the placenta from physiological pregnancy. In case of acute as well as in basal deciduitis, the proliferative activity in the trophoblast of the chorionic villi of the placenta increase.

**Honchar T.V.**

**DEVELOPMENT AND ESTABLISHMENT OF PELVIC JOINTS IN THE PRENATAL PERIOD OF HUMAN ONTOGENESIS**

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The research of morphogenesis and dynamics of space-time relationships of pelvic joints during the fetal period of development in terms of topographic and anatomical approach to the problems of embryogenesis has done with help of proper morphological methods. Vertebral arches are laid before its vertebral bodies but they exist separately for a long period of time. After the development of pre-cartilage tissue begins in the spine, intervertebral cartilages (future intervertebral discs) appear in the form of thin strips of compacted mesenchyme. They begin to form in the cranial spine of embryos 10.0-13.0 mm parietal-coccygeal length (PCL) and are found along the spinal column.

The strips then form a ligament joint that defines in this joint earlier than in others. The small coccygeal vertebrae, which have reached maximum in number already, are also connected by intervertebral cartilages. The connection of individual sacral elements into a single rudiment begins in the prenatal 22.0-23.0 mm PCL. In the pre-fetal 25.0 mm PCL begins to develop the sacroiliac joint, in the pre-fetal 50,0 is in the continuous connection stage. The height of the intervertebral cartilages is greater than the height of the vertebral bodies in the early stages. The main value of the cartilaginous layer is greatest in the lumbar region, relative - in cervical by the time of birth. Intervertebral discs in prenatal ontogenesis do not reach a definitive structure. The chordal canal is also found in the sacral region of adult, so the intervertebral discs L4 – L5 and L5 – S1 are referred to as hemi-arthrosis. The ribs depart from the spine perpendicularly to its axis in pre-fetal 15.0-19.0 mm PCL. The transverse processes of the thoracic vertebrae are arranged transversely. Therefore, rotation of costal-vertebral joint in the pre-fetal period is perpendicular to the spine. In the pre-fetal period 70,0-75,0 mm PCL the components of the sacroiliac joint are detected: the joint cavity, articulation surfaces and the joint capsule. The articular joints of the arches occur later than the joints of the vertebral bodies with the help of intervertebral cartilages (intervertebral discs). At first, the articulation processes appear, and then the transverse ones. The spine processes develop in fetal period. The caudal region of spinal cord can influence on the lumbar region long retain the characteristic of "embryonic" features due to developmental delays. Embryo's articulation processes of the lumbar and thoracic vertebrae are located in the frontal plane. Newborns have them situated in the middle between the frontal and sagittal planes.

The formation of joints is closely related to the development of the neuromuscular system. Intra-vertebral foramens are formed in the pre-fetal 13.0-15.0 mm PCL. The degree of development in the sacral-spinal nerves in the pre-fetal and fetal periods, which provide innervation of the joints in the spinal cord and muscles in the area of SC can suggest that these connections can possibly have single movements, which is important for the formation of joints. In pre-fetal 24.0-28.0 mm PCL the main components of joints in the spinal cord are formed: the articulation surface, the joining capsule and joint gap. The connection of sacro-vertebrae joint begins in the pre-fetal 22.0-23.0 mm PCL, and the sacroiliac joint begins to develop in the pre-fetal 25.0-27.0 mm PCL.

**Ilika V.V.**

**IMMUNOHISTOCHEMICAL STUDY OF TROPHOBLASTS PROLIFERATIVE PROCESSES IN CHORIOAMNIONITIS COMBINED WITH IRON-DEFICIENCY ANEMIA IN GRAVIDAS**

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The placenta is a biological monitoring organ, a pregnancy reflector, and a prognosticator of health. The processes of cell number regulation play an important role in the growth of organs in the process of their development. In the absence of risky effects, the regulation of cell number is carried out mainly by regulating the intensity of cell proliferation and apoptosis (death) processes, which are normally in a certain balance.

Objective: to establish quantitative parameters of cell proliferation in the trophoblast of the chorionic villi of the placenta in acute and chronic choriomnionitis with iron-deficiency anemia in gravidas by means of the immunohistochemical method.

The placental tissue was preserved in phosphate buffered neutral 10% formalin solution with further passing the material and preparing paraffin blocks. By means of a sliding microtome the cuts were made 5 micrometers thick keeping to appropriate requirements. Histological examinations were conducted on the base of histological samples stained with hematoxylin and eosin. According to DAKO recommendations by means of immunohistochemical method further detection of antigen Ki-67 expression in nucleus of trophoblast structures was determined (polymeric system of detection with the stain diaminobenzidine). The number of Ki-67-positive nuclei was calculated in per mille. Statistically significant were differences with 0,05. The results are presented in Table.

Research groups	Ki-67 – positive nuclei in trophoblasts of chorionic villi (‰)	
	Observation of inflammation of the manure during pregnancy without anemia ( $n=23$ )	Observation of inflammation of the manure in iron deficiency anemia in gravidas ( $n=21$ )
Acute chorioamnionitis	$54 \pm 2.3$ $1 < 0.001$ $2 > 0.05$	$56 \pm 3.8$ $3 > 0.05$ $4 = 0.03$
Chronic chorioamnionitis	$(n=20)$ $57 \pm 3.5$ $1 < 0.001$ $2 > 0.05$	$(n=21)$ $59 \pm 3.6$ $3 > 0.05$ $4 = 0.02$

Note:  $1$  – the probability of difference between the physiological pregnancy and the study group;  $2$  – the probability of difference between the group of placentas with iron-deficiency anemia and the study group;  $3$  – the probability of difference between the inflammation and comorbid inflammation in iron-deficiency anemia;  $4$  – the probability of difference between the inflammation in combination with iron-deficiency anemia and without inflammation in iron-deficiency anemia.

The results of our research can serve as additional criteria for making pathological diagnosis of acute and chronic forms of chorioamnionitis with the determination of morphological differences caused by iron-deficiency anemia in gravidas out of inflammatory foci. Iron-deficiency anemia in gravidas leads to the intensification of proliferative processes in the trophoblast of the chorionic villi of the placenta relative to the placenta from physiological pregnancy. In case of acute as well as in chronic chorioamnionitis the proliferative activity in the trophoblast of the chorionic villi of the placenta increases.

**Ivaskevich I.B.**

**DIFFERENTIAL DIAGNOSIS OF ALCOHOL AND CARBON MONOXIDE POISONING BY MEANS OF STATISTICAL ANALYSIS OF DIFFUSIVE TOMOGRAPHS OF OPTICAL ACTIVITY FLUCTUATIONS OF THE ADRENAL GLANDS HISTOLOGICAL SPECIMENS**

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The currently known diagnostic signs of death from acute poisoning such substances as alcohol and carbon monoxide are relatively evidential, and sometimes subjective, which determines the search for new diagnostic methods to differentiate the cause of death from poisoning in forensic practice.

Objective of the research is to evaluate the possibility of objective differentiation of the cause of death in cases of ethanol and carbon monoxide poisoning by statistical analysis of diffuse tomograms of fluctuations in the optical activity of histological specimens of the adrenal glands.

The object of the study were histological sections of the adrenal glands, selected from 110 corpses that died of coronary heart disease (1 control group,  $n = 20$ ), due to ethanol (group 2,  $n = 45$ ) and carbon monoxide poisoning (group 3,  $n = 45$ ). Histological sections of the adrenal glands were made according to standard methods on a microtome with rapid freezing. The research method is based on the implementation of polarization reconstruction of the distributions of the average values of birefringence of the polycrystalline component of the adrenal glands specimens in cases of ethanol and carbon monoxide poisoning.

The statistical analysis (calculation of the mean  $Sr$ , dispersion  $Dp$ , asymmetry  $As$  and excess  $Ek$ , which are systematized and presented in table) identified the following scenario of changes in tomographic manifestations of necrotic changes in the molecular structures of the adrenal tissue in cases of alcohol and carbon monoxide poisoning – reduction of the magnitude and ranges of changes in the values of fluctuations of circular birefringence (FCB), which are quantified in the reduction of statistical moments of the 1st and 2nd orders, as well as in the increase of the statistical



moments of the 3rd and 4th orders, which characterize the asymmetry and excess of FCB distributions.

Specimen	Histological sections of the adrenal glands		
	Control group (n=20)	Group 2 (n=45)	Group 3 (n=45)
Statistical moments			
Average, $Sr \cdot 10^{-2}$	$0,28 \pm 0,012$	$0,13 \pm 0,006$	$0,065 \pm 0,003$
$i; j$		$j < 0,05$	$j < 0,05$
$i; j$		$i; j < 0,05$	
Dispersion, $Dp \cdot 10^{-2}$	$0,31 \pm 0,014$	$0,15 \pm 0,007$	$0,085 \pm 0,003$
$i; j$		$j < 0,05$	$j < 0,05$
$i; j$		$i; j < 0,05$	
Asymmetry, $As$	$0,31 \pm 0,014$	$0,52 \pm 0,024$	$0,89 \pm 0,041$
$i; j$		$j < 0,05$	$j < 0,05$
$i; j$		$i; j < 0,05$	
Excess, $Ek$	$0,39 \pm 0,017$	$0,68 \pm 0,033$	$0,97 \pm 0,041$
$i; j$		$j < 0,05$	$j < 0,05$
$i; j$		$i; j < 0,05$	

Statistical reliability ( $i; j; i; j < 0,05$ ) and diagnostic efficiency of forensic digital differentiation of diffuse tomograms of the adrenal glands specimens of the deceased from all groups were found. A satisfactory ( $Dp \ 82\%$ ) and excellent ( $Sr, As, Ek \ 90-92\%$ ) level of balanced accuracy of statistical processing of coordinate distributions of the value of the FCB sections of the adrenal glands in forensic differential diagnosis of alcohol and carbon monoxide poisoning was established.

The efficiency and statistical reliability ( $i; j; i; j < 0,05$ ) of application of the method of statistical analysis of diffuse tomograms of optical activity fluctuations of histological specimens of adrenal glands in forensic differentiation of the cause of death are demonstrated.

**Karatieieva S.Yu.**

### **SEARCH FOR RESULTS OF APPLICATION OF THE MORPHOMETRIC PARAMETERS AT THE FIELD OF SPORTS**

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The professional sports performance associated with a significant load on the athlete's body encourages scientists, doctors and coaches to search for physiological reserves of the body and the optimal training regimes. From this point of view, the study of changes that occur into individual organs, systems and in the body as a whole, under the influence of physical activity of varying intensity and nature is relevant and of great practical importance.

The current study was conducted on an athletes, parameters, objective data. The study results have shown the following information: the level of results in modern sports is so great that to achieve them, athletes need to have the appropriate morphological and functional data, as well as excellent physical and mental abilities. The main problem in training athletes is adequate selection and sports affiliation. The solution of the problems of selection involves the creation of a model of an athlete for the particular kind of sport and a certain set of characteristics that determine athletic performance.

This requires anthropometric assessment, morphometric and biometric data to track physical and physiological parameters, information to assess performance and recovery in sports, modification of training regimes to prevent injuries, provide guidance on regulating the use of technologies that used in professional sports, as well as to research and make recommendations for the proper collection, storage and exchange of the health information.

However, now prognostic value and dominance of indicators of total and partial body size and morphometric and somatotypical characteristics in predicting the prospects for achieving high results in professional sports have not been established yet.

**Kashperuk-Karpiuk I.S.**  
**FETUSES ANATOMY OF THE BUCCAL REGION**  
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Buccal region is a complex of structures of soft tissues, anatomic components of which are in a close mutual position, while its shape is maintained of the external muscular-aponeurotic system. It consists of muscles, fascias and maintaining junctions, which come from deep and fixed structures to the moved skin. There are numerous anatomic structures located on relatively small area, including terminal segment (portion) of parotid duct, buccal fat pad, blood vessels, lymphatics and nerves. The lack of knowledge about the structural peculiarities of buccal region ensure new researches, which in turn allows to improve the methods of diagnostics and surgical correction of congenital and acquired diseases of human face.

We have developed the scheme of topographical and anatomical coordinates of the boundaries of lateral and buccal areas of the face and imaginary line of the parotid duct. Parotid duct projection on the skin of buccal region passes from the auricle's tragus to the angle of the mouth. The direction of the parotid duct is arched, with the convexity up, due to well developed buccal fat pad. The additional parotid duct is detected in 22% of cases. A variety of anatomical variants of syntopic interactions between the buccal fat pad and parotid duct or its shape variants have been researched. Duct either pierces the corpus buccal fat pad or passes it superiorly.

There were 74 specimens of the buccal region of human fetuses aged from 4 to 9 months of the intrauterine development measuring 90,0-410,0 mm of parietal-coccygeal length (PCL) (35-men's and 39 - women's) studied using complex of morphological methods which included morphometry, anthropometry, identification of body type, preparation, 3D-reconstruction and statistic analysis. The scheme was developed for topographical and anatomical coordinates of boundaries of lateral and buccal regions of the face and imaginary projectional line of the parotid duct. The relationship between parotid duct and buccal muscle has been researched on macro- and microscopic levels. The study suggests that the structural peculiarities of the syntopy provide sphincteric function, which prevents regurgitation of saliva.

So, a variety of anatomical variants of syntopic interactions between the buccal fat pad and parotid duct and its shape variants have been researched. Duct either pierces the corpus buccal fat pad or passes it superiorly. The structures of buccal region are singled out by the considerable anatomical variability. The further aim of this study is to find out spatiotemporal dynamics of their syntopy and special features of their spatial structure.

**Kavun M.P.**  
**MORPHOGENESIS OF LIVER VESSELS IN HUMAN PREFETUS**  
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The study of the development and formation of the liver vessels in human prefetus is necessary both for establishing the general patterns of histogenesis of the liver and for the investigation of the content of the formation processes that lead to the congenital defects of the organ.

The purpose of the investigation was to establish the general patterns of development of liver vessels in the prefetal period of human ontogenesis and to determine the composition of the processes leading to the occurrence of congenital liver malformations. At the beginning of the prenatal period (prenatal 14.0 - 20.0 mm CRL) the liver significantly increases in size, its transverse size is already 5.0 mm.

Entering the organ, the portal vein of the liver is divided into two main branches: the right and left partial veins. The left branch of the portal vein of the liver approaches the left lobe of the organ and connects with the umbilical vein. The right branch of the portal vein of the liver in turn is divided into right paramedian and right literal vein. The left branch of the portal vein is a short

vessel, also called the connecting branch, because it is the site of anastomosis between the portal vein of the liver and the umbilical vein.

In fetus 18.0 mm CRL (mid-seventh week) along the branches of the portal vein of the liver, liver cells form thin bile ducts, and the latter are separated from the mesenchyme surrounding the portal vein of the liver, a well-defined slit, the width of which in preterm of this age group is 20  $\mu\text{m}$ .

In 13 series of histological sections of the fetus ranging in size from 21.0 mm to 30.0 mm CRL, it was found that the liver continues to increase in size, its transverse size in this group of amniotic fluid is 6.0 mm.

In the middle of the pre-fetal period (the ninth week of fetal development), the morphogenesis and topography of the structures we conduct our research on were studied in six series of preterm infants from 31.0 to 41.0 mm TCD.

The liver in the fetus of this group continues to increase, occupies the upper and middle floors of the abdominal cavity, the transverse size of the organ is 35.0 mm, length - 7.0 mm.

In the middle of the pre-fetal period the width of the portal hepatic vein in the liver gate is greater than the width of the umbilical vein. Thus, in fetus 35.0 mm CRL width of the portal hepatic vein is 300  $\mu\text{m}$ , width of the umbilical vein - 250  $\mu\text{m}$ .

At the end of the third month of pre-fetal development (fetus 50.0 to 75.0 mm CRL) near the lower surface of the liver, the transverse size of the portal vein is 2.5 - 3.0 mm, umbilical vein - 2.0 - 5.0 mm. In the area of the gate of the organ, the portal vein of the liver with a short venous trunk (connecting branch) connects with the umbilical vein and then continues to the right lobe of the liver.

It should be noted that the diameter of the partial branches of the portal vein of the liver in this period slightly exceeds the diameter of the main trunk of the vessel and reaches 3.5 to 4.5 mm.

**Kryvetskyi I.V.**

## **ANATOMY OF THE SPINAL COLUMN IN THE FETUSES**

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The urgency of the work is explained by the necessity of a complex study of the development peculiarities, topography formation of structures of the thoracic spine of the spinal column and dynamics of their syntopic correlation in the prenatal period of ontogenesis and in the newborns, that is of great significance for elucidation of the morphological preconditions and time of the possible origin of the congenital spinal defects with the object of the development of new, more rational methods of surgical interventions in this area, elaboration of new stabilization technologies and spinal column correction at disabling deformities of the spine in children and adolescents.

The aim is to ascertain chronological sequence of the development and formation of the topography structures of the thoracic part of the spinal column in the early period of human ontogenesis. The topographic and anatomical features of the relationships between the structures of the thoracic part of the spinal column from the moment of their laying to birth, dynamics of their formation and growth taking into account morphogenesis of the adjacent structures are established. With the help of the adequate morphological methods, investigation of morphogenesis and dynamics of spatial-time relationships of the thoracic spine of the spinal column of a person, their connections during the fetal period of the development and in the newborns from the point of view of the topographic-anatomical approach to embryogenesis problems was carried out. The features of the blood supply and venous outflow of the spine are ascertained. Critical periods, morphological preconditions and time of the possible origin of some innate defects of the spinal column were established. On the basis of the obtained results, the problem of prenatal diagnostics of the innate malformations of the thoracic part of the spinal column was solved.

The thoracic vertebrae laying occurs in the germs of 7.0-9.0 mm CRL by forming the condensation of sclerotome cells round the chord and the nervous tube, from which mesenchymal

thoracic vertebrae are formed. The vertebral bodies are formed from the cranial and caudal parts of two adjacent sclerotome masses. Intersegmental arteries remain on the level of the vertebral bodies, and the spinal nerves lie between thoracic vertebrae. In the germs of 10.0-12.5 mm CRL the arches of the vertebrae move away from the bodies perpendicularly in the dorsal direction.

Thus, the formation of articular and transverse processes begin. At this early stage of the development there are no joints in the spinal column of the germs, the spinal canal forming begins. Bodies are clearly defined from the thoracic vertebrae, and in the lumbar and sacral vertebrae only arches are clearly visible and closely spaced bodies. The vertebral bodies at this stage are well differentiated. All of them have the same, primitive, quadrilateral body shape and are separated from each other by a layer of mesenchyma. The layers correspond to the future intervertebral discs.

**Kyshkan P.Ya.**

**IDENTIFICATION OF PIERCING-CUTTING OBJECTS OF INJURY WITH SPECIFIC PARAMETERS BY MEANS OF 3D RECONSTRUCTION OF THE WOUND CHANNEL**

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The majority of lethal outcomes due to piercing-cutting injuries are associated with murders. A forensic expert always faces the problem of identification of a piercing-cutting object provoking injury. Examination of a wound channel is of considerable forensic value for identification of the shape of a blade and its specific peculiarities. From the practical point of view in order to identify the mechanism of injury and the object provoking trauma in addition to traditional methods introduction of up-to-date methods of three-dimensional spatial modeling into forensic medicine today has become more relevant and essential. These methods enable to quickly and accurately digitalize all the injuries available on a crime scene and considerably assist in making more objective expert's report. Digital technology provides storage of electron 3D models for unlimited time and in case of necessity repeated or additional investigations can be carried out. Moreover, these models can be used for presentations of digital documentary data base or demonstration of high-accuracy volumetric models of anatomical structures printed on 3D printers during sittings of the court and jury trial which pass a sentence.

In our previous researches the method of 3D-reconstruction of the wound channel formed by a piercing-cutting object with acute injury of the soft tissues and parenchymal organs was developed (Kyshkan et al., 2020). According to this method 3D modeling of the experimental wound channel was performed (Kyshkan et al., 2021). On the assumption of it, the issue concerning possible use of a three-dimensional spatial reconstruction of the wound channel caused by a piercing-cutting object with specific parameters to identify the instrument causing injury becomes reasonable.

To find possibilities to identify a piercing-cutting traumatic object with specific parameters by means of the use of up-to-date computer programs and methods of three-dimensional spatial reconstruction of bodily injuries in the space of graphics editor «3ds Max» on the basis of photogrammetric method.

The experimental and practical parts of our research were carried out with the use of our patented methods. Fifteen experimental wound channels were made by means of alginate impression mass with rubber-like effect «Hydrogum 5» (firm «Zhermack», Italy), which most accurately retains and reconstructs the properties of an experimental blade with a thickened tenon edge immersed into it. To make experimental injury a piercing-cutting object with specific parameters was used – a knife with one-sided sharpening of the blade and thickened tenon edge, its blade was 9.53 cm long, 2.7 cm wide in the point of its biggest thickening, and the tenon edge 0,42 cm thick. Every fragment of the wound channel was contrasted with a dye using 1% brilliant green alcohol solution. All the fragments of the wound channel were opened parallel to its length and were placed on a rotary table located in a light cube to provide adequate illumination and photos were taken. The digital camera SONY RX 10 II was used for shooting. The object of shooting was

labeled with a number, a fragment of a plotting scale 1,0 cm long was placed on it to calibrate the scale and control the sizes of the object examined in computer programs.

The photos obtained in JPEG format were loaded into the computer program «Agisoft Photoscan», and 3D textured models of a wound channel fragment were created in it. The model obtained and the texture was exported in «OBJ» format. To calibrate the scale of 3D models obtained they were placed into the graphic space of «3ds max» program, which helps to reconstruct the wound channel in the graphics editor by means of 3D models of the wound channel fragments.

At first linear dimensions of injuries were measured by means of a classical method with a ruler. At different levels of immersion of a piercing-cutting object the width of the wound channel and the distance between the angles from the side of the tenon edge were accurately registered which illustrate how thick the blade is and how long separate fragments are, which in their turn reproduce the width of the blade of a sharp traumatic object. It should be noted that during examination and measuring 3D models of injuries by means of the graphics editor «3ds max» linear sizes of certain morphological parts of the wound channel were obtained with a higher accuracy to 0.001 cm, which was much higher in comparison with the classical method.

Examination of the range of depth of the wound channel obtained by means of «3ds max» program, which appeared to be  $9.533 \pm 0.001$  cm, found the range of absolute relative deviation in this case to be 0.03. To identify a sharp traumatic tool an important diagnostic element characterizing the widest part of the blade of a piercing-cutting object and indicating the depth of immersion of the blade into the body is the inlet length of a stab injury. The inlet length in the experiment was  $2.706 \pm 0.0003$  cm, and the range of its absolute relative deviation was 0.23%. The parameter of the inlet width illustrates the measurement of the blade thickness in its middle part in the experiment was  $0.223 \pm 0.001$  cm. The range of its absolute relative deviation was 1.48%. The distance between the angles from the tenon side is of important identifying value to identify a traumatic sharp instrument and its thickened tenon edge. In our case illustrated the mentioned dimension is  $0.422 \pm 0.0003$  cm with the range of absolute relative deviation of 0.52%.

The use of the three dimensional methods to identify a traumatic piercing-cutting object with specific parameters by means of 3D spatial reconstruction of the wound channel fragments provides high accuracy in solving applied tasks in modern forensic practice and criminal law science.

**Lavriv L.P.**

## **THE ANATOMICAL FEATURES OF THE PAROTID GLAND STRUCTURE**

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Formation of the organs is a very complicated process which is not definitively studied nowadays. It is very important to study the structure of the organs and systems in association with the basic processes of morphogenesis on the basis of the findings of embryogenesis. The study of the development and forming of the topography of the parotid gland during the prenatal period human ontogenesis is of great importance for integral understanding of the structural – functional organization of the salivary apparatus and the oral cavity on the whole. The analysis of scientific literature dealing with the parotid gland anatomy is indicative of a fragmentariness and discrepancy of the data, pertaining to the syntopy and chronology of the topographic-anatomical changes during the fetal period of human ontogenesis.

The objective of the study was to investigate variant anatomy and topographic-anatomical peculiarities of the human parotid gland and surrounding structures in fetuses.

The parotid gland was examined on 25 human fetuses, 130,0-375,0 mm of the parietal-coccygeal length (PCL). The following methods were applied in the course of the study: thing section of the parotid gland and parotid-masticatory area under the control of a binocular magnifying glass; macro- and microscopy; morphometry; computed 3-D design.

The parotid gland is found to be located in fetuses with 130,0-375,0 mm of PCL in a deep depression posteriorly the branch of the lower jaw, in the posterior mandibular fossa. A greater part

of the gland is located between the mandible and sternocleidomastoid muscle penetrating deeply between these structures. The skin of this particular region is thin, movable. The subcutaneous pot is thin and fused with the skin. The structure of the parotid gland of 4-10 month human fetuses is anatomically changeable which is manifested by different shape (oval, leaf-shaped, horseshoe-like, triangle, irregular tetragonal), location and syntopy. Computed 3-D design of the gland presents its volumetric description which is the most practical one – in the shape of trilateral pyramid turned to the malar arch by its base, and to the mandibular angle – by its apex. A number of structures pass through the tissue of the parotid gland including facial nerve, posterior mandibular vein, external carotid artery, auricular-temporal nerve. The parotid duct is formed due to the fusion of two extra-organ lobular branches which in their turn are formed by means of fusion of several upper and lower lobular ducts emerging from the gland tissue passing through its capsule. The direction of the parotid gland is arch-like, with upward convexity. Passing along the external surface of the mastication muscle the parotid duct touches the upper extremity of the adipose body of the cheek and penetrates through the buccal muscle into the oral vestibule where it opens in the shape of a papilla of the parotid duct. The length of the parotid duct in the fetuses of the third trimester is 8,0-26,0 mm, diameter of the lumen is within 0,8-2,5 mm. The parotid duct is projected on the skin of the face from both sides along the line from antilobium to the mouth angle. The wall of the parotid duct consists of the connective tissue rich in elastic fibers and epithelium lying the lumen of the duct. The epithelium consists of two layers – deep cubic and superficial cylindrical.

Therefore, morphogenesis and topographic formation of the human parotid gland in fetuses are influenced by a total effect of spatial-temporal factors associated with the dynamics and close syntopic correlation of organs, vascular-nervous formations and fascial-cellular structures of the parotid area. At the end of the 10<sup>th</sup> month of the prenatal development the parotid gland under the microscope demonstrates its practically definite shape, although histological processes of differentiation in it are not completed yet. A study of the specific characteristics and consistent patterns of the morphogenesis and dynamics of the spatiotemporal changes of the salivary glands will make it possible to reveal new findings, pertaining to the emergence of variants of their structure, the preconditions of the onset of the congenital malformations and acquired diseases.

**Lazaruk O.V.**

## **THE RISK OF BREAST CANCER METASTASIS IN WOMEN DEPENDING ON AGE**

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The risk of developing breast cancer (BC) in women over 65 years of age is 150 times higher than in those under 30 years of age. The mortality rate in the older age group is almost three times higher than the mortality rate in the younger age group. The incidence of breast cancer among women aged 40-50 years in Ukraine is about 60 per 100 thousand of the population, and at the age of 50-60 almost 120 per 100 thousand. This means that women at this age are the most vulnerable and need to be screened. It is necessary to popularize and encourage modern methods of diagnosing oncopathology. It is necessary to develop a conscious desire for self-control in susceptible age groups, as in our country the number of older people in relation to the young is growing. In its turn, there is a tendency to "rejuvenate all malignant tumors." Age periods are used to predict the course of the disease.

Materials and methods: 503 cases of BC were studied. The peculiarities of metastasis in different age groups were studied. The age of the youngest patient with was 32 years, the oldest - 87 years. The mean age of women in the entire sample (n = 503) was 57.25 years ( $\pm$  3.34). The average age of women with ductal breast cancer with metastases is lower by 6.34 years and is (50.09 years). Whereas women in the group without metastases - 59.63 years. When analyzing age values between 10 years, the situation regarding the disease is different. The number of observations in percentage, in the group with metastases in the range of 30-39 years. - 8.35% of observations, and in the group without metastases - 4.62%, in the age range of 40-49 years, in the group with metastases - 19.49%, without metastases - 9.13%. At the age of 50-59 in the group with metastases - 26.87%, without

metastases - 26.55%. In the age range of 60-69 years in the group with metastases - 31.89% without metastases - 36.60%, and in the period of 70-79 years in the group with metastases - 13.4% and in the group without metastases - 20%. The result is that in the group with metastases up to 60 years, the percentage of women is almost twice the percentage of the group without metastases. After 60 years, the group without metastases takes the lead.

The risk of breast cancer metastasis depend on age, at a younger age there are more aggressive morphological forms of carcinoma, which may be explained by the earlier age of patients. Therefore, metastatic cancer is more common at a young age and attention to detection and timely treatment should be strengthened. However, at the age range of 50-59 years, the number of cases with and without metastases in both groups is similar.

**Leka M.Yu.**

## **FETAL TOPOGRAPHY OF ANTEROLATERAL ABDOMINAL WALL NERVES' MUSCLES**

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The polemic of incising the anterior abdominal wall in order to access the abdominal organs remains relevant until now. It should be noted that laparotomy and lumbotomy often damage the intercostal nerves and their branches, as well as the iliac branches, iliac nerves, which are involved in the abdominal wall innervation of the muscles and skin.

The aim of the investigation was to determine the sources of innervation of the muscles of the anterolateral abdominal walls in human fetuses 7-10 months. The study was performed on 24 preparations of human fetuses 7-10 months 231.0-375.0 mm parietal-coccygeal length without external signs of anatomical abnormalities or the skeleton irregularities of the chest, organs and thoracoabdominal structures cavities using macromicroscopic preparation, superficial staining of dissected nerves, as well as morphometry. The right and left intercostal nerves were studied along their entire length from the site of origin to the end branches in the muscles of the anterior-lateral parts of the torso. As a result, it was found that in the thickness of the muscles in abdominal anterolateral wall from the trunks of the intercostal nerves, iliopsoas and inguinal nerves depart at obtuse and acute angles of descending and ascending branches. The latter, in turn, are divided into branches of the 3rd and 4th orders, branching in the thickness of the abdominal muscles. In the studied fetuses, single and numerous connecting branches were observed mainly in the lower parts of the muscles of the anterior abdominal wall between the branches of one nerve trunk and between different nerves. This reveals the main and placer forms of branching of the main nerve trunks with irregular distribution of branches in the abdominal muscles. One should mention, that the concentration of nerves and their branches gradually increases in the caudal direction from the upper abdomen to the lower, as well as from the lateral side to the midline of the abdomen. When making incisions one should take into account the course and distribution of nerves and their branches in the upper anterior abdominal wall, where the connecting branches between the intercostal nerves, iliac and inguinal nerves are much smaller compared to the lower parts, where the neural network is developed better and more connecting branches, therefore, it is possible to make incisions that provide greater access to the organs of the abdominal cavity.

A variability of intercostal nerves topography, of iliopsoas and inguinal nerves and their number in the thickness of the muscles of the anterior and lateral walls of the abdomen was established. In particular, in some cases, in the innervation of anterolateral muscles of the abdomen walls involved VI (V) – XII intercostal nerves and iliopsoas nerve, and in other observations – VII-XII intercostal nerves, iliopsoas and iliac-inguinal nerve.

In the external and internal abdominal oblique muscles and the rectus abdominis, the nerves usually enter from the posterior surface, and the transverse abdominal muscle from the outer surface. Furthermore, in the external and internal abdominal oblique muscles, the nerves enter mainly at an obtuse angle to their longitudinal axis and at an acute angle relative to the muscle bundles. The nerves usually enter the transverse abdominal muscle and the rectus abdominis muscle

at right angles to their longitudinal axis. The direction of the nerves when entering the transverse abdominal muscle coincides with the course of the muscle bundles, and the nerves enter the rectus abdominis at right angles to them.

Data on the fetal topography of the intercostal nerves, iliac-peritoneal and iliac-inguinal nerves in anterolateral abdominal walls will help clinicians to decide on the shape and direction of incisions in different parts of the abdominal wall.

**Marchuk F.D.**

**THE PECULIARITIES OF MORPHOGENESIS OF THE MAXILLARY SINUSES  
DURING THE SECOND CHILDHOOD**

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According to modern views, the nasal cavity and paranasal sinuses are a single physiological system in which each anatomical formation carries a certain functional load. All paranasal sinuses are paired formations, they are connected to the nasal cavity by outlets. The largest sinus is the maxilla, it is located in the body of the maxilla. Numerous anomalies that occur in clinical practice can mostly be explained only by elucidating the origin and interaction of organs and structures, which over time acquire their characteristic shape, studying their unusual topography and deep understanding of the corresponding embryonic facts.

The study of peculiarities of development and formation of the walls of the maxillary sinuses during the second childhood of human ontogenesis was conducted on 28 preparations of the maxilla, skulls and autopsies of the head of corpses of people of the second childhood using histological research, dissection, CT-research, radiography and morphometry.

Based on research of biological preparations of the maxillofacial area of the second childhood (8-12 years), a change in the configuration of the maxillary sinuses and the final formation of its walls was established. The maxillary sinuses on all drugs are defined laterally near the base of the inferior nasal cavity. The inferior wall of the sinuses was wider. The medial wall corresponded to the middle nasal passage and is represented, as in previous stages of development, by duplication of the mucous membrane. The walls of the maxillary sinuses are covered with a mucous membrane. The mucous membrane is lined with a multi-row cylindrical ciliated epithelium, which is located on the basement membrane. The thickness of the mucous membrane reaches 1.0-1.65 mm. There are complex tubular-alveolar glands. The glands of the subepithelial layer of the mucous membrane of the maxillary sinuses are located in separate rows. The highest concentration of glands was found on the medial wall of the sinuses, which bordered on the glands of the mucous membrane of the middle nasal passage.

During the period of the second childhood there is an eruption of permanent teeth and, as is known, this period coincides with the period of puberty, so the changes in the sinuses are of particular interest both in terms of functional anatomy and the final formation of the skeleton. This age is characterized, although slower than the previous one, by a uniform growth of all the walls and volume of the sinuses. Its growth in height is especially noticeable. With the eruption of permanent teeth, which fall down, the sinus seems to be freed from the teeth, and every year its pneumatized part becomes larger.

So, based on the conducted research, it is possible to draw a conclusion that in the second childhood the configuration of the maxillary sinus's changes and the final formation of their walls occurs, there are changes mainly quantitative in nature (increasing the size of the maxillary sinuses), and this process continues in later age periods of ontogenesis.



**Oliinyk I.Yu.**

**MORPHOLOGICAL PECULIARITIES OF THE BONE TISSUE OF THE HUMAN  
LOWER JAW IN CASE OF ITS DISUSE ATROPHY**

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Current real-time science and technology techniques based on ENDORET PRGF technologies and the implementation of their results in practical medicine, provide ample opportunities for the use of cell autotransplantation for guided tissue regeneration, including in the treatment of "disuse atrophy" of the human lower jaw bone tissue with early tooth loss.

The purpose of this work is to ensure the principles of biological feasibility and physiological capacity, technical rationality. The pathology in the distal segment of a lower limb, which is a vertical atrophy of bone tissue was confirmed by the methods of computer tomography, Vatech PaX-I 3D Green systems of extra-oral radiography with a scan size range of 16x9 cm, a focal spot of 0.5 mm (IEC60336) with a gray scale of 14 bits with a size of 0.2/0.3 voxel. Using ENDORET PRGF technology, according to the approved BTI protocol, autocellular grafts that have provided a positive result that meets the basic principles of the goal in restoring the mechanisms of physiological processes of normal quantitative and qualitative morphology of bone tissue, with its biological characteristics were obtained.

The results of the study showed that bone tissue on a scale of shades of gray based on the classification of Hounsfield, is not characterized by a single biotype and in the area of missing 3.6 tooth belongs to the second biotype, and in the area of missing 3.7 tooth - to the first biotype by its density. The indicators of densitometric determination confirmed excessive mineralization of the trabecular layer, ie vertical atrophy of bone tissue, which is in the sagittal section in the projection of the missing 36 teeth - with a maximum number of 881 gray standard units (GSU),  $M=315$  GSU (where, M is the average value of absolute number); sagittal section in the projection of the missing 37 teeth - with a maximum number of 1726 GSU,  $M=1173$  GSU. This clinical experience with the use of autocellular grafts in the treatment of "disuse atrophy" of the bone tissue of the jaws, which is essentially scientifically-research in nature, based on modern, at the same time available technologies of cell engineering and technical progress, provides a predictable result of clinical observation and deserves further research and practical testing.

**Proniaiev D.V.**

**FETAL UTERUS ANATOMY**

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The thesis deals with determination of chronologic succession regularities in perinatal morphogenesis and formation of topographic-anatomical interrelations of the uterus. Peculiarities of a typical and variant anatomy of the uterus are studied on 160 specimens of fetuses applying a complex of morphological methods of examination: macroscopic, common and thin section, microscopic, vessel injections, making topographic-anatomical sections, radiological, computed tomography, three-dimensional computed reconstruction, morphometric and statistical. Reliability of difference between independent quantitative values was determined by means of Mann-Whitney U-criterion. Spearman statistical test was applied to analyze correlations of the results obtained. By means of the applied methods of examination combined, the individual and age anatomical variability and spatial-temporal perinatal transformations of the uterus with the following determination of critical periods were determined for the first time. It is of great importance for finding morphological preconditions promoting occurrence of congenital developmental defects.

Perinatal changes of the uterine shape are observed, a certain shape of the uterine fundus at every stage of the perinatal development is determined. The relief of the uterine fundus is confirmed to differ by its greatest variability. It can be vallecuate, tuberculous, flat and convex. Physiological disappearance of the channel on the uterus is followed. It is confirmed by the determined reliable reverse correlations of average force between the width of the uterine fundus which parameters

range from  $6,0 \pm 0,21$  mm to  $6,4 \pm 1,60$  mm, and parietal-calcaneal length (PCL) of the fetus. On the basis of regularities found in the morphogenesis of the internal female reproductive organs their critical periods and morphological preconditions of occurring variant and congenital developmental defects were determined. Critical periods coincide with the period of an intensive enlargement of morphometric parameters of the uterus – 4-5 month.

**Reshetilova N.B.**

## **MORPHOLOGY OF THE THIRD VENTRICLE IN THE 16-20<sup>TH</sup> WEEKS OF PRENATAL PERIOD OF HUMAN ONTOGENESIS**

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The aim of our study is to objectively evaluate the structural transformations of the final brain and its cavities. It is undeniable that pathological changes in the ventricular system of the brain occur in the prenatal period quite often, which determines the relevance and necessity of our study. At the same time, morphological and morphometric parameters of the cavities of the brain are one of the criteria for assessing the ontogenesis of the brain and can serve as a basis for prenatal diagnosis of congenital developmental disorders. The main task of our study was to examine the peculiarity of the formation of the third ventricle in different ontogenetic periods.

To obtain qualitative and quantitative criteria, the present study was carried out on 15 preparations of human embryos and fetuses using morphological methods, such as the study and description of histological and topographic anatomical sections, macroscopy and microscopy, dissection and morphometry. To process the data obtained, the method of variation statistics was used.

Most of the structures of the third ventricle are present at the 13th week of fetal development. The form of cavity is diamond. Its length is  $6,2 \pm 0,58$  mm, width -  $2,45 \pm 0,25$  mm. The roof consists of the medullar and mesenchymal layers. Depth of the epithelial plate is  $8,0 \pm 1,68$  mm. Mesenchymal layer of roof is thinner. It is rich in blood vessels, most of which are located mainly along the lateral margins. Epithelial plate forms a series of wrinkles, which are elongated in the sagittal direction. Medial wrinkles are significantly lower than the lateral. Their structure is more complex due to its branching into smaller, secondary wrinkles.

At the beginning of the 14th week the length of the ventricle is  $6,7 \pm 0,93$  mm, width -  $3,3 \pm 0,69$  mm. At this stage the external surface of the roof is flat, and the internal one has a complex relief because it has a lot of wrinkles. The tops of wrinkles are covered with hills, which are the most pronounced in the posterior part of the roof. A few wrinkles have a common base and their loose end is thickened.

After 15 weeks the length of the third ventricle reaches  $7,1 \pm 1,27$  mm, width -  $3,6 \pm 0,51$  mm. The length of the roof plate reaches  $18,0 \pm 2,52$  mm, width of anterior part -  $3,7 \pm 0,59$  mm and the posterior one -  $1,5 \pm 0,22$  mm. The total thickness of the roof is  $0,06 \pm 0,06$  mm. Lines in the anterior roof cover the entire inner surface of epithelial plate, the thickness of which reaches  $14,0 \pm 2,1$  mm. At this stage of the size of the hypothalamus increases. The zone of matrix almost disappears. It turns into a narrow strip, which is located along the wall of the third ventricle. Migratory layer loses its isolation and spreads laterally. Hypothalamic nuclei are isolated and lose touch with each other and the matrix.

In fetuses after 16 weeks of embryonic development the length of the third ventricle reaches  $7,5 \pm 1,42$  mm, width -  $3,8 \pm 0,68$  mm. The roof of the diencephalon is sharply bent outward. Wrinkles cover the entire inner surface of the roof.

Thus, during the fourth month of embryonic development the configuration of the third ventricle of the brain remains diamond-shaped. Its length increases from 6.2 mm to 7.5 mm, and width - from 2.45 mm to 3.8 mm. Also, the size of the roof plate of diencephalon changes. During these four weeks the length of the roof of the third ventricle increases further. The structure of the vascular plexus becomes much more complicated. Therefore, starting from the fourth month the third ventricle gradually takes the shape inherent in a newborn ventricle.

**Rusnak V.F.**  
**TOPOGRAPHY OF PHARYNX IN THE FETUSES IN THE 11-12<sup>TH</sup> WEEKS OF HUMAN  
ONTOGENESIS**

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At the second half of the eleventh week of prenatal ontogenesis in prenatal 64-66 mm PCL lumens of the pharyngeal tab in different parts are not the same, decreasing in the craniocaudal region from  $2.62 \pm 0.12$  mm to  $0.56 \pm 0.06$  mm. The thickness of the walls of the pharyngeal tab also varies – the dorsal and lateral walls of the pharyngeal tab reach 141-152  $\mu\text{m}$ , and the thickness of the ventral wall – 171-181  $\mu\text{m}$ .

In the caudal part of the pharyngeal tab, namely, in the area of the transition of the pharynx into the esophagus, there are four to five folds of the mucous membrane, which are localized on the ventral and dorsal walls, 19-20  $\mu\text{m}$  high. In areas of localization of the folds of the mucous membrane there is a more pronounced than in other parts of the submucosal layer thickening of mesenchymal cells, the nuclei of which are clearly arranged according to the height of the folds.

The epithelium lining the pharyngeal tab is still not the same as the predominance of the three-layered cylindrical, with its inherent cell structure and the location of their nuclei. In the extreme caudal part of the pharynx, in some places there is also a bilayer cylindrical epithelium, the thickness of which is 19-21 microns. The nuclei of its cells, 3.7-4.4  $\mu\text{m}$  in size, occupy the basal position in the outer layer, and mainly the apical position in the inner layer. In the area of the root of the tongue, the epithelium is multilayered cylindrical.

A distinctive feature of the end of the eleventh week of embryogenesis is a change in the structure of the epithelial lining of the pharynx. In the cranial part of the dorsal wall and in the area of the pharyngeal arch, the three-layered cylindrical epithelium changes into a multinucleated ciliated epithelium. The nuclei of the ciliated epithelial cells occupy a predominantly apical position.

Changes also occur in the muscular membrane of the caudal part of the pharyngeal tab, muscle fibers appear in the form of a symplastic formation, which consists of an inseparable protoplasm with numerous nuclei. At one time with the formation of muscle fibers, namely, with the formation of myoblasts-symplasts, they are quite active in the differentiation of myofibrils, which are sequentially connected, gradually turning into long homogeneous myofibrils.

At the twelfth week of prenatal ontogenesis, i. e. at the end of the prenatal period in preterm 68.0-80.0 mm PCL significant structural changes are not observed, but there is an increase in previous sizes.

As a result of intensive growth, the craniocaudal size of the pharyngeal tab in the prenatal 72.0-78.0 mm PCL reaches  $4.46 \pm 0.04$  mm, in the oral part –  $1.82 \pm 0.26$  mm. At the level of the epiglottis, the width of the lumen of the pharynx is 242-251  $\mu\text{m}$ , and in the laryngeal part of the latter narrows markedly and, at the point of direct transition to the esophagus, is 56-61  $\mu\text{m}$ .

In the middle of the twelfth week of embryonic development, the process of formation of choanae continues in parallel, through which the connection of the secondary oral cavity with the pharynx takes place. In preterm infants 74.0-80.0 mm PCL choanae have an oval shape. Their vertical size is  $0.88 \pm 0.24$  mm, and the transverse size is  $1.04 \pm 0.26$  mm. The wall thickness of the pharyngeal tab is also not the same everywhere - in the cranial section of the dorsal wall it is larger (121-161  $\mu\text{m}$ ) than in its cranial section (92-121  $\mu\text{m}$ ). The pharyngeal tab consists of mucous, muscular, and connective tissue membranes. In the area of the transition of the pharynx into the esophagus, there are three or four folds of the mucous membrane, located on the ventral and dorsal walls. The height of the folds is almost the same and ranges from 22.3 to 23.4  $\mu\text{m}$ . In areas of localization of folds, as before, there is a more pronounced thickening of mesenchymal cells than in other parts of the submucosal layer. The muscular membrane of the pharyngeal tab is represented by two layers of transversely striated fibers.

**Sarkisova Yu.V.**

**ANALYSIS OF THE DYNAMICS OF CHANGES IN THE STRUCTURE OF THE VITREOUS BODY MATRIX IN THE POSTMORTEM PERIOD ACCORDING TO SPECTRAL-SELECTIVE AUTOFLUOROCRESCENT MICROSCOPY**

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The methods of estimating the time since death (TSD) used in practical forensic medicine, range from traditional morphological methods, such as assessment of early and late postmortem changes, to methods based on biochemical and molecular changes in the human body. However, each of the modern methods mostly has several external or internal modifying factors or limitations, especially with increasing duration of the postmortem period, which allows to establish the TSD with insufficient accuracy for investigating authorities.

Objective of the study is to develop a set of new, objective forensic criteria for an accurate establishment of TSD by spectral-selective laser-induced autofluorescence microscopy of the human vitreous body (VB) matrix. VB was taken from the anterior chamber of the eye from 60 corpses with previously known TSD from 1 to 48 hours, with the following intervals: 1, 4, 8, 12, 18, 24, 36 and 48 hours. The cause of death was cardiovascular pathology. Exclusion criteria: craniocerebral and eyeball injuries, the presence of any laboratory confirmed exogenous intoxications. A blue LSR405ML-LSR-PS-II semiconductor laser with a wavelength  $\lambda = 0.405 \mu\text{m}$  and a power of  $W=50\text{mBm}$  at the location of the laser spectral-selective microscope was used to excite autofluorescence. Subsequently, bandpass filters were used.

Experimental measurements of the coordinate distributions of the laser-induced autofluorescence of the VB matrix found dynamic time-dependent changes in the magnitude of statistical moments of the 1st – 4th orders (the value of  $SM_1$  varies from 0.91 to 0.42,  $SM_2$  – from 0.39 to 0.08,  $SM_3$  – from 0.12 to 0.99,  $SM_4$  – from 0.18 to 1.19) in the linear range up to 36 h after death. The detected changes in the values with increasing TSD can be associated with destructive necrotic changes in the composition of the human VB matrix, the fluorescent manifestations of which are accompanied by a decrease in the intensity of radiation in the thick green region of the corresponding spectral range of electromagnetic wavelengths.

Analysis of the obtained data on the time dependences of necrotic changes in the set of statistical moments of the 1st – 4th orders, which characterize the distributions of the fluorescence intensity maps of the human VB matrix, found a high level of accuracy in TSD determining within 20 - 22 minutes at intervals of up to 36 hours after death.

The effectiveness of the method of spectral-selective laser-induced autofluorescence microscopy of the human VB matrix in the determination of TSD is demonstrated. The range of sensitivity of the method is determined up to 36 hours with the accuracy of setting the TSD within 20-22 minutes.

**Stelmakh G.Ya.**

**ANATOMICAL VARIABILITY OF THE VISCERAL BRANCHES OF THE THORACIC AORTA IN THE FETAL PERIOD**

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Due to the progress of perinatal diagnostic methods and the development of surgical interventions in the organs and walls of the thoracic cavity, a multidimensional study of the variations of the branches of the aortic arch during the embryonic period is of great practical value.

The aim of the study was to establish the anatomical variability of the visceral branches of the thoracic aorta in the fetal period of human ontogenesis. An anatomical study was performed on 38 human fetuses of 81.0-375.0 mm parietal-coccygeal length (PCL) using macro microscopic dissection, application contrast of dissected vessels and nerves, and morphometry.

As a result of the investigation, it was found that the bronchial branches depart from the anterior wall of the thoracic aorta at the third and fifth levels of the thoracic vertebrae. From 2 to 4

bronchial branches go to the left main bronchus, while there is, as a rule, one branch from the third right back intercostal artery to the right main bronchus. In the vast majority of the investigated fetuses, 2 left bronchial branches were found, which most often depart from the thoracic aorta at the fourth and fifth levels of the thoracic vertebrae and run along the left main bronchus, branching together with the bronchi, providing arterial blood supply to trachea, bronchi, lung tissue and pleura. Correspondingly, single small branches depart from bronchial branches to the esophageal core, the mediastinal part of the parietal pleura, tracheobronchial and bronchopulmonary lymph nodes. During macro microscopic preparation of the thoracic aorta in fetuses of different ages, anatomical variants of bronchial branches were revealed. In particular, in the fetus 210.0 mm PCL right and left bronchial branches departed from the thoracic aorta independently at the level the fourth thoracic vertebra. In another fetus 240.0 mm PCL left upper and right bronchial branches began from the thoracic aorta with a common trunk at the fourth level of the thoracic vertebra. Similarly, in this fetus at the fifth level of the thoracic vertebra the left lower bronchial branch departed from the thoracic aorta to the left main bronchus.

A little below (at the fourth and eighth levels of the thoracic vertebrae) the place of the ultimate end of the bronchial branches, from the anterior wall of the thoracic aorta originate esophageal branches, numbering from 1 to 5, which go to the walls of the esophagus at different levels. In 21 cases of the 35 fetuses, the blood supply to the thoracic esophagus is carried out by one esophageal branch, which departs from the thoracic aorta in the period from V to X thoracic vertebrae, usually at the seventh or eighth levels of the thoracic vertebra. In 8 studied fetuses 2 esophageal branches branched from the thoracic aorta, in 5 observations – 3 esophageal branches, in the fetus 180.0 mm PCL – 4 esophageal branches and in the fetus 95.0 mm PCL – 5 esophageal branches.

In the esophageal wall, the esophageal branches emerge into ascending and descending branches, and form an arterial network. At the same time small branches go to a core and the mediastinal fiber. During the preparation, anastomoses of the esophageal branches were found, namely: in the upper part of the organ – with the esophageal branches of the inferior thyroid artery from the thyroid-cervical trunk of the subclavian artery, and in the lower part of the esophagus – with the branches of the left gastric artery from the abdominal trunk.

At the level of the posterior inferior mediastinum from the anterior wall of the thoracic aorta depart numerous core branches, and from the anterior and lateral walls of the aorta – the mediastinal branches.

**Zabrodska O.S.**

### **ANATOMICAL ASPECTS OF THE UMBILIC VEIN STUDY**

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The relevance of the study of the umbilical vein lies in the fact that this structure is used in surgical practice in children and adults. UV allows, bypassing physiological filters, to bring the necessary medicinal substances in high concentration to the pathological focus with their long-term deposition in damaged organs and tissues.

When performing scientific work, it is planned to investigate 50 objects of fetuses and 100 objects of a human after birth. Macro- and micropreparation, histological, morphometry, radiography, vascular injection, photographic documentation, statistical, corrosion methods.

The umbilical vein, as an integral part of the umbilical cord vessel, delivers arterial blood enriched with oxygen and nutrients from the mother's placenta to the fetus. After the baby is born, the function of the umbilical vein (and the umbilical cord) ceases. According to most authors, the umbilical vein is obliterated, further called the round ligament of the liver. But the research of Dovineer, Ostroverkhov, Nikolsky proved that after birth, only functional closure of the umbilical vein occurs, so it can be recanalized. This fact is especially important for clinical medicine, since it creates favorable conditions for extraperitoneal intubation of the portal system through the umbilical vein. The umbilical vein originates in the placenta and joins it with the left branch portal

hepatic vein, carrying arterial blood. The right umbilical vein carries reverse development in the first half of embryonic life. Remains left umbilical vein, at the entrance to the liver is divided into two branches: one flows into the left the trunk of the portal hepatic vein, providing the liver with arterial blood. The second branch (main) with the help of the venous duct is directed to the lower vein cava, where it flows. The umbilical vein after birth forms the round ligament of the liver, which located along the free edge of the falciform ligament, ductus venosus turns into a venous ligament. Comprehensive study of the typical and variant anatomy of the umbilical vein and its combinations in the pre- and postnatal period of ontogenesis. Determination of the features of the organometric parameters of the umbilical vein and its combinations in the age aspect. The results of the research performed will have theoretical significance, since they will significantly supplement information about the topographic and anatomical features of the umbilical vein and its branches, and can be used in the educational and scientific process of morphological and surgical departments.

Thus, in the fetus, venous blood flow in the liver is unique, because it is provided by two embryonically and functionally different systems: umbilical and portal / yolk systems. 5 to 10 weeks of pregnancy in the liver, a network of anastomoses forms between the umbilical and the vitelline system, and the volume of placental blood flow also increases, then it enters the heart through this hepatic system.

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**Andrushchak L.A.**  
**PECULIARITIES OF RUDIMENT SOURCES AND MORPHOGENESIS OF THE  
 PYELOCALICEAL SYSTEM OF THE KIDNEY**

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A clear understanding of the main stages of embryogenesis and temporal dynamics of structural transformations of the urinary system in the prenatal period of human ontogenesis allow general practitioners to clearly understand the features of malignant etiopathogenesis neoplasms of its organs and structures, to differentiate the remnants of embryonic tissues operating material from tumors, to rationally apply the method of immunohistochemistry in the diagnosis of cancer.

In order to determine the characteristics of basic sources and chronological sequence of topographic and anatomical transformations of organs and structures of the urinary system, 14 series of consecutive histological sections of human embryos and preterm infants aged 3 to 8 weeks of development (3.0-30.0 mm parietal-coccygeal length (PCL)) were studied using a complex of

methods of morphological research (anthropometry, morphometry, microscopy, three-dimensional computer reconstruction and statistical analysis).

The first signs of the basics of derivatives of a diverticulum of a mesonephric channel are defined in human embryos of the 6th week of intrauterine development (IUD) (10.0-11.0 mm PCL). It is represented by an ampoule blind expansion of the diverticulum – the basis of the renal pelvis. Starting with embryos 12.0 mm PCL, there is a protrusion of the wall of the blind end of the diverticulum in cranial and caudal directions, i.e. there are the basics of large cups. In embryos 12.0-13.0 mm TCD, these basics are represented by short tubes with extended ends. The base of small calices is formed by the protruding wall of large calices, and appears in embryos of 14.0-15.0 mm PCL (beginning of the 7th week of IUD). They have the shape of elongated tubes, the lumen diameter of which differs at different levels. Individual bases of small calices, elongated, reach the surface of the body, and their course determines significant expansion of the lumen. In the same period, further branching of derivatives of the diverticulum of the mesonephric duct occurs, i.e. the papillary ducts are formed and developed tubules. Each basis, reaching the layer of metanephrogenic cells, divides usually on three tubes of the next generation. Due to the fact that these three tubes of new generations deviate from the previous one almost at right angles and in their length are located along the surface of the rudiment of the organ, going in different directions, two of them can be found on histological sections simultaneously. Application of three-dimensional reconstruction by series of successive histological sections, made sure that each of the derivatives of mesonephric duct, growing into the thickness of metanephrogenic cells, during its division usually gives rise to three bases of the next generation. Around the extended blind at the end of each base condensation of metanephrogenic cells is formed, which in embryos 16.0 mm PCL is divided by a constriction in the form of a furrow into two consolidations. Fewer of them are located closer to the surface of the organ, and more – to its central part. Kidneys in the process of fetal development move from the place of their primary localization in the pelvis, where the source of their blood supply is a common iliac artery, cranial to the rudiments adrenal glands, giving their own vessels to the aorta, which become the renal arteries.

The source of the base of the genitourinary system is the intermediate mesoderm paired urogenital crest. As a result of its differentiation, three departments are formed: pronephros, mesonephros (mesonephric tubules and mesonephric ducts) and metanephros. Metanephral blastema of the intermediate mesoderm surrounds the ureter and gives rise to the epithelium of the renal tubules. 2. The ureter is differentiated into a developed region urinary system (in particular, in the ureter and pelvic system of the kidney). The base of renal pelvis was first observed at the beginning of the 6th week of IUD (embryos 10.0-11.0 mm PCL), large calices – at the end of the 6th week of IUD (embryos 12.0-13.0 mm PCL), small calices – at the beginning of the 7th week of IUD (embryos 14.0-15.0 mm PCL).

**Chernikova G. M.**

## **DEVELOPMENT OF THE LUNGS IN THE EMBRYONIC PERIOD OF HUMAN ONTOGENESIS**

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The lungs acquire their usual shape, structure, and adequate function in 6-7 years of a child's life. But any violation of the development of the bronchi and bronchioles in intrauterine development, during childbirth, or during early childhood significantly restricts lung function in an older child or adult. Developmental disorders can be caused by genetic factors, exogenous, viral infections of the lower respiratory tract, as well as lung development abnormalities. Therefore, a more detailed study of the anatomy, topography and histological structure of the organ at the stages of prenatal development, and especially in the early period of human ontogenesis, is relevant.

When studying histological sections of human embryos of 6.0-7.0 mm parietal-coccygeal length (TCL) in the mesenchymal mass, which is located on the surface of the anterior intestine, there are two outgrowths of the endoderm – these are the rudiments of the main bronchi. The

outgrowth on the left side is smaller than the outgrowth on the right. The left-sided outgrowth goes laterally in comparison with the right-sided outgrowth, which has a course parallel to the esophagus. In the fifth week, there is a branching of the right main bronchus. So for the first time, there is a formation called the bronchus of the first order.

On the outgrowths of the bronchi of the first order (in embryos of 7.0-9.0 mm TCL), protrusions appear. The latter begins to branch intensively, lengthen and become second-order bronchi. In the future, the second-order bronchi branch out again and give rise to smaller bronchi. The lumen of the bronchial tubes of the first and second orders has a slit-like or round-oval shape. The wall of the bronchial tubes is lined with small cubic cells that are located on the basement membrane. The bronchial rudiments are surrounded by the pulmonary parenchyma, in which blood vessels are diagnosed. The mesenchyme is a source of formation of both the pulmonary parenchyma and the wall of bronchial vessels. The first blood vessels appear in embryos aged 4.5-5.0 weeks of intrauterine development. Bronchial blood vessels repeat the pattern of the bronchial tree. The wall of these vessels contains a single layer of elongated endothelial cells. Inside the bronchi, as well as in the mesenchymal network surrounding them, there are blood cells. The mesenchymal mass, into which bronchial tubes grow during lung development, thickens around them, differentiates over time, and gives rise to components of connective and muscle tissues.

Thus, in the embryonic period of human development, important processes occur that determine in the future the formation of the main bronchi and bronchi of I and II orders, the appearance of rudiments of blood vessels in the lung parenchyma, and also during this period, the initial stage of differentiation of the mesenchyme around the bronchi begins.

**Khodorovska A.A.**

## **DEVELOPMENTAL PECULIARITIES OF LUNGS IN HUMANS**

*Department of Histology, Cytology and Embryology*

*Bukovinian State Medical University*

Studying the organogenesis of the upper respiratory tract and lungs will contribute to the development of new methods for prevention, diagnosis and treatment of congenital and acquired pathology in pulmonology and thoracic surgery.

The study was performed on human embryos of parietal-coccygeal length (PCL) of 42.0 mm, the longitudinal size of the right lung is 4.18 mm, the left - 4.40 mm, in an embryo 45.0 mm in length - 4.40 and 4.74 mm, respectively, and in 43.0 mm - 4.76 and 5.20 mm. The transverse size of the right lung, as in the earlier stages of development, is larger than the left and the embryo 42.0 mm in length is 2.86 mm (right lung) and 2.42 mm (left lung), in an embryo with a PCL size of 45.0 mm - 3.30 and 2.96 mm, respectively, in a 48.0 mm embryo - 3.52 and 3.19 mm.

There is a further branching of the bronchial tree and, starting with the embryos of 45.0 mm in length, in contrast to earlier stages of development, the branching of the bronchi occupies almost the same area of the lung bookmark as its mesenchymal part. In addition, due to the differentiation of the mesenchyme, interlobular connective tissue septa begin to form.

The length of the right main bronchus in the embryo with a PCL of 42.0 mm is 1.32 mm, in the embryo 45.0 mm - 1.54 mm, in the 48.0 mm - 1.84 mm, the left - respectively 1.76, 1, 98 and 2.42 mm. The diameter of the right main bronchus increases from 594 microns (embryo 42.0 mm long) to 924 microns (embryo 43.0 mm long), the left - from 528 to 660 microns, their wall thickness - from 132 to 176 microns. The diameter of the lobular bronchi ranges from 264 to 330 microns (embryo 42.0 mm long) and from 308 to 374 (embryo 48.0 mm long). The largest diameter has the lower lobe bronchus of the right lung, the smallest - the middle lobe bronchus of the same lung.

The structure of the bronchial tree is similar to the same embryo 37.0 mm long, but the cartilage anlage, in addition to the main bronchi, is also in the wall of the lobular bronchi. In addition, the folds of the bronchial mucosa become more numerous, and their height increases, reaching 198-220 microns in the main bronchi, 88-110 microns - in the lobes, and 44-66 microns - in the segmental (embryo with PCL size 45.0 mm).

The mucous membrane of the main bronchi contains a relatively large number of smooth muscle cells. The height of the epithelial layer is 32-36 microns, the nuclei of its cells occupy mainly the apical position, and the protoplasmic part of the cells adjoins the basement membrane. As in the earlier stages of development, the bronchial tree is lined with high multilayered epithelium all the way. In the system of a pulmonary artery, its lobular, segmental and subsegmental branches are accurately recognized.

As a result, most of during this period, there is a further complication of branching of a bronchial tree owing to what epithelial tubules occupy a little bigger area of a anlage of the body than its mesenchymal part. The interlobular septa are much better expressed and are represented by a delicate fibrous connective tissue.

**Komar T.V.**

## **TOPOGRAPHIC AND ANATOMICAL FEATURES OF THE PERONEAL ARTERY IN 4-MONTH-OLD HUMAN FETUSES**

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The study of the variant anatomy of the vessels of the lower extremities from the practical and theoretical point of view remains relevant and promising because the number of surgical procedures using methods of revascularization of soft tissue defects of the lower leg has recently increased. Significant importance is attached to the development of new types of transplants in the area of the branch of the peroneal artery.

The study aimed to determine the topographic and anatomical features of the peroneal artery in human fetuses at 4 months. The study was performed on 14 preparations of human fetuses 4 months 81.0-135.0 mm parietal-coccygeal length without external signs of anatomical malformation or abnormalities in the development of the lower extremities by macromicroscopic preparation and morphometry.

As a result of the study, we consider it appropriate to divide the trunk of the peroneal artery into three segments, as each of them has certain topographic and anatomical features. The first segment of the peroneal artery (proximal part) – is from the beginning to the passage of the trunk of the peroneal artery in the ankle-popliteal canal. The second segment (middle part) corresponds to the topography of the peroneal artery in the inferior muscular-peroneal canal. Moreover, the length of the second segment of the peroneal artery is directly proportional to the length of this canal. The third segment of the peroneal artery (distal part) is the segment of its trunk from the point of exit from the inferior muscular-peroneal canal to its branch to the terminal branches. Note that the length of the third segment of the peroneal artery in the studied fetuses varies, which is due to the level of branching of the peroneal artery to the terminal branches.

Variants of the topography of the proximal segment of the peroneal artery, one of the most common, are usually associated with the sources of its origin. It has been established that the peroneal artery can originate from three sources. The initial division of the posterior tibial artery, the posterior tibioperoneal trunk, or be a direct extension of the popliteal artery. In most of the studied fetuses, the peroneal artery departed from the posterior tibial artery, but there is no reason to consider it exclusively a branch of it.

Topographic and anatomical features of the second segment of the peroneal artery are determined by the number of branches that originate here and the possible variants of their anastomoses. Variants of the topography of the third segment of the peroneal artery are associated not only with the level of branching of its terminal branches but also with anastomoses between the distal parts of the posterior tibial artery and peroneal artery. Rare variants of doubling of the peroneal artery were found in fetuses of 95.0 and 110.0 mm of parietal-coccygeal length, and in both cases, the peroneal artery originated from the tibioperoneal trunk.

Data on the topographic and anatomical features of each segment of the peroneal artery will help clinicians to improve modern approaches to endovascular interventions.

**Malyk Yu.Yu.**

## **MORPHOLOGICAL STRUCTURE OF THE LEFT VENTRICLE PAPILLARY MUSCLES OF THE HUMAN'S HEART**

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Prevalence of cardiovascular disease and mortality from them in Ukraine occupy the first place in recent years. Therefore, the increased interest in the researches of structural and functional features of the internal relief of the ventricles and valvular apparatus of the human heart remains relevant due to the rising necessity for in-depth study of the etiology and pathogenesis of cardiovascular diseases. The valvular apparatus of the heart is a complex configuration formed by the valve leaflets, chordae tendineae and papillary muscles. The normal functioning of the valvular apparatus of the heart depends primarily on the relationship of its structural components, deviations in the structure of which leads to uncoordinated operation of the entire valvular complex and disruption of hemodynamic of the heart. And to identify structural changes that occur in pathology of the heart requires data on its morphological structure in the norm.

The aim of the study was to investigate the macro-, micro- and submicroscopic structure of the papillary muscles of the left ventricle of the human heart. The material for the study were papillary muscles found in the cavities of the left ventricles of 20 human's hearts. Macroscopic, light and electron microscopy methods were used.

Macroscopically on the anterior and posterior wall of the left ventricle, there was mainly one papillary muscle. Two papillary muscles were found in 68% of cases, three papillary muscles in 21% of cases, four in 7% of cases, and five in 4% of cases. But it is more correct to speak not about the number of papillary muscles but about the number of functional units, each of which consisted of several papillary muscles. It should be noted that often visualized not single papillary muscles, but their complexes. In 92%, two groups consisted of two to five papillary muscles and connected to each other. In 25%, the papillary muscles fused at the base. Sometimes the papillary muscles are connected by muscular septa. The shape of the papillary muscles was cylindrical, conical, or irregular. Papillary muscles with several heads were also observed. Electron microscopy method showed that the papillary muscles were externally lined with a single layer of endothelial cells that lay on a continuous basal membrane. In the center of the endotheliocyte was an elongated oval nucleus filled with an electron-transparent nucleoplasm with euchromatin located in the center and heterochromatin, which occupied a peripheral position in the nucleus. In the cytoplasm of the endothelial cell were localized a few general organelles, a large number of pinocytic vesicles. The luminal surface of the endothelial cell contained submicroscopic projections in the form of individual microvilli. The peripheral collagen-elastic layer was localized under the endothelium. This layer is formed by loose fibrous connective tissue with elastic fibers located in it, which quantitatively prevailed over collagen fibers and fibroblastic cells. Collagen fibers formed thin bundles. Between the collagen and elastic fibers identified fibrocytes, which had a strongly elongated irregular shape, an elongated nucleus along the cell in which heterochromatin predominated, a reduced volume of cytoplasm with less development of organelles. The basis of the papillary muscles was constituted by contractile cardiomyocytes, which had an elongated cylindrical shape, they were interconnected each other by intercalated discs and formed functional fibers that anastomosed and formed a three-dimensional network. Besides, among contractile cardiomyocytes identified the elements of the conduction system of the heart - the Purkinje cells. Between the bundles of cardiomyocytes were localized thin layers of loose fibrous connective tissue with blood vessels.

Thus, an in-depth study of the morphology of myoendocardial formations such as papillary muscles of the ventricles of the human heart will improve methods of diagnosis and treatment of malformations and heart disease because this is what clinical medicine needs today.

**Oshurko A.P.**

**INFLUENCE OF QUANTITATIVE MORPHOLOGY ON TOPOGRAPHIC FEATURES  
OF THE LEFT MANDIBULAR CANAL IN CASE OF BONE ATROPHY**

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In clinical practice, when analyzing CT studies, the attention of dental surgeons is attracted by topographic and anatomical changes in the mandibular canal depending on bilateral loss of molars (large molars), which cause bone atrophy, even in individuals without obvious effects of somatic pathology or environmental conditions. A detailed description of absolute morphometric values was carried out, based on the average number of "clinical samples" in four people, the topography of the left mandibular canal to the body surfaces and the alveolar part, provided that it is preserved in the projection of the missing 3.6, 3.7 teeth. 3D reconstruction models with the marking of the mandibular canal are presented, which improves the visual perception of its topographic features. In general, for research, the method of "clinical sampling" involved sixty-eight CT scans of the human mandible, which provide the best opportunities for diagnosis and carry proper information content in the task of this work with the division into four age groups, namely: the first group - up to 45 years old, the second group - 46-60 years old, the third group - 61-75 years old and the monitoring group - 25-75 years old, persons with natural dentition. The collection of research materials was conducted after paraclinical examination of digital records of 243 CT cone-digital scans, which were obtained by the Vatech PaX-I 3D Green extra-oral radiography system with a scan size range of 16x9 cm, which minimize the possibility of artifacts caused by patient movement, a focal spot of 0.5 mm (EC60336) on a 14-bit gray scale with a size of 0.2/0.3 voxels and due to the short scanning time, high-quality images were obtained. The analysis was performed using Hewlett-SNCPUM1 computer equipment with 16.0 GB of RAM, 10 Pro Software for Workstations, 2019:00391-70000-00000-AA425. Absolute values of the location of the left mandibular canal in patients of the first study group (control) with a preserved dentition (48 years) in the projection: 1) 3.6 tooth in relation to: the upper edge (UE) of the alveolar part of the mandible is 13.3 mm; the edge of the base (EB) of the lower jaw is 6.6 mm; the buccal surface (BS) of the lower jaw body is 6.5 mm; the lingual surface (LS) of the lower jaw body is 1.9 mm; 2) 3.7 tooth in relation to: UE – 10.3 mm; EB – 7.0 mm; BS – 6.6 mm; LS – 2.3 mm. In the second study group, a 35-year-old patient with a terminal dentition defect, the topography of the left mandibular canal is characterized by morphometric values in the projection of the missing: 1) 3.6 tooth in relation to: UE – 9.8 mm, EB – 5.6 mm, BS – 2.7 mm, LS – 2.7 mm; 2) 3.7 tooth in relation to: UE – 7.6 mm, EB – 7.9 mm, BS - 4.0 mm, LS - 2.2 mm. A 52-year-old patient of the third study group with a terminal dentition defect, the topography of the left mandibular canal is characterized by morphometric values in the projection of the missing: 1) 3.6 tooth in relation to: UE – 10.8 mm, EB – 7.1 mm, BS – 3.9 mm, LS – 4.3 mm; 2) 3.7 tooth in relation to: UE – 11.5 mm, EB – 6.2 mm, BS- 4.7 mm, LS-4.4 mm. Topographic differences in the left mandibular canal are represented in a 64-year-old patient of the fourth study group with a terminal dentition defect, characterized by morphometric values in the projection of the missing: 1) 3.6 tooth in relation to: UE – 11.7 mm, EB – 5.8 mm, BS-5.7 mm, LS-2.1 mm; 2) 3.7 tooth in relation to: UE – 11.1 mm, EB – 6.5 mm, BS – 5.9 mm, LS – 2.4 mm. The topography of the mandibular canal and its neurovascular bundle is a sign for drawing up a treatment plan and choosing rehabilitation procedures in patients with tooth loss, following existing and approved protocols. We understand that even the analysis of the obtained absolute values does not reveal the corresponding patterns of topographic changes in the mandibular canal, depending on bone atrophy caused by the loss of the masticatory teeth, that is, molars, in different age categories. However, it encourages a deeper study of possible variations, with the expansion of the number of research objects and their statistical analysis, according to the classical parameters and characteristics of the variation series. The analysis of modern literature sources did not provide a proper understanding of the problems mentioned above, but it was an impetus for a thorough study of the topography of the human left mandibular canal with bone atrophy caused by terminal dentition defects.

**Popova I.S.**

**DEVELOPMENTAL FEATURES OF THE ANTERIOR NECK TRIANGLE IN HUMAN FETUSES DURING PRENATAL PERIOD OF HUMAN ONTOGENESIS**

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Anatomical spaces found in the anterior neck region are the clinical landmarks for the possible spreading of inflammatory (reactive adenopathy or the soft tissues inflammation), odontogenic, traumatic, congenital, or oncological pathologies. Taking into consideration the fact that congenital malformations of the neck originate from embryological tissue during the prenatal period of ontogenesis, knowledge on normal morphogenesis will allow us to understand possible ways of their formation and improve their effective detection and treatment.

That is why the aim of our research was to investigate and circumscribe morphometric and developmental features of the anterior triangle of the neck in human fetuses during the prenatal period of human ontogenesis.

Totally 12 specimens of human fetuses aged from 4<sup>th</sup> to 10<sup>th</sup> month (85,0-350,0 mm of parietal-coccygeal length (PCL)) of intrauterine development (IUD) have been investigated by means of morphological methods: macroscopy (under the control of binocular microscope), microscopy, morpho- and anthropometry, statistical analyses. The study was performed in accordance with the provisions of the declaration of Helsinki (1995) as revised in Edinburgh (2000), ICH GCP (1996), and had been approved by the Bukovinian State Medical University Ethics Committee.

We have observed that multilayered configuration of the neck can be seen in 90,0 mm PCL fetus, as deep cervical fascia has developed its subdivisions: superficial, visceral, and deep layers, accordingly. Fascial layers create fascial tissue spaces that can be distinguished at the early stages of the fetal period (85,0; 100,0 mm PCL fetuses and on) as they unfold some volume of the fatty tissue. Clinically, these spaces may be involved in spreading inflammatory pathologies of the neck by means of soft tissues. The area of the anterior neck triangle is a considerable index, as it generalizes the content volume of the strap-like infrahyoid muscles: omohyoid, sternohyoid, thyrohyoid, and sternothyroid as well as magistral blood vessels and some visceral organs. The area index (mm<sup>2</sup>) of the anterior neck triangle (index dependence depicted by formula  $(-713,8855+218,2721*x)$ ) in human fetuses of 4<sup>th</sup> – 10<sup>th</sup> month of IUD (90,0; 360,0 mm PCL) shows the increasing tendency throughout the fetal period of IUD with the highest rates at 8<sup>th</sup>–10<sup>th</sup> months period – 1200,0±20,0 mm<sup>2</sup>. We have also noted a direct relationship of the increasing fetal age to the area of the anterior triangle with moderate index deviations within each month of the examined specimens. A significant feature in anterior triangle development is its area index reaching peak points around 8,5-9<sup>th</sup> months of IUD (290,0; 300,0 mm PCL fetuses). In spite of the above-mentioned fact of the highest indicators during 8,5-9<sup>th</sup> months of IUD, the critical period of the anterior triangle of neck development should be considered 7<sup>th</sup> month of IUD. This can be explained by the highest intensity of bony structures development (morphometric indexes of mandible, clavicle, and sternum) as well as the critical period for muscular (infrahyoid group of neck muscles, sternocleidomastoid), vascular, nervus (ansa cervicalis) and fascial structures late intrauterine modification and histological maturation.

As a result, we may conclude that: 1. The early fetal period of human prenatal development is characterized by the multilayered configuration of fascial layers and spaces; 2. An increasing tendency of the anterior neck triangle area index is observed throughout the fetal period; 3. The 7<sup>th</sup> month of intrauterine human development can be considered the critical period for anterior neck region development.



**Proniaev V.V.**

**MORPHOGENETIC AND TOPOGRAPHIC PECULIARITIES OF THE MALE PERINEUM DURING THE PRENATAL PERIOD OF ONTOGENESIS**

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For the first time, modern methods of morphological research will elucidate the features of development and spatio-temporal dynamics of topographic and anatomical changes in the structures of the perineum during the prenatal period of human ontogenesis. The sources and sequence of occurrence of rudiments of structures and organs of the pelvic and urogenital areas of the perineum will be determined. The peculiarities of age and individual anatomical variability of the shape and structure of the perineal tissues of human fetuses depending on the coefficient of the constitutional type during the three critical periods of fetal development will be clarified.

According to the WHO, today congenital malformations (CHD) are a major factor in neonatal morbidity, disability, and mortality. There is also an increase in cases of cancer and injuries in the study area (industrial injuries, injuries). In-depth study of the sequence of rudiments of structures and organs of the pelvic and urogenital areas of the perineum during the critical period of fetal development allows us to track etiopathogenetic aspects in the development of congenital malformations of the perineum and contributes to the improvement and development of anatomically sound and optimal pathologies.

Our main purpose is to determine the morphological features of development and spatio-temporal dynamics of topographic and anatomical changes in the structures of the perineum during the prenatal period of human ontogenesis.

The tasks of the research are: to define sources of a anlage of structures and bodies of pelvic and urogenital sites of perineum; to determine the morphogenetic and anatomical variability of perineal tissues according to the critical periods of fetal development; to find out the features of different variants of the structure of the perineum according to age and constitutional features; to find out the projection-syntopic relations of vascular-nervous structures of the perineum; to track the dynamic and morphometric changes and correlations between the structures of the pelvic and urogenital areas of the perineum.

The expected results are: previously unknown data on morphological features of development and spatio-temporal dynamics of topographic and anatomical changes of perineal structures during the prenatal period of human ontogenesis will be determined. The obtained data will contribute to the tracking of etiopathogenetic aspects in the development of congenital malformations of the perineum and the improvement and development of anatomically sound and optimal methods of surgical correction of both congenital pathology and other pathological conditions.

**Semeniuk T.A.**

**ENDOTHELIUM OF THE HEART VENTRICLES IN HUMAN: ITS MORPHOLOGICAL CHARACTERISTICS AND METHODS OF ITS INVESTIGATION**

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Heart disease is a significant contributor to cardiovascular deficiencies and a strong predictor of mortality. Nowadays, much attention in the study of the pathogenesis of ischemic heart disease is paid to endothelial dysfunction. Endothelial cells play an essential role in the human heart because they are critical mediators of haemodynamic forces within the heart. Mechanical stimuli in front of the endothelium can initiate any endothelial dysfunction and cardiac disease progression. The results of morphological studies can significantly improve the quality and the outcome of therapeutic strategies and surgical treatments of the different cardiac pathologies.

The purpose of this investigation was to study and determine the morphological characteristics of the endothelium of the ventricles of the human heart in the norm.

The study was performed on 27 hearts of adults using light microscopy, electron microscopy, immunohistochemical method. Hearts of adults were obtained from autopsy cases. Biological materials were formalin-fixed, paraffin-embedded, and stained with hematoxylin and eosin, immunohistochemically for CD31, CD34 cytoplasmic markers.

Examination of the histological sections using light microscopy showed endothelium itself consists of a single layer of flattened-shaped cells which are simply attached or interlocked with each other or show “roof tile”-like overlaps. In some of the endothelial cells, the cell margins have a wavy outline where were found marginal outgrowths and folds. Marginal folds were predominantly found at the edges of cells. Electron microscopy showed that the endothelial cells are separated by the basement membrane from the underlying collagen and elastic fibers of a subendothelial layer. The basement membrane is bilaminar, and it is composed of lamina densa and lamina rara. The endothelial lining looks like a “cobblestone appearance” due to the nuclei protuberance into the chamber of the ventricles. An endothelial cell has a large pale-stained nucleus with a few marginally located heterochromatin. The nucleus usually contains one nucleolus. A nuclear envelope has numerous invaginations in it. The nucleus was localized in the center of the cell and occupied almost the entire volume of the cell. This region of a cell where the nucleus is found is named a nuclear zone. Cytoplasmic organelles such as mitochondria with a light matrix, rough endoplasmic reticulum with large-sized ribosomes, and a few complexes of dictyosomes were concentrated around the nucleus. The numerous vacuoles and vesicles were identified around of Golgi complex cisternae. These general organelles were mainly concentrated in the organelle zone of the cell. Pinocytotic vesicles and transendothelial channels were found in the peripheral zone of the cell. In some endothelial cells, the cell margins have a wavy outline where marginal outgrowths and folds were found. Marginal folds were predominantly found at the edges of cells. The endothelial cells showed finger-like projections – microvilli on their luminal surface, which project into the chambers of ventricles. We supposed that these special organelles increase the overall surface area for an increased exchange of substances between the blood of the heart chambers and endothelial cells. Probably some of these projections may be artifacts and derived from fibrin in the blood, but there is no doubt that most are true ultrastructural features of the surface of the endothelial cell. During the immunohistochemical method of the investigation we detected that the endocardial endothelium was strongly stained for CD31 but irregularly and less intensely for CD34.

Thus, the data of this investigation determined that the innermost layer of the endocardium is the endothelium. It consists of a single layer of epithelial cells that are flattened in shape. The endothelial cell contains one centrally placed nucleus with one nucleolus in it. Three functional zones are determined in every endothelial cell. These zones are the nuclear zone, organelle zone, and peripheral zone. The basement membrane supports endothelial cells and separates them from the underlying connective tissue elements. It is bilaminar. CD31 and CD34 markers are effective markers for the detection of endocardial endothelial cells.

**Stoliar D.B.**

## **MORPHOMETRIC CHARACTERISTICS OF THE TEMPOROMANDIBULAR JOINT IN HUMANS DURING THE 4TH MONTH OF INTRAUTERINE DEVELOPMENT**

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*Bukovinian State Medical University*

Despite certain progress and intensive development of dental technologies, there are several unsolved issues concerning the dentoalveolar system structures. One of its important structures is the temporomandibular joint (TMJ). Impaired development of the TMJ provokes changes of the facial contour and defects, degeneration or hypertrophy of the masticatory and mimic muscles, disorders of swallowing and chewing, and occlusion.

The aim was to determine anatomical peculiarities of the TMJ in the third trimester of intrauterine development. The study was conducted on 4 samples of fetuses 161,0-183,0 mm of the parietal-calcanal length through the methods of morphometry and craniometry, macro- and micropreparation, computed tomography, and statistical analysis.

In the 4-month-old fetuses, flat articular fossa observed, the articular tubercle is not determined. A synovial membrane is formed in the cavity of the joint. Cartilaginous tissue embraces the outer edge of the condyloid process in the form of a strip. The density of the cartilaginous substance increases in the direction towards the surface of the condyloid process, it is difficult to dissect, the cartilage gradually turns into perichondrium and has the appearance of a dense plate. The border between cartilage and osseous tissue is uneven. The lateral pterygoid muscle is attached to the condyloid process from the front. The articular disc is formed by coarse fibrous connective tissue. The tissue of the articular disc is pierced through by single blood vessels. In certain areas, their number increases, but closer to the attachment of the articular disc to the anterior part of the articular capsule, the number of vessels decreases. Circumference at the level of glabella, parietal tubers, and inion (external occipital protuberance) is  $132\pm 7.63$  mm, the distance between the parietal tubers equals  $36\pm 3$  mm. The distance between glabella and inion in the sagittal plane is  $43.3\pm 3$  mm, the distance between the most remote points of the zygomatic arch is  $31.6\pm 2.08$  mm. The distance between the nasion and the gnathion (the lowest point of the midline of the mandible) is  $21.6\pm 1.5$  mm. In 4-month-old fetuses, the distance between the right and left mandibular processes is  $28\pm 4.16$  mm, between the right and left gonions –  $23\pm 3$  mm. The length of the body of the mandible is  $15\pm 1.7$  mm, the height of the ramus of the mandible constitutes  $6\pm 0.9$  mm. The distance between the right and left mental tubercles is  $7\pm 0.8$  mm, between the mandibular process and mental tubercle (the distance of the body of the mandible) –  $20\pm 2$  mm. The distance between the gonion and the pogonion is  $19\pm 2$  mm, the transverse width of TMJ –  $1.62\pm 0.09$  mm.

The obtained and systematized results of the study can be used in the laboratories for screening morphological material to estimate the degree of maturing, for predicting a body's vital capacity as well as diagnosing abnormalities in normal development with suggestions as to their correction.

**Yaremchuk N.I.**

## **THE IMPORTANCE OF COMPUTED TOMOGRAPHY IN THE STUDY OF HUMAN LOWER JAW BONE TISSUE**

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Bukovinian State Medical University*

Digital methods for paraclinical, in particular, X-ray-anatomical CT scan, which is much broader than conventional clinical radiology, provide accessibility and the ability to obtain a quick result of the study of the dynamic system of bone tissue, which depends on the course of metabolic processes and the influence of factors of the internal and external environment, causing its pathophysiological and morphological changes, including the structural topographic features of the left and right mandibular canals, temporomandibular joints, coronary and articular processes of the lower jaw. The examination is carried out more thoroughly than when performing a series of images or the usual 3D software modeling in various projections or planes, using an even wider arsenal of devices. Computed Tomography makes it possible to establish the features of the topography of human lower jaw structures, obtain information about the structure of its external and internal cortical plates, and determine densitometric values that indicate qualitative characteristics that reflect the type of bone density, taking into account its age dynamics.

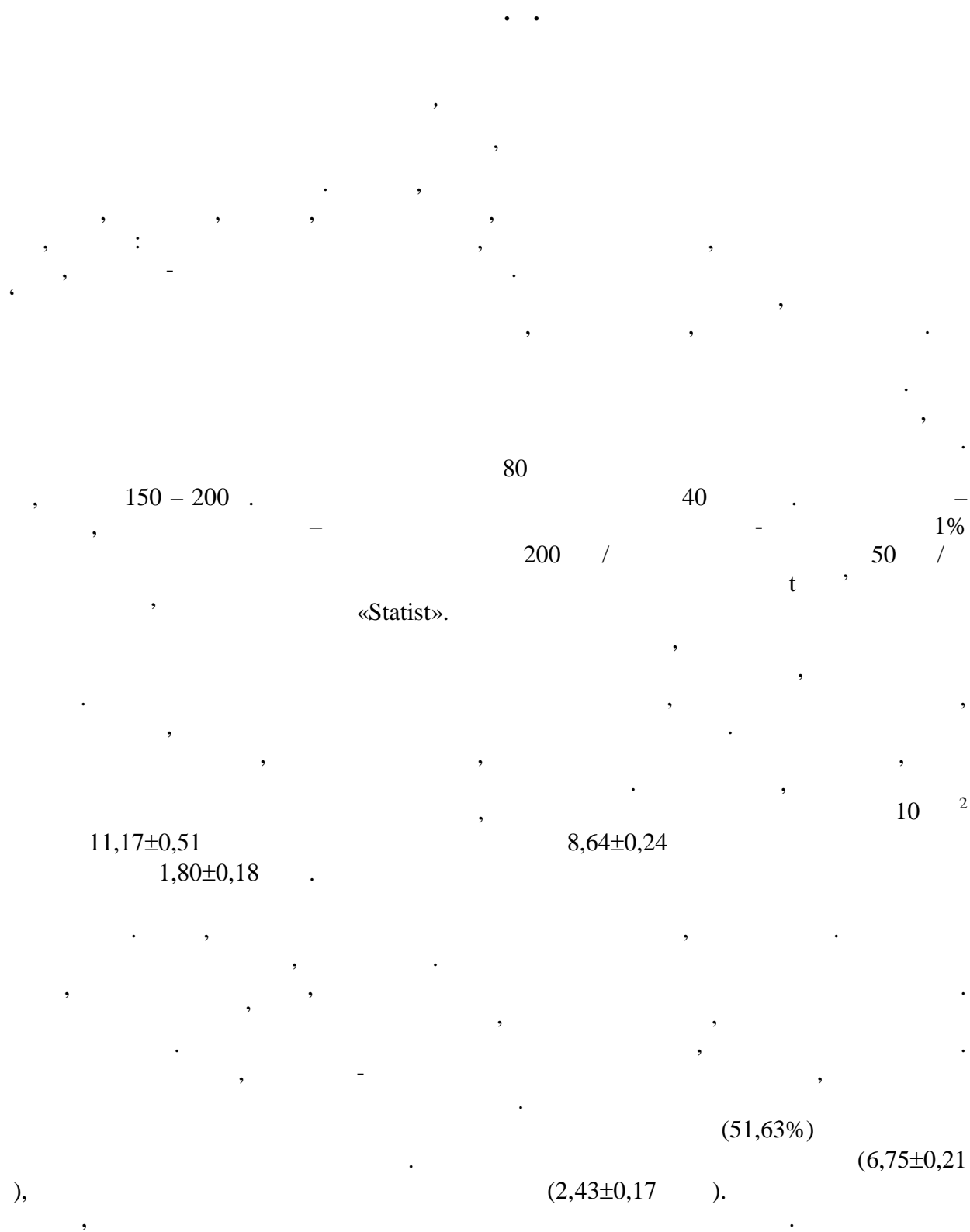
Widely used methods of flame atomic emission and atomic absorption analysis provide opportunities for modern researchers to study the features of the structure and quality of maxillofacial bones by considering the content of macro- and microelements. The results of such studies are often crucial for choosing effective methods of prevention and treatment and serve only as a small part in the implementation of the rehabilitation of dental patients.

To prove the prospects of using digital techniques for morphometric analysis of human lower jaw bone tissue in modern clinical and scientific studies.

Using the digital format in three planes: frontal, sagittal, and axillary, we got a proper visual understanding already during the analysis of CT images. Using the tools of the vertical and horizontal optional panels, we marked the morphological structures of existing inclusions,

determining their size, both in the body of bone tissue and outside it. At the same time, a 3D reconstruction model of X-ray, cartilage and bone mapping was recreated on the first day of clinical analysis. The high competitiveness of software added confidence and affirmation in their perfection, gave an impetus to fundamental and accurate implementations, and served as a support for conducting new scientific research.

Digital methods of morphometric analysis are a priority in terms of accessibility, economic validity and ergonomics of their use in clinical or scientific research.





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**Dudka Y.A.**  
**INFLUENCE OF THE PINEAL HORMONE**  
**ON THE FUNCTIONAL STATE OF THE KIDNEY**

*Ya.D. Kirshenblat Department of Physiology*  
*Bukovinian State Medical University*

A toxic effect of cisplatin, which is widely used in oncology, negatively affects the functions of various organs, including the kidneys. All this dictates the need to study nephroprotectors more and more. One of the leading substances is the hormone of the pineal gland - melatonin.

The aim of the study was to establish the nephroprotective potential of melatonin under conditions of the cisplatin model of acute kidney injury (AKI). The studies were carried out on 24 rats; total PL and PL fractions were determined by thin layer chromatography. Two hepatotrophic xenobiotics were used: carbon tetrachloride and the alkaloid heliotrin. Intoxication with carbon tetrachloride in rats was carried out by inhalation in the dose of 0.3–0.4 ml per 100 g of animal weight for 21 days; and heliotrin was injected subcutaneously, the control group consisted of rats receiving saline. As antioxidants, membrane stabilizers, the tested medicinal preparations (vitamin E, sodium selenite, liposome, LESE-complex of preparations containing liposomes, vitamin E and sodium selenite) were administered on 70–90 days from the beginning of the experiment.

The study of the content of total and individual PL during intoxication with carbon tetrachloride showed a decrease in the level of PC (phosphatidylcholine) by 1.6 times, PE (phosphatidylethanolamine) by 1.5 times, an increase in LPC (lysophatidylcholine) by 3 times, a decrease in total FL by 3 times. With the introduction of heliotrin, the same tendency towards a decrease in the amount of total and neutrophilic PL was observed. In rat liver on the 70th and 90th days of the study, the PL content increased under the influence of vitamin E by 38% and 41%; sodium selenite 10.5% and 21.8%; liposomes - 20% and 35.6%, and LESE - 45% and 49.2%, respectively, compared with the control group. The study of the content of neutrophilic fractions of PL 1.2–2.3 times increased.

The LESE complex showed a more pronounced effect on the content of total and neutrophilic PL in comparison with other drugs. The drugs used have a membrane stabilizing, antioxidant effect, and in combination, they enhance the effect of other components, which is a reflection of the restoration of the membrane structure.

### **Kyslytsia S.O.**

#### **CONSERVATIVE METHODS OF TREATMENT OF ACUTE RHINOSINUSITIS**

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Rhinosinusitis is inflammation of the mucous membrane of the nose and sinuses. The problem of other inflammatory diseases of the upper respiratory tract, acute rhinosinusitis, in particular, is quite relevant in clinical practice. In recent years, there has been an increase in the incidence of diseases of the nose and paranasal sinuses, which leads to an increase in the number of outpatient visits by family physicians and otorhinolaryngologists.

Objective of the study was to investigate the reasonability and effectiveness of the use of antibacterial agents in patients diagnosed with "moderate acute rhinosinusitis", as well as to confirm or deny the need for treatment based on evidence-based medicine. For the study, patients were selected who were diagnosed on the basis of complaints, medical history, physical examination and laboratory tests with moderate-severe acute rhinosinusitis, and duration of the disease 1 - 3 days. The age of patients was 18 - 40 years.

A total of 30 people took part in the study. To perform the planned study, patients were divided into 3 groups: 1. Patients who received phytopreparation as a part of treatment; 2. Patients who received inhaled glucocorticoid as a part of treatment; 3. Patients who took antibacterial drug as a part of treatment. In the first group of patients, improvement occurred from 4 to 5 days, and recovery from 7 to 8 days from the beginning of treatment. In the second group of patients, improvement occurred from 3 to 4 days, and recovery from 6 to 7 days from the beginning of treatment. In the third group of patients, improvement occurred from 5 to 6 days, and recovery from 8 to 9 days from the beginning of treatment.

Therefore, the results of our work showed the need for antibacterial drugs in acute rhinosinusitis of moderate severity is not appropriate, as indicated in the Order of the Ministry of Health of Ukraine from 11.02.2016 85. Uncontrolled use of antibiotics or in the absence of indications antibiotic resistance increases. Treatment should be carried out in accordance with the current orders of the Ministry of Health of Ukraine, as well as based on evidence-based medicine.

### **Povar . .**

#### **FEATURES OF THE REACTION OF SYSTEMIC INDICATORS OF PROOXIDATIVE-ANTIOXIDANT HOMEOSTASIS TO CEREBRAL ISCHEMIA-REPERFUSION IN RATS WITH DIABETES MELLITUS**

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Objective of the work was to study the indicators of prooxidant-antioxidant homeostasis in the blood plasma in rats with diabetes mellitus complicated by ischemia-reperfusion of the brain.

Diabetes mellitus was simulated by injection of Streptozotocin (Sigma, USA) in the dose of 60 mg per 1 kg of the body weight into the intra-abdominal cavity of albino male rats at the age of two months. Six-month-old animals without diabetes and with its presence underwent bilateral carotid ischemia-reperfusion by clipping the common carotid arteries for 20 minutes. Early effects of ischemia-reperfusion were studied one hour after the start of reperfusion, and delayed - on the 12th day. The content of malonic aldehyde, diene conjugates, products of oxidative modification of proteins of neutral and basic character, activity of superoxide dismutase, catalase, glutathione peroxidase were determined in blood plasma. Numerical data were processed by means of the package of the applied software programs "Statistica" ("Statsoft", USA).

The content of lipoperoxidation products and the activity of antioxidant enzymes are found

to increase in rats without diabetes after 20-minute carotid ischemia-one-hour reperfusion. In the presence of diabetes mellitus in this period the content of malonic aldehyde and the activity of all antioxidant enzymes in the dominant depression of the last ones decrease. On the 12th day of the postischemic period in rats without diabetes mellitus, the increase in malonic aldehyde content is to some extent compensated by increased superoxide dismutase activity, and in animals with diabetes mellitus the inactivity of lipoperoxidation occurs in the background of depression of all antioxidant enzymes.

In the absence of diabetes in the early period of observation, the content of products of oxidative modification of proteins increases; on the 12th day, these values return to control values. In rats with diabetes mellitus, the increase in the content of products of oxidative modification of neutral proteins in the early post-ischemic period to the 12th day of observation persists, and the content of products of oxidative modification of proteins of the main character in the late post-ischemic period decreases. Regardless of the direction of changes in the content of products of oxidative modification of proteins in cerebral ischemia-reperfusion, in animals with diabetes mellitus in both observation periods their content significantly exceeds the corresponding values in animals without diabetes mellitus, indicating a higher intensity of their oxidation.

Diabetes mellitus changes the response of prooxidative-antioxidant homeostasis to cerebral ischemia-reperfusion in both terms of ischemia-reperfusion.

**Semenenko S.B.**

## **PATHOPHYSIOLOGICAL MECHANISMS OF THE EPIPHYSIS EFFECT ON THE ION-REGULATORY FUNCTION OF THE KIDNEY UNDER CONSTANT DARKNESS**

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Doctors have been aware of the rhythmic organization of certain body functions for a long time. In healthy people, the rhythms of physiological processes are synchronized with each other and with the rhythms of the environment which provides optimal conditions for the functioning of the body and is a sign of health.

The aim of our research was to study the pathophysiological mechanisms of the pineal gland on the ion-regulating function of the kidneys under conditions of constant darkness. The experiments were performed on 72 sexually mature nonlinear male albino rats weighing 0.15-0.18 kg. The animals were kept in a vivarium at a constant temperature and humidity on a standard diet. The control group consisted of animals ( $n = 36$ ), which were kept under normal light conditions (12.00C:12.00T) for 7 days. The experimental group consisted of animals ( $n = 36$ ), which were in constant darkness (12.00T:12.00T) for 7 days. On the 8th day, the animals were subjected to a 5% water load warmed to room temperature with tap water and the parameters of ion-regulating function of the kidneys under conditions of forced diuresis were studied. The studies were performed at 4-hour intervals during the day. Concentration, excretion, absolute and relative reabsorption, proximal and distal transport of sodium ions, concentration index, sodium / potassium ratio and clearance of sodium ions were studied. Diagnosis of functional features was based on the analysis of changes in the characteristics of the mesor (average daily level), amplitude, acrophase and shape of the circadian rhythm curve. The obtained individual chronograms for each animal were grouped on the principle of identity of the maximum acrophase and calculated by the method of "Cosinor analysis" average for each group of chronograms mesor, amplitude and phase structure (time interval between acro- and bathyphase). All stages of the experiment were carried out in compliance with the basic requirements of the European Convention for the Treatment of Animals. The obtained experimental data were processed on personal computers by the EXCE-2003 software package (Microsoft Corp., USA). The values of the arithmetic mean ( $\bar{x}$ ), its variance and the error of the mean ( $S_x$ ) were calculated for all indicators. To identify the probability of differences in the results in the experimental and control groups of animals, the Student's ratio ( $t$ ) was determined, and then the probability of differences in the samples ( $p$ ) and the confidence interval of the mean

according to the Student's distribution tables were studied. Values for which  $p < 0.05$  were considered probable.

An average daily level of sodium ions in the urine increased reliably. High natrium uresis was recorded at all study intervals. The acrophase remained unchanged, but the rhythm amplitude increased by 35%. Changes in the ion-regulatory function of the kidneys were also characterized by a probably high clearance of sodium ions during the observation period. Mesor was 0,  $b \pm 0.15$  ml / 2 h and exceeded 500% of control animals. An average daily level of rhythm of proximal transport of sodium ions in all studied periods of the day was lower than in the control group of animals, which probably led to the elimination of excess of this cation from blood plasma. Distal transport also decreased at all times of the day. The amplitude of the rhythm increased by 33%, and the mesor decreased by 78% compared with the control data. The phase structure of the rhythm did not change. Summarizing the results of the study, it should be noted that in conditions of constant darkness of the pineal gland changes in the chronostructure of the ion-regulating function of the kidneys are compensatory in nature. In particular, the probable decrease in the average daily level of sodium ion reabsorption, the basal level of proximal and distal transport of sodium ions, which leads to high natriuresis during the entire observation period, attracts attention.

**Tymofiychuk I.R.**

**COGNITIVE DISABILITY IN ESTROGEN-ECTOMIZED AND OLD RATS WITH DEVELOPMENT OF DIABETES MELLITUS**

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Bukovinian State Medical University*

In recent years, there have been many works dealing with the study of the effects of sex hormones on cognitive function. Clinical studies have found that in menopausal women, the tendency to develop type 2 diabetes will increase, spatial and short-term working memory worsens, and there is a tendency to develop depression. The findings suggest that estrogens are involved in the mechanisms of insulin resistance in tissues, in the synthesis of mediators in the catecholaminergic systems of the brain, but many issues remain unresolved. The aim: to establish the effect of estrogens on the indices of spatial memory in ovariectomized and old rats in the background of development of experimental diabetes.

The study was conducted on 30 adult female rats 4-5 months and 20 months old. The study groups were ovariectomized and experimental type 2 diabetes mellitus with protamine sulfate was simulated. The study of spatial memory was carried out in an eight-sleeved radial labyrinth. Ovariectomy caused deterioration of spatial memory relative to the living control group, and diabetes mellitus aggravated pathological changes.

Our data allow us to draw conclusions about the influence of sex hormones on cognitive functions. Ovariectomy caused a deterioration of spatial memory, and the combination of ovariectomy and diabetes aggravated the pathological process. In older animals, the study found a decrease in spatial memory, and diabetes further aggravated the cognitive function. Changes that occur after ovariectomy indicate involvement of estrogen in the regulation of cognitive functions in the process and indicate the possibility of using estrogens in the treatment of neurodegenerative changes in premature and age-related menopause and in the background of concomitant pathological processes.

**Yasinska O.V.**

**FEATURES OF THE PROTEIN METABOLISM IN THE ADRENAL TISSUES OF IMMATURE RATS WITH HYPOBARIC HYPOXIA DEPENDING ON SEX AND THE FUNCTIONAL ACTIVITY OF THE PINEAL GLAND**

*Ya.D. Kirshenblat Department of Physiology  
Bukovinian State Medical University*

Hypoxia is one of the conditions of usual life style and, at the same time, a factor increasing reactive oxygen species (ROS) level. Structural-functional changes of the adrenal glands as







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**Bulyk R.Ye.**

**CHANGES OF MORPHOFUNCTIONAL STATE OF MEDIAL SMALL-CELL  
SUBNUCLEUS OF PARAVENTRICULAR HYPOTHALAMIC NUCLEUS ON THE  
BACKGROUND OF DIFFERENT ILLUMINATION PERIODS**

*Department of Medical Biology and Genetics  
Bukovinian State Medical University*

Nowadays the study of implication of neuroendocrine structures for central mechanisms of circadian rhythms is one of the most actual questions of modern chronophysiology. The changes of photoperiod, being a stress factor, desynchronize the rhythmicity of somatic and visceral function, coordination and modulation of body adaptation to various influences. Medial small-cell subnucleus of paraventricular hypothalamic nucleus (msPVN) is one of the structures, that are primary involved in neuroendocrine response in case of stress reactivity, regulating the activity of adenohypophysis by synthesis of corticotrophin-releasing hormone. The data, concerning morphofunctional characteristics of msPVN, exposed to photoperiod of different duration, hasn't been reported in literature.

The aim of the research was to reveal the influence of steady lighting on morphofunctional state of msPVN in different day intervals. Sexually mature rat males were divided for two groups: first group was subjected to standard lighting (light input from 8.00 to 20.00), second one – to 7-days lighting. Morphometry and densitometry of msPVN, quantitation of their RNA content were conducted by computerized image analyzer VIDAS-386 (Germany) within visible spectrum. Measured at 14.00 and 02.00, msPVN indices of rats, kept in hyperilluminized cages, weren't affected. The exception concerned RNA concentration in nucleolus, that was by 2,5% higher in the daytime and by 2,7% lower at night as compared with controls. The analysis of daily variations and rhythmicity of msPVN neurons functional activity in rats under photostimulation revealed them to be similar to those of intact animals. Steady lighting at 14.00 led to the increase of neuron area by 7,8% related to augmented area of nucleus and cytoplasm (by 7,4 and 16,2% respectively) in comparison with the group of previous time interval.

Though long-time lighting is thought to be stress factor and trigger of desynchronism, it doesn't concern the studied structures. Absence of accelerated msPVN functional activity and significant differences in neuron area under steady and standard lighting on 8<sup>th</sup> day indicates the implication of adaptive-compensatory mechanisms, directed to maintain the stability of msPVN, and the impossibility of alteration of their regulation under light irritant.

**Kushniryk O.V.**

**CURRENT ISSUES IN THE STUDY OF PRION INFECTIONS**

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The prion proteins were discovered in 1982 and 2021 marks the 39th anniversary of the first findings in etiology of especially dangerous "slow" infections – prion diseases in humans and animals. The establishment of the role of infectious prion protein (PrP<sup>d</sup>) as the only factor in the pathogenicity of prion diseases turned out to be shocking to the scientific community, but subsequently changed the approach to research even in such conformational diseases as Alzheimer's disease, Parkinson's disease, diabetes mellitus and others, the pathogenesis of which is characterized by pronounced amyloid formation – protein aggregates including densely packed – layers. Taking into account that over the past years considerable knowledge has been accumulated about the biology of prion proteins and the pathogenesis of the diseases they cause, the aim of this work is to characterize modern issues of prion infections for human and animals.

The formation and accumulation of the cellular prion protein PrP<sup>c</sup> is the result of the expression of the PRNP gene localised in human chromosome 20. In various animal species, the

length of its polypeptide chain varies slightly: from 252 amino acid residues in a rabbit to 253-254 in human. The presence of a 22-membered signal sequence at the N-terminal region of the PrPc protein molecule provides cotranslational transfer of the newly formed polypeptide chain across the membrane of the endoplasmic reticulum. When the polypeptide chain passes through the channel (SEC61) in the rough ER membrane wall, the leader signal sequence is removed, as well as the folding of the molecule into a globule and its covalent modification. Two N-glycosylation sites of the sequence Asn-Ile-Thr and Asn-Phe-Thr are located at amino acid residues 181 and 197 respectively (human prion protein). The distribution of di-, mono-, and non-glycosylated forms of prion can vary both in different organisms of the same species, and within the same organism. Glycosylated forms of the protein are also diverse, which makes it possible to isolate about 400 different PrPc glycoforms. Natural and induced mutations in the hydrophobic sequence located in the middle part of the molecule, near it, as well as in the region of the N-terminal region, lead to an increase in the proportion of CtmPrP, which causes neurodegenerative diseases. A number of facts have been established that indicate the influence of the degree of glycosylation of prion proteins on the efficiency of prion disease transmission, as well as on the formation process of various strains of the prion pathogen. To date, more than 30 possible mutations of the prion protein have been described, of which most are reliably associated with hereditary prion diseases in human. Together with the infectious isoform, they do not exceed 10-20% of all reported cases of prion diseases, the rest are the sporadic form of Creutzfeldt-Jakob disease (neurodegenerative disease of spongiform encephalopathy in humans).

Thus, prion diseases are a group of neurodegenerative diseases of animals and humans caused by infectious isoforms of one of the host proteins called prion (PrP) and encoded by the cellular genome. Currently, the term PrP is used both to denote the isoform of a protein formed during normal cell metabolism (PrPc) and its pathological (infectious) isoform (PrPd), which causes prion diseases in humans and various animal species.

**Lomakina Yu.V.**

## **NEW APPROACHES IN DIAGNOSIS OF CYSTIC FIBROSIS**

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Cystic fibrosis (CF) is an autosomal recessive disorder caused by the mutation of a gene located on the long arm of chromosome 7 that encodes for a protein of 1480 amino acids, the cystic fibrosis transmembrane conductance regulator (CFTR), which works as a chloride channel on the apical membrane of epithelial cells. This mutation results in a change of the viscosity of secretions, and the production of thick mucus that leads to malabsorption, loss of electrolytes in sweat, and alteration of pulmonary secretions. As we know along with impairment of sweat glands and mucous glands the patient also suffers from various allergic bronchopulmonary infections such as aspergillosis and are at a high risk of pneumothorax.

Purpose of the study - to find out the most prevalent methods used to diagnose Cystic fibrosis by deep surfing scientific internet sources. To explain the main diagnostic that are used for Cystic fibrosis along with their importance, methods, and comparison between their cost and effectiveness.

Immunoreactive trypsinogen (IRT) test is the Newborn Screening technique used to diagnose cystic fibrosis in newborns. This test is done by taking blood sample by pricking the heel of the infant. If the level of IRT is not abnormal, then it is possible that the newborn is not suffering from CF. But, if the infant shows signs and symptoms consistent with CF, other tests for cystic fibrosis, such as sweat chloride or CF gene mutation testing, can be considered. Such as Sweat chloride test. It is well known that level of chloride in sweat is high in patients with CF. It happens due to defective chloride transport. The sweat test detects the level of chloride that is excreted in sweat. It is used as a diagnostic technique for CF. A chloride level of more or equal to 60 mmol/L is likely to be diagnosed with CF. Next test that is commonly used for CF is a Sputum test. Patients with CF frequently suffers from respiratory infections, caused by bacteria or fungi. A

sputum/mucus CF respiratory screen or culture helps doctors to diagnose and identify these bacteria or fungi so they can use the most effective antibiotics to cure a specific infection. An additional method of CF is the X-Ray with a small dose of ionizing radiation. It helps to evaluate dilated airways, which contains mucus, and also to detect lung infections that can be treated with antibiotics. Chest x-rays are used regularly to observe changes in patients with cystic fibrosis and detect other respiratory conditions such as pneumonia and collapsed lung. To discover more detailed lung picture we can use CT scanning. Chest CT scans can show both mucus and bronchiectasis that may specify infection, inflammation, and potential lung damage. Normally, sinuses are filled with air and appear black in CT scans but in patients with CF, the sinuses can be filled completely with mucus and appear white or grey in a sinus CT scan. To find out how lungs are working it is useful to apply Pulmonary function tests (PFTs). PFTs are non-invasive tests that measures Rates of flow and gas exchange and Lung volume and lung capacity.

We can observe that each of these methods are equally important when it comes to diagnose cystic fibrosis. The patients and parents can experience anxiety due to extra testing, the waiting associated with it and the difficulty in explaining the results. All these methods offer great hopes for the patient if the patient is diagnosed early before any irreversible damage is done.

**Obradovych A.S.**

## **USING OF MELATONIN AS A POTENTIAL COVID-19 PROPHYLAXIS METHOD**

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One of the most terrible occurrences in recent history is the current COVID-19 pandemic. The elderly people and those with chronic inflammations are more likely to die as a result of coronavirus infection. As a result, it's critical to figure out how to boost vulnerable groups coronavirus resistance. The goal of this study is to look into the possibilities of using melatonin as a medicine to assist reduce the number of deaths and boost the body's immune system.

Melatonin (N-acetyl-5-methoxytryptamine) is a bioactive molecule that has been used to treat sleep disorders, delirium, atherosclerosis, respiratory disease, and viral infections.

Recent studies show that the effect of SARS-CoV on humans is clearly age-related. Obviously, the increased sensitivity to coronavirus in the elderly is due to their reduced levels of melatonin. Daily variations in melatonin in young people (age 26+/-2 years) were in the region of 7 pg/ml, and in people aged 84+/-2 years, the level of melatonin dropped to 2 pg/ml. So, the application of melatonin may partially alleviate age-related comorbidities exacerbating SARS-CoV-2 infection and increasing its risk.

Viral respiratory infections are associated with oxidative stress characterized by elevated levels of reactive oxygen (ROS) and/or nitrogen species (RNS). SARS-CoV induces oxidative stress; oxidative stress induces the expression of PLA2G2D phospholipase; higher expression of PLA2G2D reduces anti-viral immunity, making the virus more lethal. Melatonin possesses high antioxidant properties. It binds up to 10 free radicals per molecule, while such classic antioxidants as vitamins C and E bind just one. Also, melatonin has a high bioavailability, penetrating blood-brain barrier and placenta.

The COVID-19 societal crisis has led to massive and prolonged stress, anxiety and sleep deprivation, which shall become a subject of systemic scientific analysis. These evident factors may have a significant negative impact on people's immune systems and their ability to combat COVID-19 and other illnesses. Like the neuroendocrine system, the immune system has its own set of rhythms. Melatonin's nightly release, for example, is timed to coincide with the peak of progenitor cell proliferation before they are differentiated into granulocytes and macrophages.

Based on circadian cycles, phagocyte activity rises in tandem with the nocturnal peak of melatonin. Long-term sleep deprivation and/or chronic stress impair immune function by disrupting barrier mechanisms, suppressing phagocytosis, reducing proliferation and activity of some leukocytes, particularly CD<sup>4+</sup> T cells, while increasing T-suppressors and raising oxidative stress and pro-inflammatory background, as well as increasing oxidative stress and pro-inflammatory

background. As a result, those who suffer from chronic sleep loss and/or stress are more vulnerable to infectious infections.

The production of melatonin is significantly impaired in people with chronic insomnia. The longer a person has experienced symptoms of insomnia, the greater the effect on melatonin concentration. However, in the case of chronic stress, initially, the concentration of melatonin rises significantly as a protective mechanism exerting anti-inflammatory and antioxidant effects, dropping sharply after. So, restoring (even partially) normal sleep habits and reducing anxiety through melatonin may have a significant public health effect during current COVID-19 crisis.

Thus, we may be able to prevent the development of severe disease symptoms in coronavirus patients, reduce the severity of their symptoms, and/or reduce the immuno-pathology of coronavirus infection on patients' health after the active phase of the infection is over by using the safe over-the-counter drug melatonin.

**Vlasova K.V.**

### **SUPRAOPTIC NUCLEI RECEPTORS DENSENESS AT NIGHT PERIOD UNDER LIGHT EXPOSURE**

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*Bukovinian State Medical University, Chernivtsi*

Melatonin is a hormone that your brain produces in response to darkness. It helps with the timing of your circadian rhythms (24-hour internal clock) and with sleep. Being exposed to light at night can block melatonin production and it affects the time organization of a large number of central and peripheral functions. It is also a powerful antioxidant mediator and has roles in other physiologic pathways. Melatonin deficiency is associated with metabolic derangements including glucose and cholesterol dysregulation, hypertension, disordered sleep and even cancer.

Our aim was to check the reaction on light stress of melatonin receptors 1A type in magnocellular neurons of supraoptic nuclei (SON) of the hypothalamus. Objective – to detect the role of light on melatonin receptors of supraoptic nuclei. White male rats were divided into two groups with the same biomaterial sampling time at 2 o'clock of midnight on the eighth day. The difference between groups is the light exposure on laboratory animals. The brain samples were fixed with formalin, dehydrated and it was embedded in paraffin. To detect melatonin receptors denseness was used specific polyclonal antibodies produced by Abcam.

Staining of SON neurocytes obtained denseness of melatonin receptors at 02.00 A.M. –  $0,488 \pm 0,0024$  under complete darkness whereas in the group of animals with light exposure influence at 02.00 A.M. the results of denseness of receptors –  $0,216 \pm 0,0017$  in SON indicating the existing primary signs of cellular disfunctions.

Saving the biorhythm is extremely important as changing the functioning of the hypothalamus SON neurocytes is likely to have significant consequences associated with an imbalance of homeostasis. Hence all of the above mentioned and further more menaces were an absolute outcome of a prolonged and intense disturbance in the daily routine and habits which must be subjected in order to do the needful.

**Yosypenko V.R.**

### **SUBMICROSCOPIC CHANGES OF THE LATERAL PREEPTIC NUCLEUS OF THE HYPOTHALAMUS UNDER LIGHT STIMULATION**

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*Bukovinian State Medical University*

Today, there is an increase in the number of elderly people among the world's population. Typical problems of this age group are impaired quality and/or duration of sleep, which can affect the development of pathological processes and overall health. Sleep is an extremely complex genetically determined cyclic process that is regulated by homeostatic and circadian components involving various neural structures, among which the lateral preoptic nucleus (LPO) of the hypothalamus plays a key role.

The aim of the study was to investigate the effect of light stimulation on the ultrastructural characteristics of LPO neurons in the hypothalamus of old rats.

The experiments were performed on 24 old white male rats. The test material was fixed in a 2.5% solution of glutaraldehyde prepared on the basis of phosphate buffer with a pH of 7.2–7.4. Next, post-fixation was performed in a 1% solution of osmium tetroxide and dehydrated in propylene oxide, after which it was poured into a mixture of epoxy resins. Ultrathin sections made on an ultramicrotome LKB-3 were contrasted with uranium acetate and lead citrate according to the Reynolds method and studied under an electron microscope PEM - 125K.

Electron microscopic examinations of LPO of the hypothalamus under standard light regime at 2 pm found cell nuclei of round or elliptical shape with clear contours of the nuclear membrane, which can form shallow intussusception, the perinuclear space is not expanded. The cytoplasm of neurons contains moderately developed tubules of the granular endoplasmic reticulum (EPR) and cisterns of the Golgi complex (GC). There are mitochondria with clearly contoured cristae and a moderately osmophilic matrix.

At the same time, the neurons of the LPO of the hypothalamus under the conditions of the standard mode of illumination at 2 am contain nuclei with uneven contours, sometimes with rather deep indentations. The neuroplasm contains well-developed tubules of granular EPR with ribosomes fixed on their membranes. GC cisterns are small and localized paranuclear, but many vesicles and microbubbles are found. Mitochondria rounded, small, with moderately pronounced cristae.

A study of the ultrastructure of LPO of the hypothalamus at 2 pm under light stimulation showed the presence of "dark" neurons. The detected cells contain osmophilic karyo- and neuroplasm. The nuclei of the cells are pyknotic, electron-dense, and contain a nuclear membrane intussusception. The cytoplasm of cells is compacted, it is poorly defined organelles that are destructively altered. In the cytoplasm of cells, dilated tubules of granular EPR and CG cisterns are visualized, with the formation of vacuole-like structures. Mitochondria are also destructively altered, vacuolated with partially reduced cristae.

A study of the ultrastructure of LPO of the hypothalamus under light stimulation at 2 am showed that the neurons contain a rounded nucleus with electron-dense karyoplasm and uneven contours of the nuclear membrane, which forms deep intussusception. The hyaloplasm is also compacted, the EPR tubules are determined, which are locally expanded with the formation of vacuole-like structures. Mitochondria are small in size, vacuolated, with an enlightened matrix and reduced cristae.

Thus, we can conclude that the neurons of the LPO of the hypothalamus of old rats show increased functional activity in the dark. Light stimulation leads to hypertrophic and initial destructive changes in the nuclei and organelles of the neurons of the LPO of the hypothalamus.

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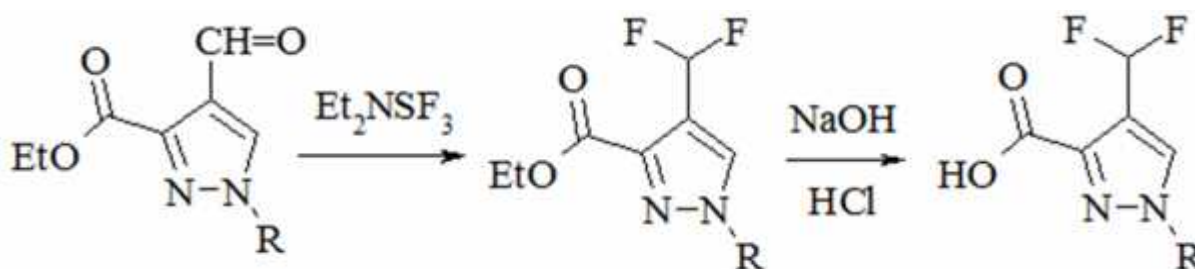


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**Barus M. M.**  
**A NEW APPROACH TO THE PREPARATION OF 4-DIFLUOROMETHYL-1H-PYRAZOLE-3-CARBOXYLIC ACIDS**

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*Bukovinian State Medical University*

The introduction of fluorine atoms or fluoroalkyl groups in heterocyclic systems is fundamentally important for a significant increase in their biological activity. Due to its unique structure, the fluorine atom can give specific properties to various molecular scaffolds, in particular, significantly expand the weak binding interactions, increase metabolic stability, and even dramatically change the physicochemical behavior. In such processes, a special role belongs to the trifluoromethyl group, which has become a privileged structural element for the effective correction of pharmacokinetic parameters of heterocyclic structures. For example, among the biologically attractive functional pyrazoles, trifluoromethylated derivatives have become important for modern medical chemistry. Among them, the anti-inflammatory drug Celecoxib [4-{5-(4-methylphenyl)-3-(trifluoromethyl)pyrazol-1-yl} benzenesulfamide] deserves special attention, which belongs to the selective COX-2 inhibitors and is introduced into clinical practice for the treatment of osteo- and rheumatoid arthritis.



Difluoromethyl-containing pyrazoles are also compounds with a complex of biological action, although compared to trifluoromethyl analogues, they are studied to a much lesser extent. These include 3-aryl (heteroyl) substituted 4-difluoromethylpyrazoles, some of which contain cannabinoid receptor ligands, as well as substances that can be used to treat inflammatory diseases and diabetes. Not less important is their use in agrochemistry as a promising herbicide.

3-Carbofunctionalized 4-difluoromethylpyrazoles are studied to a much lesser extent and are presented in the literature only as an example of ethyl 1-methyl-4-difluoromethylpyrazole-3-carboxylate, although they appear to be quite convenient synthetic blocks for the design of various functional derivatives. Due to this, it seemed important to develop a preparatively convenient method for obtaining 4-difluoromethylpyrazole-3-carboxylic acids.

It is known that the interaction of the corresponding aldehydes with an effective fluorinating reagent diethylaminosulfur trifluoride (DEST) is usually used to modify organic compounds with a difluoromethyl moiety. Ethyl 4-formylpyrazole-3-carboxylates were selected as substrates for the difluoromethylation reaction. It was found that their interaction with a 2.2-fold excess of DEST in dichloromethane at room temperature leads to their formation with yields of 68-75%, 4-difluoromethylpyrazole-3-carboxylates in  $^1\text{H}$  NMR spectra in the range of 9-10 m h. there are no singlets of CH-protons of the formal group and there are triplets of protons of the  $\text{CHF}_2$  band in the range of 7.12-7.18 m h.

Treatment of the obtained esters with 10% sodium hydroxide solution at room temperature, and then further acidification of the reaction mixture with 20% hydrochloric acid allows to smoothly convert them to the corresponding acids, which were isolated with yields of 86-92%.

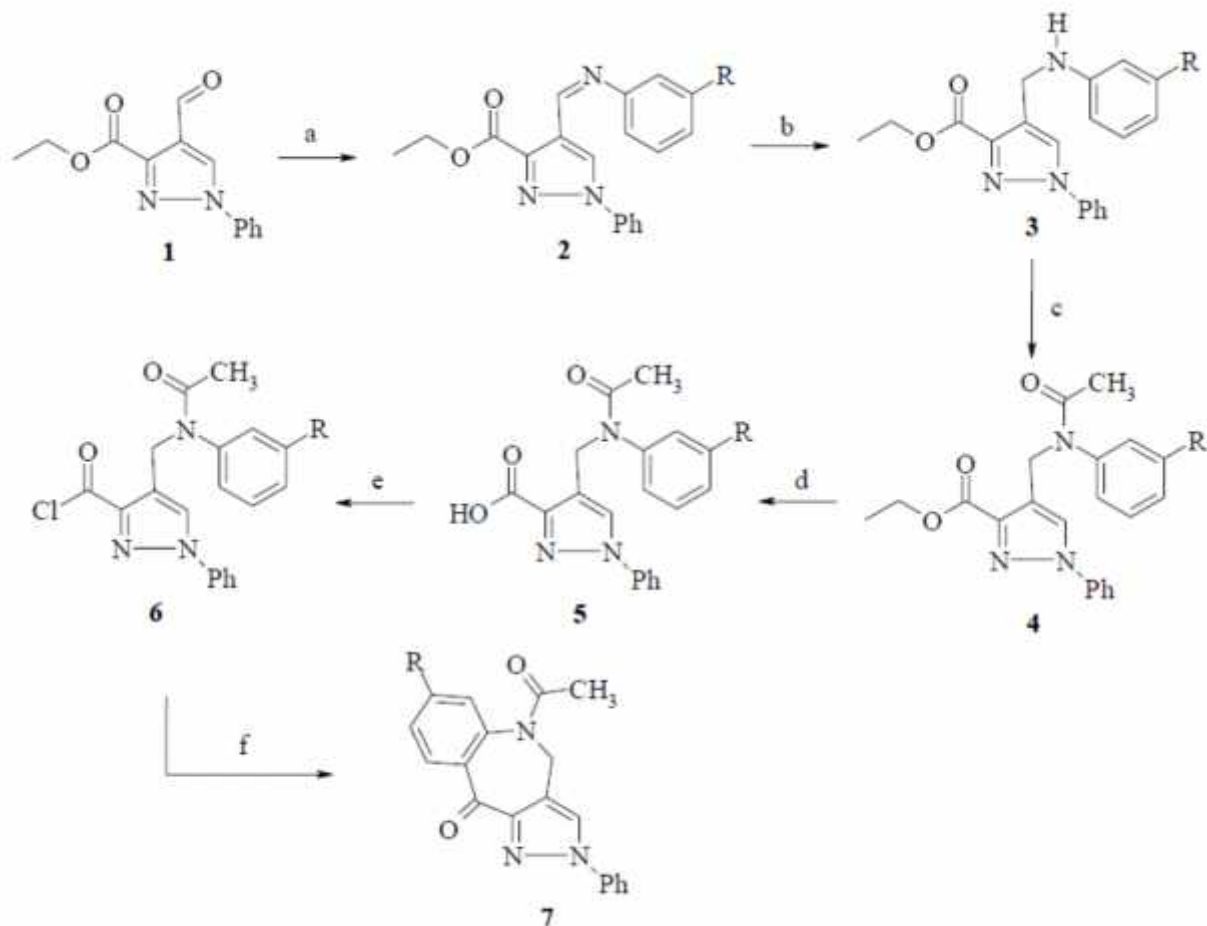
**Bratenko M. K.**  
**BENZOAZEPINOPYRAZOLES – A NEW HETEROCYCLIC SYSTEM**

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*Bukovinian State Medical University*

The development of methods for the synthesis of compounds based on multiheterocyclic nuclei has been intensively developed in recent decades. This is primarily due to the use of these systems as a building block for the construction of potential pharmaceutical candidates.

We have developed a way to construct condensed benzoazepinopyrazoles based on the previously described ethyl ester of 1-phenyl-4-formylpyrazole-3-carboxylic acid 1.

The structural scheme of the synthesis is as follows:



R = H, Cl, F, CH<sub>3</sub>, CH<sub>3</sub>O

a - *m*-anilines, boiling toluene, 30 minutes

b - NaBH<sub>4</sub>, alcohol, 20° C.

c - acetyl chloride, Et<sub>3</sub>N, CH<sub>2</sub>Cl<sub>2</sub>, 50° C.

d - alcohol KOH, HCl.

e - SOCl<sub>2</sub>, CH<sub>2</sub>Cl<sub>2</sub>.

f - nitrobenzene, AlCl<sub>3</sub>, 5° - 40° C, 2 h.

The composition of the obtained compounds was reliably confirmed by elemental analysis and mass spectrometry, and the structure was established by NMR spectroscopy.

Chernyukh O.G.

**QUALITATIVE DETECTION OF Ig G ANTIBODIES TO SARS-CoV-2 CORONAVIRUS NUCLEOCAPSID ANTIGEN IN THE BLOOD SERUM OF PATIENTS WHO HAD VIRAL RESPIRATORY INFECTION, CAUSED BY SARS-CoV-2**

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Interest in the diagnostics and study of SARS-CoV-2 and the development of numerous complications lead to the study and research of the level of humoral immunity, which results in the production of specific antibodies and the formation of immunological memory.

Immunoglobulin G (IgG) molecules consist of two light chains (kappa or lambda) and two heavy gamma chains. IgG is approximately 80% of all immunoglobulins; its main task is protection against microorganisms, direct neutralization of toxins and initiation of the complement binding assay. IgG is the only immunoglobulin that can penetrate the placental barrier and provide passive immune protection to the fetus and newborn. IgG plays a main role in the formation of long-term humoral immunity after going through infectious diseases, including SARS-CoV-19.

The purpose and objectives of the study were to conduct a qualitative analysis of IgG levels in patients who suffered from mild to moderate SARS-CoV-19 (without hospitalization) within 2-6 months after recovery.

Blood serum of 41 patients was studied to determine the presence of Ig G antibodies to SARS-CoV-2 by solid-phase indirect ELISA (enzyme-linked immunosorbent assay) with a two-stage procedure:

- while depositing the test sample into the wells, it bounded to the recombinant nucleocapsid antigen SARS-CoV-2 on a solid basis with the formation of the antigen-antibody complex;
- with subsequent detection under the assistance of peroxidase conjugate of monoclonal antibodies to human Ig G. The wells are filled in with the TMB (3,3',5,5'-tetramethylbenzidine) substrate, after washing off of the unbound components is carried out. The reaction is stopped with a stop reagent and the optical density is measured at a wave length of 450/620 nm, which is proportional to the concentration of Ig G to SARS-CoV-2 in them. The test of the DiaProPhMed system (Kyiv, Ukraine) was used in the work.

Statistical data processing was performed using the parametric Student's t test (t-test).

The result of the analysis was calculated by the positivity coefficient (PC):

$$PC = OD_{\text{sample}} / BV$$

The limit (*boundary value*) BV was calculated:

$$BV = \text{Average Value} + 0.2$$

where *Average Value* – the average value of optical density of negative control (at least two, while examining more than 24 samples at the same time, the number of controls reaches four, etc.).

$OD_{\text{sample}}$  - optical density of the test sample.

The result of the analysis was considered negative if  $PC < 1$  and positive if  $PC \geq 1,1$ .

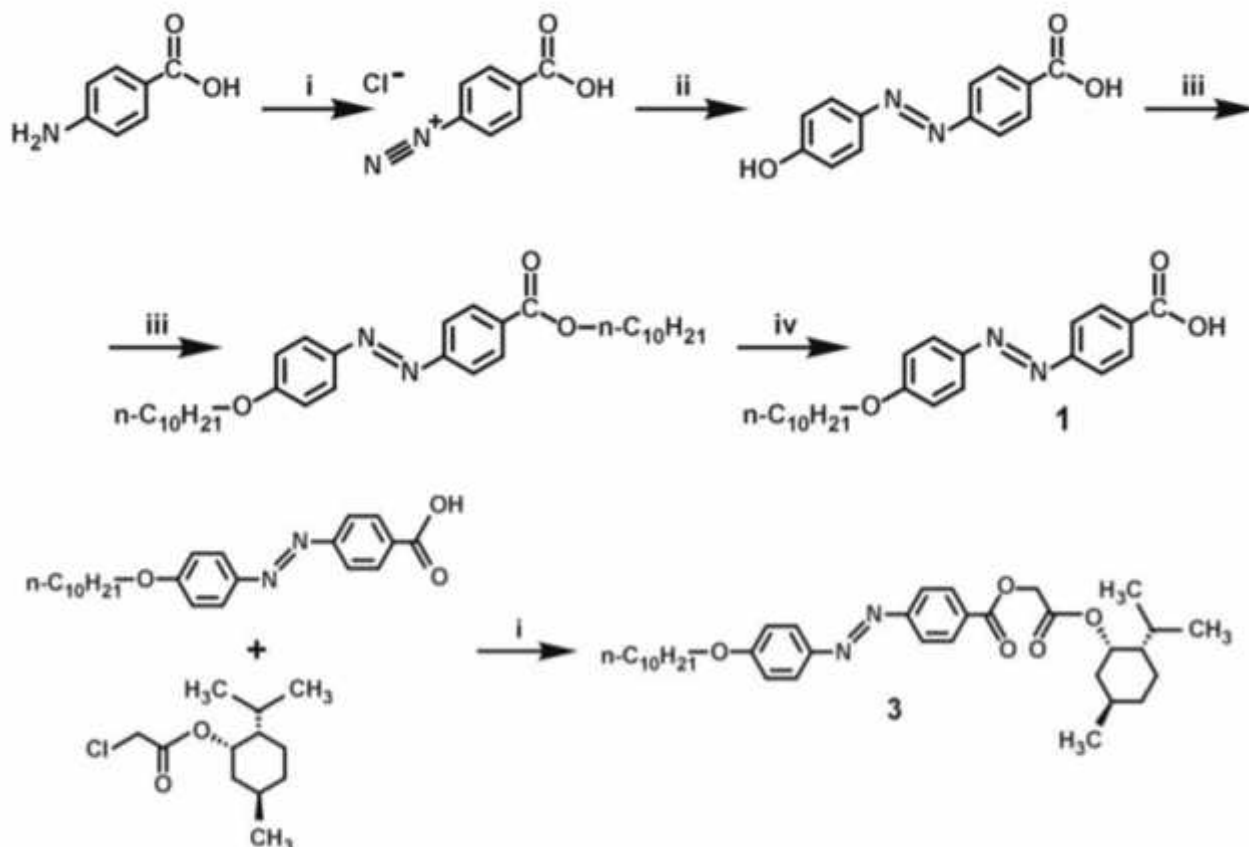
The result of PC of 12 people was definitely negative, its average value was 0.26 (from 0.09-0.37) ( $M \pm m = 0.26 \pm 0.03$ ). For 29 people the PC varied from 1.22 to 10.2 ( $M \pm m = 4.713 \pm 0.72$ ). The other 21 of them had PC moderately and severely affected ( $PC \geq 3.0$ ).

Thus, 70.7% of patients examined for the level of Ig G antibodies to the nucleocapsid antigen of coronavirus in the blood serum had an expressing immunity ( $p < 0.001$  in comparison to the group with negative PC). At the same time 72.4% of patients with positive immunity, the level of IgG antibodies was characterized as high. To sum up, Ig G level of most patients, who had mild or moderate SARS-CoV-2 disease, was present in the blood for a long period of time.

**Chornous V.O.**  
**LIGHT-CONTROLLABLE CHIRAL DOPANT BASED ON AZO-FRAGMENT:  
 SYNTHESIS AND CHARACTERIZATION**

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We present the newly synthesized chiral dopant 2-[(2-isopropyl-5-methylcyclohexyl)oxy]-2-oxoethyl 4-[(E)-[4-(decyloxy)phenyl]diazenyl]benzoate (ChD-3501), consisting of azo- and aliphatic fragments together with a chiral center based on 1-menthol as a reversible light-controllable chiral dopant. To assess the effects of UV/VIS irradiation and temperature in the isotropic and liquid crystalline (LC) states, we studied the spectral kinetics of ethanol solution of ChD3501, as well as induction of the cholesteric helix when it was dissolved in nematic LC (E7) as a chiral dopant. The concentration dependence of the helical pitch of the induced cholesterics was studied by means on Grandjean-Cano method, and the helical twisting power of ChD-3501 in the nematic host E7 was determined. The reversible trans-cis isomerization of chiral dopant ChD-3501 in E7 under UV/VIS irradiation was studied, and it has been found that the storage of the cis-isomer at certain constant temperature also leads to the reversible isomerisation, which presents a certain interest for applications



Synthesis of 2-(1R,2S,5R)-[(2-isopropyl-5-methylcyclohexyl)oxy]-2-oxoethyl 4-[(E)-[4-(decyloxy)phenyl]diazenyl]benzoate (3).

**Davydova N.V.**  
**THE TOTAL ANTIOXIDANT ACTIVITY OF BLOOD PLASMA IN CASE OF ALCOHOL  
 INTOXICATION, ITS COMBINATION WITH MODIFIED PHOTOPERIOD AND  
 MELATONIN ADMINISTRATION**

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 Bukovinian State Medical University*

The role of reactive oxygen species in pathogenesis of ethanol intoxication is well established. In modern life, alcohol consumption is often combined with mistimed or nearly

constant exposure to light leading to desynchronization of normal circadian rhythms. The biological rhythms are regulated by melatonin, which is produced in the pineal gland in darkness, and besides many physiological effects, it has potent antioxidant action.

Total antioxidant activity together with antioxidant enzymes are commonly used markers of antioxidant status and thus oxidative stress. The capacity of known and unknown antioxidants and their synergistic interaction is assessed, thus providing insight into the delicate balance between oxidants and antioxidants in vivo.

The aim of the work was to study the total antioxidant activity (TAOA) of rats' blood plasma in terms of alcohol intoxication, its combination with constant light exposure and melatonin administration.

Experiments were performed on 32 white male rats weighing 180-230 g, kept under standard conditions and a vivarium diet. Subacute alcohol intoxication was induced by intragastric administration of 40% ethanol in a dose of 7 ml/kg of body weight for 7 days. The light exposure was caused by a constant fluorescent light with an intensity of 1500 lux for 24 hours a day.

We have revealed that alcoholic intoxication was accompanied by a decrease in TAOA by 15% below the control level. Combination of ethanol poisoning with light exposure caused more significant decrease of TAOA of blood plasma (by 27%). It can be related to a decreased level of SH-groups in blood plasma which promotes the non-enzymatic antioxidant effect. The content of SH-groups against the background of alcoholic intoxication and its combination with constant lighting was by 25.6% and 13.3% below the control level correspondingly. This represents a decrease in the adaptive response to oxidative stress related to ethanol poisoning and lack of melatonin under constant light exposure.

The administration of "Vita-melatonin" in a dose of 5 mg/kg daily at 8 p.m. for 7 days contributed to the normalization of TAOA of blood plasma in both experimental groups and SH-groups of alcoholized rats, which have been exposed to light. The alcoholized rats which had received melatonin against the background of normal photoperiod showed only tendency to normalization of SH-groups, but the level was 13% lower than in control.

Thus, melatonin administration contributed to the normalization of total antioxidant activity of rats' blood plasma against the background of alcoholic intoxication and its combination with constant lighting.

**Dikal M.V.**

## **MORPHOLOGICAL CHANGES IN THE CORTEX OF THE KIDNEYS UNDER THE DEVELOPMENT OF ASEPTIC FEVER**

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Fever is a pathological process characterized by Kidney disorders of thermoregulation and can occur both in various pathological conditions and under the influence of pyrogenic substances and includes three stages: temperature rise, high temperature and its decrease.

The aim of the study was to find out the peculiarities of morphological changes in the cortical region of the kidneys in the dynamics of aseptic fever under the conditions of pyrogenal administration.

In experiments on 60 males of nonlinear white rats weighing 0.16-0.20 kg, aseptic fever was investigated, which was simulated by a single subcutaneous injection of pyrogenal at a dose of 25 µg/kg. Histological examinations were performed with staining of dewaxed sections with hematoxylin and Slinchenko.

According to the obtained results, morphological changes under conditions of aseptic fever were characterized in the first stage by temperature rise, vacuolar dystrophy of the epithelium of the proximal tubules and small-focal nature of changes in protein properties with a color shift to red, in the second stage, at high temperature, expansion of Shumlyansky-Bowman capsule and dystrophic changes in the epithelium of the distal tubules, and in the third stage, a decrease in temperature by

the moderate expansion of the lumen of the Shumlyansky-Bowman capsule and insignificant dystrophic changes in the epithelium of the proximal tubules.

Thus, these morphological changes in fever are due to the fact that an imbalance develops between heat production and heat transfer, which leads to activation of the renin-angiotensin system and disruption of energy metabolism in the renal cortex.

**Ferenchuk Ye.O.**

## **EFFECT OF GLUTATHIONE ON OXIDATIVE-ANTIOXIDANT SYSTEM IN THE LIVER OF RATS IN EXPERIMENTAL NEPHROPATHY**

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Kidney disease is a worldwide health problem. Notably, oxidative stress of kidney damage is increasingly recognized as a major risk factor not only for renal disease but also for cardiovascular and liver diseases. The antioxidant glutathione is involved in many biological processes such as free radical neutralization, detoxification, maintenance of cellular redox, ascorbic acid and vitamin E regeneration, transport and storage of cysteine. However, to date, there is not enough knowledge about the role of glutathione in damaged liver cells by renal disease, although there are considerable studies about its antioxidants function.

Our work aimed to determine the state of the oxidative-antioxidant system in the liver of rats by experimental nephropathy and the influence of glutathione.

The experiment was conducted on 131 male albino rats with the bodyweight of 0.16-0.18 kg. Experimental nephropathy was modeled by injection of a single intraperitoneal dose of folic acid (250 mg/kg). Glutathione was introduced daily (100 mg/kg) by the intragastric way for 3 and 7 days after the injection of folic acid. All manipulations with animals were carried out according to the European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes and law of Ukraine "On protection of animals from cruelty". The content of TBA-active products, glutathione, the activity of glutathione peroxidase in the liver was determined.

The type of distribution was estimated using the Shapiro-Wilk test. Significant differences between groups were evaluated by using the Wilcoxon test and Kolmogorov-Smirnov test with  $p < 0.05$  considered.

In experimental groups of animals under conditions of nephropathy, the processes of free radical damage of molecules in the liver intensified: increase in the content of TBA-active products by 17% ( $p < 0,01$ ) on day 3rd and 27% ( $p < 0,05$ ) on 7th day of the experiment, decrease the level of glutathione by 33% ( $p < 0,01$ ) on 3rd day and by 23% ( $p < 0,05$ ) – on the 7th day of the experiment. The use of glutathione, both on the 3rd and 7th day of the experiment normalizes the studied indicators.

Glutathione peroxidase prevents membrane degradation from ruinous dehydration of peroxidic radicals, catalyzes the degradation of hydrogen peroxide, glutathione oxidation, and due to the changes in the activity of the enzyme, the rate of oxidation of the organism's thyroid pathways can be reduced. We have set a decrease in the activity of glutathione peroxidase by 11.6% on 3rd day and by 36.5% on 7 day, so that the reduction of glutathione resources has been established. Decreased antioxidant defense and overproduction of reactive oxygen species lead to oxidative stress and energy decrease – one of the key mechanisms of distant organ injury by kidney disease. On the third experimental day, the use of glutathione increased the growth of glutathione peroxidase activity by 7%, and after seven days the increase in activity of the enzyme was increased by 23%.

The received results of the effect of glutathione on the state of the oxidative-antioxidant system of the liver by kidney disease open the possibility to use glutathione for nephro- and hepatoprotective effects, but further research is needed.

**Kropelnytska Yu.V.**  
**NEW PHOTOCATALYTICAL SYSTEMS BASED ON TiO<sub>2</sub> AND THE SYMMETRIC  
CATIONIC POLYMETHINE DYE**

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Light-sensitive materials with some photocatalytic activity based on semiconductors are known as important functional materials since they can be employed in construction of photocatalytical systems for accumulation and transformation of solar energy, toxic waste decontamination, development of nontraditional low-tonnage syntheses of important compounds and so on.

In this context, many efforts have been made to ensure sensitization of the wide-zone semiconductors such as TiO<sub>2</sub> in order to shift their 'red' limit of the sensitivity band towards longer waves. Unfortunately, the quantum yield and overall efficiency of the phototransformations are still too low for practical realization of these solutions. That is why it is still quite topical to conduct a search for new highly effective functional materials with advanced parameters. As proved by numerous investigations performed before, the heterostructure made of a semiconductor, the dye-sensitizer and the protective polymer is a promising solution to improve the operation characteristics of the photosystems.

The symmetric cationic dye was used as the semiconductor and polyepoxypropylcarbazole was used as the polymer-protector. The photoreduction of methylene blue was taken as a model process for evaluation of the heterostructures photocatalytic activity. Following the experimental method, a mixture of the Polymer/Dye/TiO<sub>2</sub> heterostructures, methylene blue and formaldehyde was irradiated at active stirring in the oxygen free atmosphere until complete discoloration of methylene blue. As was investigated the photocatalytic reduction of methylene blue can be initiated either by the light being absorbed by TiO<sub>2</sub> or because of the light absorption performed by the dye-sensitizer. However, a character of relation between photocatalytic activity and the dye content depends on the light absorption mechanism. If the process is controlled by the light absorbed by TiO<sub>2</sub>, photocatalytic activity is constantly decreasing with growth of the dye content while its initial growth then changes to a fall in case the process is controlled by another mechanism (photoexcitation of the dye).

In the view of such changes in photocatalytic activity values, one can suppose that they can be caused by sensitization of heterostructure Polymer/Dye/TiO<sub>2</sub> to the visible light, which cannot be absorbed by the pure titania. It is obvious that the growth of dye content in heterostructure would result in a better light absorbance and, consequently, a higher activity of heterostructure. Next decrease in the photocatalytic activity value at further growth of dye content can be resulted by weakening of interaction between the dye and the substrate that occurs at some higher contents of dye and puts obstacles on the interphase electron transfer. Besides, same effect can also be caused by formation of the less light-sensitive associates at the increased content of the dye.

It can be concluded that the results of this investigation prove that the symmetric cationic dye is capable of acting as a sensitizer of titanium dioxide. The dye's light sensitivity zones and its excited redox potentials were determined. It was shown that their potentials were sufficient to realize the sensitization of TiO<sub>2</sub> by electrons transfer to its conductivity zone.

**Krupko O.V.**  
**STATISTICA (STATSOFT) PROGRAM IN EXPERIMENT PLANNING AND  
VISUALIZATION OF THE CONTENT-PROPERTY DEPENDENCY IN THE SYSTEM  
Cd<sup>2+</sup>-L-CYSTEINE-S<sup>2-</sup>**

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The aim of the work: to investigate the effect of precursor concentration in the three-component system Cd<sup>2+</sup>- L-Cys - S<sup>2-</sup> on the optical properties of the resulting nanoparticles of cadmium sulfide stabilized by the amino acid L-Cysteine, using the Statistica program.



Objective: to conduct a number of experiments on the synthesis and research of optical properties of IC CdS/L-Cys according to the planning of the program Statistica selected version of the program Ternary Plans, 3D (Mixture designs).

Materials and methods: initial reagents of high qualification: 0.5 M solution  $\text{CdCl}_2 \cdot 2,5\text{H}_2\text{O}$  "x.h." 0.05 M solution L-Cysteine ( $\text{HOOC-CH}(\text{NH}_2)\text{-CH}_2\text{-SH}$ ) "h.h."; 0.5 M  $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$  solution (99% Aldrich purity), 0.1 M NaOH solution. The study of optical properties of solutions was carried out at a temperature of  $298 \pm 5$  K using spectrophotometers MDR-4 and USB-650 (Ocean Optics). The optical density of solutions was measured within the values of 0.01 – 2 with an increase in the wavelength in the range of 350 – 1000 nm.

The STATISTICA program covers a large number of statistical analysis methods (more than 250 built-in functions) combined with specialized statistical modules that provide advanced interactive visualization tools. Ternary Plot, 3D (Mixture designs) is selected to construct a mathematical model of the "composition-property" dependency of the three-component  $\text{Cd}^{2+}$  – L-Cys –  $\text{S}^{2-}$  system. The non-monotonous effect of the content of each precursor on the optical characteristics of stabilized colloidal solutions of IC illustrates the three-dimensional (according to the STATISTICA program) graphical interpretation of the obtained data and its projection on the plane is shown in Fig. The complete cubic equation for describing isolium absorption edge is:

$$= 435 x_1 + 434 x_2 + 445 x_3 - 81 x_1 x_2 + 16 x_1 x_3 - 10 x_2 x_3 + 55 x_1 x_2 (x_1 - x_2) + 124 x_1 x_3 (x_1 - x_3) + 106 x_2 x_3 (x_2 - x_3) - 350 x_1 x_2 x_3 .$$

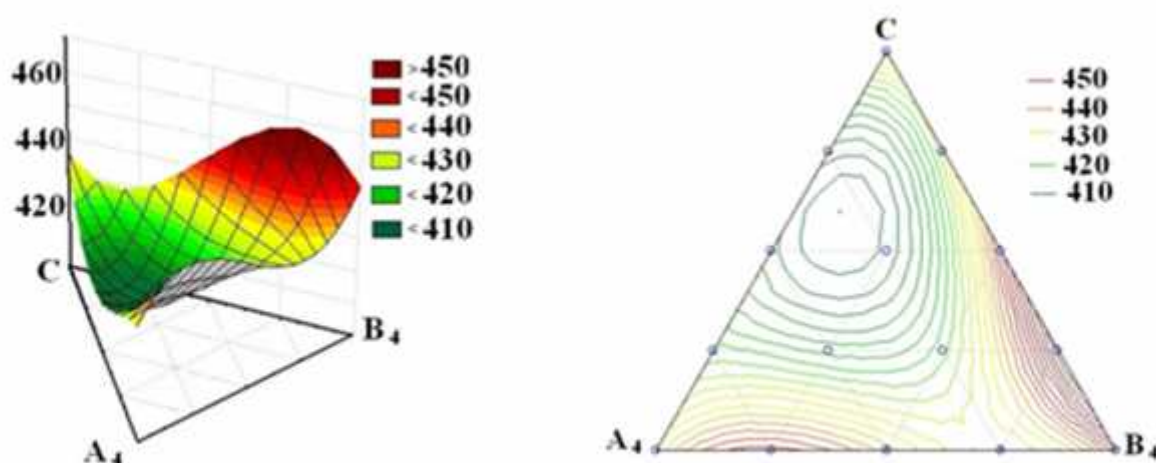


Fig. 3D-image of concentration dependence of the absorption edge of the studied solutions of the  $\text{Cd}^{2+}$  – L-Cys –  $\text{S}^{2-}$  system (left) and its projection to the plane (right), summarized by the complete cubic equation.

Thus, statistical processing of the results obtained equation and built diagrams of concentration dependencies of wavelengths of the edge of optical absorption of colloidal solutions of semiconductor nanoparticles CdS in system  $\text{Cd}^{2+}$  – L-Cys –  $\text{S}^{2-}$  under condition of pH synthesis = 11,  $T = 298 \pm 2$  K. Based on the research carried out using the program Statistica (Ternary Plot, 3D Mixture designs) the areas of time-stable colloidal solutions of CdS/L-Cys nanoparticles in the system are determined  $\text{Cd}^{2+}$  – L-Cys –  $\text{S}^{2-}$ :  $\text{Cd}^{2+}$ : 10,0 – 35,0 %;  $\text{S}^{2-}$ : 10,0 – 35,0 %; L-Cys: 30,0 – 80,0 %; and unstable: 1)  $\text{Cd}^{2+}$ : 47,5 – 60,0 %;  $\text{S}^{2-}$ : 10,0 – 22,5 %; L-Cys: 30,0 – 55,0 %; 2)  $\text{Cd}^{2+}$ : 10,0 – 22,5 %;  $\text{S}^{2-}$ : 35,0 – 60,0 %; L-Cys: 30,0 – 55,0 %.

**Kushnir .Yu.**

**EFFECT OF MELATONIN ON AGE-RELATED CHANGES OF GLYCATED HEMOGLOBIN CONTENT IN THE BLOOD OF ALLOXAN DIABETIC RATS**

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Melatonin and its metabolites have potent antioxidant/anti-inflammatory properties, and they have proven to be highly effective in a variety of disorders linked to inflammation and oxidative stress. The increasing incidence of type 1 diabetes coupled with advances in treatment of type 1 diabetes has resulted in an unprecedented number of older adults living with and managing type 1 diabetes. Hyperglycemia-mediated oxidative stress plays a crucial role in diabetic complications. The consequence of the emergence of this shift can be the appearance of age features in the body's resistance to harmful factors of diabetes mellitus. Changes in the ontogenesis of sensitivity of the glycosylated hemoglobin content in the blood on the background of diabetes mellitus and melatonin injections are less studied.

The object of this experimental research was to ascertain the influence of melatonin on the background of aging on the level of glycemia and glycosylated hemoglobin content in the blood of alloxan diabetic rats. We used male Wistar rats, two age groups: the I - 2-month (late puberty), and II - 4-month (adult). Alloxan diabetes was evoked via injecting the rats with a 5% solution of alloxan monohydrate intraperitoneally in a dose of 170 mg/kg. In each age group were control rats and diabetic animals which were introduced the melatonin ("Sigma", USA) preparation intraperitoneally in a dose of 10 mg/kg of body weight at 8 a.m. daily during 42 days starting with a 5-th 24 hour period after the injection of alloxan. Blood was taken from the tail vein to evaluate the glycemia level on 5-th and the 47-th day after the injection of alloxan. Rats were sacrificed on the 47-th day of the experiment in accordance with the ethical treatment of animals. Determination of the glycosylated hemoglobin content in whole blood (HbA<sub>1c</sub>) was performed using a biochemical analyzer ("Bio-Rad Laboratory Inc.", France).

The level of glucose on the fifth day of the experiment in animals of both groups increased on average by 116% compared to control. However, on the 47-th day, this index was higher in the group of old rats by 22% more than in adult rats. HbA<sub>1c</sub> content in erythrocytes of adult and old animals with overt diabetes increased by 177% and 190%, respectively compared with the control. The changes may be the result of age-related disorders of energy metabolism due to disturbances in free radical mechanisms. Moreover, hyperglycemia leads to increased free radical mechanism in old rats. We have reached the recovery of the HbA<sub>1c</sub> content in the blood of diabetic rats of both age groups by melatonin injections. These results are consistent with the degenerative role of hyperglycemia on cellular reducing equivalent homeostasis and antioxidant defense, and provide further evidence that pharmacological intervention of antioxidants may have significant implications in the prevention of the prooxidant feature of diabetes and protects redox status of the cells. ROS reacts with some amino acid, producing anything from modified, denatured and non-functioning proteins that in further may be responsible for oxidative stress.

Thus, we have determined that there is a change in the course of ontogenesis the content of the HbA<sub>1c</sub> in the blood to the effect of diabetes mellitus factors. According to the results we've got, melatonin shows its protective action against hyperglycemia-induced age-related changes of the HbA<sub>1c</sub> content in the blood of alloxan diabetic rats.

**Lenha E.L.**

**CHRONORHYTHMS OF TOTAL ANTIOXIDANT ACTIVITY OF RAT SERUM UNDER DIFFERENT FUNCTIONAL ACTIVITY OF EPIPHYSIS CEREBRI**

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The role of melatonin as a universal pacemaker of human biological rhythms has long been known. The physiological and biochemical parameters of the organism depend on the functional

state of the pineal gland. One of them is the state of antioxidant defense systems, the activity of which can be determined by the level of total antioxidant activity of blood serum (TAAS).

The goal of the study was to research the chronorhythmological features of TAAS in the serum of rats under conditions of different functional activity of the pineal gland.

Experimental studies were performed on white nonlinear adult male rats weighing  $170 \pm 10$  g. For 14 days they were kept under different lighting conditions (simulation of different functional activity of the pineal gland): group A - normofunction - (12 hours of light: 12 hours of darkness); group B - hypofunction - (24 hours of light: 0 hours of darkness); group C - hyperfunction - (0 h of light: 24 h of darkness). The experiment used fluorescent lamps with an intensity of 1500 lux. Euthanasia, by decapitation under light ether anesthesia, was performed at 8.00, 12.00, 16.00 and 20.00. Serum TAAS was expressed as the percentage inhibition of spontaneous peroxidation of endogenous brain lipids (according to the content of malonic dialdehyde). Statistical processing of the obtained results was performed using the parametric Student's t-test. The difference in results at  $p < 0.05$  was considered statistically significant.

It was investigated that in group A at 12.00 TAAS serum was the highest and amounted to 78.1%. The lowest rates were at 8.00. In animals of group B there were phenomena of desynchronosis with a shift of the peak of TAAS at 16.00 against the background of a decrease in absolute values by 13%; 27.3%; 11.4% and 15.75% at 8.00, 12.00, 16.00 and 20.00, respectively, compared to animals of group A. With hyperfunction of the pineal gland (group C), the chronorhythm of TAAS coincided with the rhythm in animals of group A. An increase in the level of TAAS have revealed in all hours of the experiment, especially at 16.00 (by 8.1%) and 20.00 (by 14.5%) compared with animals of group A.

The phenomena of desynchronosis against the background of hypofunction of the pineal gland are probably caused by suppression and disruption of the rhythm of melatonin synthesis. Normochronosis and an increase in serum TAAS when stimulating the pineal gland around the clock are probably caused by an increase in the production of melatonin, which is also a powerful antioxidant in the body.

**Lukan Yu.R.**

## **INFLUENCE OF THE PHENOMENON OF POLYMORPHISM ON THE PROPERTIES OF DRUGS**

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The ability of solids to exist in two or more forms with different crystal structures, properties, and the same chemical composition describes the phenomenon of polymorphism. This turned out to be an extremely important factor that determines the therapeutic effect of pharmaceuticals (significantly affects the parameters of their biological activity).

Especially important for chemists-technologists and pharmacists were the detection and study of differences in chemical stability, solubility, hygroscopicity, phase transition temperature. Change of the modification of active pharmaceutical ingredients (API) can occur both during synthesis (when replacing the solvent, the introduction of additional substances), and during isolation, purification, drying, storage.

A large number of modern drugs are polymorphic in their physical structure with the same chemical composition, and in the process of transition from one form to another, significant changes in medicinal properties are possible.

Obtaining polymorphic forms of the same drug often occurs when changing the conditions of crystallization of substances. For this reason, medicinal substances obtained at different factories, and sometimes even within the same series at the same factory, may differ in physicochemical properties, which is determined by the peculiarity of its technology, in particular at the stage of crystallization, as well as the possibility of polymorphic transitions during transportation and storage. This can also occur during the production and storage of ready-made drugs with appropriate changes in the properties of drugs.

For example, lincomycin and roxithromycin exist in at least 3 modifications - 2 crystalline and 1 amorphous, which differ in density values and the nature of the data of differential scanning calorimetry (DSC). The amorphous form of lincomycin during storage in the air turns into a crystalline modification, remaining stable in low humidity (storage in a desiccator).

Most substances, including antibiotics, are characterized by endothermic effects - processes with heat absorption that characterize the structural and phase transformations of substances, so the next stage of research was to study the nature of thermal transformations of lincomycin and roxithromycin.

According to the series of samples of roxithromycin for the original sample we also register one pronounced endothermic effect at 122° C. The DSC curve for an amorphous antibiotic sample and a sample isolated from the ether is of the same type, with structural transformations occurring in two stages and are accompanied by endothermic effects. For the amorphous sample of roxithromycin, the values of the maxima at 94.2° C are 113.4° C, and for the sample obtained from the ether, the values of the maxima are observed at 95° C and 11.7° C.

Despite the similarity of the thermal effects of samples of roxithromycin obtained from the ether (crystalline form) and *dimethylformamide* (DMFA) (amorphous form), the shift of the maximum effect relative to the high-temperature region indicates more stable structure of the sample of roxithromycin isolated from the ether.

**Okrepka G.M.**

## **MECHANISM OF NANOPARTICLE INCORPORATION INTO THE SALT CRYSTAL**

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The mechanism of incapsulation of aqueous CdTe/CdS quantum dots (QDs) in salt crystals of KBr is discussed. CdTe/CdS QDs in water as dopant of KBr monocrystals were used. The synthesis of CdTe/CdS QDs was based on the interaction of cadmium thioglycolate and hydrogen telluride (H<sub>2</sub>Te) in alkaline medium followed by heat treatment of the formed clusters. For incorporation into the matrix, colloidal solutions of negatively charged CdTe/CdS QDs have been synthesized. Crystals of KBr:CdTe/CdS composite were grown by slowly evaporating the solvent from a mixture of a saturated aqueous solution of salt and colloid of nanoparticles under ambient conditions. To avoid energy transfer between neighboring QDs their concentration in the parental solution was kept relatively low. Parental solutions were stored for few days at the room condition. The crystals of salt: QDs composite were isolated from the parental solution, rinsed with acetone and dried.

Embedding of the nanocrystals in the bulk ionic crystals produces materials with density lower than that for matrix itself. This fact is usually omitted in the works of other authors. To evaluate density difference between composite and host materials we grew both of them in similar conditions and determined the density as mass to volume ratio. For cubic samples volume was determined by two approaches – calculation from the linear dimensions of the crystals and/or by fluid displacement method. For the samples of irregular shape only second method was used. According to the data from our experiments the densities of composites are almost 10% less than the density of a pure salt crystal. These results hint, that incorporation of the nanoparticles occurs alongside with the formation of pores (voids) in the composite crystal.

Previous works report that QDs can serve as crystallization centers for the composite. According to this mechanism, a number of crystallization centers should be equal to the number of QDs in the parental solution, and growth of large monocrystal is unlikely. Actually, only up to 4-8 crystals form in the growth solution under typical conditions of synthesis via slow solvent evaporation. This allows us to assume that crystallization centers are still spontaneously formed by the pure salt. Additionally, high ionic strength of the parental solution makes formation of floccules of nanocrystals more favorable. These floccules are attracted to the positively charged surface, cling to it and then captured inside the crystalline volume.

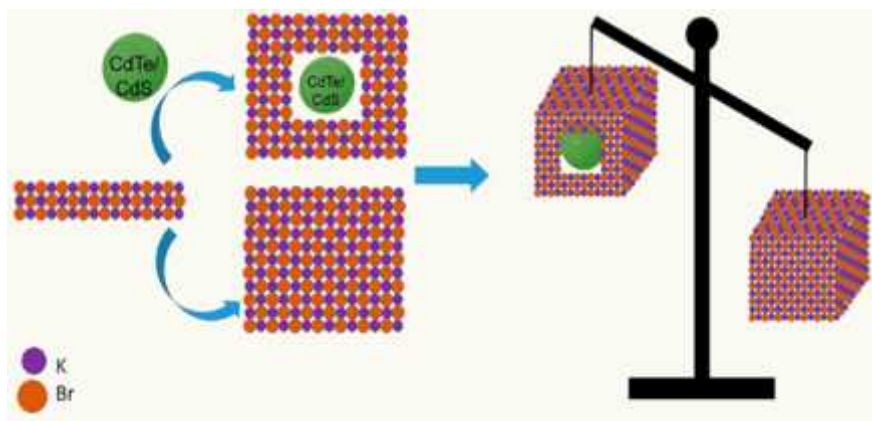


Fig. Scheme of salt and salt:QDs composite crystal growth: 1 - center of crystallization, 2 - incorporation of nanoparticles into the crystal (violet –  $K^+$  cations, red –  $Br^-$  anions and green – CdTe/CdS nanoparticles (to scale), 3 – comparison of salt and composite crystal density.

In this research work, we suggest, that QDs are not closely packed into the composite crystal so some pores are formed and this causes the decrease of the density of KBr:CdTe/CdS composite comparing to the pure salt crystal.

**Panasenko N. V.**  
**SYNTHESIS AND FLUORESCENCE SPECTRUM OF 9-(4-PYRAZOLYL)**  
**DECAHYDROACRIDINDIONES-1,8**

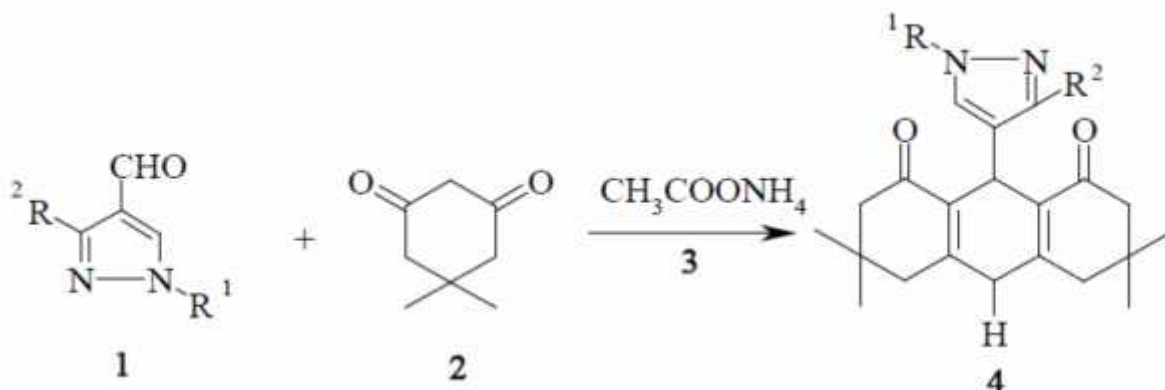
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One of the most important problems of modern photoelectronics is the purposeful creation of materials with predetermined physical properties. To create liquid crystal displays, you need dyes not only with certain optical characteristics, but also quite stable under prolonged UV irradiation.

Recently, dyes of decahydroacridine structure have been studied in detail, as they are promising, from the point of view of practical application, as laser materials and fluorescent labels in biological objects. Such materials have highly efficient phototransformation processes.

To construct complex and promising decahydroacridinediones-1,8 with a pyrazole nucleus at position 9, we developed the synthesis conditions and studied their absorption and luminescence spectra depending on the electronic nature of the substituents in the 1st and 3rd positions of the pyrazole nucleus.

The basic synthons for the synthesis of the target hybrid compounds 4 were 1,3-disubstituted 4-pyrazolecarbaldehydes 1, dimedone 2 and ammonium acetate in ethyl alcohol.



$R^1 = CH_3, CH_2CH_2CN, CH_2CH_2COOH, C_6H_5$

$R^2 = COOH, COOC_2H_5, C_6H_4, 4-MeC_6H_4, 4-MeOC_6H_4$  3- pyridyl, 4- pyridyl, 2- thienyl, 2-benzofuryl.

The composition of the obtained compounds was reliably confirmed by elemental analysis and mass spectrometry, and the structure was established by NMR spectroscopy.

The absorption spectra of compounds 4 are quite similar with a pronounced band in the range of 330-450 nm and an intense band in the range of 240-320 nm. The fluorescence spectra of the target compounds are monoband. The band practically does not change when the wavelength of excitation changes. Quantum fluorescence yields were measured relative to coumarin.

The highest quantum yield of 23 % has a compound containing a methyl group in position 1 and a carboxyl group in position 3 of the pyrazole nucleus.

**Tkachuk M.M.**

**RESEARCH OF THE NON-EQUILIBRIUM OF THE DIFFUSE LAYER FOR THE DESCRIPTION OF THE ELECTROCHEMICAL KINETICS NEAR THE ROTATING DISK ELECTRODE BY NUMERICAL SOLUTIONS OF THE STRICT BOUNDARY PROBLEM**

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The Frumkin's theory of electrochemical kinetics contains an assumption about the Boltzmann distribution of concentrations in the diffuse layer of electroactive components. However, these studies on the restrictions on the use of this model have not yet been made to the end. The Frumkin's fundamental theory of electrode reactions (with the Boltzmann distribution of concentrations in the diffuse layer) and the model based on a numerical solution of equations of stationary multicomponent diffusion near the rotating disk electrode (RDE) are compared with each other. The simulation was carried out using tested numerical methods and Mathcad program. The strict boundary problem of the mass transfer near the RDE includes:

1. The equation of material balance, taking into account the mechanisms of transfer of matter due to diffusion, migration, convection and homogeneous reaction with the participation of the electroactive substance:

$$\frac{\partial c_i}{\partial t} = -\nabla \vec{J}_i + R_i, \quad \vec{J}_i = -D_i \nabla c_i - D_i \frac{z_i F}{RT} c_i \nabla \xi + \vec{v} c_i, \quad i=1, \dots, n; \quad (1)$$

2. The equation of potential distribution near the charged electrode surface:

$$\nabla^2 \xi = -F/v \cdot v_0 \sum_{k=1}^n z_k c_k \quad (2)$$

3. The solution of stationary hydrodynamic equations for systems with the working RDE:

$$\vec{V} = V_r \vec{e}_r + V_\xi \vec{e}_\xi + V_x \vec{e}_x, \quad (3)$$

where  $\vec{e}_r, \vec{e}_\xi, \vec{e}_x$  - normed basic vectors in the orthogonal cylindrical coordinate system;

$V_r(x, \dots) = \dots \check{S} F(\xi); V_x(x) = \sqrt{\epsilon \check{S}} H(\xi); V_\xi(x, \dots) = \dots \check{S} G(\xi); \xi = x \sqrt{\check{S}/\epsilon}; a = -0,51023; b = -0,61602;$

$F(\xi) = a' - \xi^2/2 - 1/3 b' \xi^3 + \dots; G(\xi) = 1 + b' + 1/3 a' \xi^3 + \dots; H(\xi) = -a'^2 + 1/3' \xi^3 + b/6 \xi^4 \dots;$

4. To describe an electrical double layer, the Gouy-Chapman-Stern-Grahame model is used. For z-z valence background electrolyte, the potential dependence from the distance within the diffuse layer ( $x_d \leq x_i$ ) is given by the equation:

$$\xi(x_i) = \frac{RT}{F} \cdot \frac{4}{|z|} \cdot \text{ath} \left( \exp \left[ -\frac{(x_i - x_d)}{\lambda} \right] J \cdot \text{th} \left( \frac{|z| \xi_2 \cdot F}{4 \cdot RT} \right) \right), \quad (4)$$

5. The dependence of potential from distance within a Stern layer ( $0 < x_i \leq x_d$ ) can be calculated as:

$$\xi(x_i) = w_m - (w_m - \xi_2) \cdot x_i/x_d, \quad (5)$$

where  $w_m$  is the value of the metallic surface potential ( $\xi = 0$ ).

6. The connection between the potential of the electrode, measured relative to the potential of zero charge  $\xi_0$  and the potential jump in the diffuse layer  $\xi_2$  is expressed through the ratio of integral capacities of Stern  $K_{02}$  and diffuse  $K_2$  layers:

$$\frac{\xi_0}{\xi_2} = 1 + \frac{K_2}{K_{02}}, \quad \frac{\xi_2}{\xi_2} = \frac{K_2}{K_{02}}, \quad \frac{K_2(\xi_2)}{K_{02}(\xi_2)} = \frac{v \cdot v_0}{K_{02}(\xi_2)} \cdot \text{sh} \left( \frac{|z| F}{2RT} \xi_2 \right) / \frac{|z| F}{2RT} \xi_2. \quad (6)$$

**Winkler I. A.**  
**VISCOSITY OF AQUEOUS SOLUTIONS OF THE DIETARY MONO- AND  
POLYSACCHARIDES**

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It is one of the common today's trends in food processing industry to use various dietary supplements and sugar substitutes instead of sucrose. The main reasons for that are excessive calorific value of sucrose and comparatively difficult process of its digestion. These problems cause gaining excessive weight because of overconsumption of sweets on the one hand and additional load on the human digestive system – on the other. In the context of substituting sugar, it is important to control not just taste qualities but the rheological parameters of the products and raw materials. Indeed, sugar provides not just sweetness but also the required viscosity, consistency and/or uniform distribution of the components within the bulk of the end product. The latter characteristic is caused by the ability of sucrose to form and maintain more or less stable structuring in the disperse systems. The solutions of monosaccharides are less viscous and do not provide the required stability to secure this structuring. This problem can be solved by adding some amounts of polysaccharides to restore the needful viscosity.

It has been found that the effect of adding the carbohydrates on the system's viscosity depends on their molecular mass. For the concentrations 1-30 %, the viscosity increases with the hydrocarbons' concentration, and this effect enhances with an increase of the solute's molecular mass. The efficiency of adding the carbohydrates decreases in the sequence sucrose>glucose>fructose for the entire range of concentrations. The system's density also increases with its concentration.

It was found that the aqueous solutions of pectin with the concentration up to 0.4 % exhibit the properties of regular Newtonian's fluids. However, when pectin and some mono- or polysaccharide are simultaneously present, their cumulative effect on the solution's viscosity is slightly greater than just a sum of the separate effects of each component. It was found that only 0.05 % of pectin was sufficient to keep the system's viscosity at the values that are characteristic of the working solutions with sucrose. Therefore, it can be concluded that a mixed additive of pectin and some monosaccharides can maintain the rheological characteristics of the system even if it does not consist of sucrose. An additive of 0.05-1% of pectin and 10-40 % of glucose provides the needful sweetness and maintains the system's viscosity at the level that is required to keep the stability of the semi-finished confectionery and food. As seen in the Fig., viscosity of the solution of glucose containing a 0.05 % additive of pectin remains above that of the solution of sucrose with the same concentration. It proves that such solutions of glucose can be used as sugar substitutes in the food industry without a risk of losing the required system's consistency and viscosity.

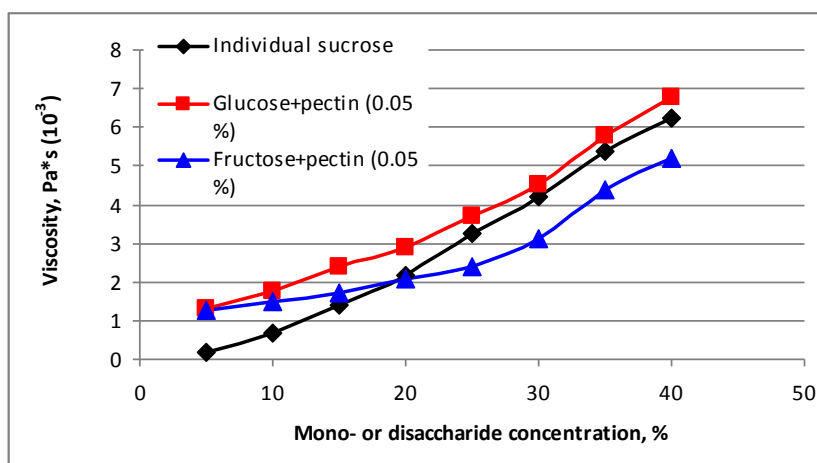


Fig. Comparison of viscosity of the individual solutions of sucrose and combined solution of glucose (fructose) with 0.05 % of pectin.

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 3 ; 4- -  
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H<sup>+</sup>- - -  
 36,0% - 7- 14,9% - 3-  
 16,1% 7- H<sup>+</sup>- -  
 16,8% 3-  
 26,1% H<sup>+</sup>- - 14,0% 12,1% 3- 7- 13,6%

H<sup>+</sup>-

( , 1988)

( , 2008),

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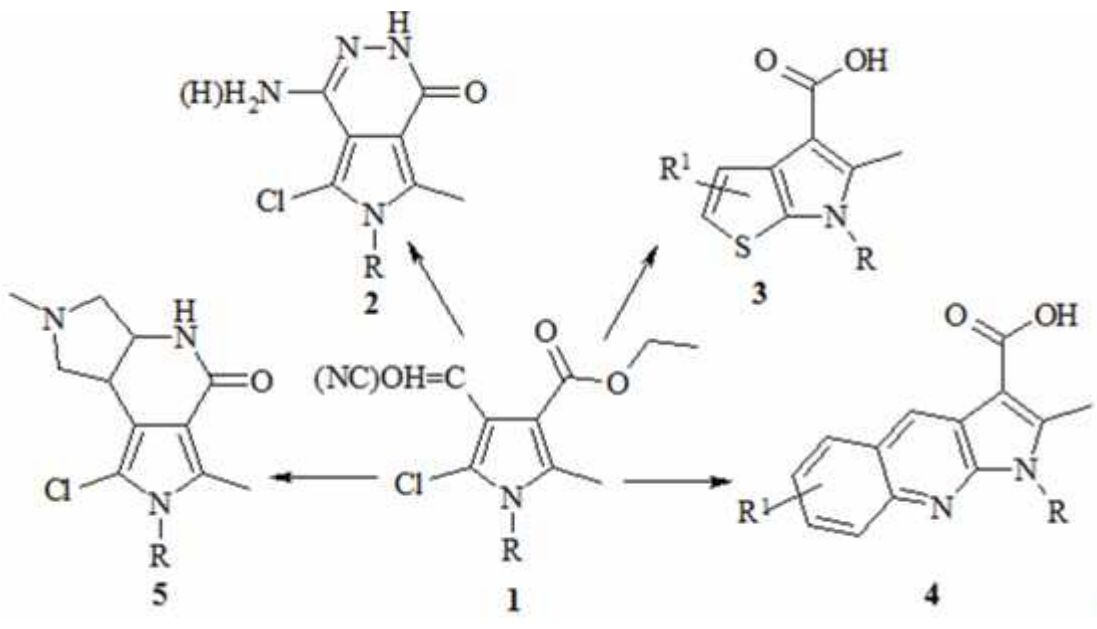
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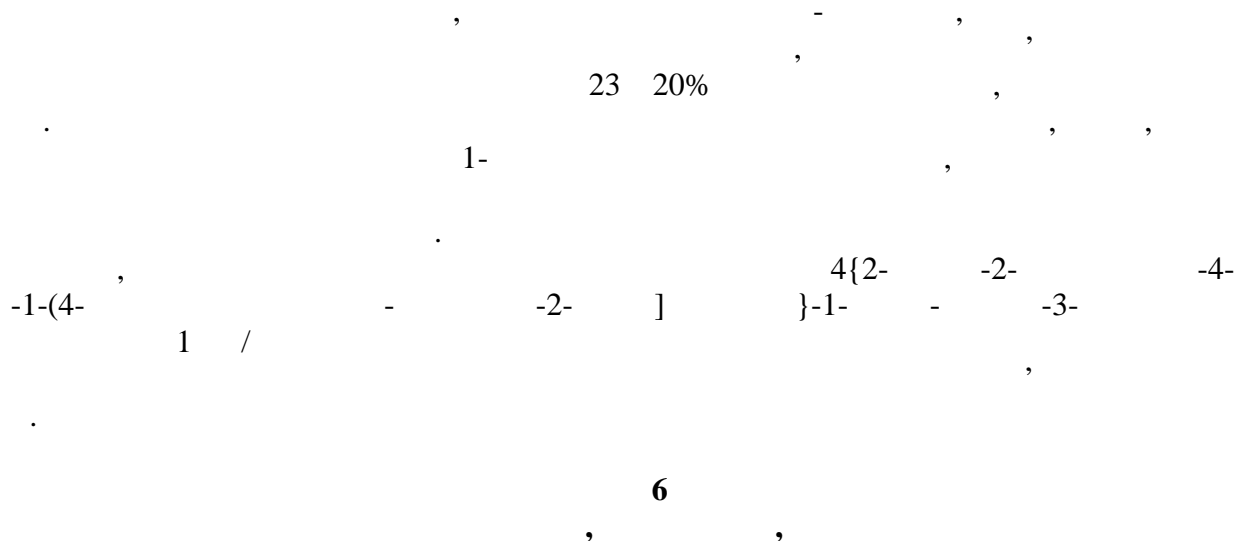
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**Al Salama Muhammad Wathek**  
**PECULIARITIES OF PATHOGENETIC CHANGES IN STABLE ANGINA IN THE**  
**ANALYSIS OF HEART ATTACK**

*Department of Internal Medicine, Physical Rehabilitation and Sports Medicine*  
*Bukovinian State Medical University*

The aim of the research is to study the peculiarities of the course of stable angina pectoris (STA) of different functional classes (FC) with postinfarction and diffuse atherosclerosis. 120 patients with an objectified diagnosis of STA of II and III FC, who were divided into two groups, were examined during our research: the 1st group included the patients with verified STA of II FC and the 2nd group included the patients with heart contractions (HC) of III FC (25.83 and 74.17% of cases, respectively).

According to the presence or absence in the history of myocardial infarction (MI), the distribution led to the division into three groups: patients with postinfarction atherosclerosis after Q-MI (44, 17% cases), with postinfarction atherosclerosis after non-Q-MI (17.50% of cases) and with diffuse atherosclerosis (38.33% of cases).

At the beginning of inpatient treatment and after 6 months at the outpatient stage, all patients underwent clinical and laboratory examination, which included biochemical blood tests (lipid profile, creatinine, uric acid (UA), enzyme-linked immunosorbent assay of serum to determine the levels of amino-terminal propeptide natriuretic peptide (NT-proBNP) and C-reactive protein (CRP).

It was found that in the group with a history of Q-MI, the proportion of patients with FC III STA probably predominates ( $51.69 \pm 5.30$  and  $22.58 \pm 7.51$ )% of cases, respectively ( $p < 0.01$ ), with probably less detection of severe angina among people without IM ( $32.58 \pm 4.97$  and  $54.84 \pm 8.94$ )% of cases, respectively ( $p < 0.05$ ).

The level of total cholesterol (LTC) in the blood is significantly higher in patients with STA III FC - ( $5.86 \pm 0.14$ ), against ( $5.33 \pm 0.21$ ) mmol / l, respectively ( $p < 0.05$ ), regardless of the presence in patients with a history of Q- and non-Q-MI - ( $5.81 \pm 0.20$ ), against ( $5.67 \pm 0.16$ ), against ( $5.81 \pm 0.20$ ) mmol / l, respectively (in all cases  $p > 0.5$ ). The level of HC is significantly higher in patients with STA III FC - ( $500.58 \pm 17.52$ ), against ( $374.14 \pm 20.89$ )  $\mu\text{mol} / \text{l}$ , respectively ( $p < 0.001$ ). However, this indicator increases only in the combination of STA with transferred Q-MI (against patients without MI - ( $517.32 \pm 23.34$ ), against ( $425.73 \pm 21.99$ )  $\mu\text{mol} / \text{l}$ , respectively,  $p < 0, 01$ ), without significant differences in the value of this indicator in combination with STA with transferred non Q-MI (against patients without MI - ( $435.63 \pm 32.336$ ), against ( $425.73 \pm 21.99$ )  $\mu\text{mol} / \text{l}$ , respectively,  $p > 0.5$ ).

Blood creatinine values were determined to be significantly higher in patients with severe STA - ( $111.19 \pm 3.88$ ), against ( $96.48 \pm 4.36$ )  $\mu\text{mol} / \text{l}$ , respectively ( $p < 0.05$ ), and in combination

with STA with Q-MI - against patients without MI ( $115.60 \pm 5.28$ ), against ( $94.37 \pm 2.98$ )  $\mu\text{mol} / \text{l}$ , respectively ( $p < 0.001$ ) and not Q-MI - against patients without MI ( $115.19 \pm 8.78$ ), against ( $94.37 \pm 2.98$ )  $\mu\text{mol} / \text{l}$ , respectively ( $p < 0.05$ ). There was a probable increase in the levels of NT-pro BNP - ( $365.28 \pm 52.03$ ), against ( $191.16 \pm 29.23$ )  $\text{pg} / \text{ml}$ , respectively ( $p < 0.01$ ) and CRP - ( $13, 60 \pm 1.18$ ), against ( $6.77 \pm 0.40$ )  $\text{mg} / \text{l}$ , respectively ( $p < 0.001$ ). There was no difference in these biomarkers depending on the presence in the history of transferred Q- and non-Q-MI. The concentration of CRP in patients without MI, after Q- and non-Q-MI ( $10.34 \pm 1.19$ ), against ( $11.34 \pm 0.86$ ), against ( $12.76 \pm 5.50$ )  $\text{mg} / \text{l}$ , respectively (in all cases  $p > 0.5$ ) did not have a reliable position.

In contrast, the level of triglycerides (TG) does not significantly depend on the severity of STA - ( $2.33 \pm 0.07$ ), against ( $2.16 \pm 0.12$ )  $\text{mmol} / \text{l}$ , respectively ( $p > 0.5$ ), nor from the transferred Q- and not Q-MI. The level of TG in patients without MI, after Q- and non-Q-MI is ( $2.28 \pm 0.13$ ), against ( $2.31 \pm 0.07$ ), against ( $2.09 \pm 0.08$ )  $\text{mmol} / \text{l}$ , respectively (in all cases  $p > 0.5$ ).

Analyzing the results, it should be noted that the higher functional class of stable angina involves an increase in total cholesterol, levels of amino-terminal propeptide natriuretic peptide and C-reactive protein, regardless of the presence of a history of Q- and non-Q-myocardial infarction.

**Bachuk-Ponych N.V.**

## **ADJUVANT THERAPY OF METEOROLOGICAL PATIENTS WITH ISCHEMIC HEART DISEASE**

*Department of Propedeutics of Internal Diseases  
Bukovinian State Medical University*

The existing standards for the treatment of age-related vascular pathologies of the heart and brain do not provide the correction in weather-dependent patients, so there is a problem of finding drugs with multiorgan action, among which herbal medicines have undeniable advantages.

The aim of the investigation is to study the clinical efficacy of Krateprovin (Bovios Pharm, Ukraine) and its effect on left ventricular ischemia in the complex treatment of patients with coronary heart disease (CHD) in the inpatient and outpatient stages. Krateprovin consist of ginkgo biloba leaf extract (EGB) 50 mg, hawthorn fruit extract 150 mg, periwinkle extract 60 mg, pueraria root extract 50 mg. 98 patients with coronary heart disease, stable angina pectoris II-III functional class, aged 47-75 years were examined. Patients in the comparison group (23 people 23.47%) received standard treatment (angiotensin-converting enzyme inhibitor, beta-blocker, nitrate, if necessary - diuretic), patients in the control group - (75 people, 76.53%) - additional drug Krateprovin (2 capsules per day regardless of meals for 2-4 months). Daily ECG monitoring was performed using a portable complex "Solvaig" (Hungary). Examinations were performed in the first two days on a drug-free background and 14-16 days after the course of treatment. It was found that all patients had different degrees of meteorological dependence, 76 people (77.55%) had increased cardiac manifestations, which were accompanied by headache, sleep disturbance, irritability, arthralgia, which neurologists assessed as manifestations of dyscirculatory encephalopathy I-II degree. The seasonal manifestations of meteorological dependence in the late autumn and early spring periods were clinically more significant and longer than in the winter and summer periods.

The use of Krateprovin in the complex treatment of patients with coronary heart disease significantly contributed to accelerate the regression of clinical manifestations of coronary heart disease by 2 –5 days. The results of Holter ECG monitoring show that the reduction of ischemia manifestations in patients with coronary heart disease was achieved by taking Krateprovin- the number of ischemic episodes decreased from  $7.2 \pm 0.58$  to  $3.1 \pm 0.21$  ( $p < 0.05$ ), the duration of ischemic episodes decreased from  $46.7 \pm 4.08$  to  $21.2 \pm 2.01$  min ( $p < 0.05$ ), respectively, with a significant difference compared to similar parameters of the comparison group.

This effect Krateprovin demonstrates, probably, due to the content of flavonoids (quercetin, isoquercetin, rutin, triterpene compounds, ginkgolides A, B, C, J and bilobalides) - the main active substances of EGB and pueraria. They determine the antispasmodic, capillary-strengthening, anti-inflammatory and membrane-stabilizing properties of the drug. The vasoprotective properties of

flavonoid glycosides of the extract are stem from the dilatation of arterioles and narrowing of veins, due to which the filling of the venous system is regulated.

After the conducted inpatient treatment, patients continued to take Krateprovin at the outpatient stage for two (persons under 55 years) - four (persons over 55 years) months in the early spring and late autumn period, and in the period between them, episodic 2-5 days according to calendar of meteorological days.

Domestic phytopreparation Krateprovin - is an effective therapeutic and prophylactic drug, which can help with a correction of meteorological dependence in patients with age-related atherosclerotic lesions of the heart and brain, as well as has a positive effect on the dynamics of clinical symptoms, exhibits significant antiischemic and antihypertensive properties.

**Dogolich O.I.**  
**CARDIOVASCULAR RISK AS A COMORBIDITY PHENOMENON**  
**IN PATIENTS WITH GOUT**

*Department of Propedeutics of Internal Diseases*  
*Bukovinian State Medical University*

In last ten years, the growth rate of gout is 0.5 to 2-3.5% in the world. The study of the peculiarities of the formation of comorbidity processes in patients with gout, depending on its stage and age, is the object of attention of scientists of the last decade, especially through the prism of evaluation of cardiovascular risks.

Objective - to assess the risk of cardiovascular events in gout patients, depending on the level of comorbidity in the age aspect. The study included 115 patients with primary gout at the age of 37-74 years, among which men dominated (99 people - 86.09%). The calculation of total cardiovascular risk was performed on the scale SCORE (2007), according to which one can calculate a 10-year risk of occurrence of major coronary events.

It has been established that in men the gout is progressing slowly, with the increase of the phenomena of polymorbidity and comorbidity from the first (interval gout) to the second stage (chronic gouty arthritis), among which the manifestations of the metabolic syndrome (MS) were dominant. Only 4 males (3.49%) did not detect concomitant and comorbid diseases.

In patients with a second stage of gout, the manifestations of MS were noted in 63 patients (54.8%) and were more pronounced (AG II st., Obesity II-III, steatohepatosis or steatohepatitis, CHD in more significant forms, diabetes II type, higher levels of dyslipidemia).

In accordance with the European guidelines for the use of SCORE in clinical practice, we evaluated the total 10-year risk of cardiovascular events in the examined patients. According to this analysis, it is found that in the majority of patients with gout there is a high (more than 5%) level of cardiovascular risk (101 patients - 87.8%). Of these, the probability of developing a severe form of coronary artery disease (cardiovascular risk more than 20%) noted in 23 (20.1%) people. Only in 26 (22.6%) patients the level of development of a fatal cardiovascular event was low and average (1-4%).

In the age-old aspect, in the elderly patients, the percentage of total cardiovascular risk increased: at the age of 51-60 years - up to 7-9%, 61-70 years - up to 14-16%, over 70 years - more than 20%. That is, in the age aspect in patients with gout the level of cardiovascular and cardiovascular risk is significantly increased.

In patients with gout with increasing stage, severity of its course, level of comorbidity and age of patients, the level of total cardiovascular risk increases significantly. To prevent the development of cardiovascular events can be considered timely and adequate treatment of comorbidity processes and the improvement of anti-aggregate therapeutic complexes.

**Gingulyak O.M.**

## **CHANGES IN VASCULAR ENDOTHELIUM ON THE BACKGROUND OF CORONARY HEART DISEASE AND ATHEROSCLEROSIS**

*Department of Internal Medicine, Physical Rehabilitation and Sports Medicine  
Bukovinian State Medical University*

Today, the main reason for the development of coronary heart disease (CHD) - atherosclerosis - is regarded as one of the forms of chronic inflammation, which is based on the violation of cholesterol metabolism. CHD occurs in men in the absence of explicit risk factors, usually in the age of 55 years of age due to not always known causes of its occurrence is possible and at an earlier age. Recent studies have undeniably proved that inflammation is one of the main pathogenetic mechanisms of atherosclerosis, starting with the first manifestations of damage to the vessel wall and ending with the rupture of the atherosclerotic plaque and the onset of acute coronary syndrome. Therefore, the study of atherogenesis by studying the intima-media complex will make it possible to detect patients at the subclinical stage of atherosclerosis, and the application of various therapies (metabolic, hypolipidemic) objectivizes the therapeutic approach that is more effective in the treatment and prevention of early atherosclerosis, which will enable to prevent the development of severe vascular diseases of the cardiovascular system and central nervous system.

The main purpose of their work is to determine the early signs of endothelial dysfunction and increase the thickness of the intima-media complex (TCIM) of the carotid arteries and to objectify the level of inflammation markers in subjects with subclinical atherosclerosis, the effect of treatment.

The following research methods were used: a detailed collection of complaints and anamnesis, a thorough objective examination, laboratory, biochemical, instrumental research methods. Experts of the European Society for hypertension and the European Society of Cardiologists in 2003 determined the optimal values of TCIM <0.9 mm; an increase is considered to be TCIM of 0.9 mm to 1.3 mm, and criterion of atherosclerotic plaque - TCIM ≥ 1.3 mm.

A total of 45 young men of the male sex with the phenomena of subclinical atherosclerosis were examined, at the beginning of treatment and after treatment after 3 months. The colored duplex scan (CDS) was examined by the internal right and left carotid artery (ICA) TCIM. Before the treatment with hypolipidemic drugs TCIM was - <0.9 mm, which was diagnosed for right asthma in 26.7% of cases among the examined patients, 0.9-1.3 mm - in 33.3% of the subjects, > 1.3 mm in 40 % of patients. For the assessment of the left ICA, the data were as follows: TCIM - <0.9 mm at 26.7%, 0.9-1.3 mm - 4.6.7%, > 1.3 mm in 26.7% of the subjects. After the treatment, which lasted for 3 months, the following parameters were obtained: TKIM - <0,9 mm on right VAA in 43,5%, 0,9-1,3 mm in 30,4%, > 1,3 mm in 26,1 . The left CCA study was 56.5%, 26.1% and 17.3% respectively, indicating a positive effect of treatment and indicating an increase in the number of patients with normal CI (<0.9 mm) and a significant decrease in CIM thickening.

The use of anti-atherosclerotic therapy at the stage of subclinical atherosclerosis, which is diagnosed with color duplex scan with the evaluation of TCIM, makes it possible to reduce the level of coronary and cerebral pathology, and the use of hypolipidemic therapy significantly reduces the signs of atherosclerosis.

**Glubochenko O.V.**

## **SPINAL GOUT: CLINICAL ASPECTS**

*Department of Propedeutics of Internal Medicine  
Bukovinian State Medical University*

Gout is the most common inflammatory arthritis that is caused by the deposition of monosodium urate crystals in synovial fluid, periarticular tissue, subcutaneous tissue, and the urinary tract. Recent reports of the prevalence and incidence of gout vary widely according to the population studied and the methods employed, but they range from a prevalence of less than 1% to 6.8% and an incidence of 0.58–2.89 per 1,000 person-years (Mats Dehlin, et al. 2020).

Our aim was to analyze, according to the modern literature data, the clinical peculiarities and spreading of the unusual presentations of gouty tophi variants, particularly the spinal gout.

The monosodium urate crystals are accumulated in the synovial fluid and form deposits on the cartilage and, potentially in every tissue of the body, including the axial skeleton, where the facet joints, spinous processes, intervertebral disks, or sacroiliac joints may have urate crystals deposits (Forbess LJ et al 2012). Spinal tophi may also occur and are rarely reported, resulting in various clinical manifestations such as back pain, spinal cord compression, radiculopathy, and even mimicking epidural abscess and spondylodiscitis (Wan SA, 2019). Although gout is prevalent worldwide, the cases of spinal gout are less frequently reported. They are presented variably with acute, subacute, or chronic symptoms. (Koro, L, et al., 2021). This author reported a case of a 35-year-old male with thoracic spinal cord compression by tophaceous gout who developed progressive spastic paraplegia and lower extremity numbness acutely over a 5-day period. Yafei Cao et al., in 2019 reported a case of a patient that presented with quadriplegia that developed over 3 days, who was empirically treated for spinal gout. Liu T, et al., in 2015 reported an unusual case of thoracic spinal cord compression caused by extradural tophaceous deposits whose initial diagnosis had been lymphoid malignancy. Author did analysis of 26-year-old man with severe tophaceous gout presented with a 4-month history of progressive weakness and dyschesia of both lower extremities. In 2018, Ding et al. reviewed the characteristics of 30 previously reported cases of thoracic spinal cord compression caused by tophaceous gout and found that at the onset of disease, 60% of patients were presented with back pain and 43.3% had weakness and/or numbness in their lower limbs. HosseinElgafy et al., in 2016 in their review of literature described the clinical picture of 68 spinal gout patients. According to this investigation, 47 (69.1%) of patients were presented with localized back/neck pain, 38 (55.9%) with some form of spinal cord compression, defined as weakness, numbness, loss of bladder or bowel control, and decreased sensation below the compression level, 17 (25%) with spinal nerve root compression or radiculopathy, defined as motor dysfunction or dysesthesia along the course of a specific nerve caused by compression of its root, 13 (19.1%) with fever, 1 (1.5%) with cranial nerve palsy, and 2 (3.0%) with atlanto-axial subluxation.

So, due to its rarely encountered in clinical practice and the lack of typical defining criteria, the diagnosis of spinal gout is quite difficult and easily misdiagnosed. It is recommended that patients presenting with axial pain; radicular pain or myelopathy; and especially high uric acid levels, with or without a history of gout, should be evaluated for spinal gout.

**Halytska V.O.**

## **BRONCHIAL ASTHMA IN COMBINATION WITH DIABETES MELLITUS TYPE 2 – THE CURRENT STATE OF THE PROBLEM**

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According to WHO, the number of patients with bronchial asthma (BA) continues to grow rapidly in the world and by 2025 the number of patients with asthma seems to be increased by 100 million people. According to GINA 2019, the prioritized task is to study clinical and functional signs of asthma phenotypes in case of comorbid states presence, as well as detection of biomarkers of the pathological process. Despite all the success achieved in the diagnostic process and treatment, diabetes mellitus (DM) continues to be among the top 10 causes of death in the world (9th place), and in the DALY list – 8th place.

The aim is to analyze literature on the issues of comorbid asthma and diabetes mellitus type 2. The full-text text mode access to THE ELSEVIER, SCOPUS, EBSCO, MEDLINE, PUBMED, SPRINGER database had been used, as well as authoritative Ukrainian and foreign therapeutic editions, in particular pulmonology journals.

In the study conducted in 2021, Gabor Tomisa indicated the prevalence of DM among patients with asthma in the broad range of 0,8-13,9%. The risk of asthma in patients with diabetes is 2,2 times higher than for patients without diabetes. The combination of DM type 2 and BA, which

are multifactorial diseases, is accompanied by a cascade of metabolic disorders and is associated with worse control of glycemia, frequent and severe BA exacerbations. In the US study published in 2019 (Wu et al.) higher level of HgbA1c was associated with higher rates of asthma exacerbation. In 2020 Sarah a Hiles et al. pointed out that the blood eosinophils count in respiratory tract diseases is an important field of research, especially in the perspective of precision medicine, where biomarkers can be used for more individualized treatment. Furthermore, in those with early onset asthma, it is associated with increased eosinophilic inflammation, whereas in late onset, it correlates with predominantly non-T2 inflammation and lower nitric oxide (NO) (HartmutGrasemann, 2020). The feature of the immunological status of patients with BA in combination with DM type 2 is the reduction of IgE level along with the increase in the number of lymphocytic autoantibodies. Such pathogenetic changes as the reduction in the allergic and immunocomplex components of the chronic inflammation process may indicate switching to the autoimmune process, which is more aggressive (Yeryomenko G.V., 2019). A recent study (Katrien Eger, 2021) shows that the vast majority of patients with severe asthma respond favorably to anti-IL5 biologics after 2 years of treatment, however it is a proportion of nonresponders. There are no available clinical studies that would show the effectiveness of using glutathione or its precursors, such as S-adenosilmethionine (SAM), in improving clinical outcomes in patients with comorbid asthma, obesity and/or DM type 2. It was established that a reduced level of vitamin D (VD) is more significant among obese people, and it was detected a negative correlation between a concentration of 25(OH)D and the risk of diabetes mellitus. The low VD level was associated with increased asthma morbidity and susceptibility to air pollution. However, the results of some earlier clinical trials which added vitamin D to treatment were significantly disappointing in improving clinical outcomes in asthma. (Sonali Bose et al., Mario Castro et al., 2019)

Taking all into account, there is still a significant percentage of patients with BA resistant to treatment, especially in the case of comorbid pathology. Therefore, it is necessary to continue researches on pathological mechanisms of the mutually aggravating BA and DM type 2, the inflammatory endotyping, determination of genetic and epigenetic markers with the purpose of development new biological drugs and improvement of patients' life quality. Further studies should be conducted to determine the impact of gene polymorphism VDR and CD14 on the clinical course and treatment response of patients with comorbid asthma and DM type 2. In addition, further research is needed to understand how excessive production of reactive oxygen species (ROS) due to mitochondrial dysfunction in asthmatic patients with comorbid DM type 2 worsens the state of airway epithelial, causes changes in lung function and reduces the response to treatment.

**Horevych S.S.**

**EFFECTS OF COMBINED THERAPY WITH ROSUVASTATIN AND  
POLYUNSATURATED OMEGA-3 FATTY ACIDS ON LIPOPROTEIN-ASSOCIATED  
PHOSPHOLIPASE A<sub>2</sub>**

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Atherosclerotic cardiovascular disease is still the leading cause of morbidity and mortality worldwide despite great advances on diagnosis and treatment have been achieved in the past decades. Diabetic subjects have a two- to four fold increased risk of heart disease, but the mechanism through which this increased risk is mediated is not fully understood. Inflammatory processes have been increasingly recognized as a critical step in the pathogenesis of both diabetes and heart disease and may offer a biological link between the two diseases. One newly recognized inflammatory biomarker is lipoprotein-associated phospholipase A<sub>2</sub> (Lp-PLA<sub>2</sub>), an enzyme that may influence atherogenesis and plaque rupture without altering the general immune response. Lp-PLA<sub>2</sub> is an enzyme excreting predominantly from atherosclerotic plaques by macrophages and neutrophils and then circulating in blood stream. Previously, clinical epidemiological studies showed that increased plasma level of Lp-PLA<sub>2</sub> was associated with increased risk of cardiovascular events such

as myocardial infarction and ischemic stroke, and Lp-PLA<sub>2</sub> inhibitors could significantly reduce the incident of cardiovascular events.

The aim of research was to study the levels of LP-PLA<sub>2</sub> in patients with chronic ischemic heart disease and type 2 diabetes mellitus and effects of the combined therapy with rosuvastatin and polyunsaturated omega-3 fattyacids (omega-3 PUFA) onLp-PLA<sub>2</sub> level. The study included 64 patients with coronary heart disease (CHD) and type 2 diabetes mellitus, randomised into two groups: Group I (n=32) receiving rosuvastatin monotherapy (20 mg/d); and Group II (n=32) receiving combined therapy with rosuvastatin (10 mg/d) and omega-3 PUFA (2 g/d). We assess serum levels of LP-PLA<sub>2</sub> before and after treatment. At baseline, 12 weeks later, all participants underwent the serum levels of Lp-PLA<sub>2</sub>.

The results of the study showed that all patients with coronary heart disease associated with type 2 diabetes mellitus diagnosed with elevated levels of LP-PLA<sub>2</sub> in the blood (more than 200 ng/mL). In both groups, three-month therapy was associated with a significant decrease in Lp-PLA<sub>2</sub> level (-28 % and -35 % for monotherapy and combined therapy groups, respectively; =0,001 for both comparisons).

Combined therapy with rosuvastatin and omega-3 PUFA decrease level of the content of LP-PLA<sub>2</sub> better than in group with monotherapy. The advantages of combination therapy provide a higher hypolipidemic effect and allow by reducing the dose of statins to eliminate their negative impact on the reduction of endogenous antioxidants. This effect reduces the risk of developing of cardio-vascular events in patients with chronic ischemic heart disease and type 2 diabetes mellitus.

**Hrechko S. I.**

### **THE LEVEL OF KINESIOPHOBIA IN PATIENTS WITH HEART FAILURE**

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Secondary prevention of coronary heart disease is aimed at reducing the risk of recurrent heart attack and is carried out in heart disease. Exercise in cardiac rehabilitation has been treated in an almost positive way in terms of mortality, morbidity, quality of life, and risk factors for people with coronary heart disease. However, the relationship between daily physical activity and risk factors of cardiac diseases is more uncertain for secondary prevention. The positive effect of cardiac rehabilitation is reduced by morbidity and mortality, both general and cardiovascular, including a positive effect on the functional state of patients, their weight, blood pressure, lipid profile, glycaemia, and insulin sensitivity, fibrinolytic activity. It has been observed that ectopic myocardial activity decreases, and anginal attacks decrease and oxygen consumption increases due to exercises. Other benefits include improvement of quality of life and decline of depression.

We have assessed the level of kinesiophobia due to cardiac function evaluated by clinical parameters in patients with cardiovascular disease and performed the analysis of clinical, laboratory, instrumental, 68 patients (27 women) aged  $62,9 \pm 6,35$  years hospitalized in the acute coronary insufficiency unit. Kinesiophobia was assessed using the Tampa Scale of Kinesiophobia Heart (TSK-Heart) questionnaire. Rehabilitation programs are complex and need to be identified individually to achieve the established health benefits. The results of the survey indicate that a high level of kinesiophobia was observed in 20% of patients with coronary heart disease six months after the cardiac problem. From the point of view of secondary prevention, it is desirable to detect high levels of kinesiophobia in patients with coronary heart disease, as recognition may facilitate appropriate recommendations and treatment for such patients. It is necessary to emphasize the importance of using a psychometrically based questionnaire. This provides introductory support for TSK-SV Heart as a reliable, valid questionnaire for measuring kinesiophobia in patients with coronary heart disease

There are several important clinical variables that affect the result of rehabilitation associated with the high level of kinesiophobia. Patients with high levels of kinesiophobia had a significantly higher history of myocardial infarction ( $p<0,05$ ), concomitant diabetes mellitus ( $p<0,01$ ), and hypertension ( $p<0,05$ ) compared to patients with low levels of kinesiophobia. In

addition, patients with high levels of kinesiophobia had more complications during their hospital treatment, including signs of heart failure ( $p < 0,05$ ) and such kind of arrhythmia as atrial fibrillation ( $p < 0,05$ ). The presence of kinesiophobia and the fear associated with physical rehabilitation potentially might interfere with successful cardiac rehabilitation. Further research should expand this information and develop optimal treatment interventions for patients with the high level of kinesiophobia and the main goal of increasing physical activity and exercise.

The exercise program is well tolerated and can be used as an alternative to traditional hospital exercise programs. The TSK-SV Heart Scale was assessed as a reliable, valid questionnaire to measure kinesiophobia in patients with coronary heart disease. In patients with cardiovascular disease, kinesiophobia has a multifactorial nature and is much greater in patients with NYHA III, and especially class IV. The impact on kinesiophobia was identified by clinical variables that affected rehabilitation outcomes and prognosis, representing all components of ICF, medical variables, and health-related quality of life in patients with coronary heart disease.

**Hulaha O.I.**

### **EPLERENONE USE IN ACUTE MYOCARDIAL INFARCTION**

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Heart failure (HF) remains an important social problem. The severity of the prognosis of clinically manifest HF is indicated by the fact that approximately half of such patients die within 4 years. An important aspect of research remains the impact on the progression of HF by selecting adequate pathogenetically drug therapy.

In order to identify the influence of markers of HF progression, 121 patients with acute myocardial infarction (AMI), whose average age was  $51.5 \pm 3.94$  years, were examined. All patients received nitrates,  $\beta$ -blockers, angiotensin-converting enzyme inhibitors, anticoagulants, antiplatelets. Patients were divided into two groups: group 1 received basic therapy with the addition of spironolactone at a dose of 25 mg for 25 days; group 2 received basic therapy with the addition of eplerenone at a dose of 25 mg for 28 days. The control group consisted of 15 healthy individuals of the same sex and age. The state of neurohumoral regulation was studied by determining the level of aldosterone and the state of proteolytic activity according to the assessment of azocollagen (by lysis of high molecular weight proteins).

We found that before treatment, the level of aldosterone was 1.6 times higher than in the control ( $240.58 \pm 27.12$  vs.  $149.36 \pm 19.24$  pmol / l;  $p < 0.01$ ), and the proteolytic activity of azocollagen before treatment was almost 3.5 times lower than in the control ( $0.010 \pm 0.002$  vs.  $0.035 \pm 0.001$  E440 / ml / h;  $p < 0.01$ ). After treatment, aldosterone levels decreased significantly in both groups with a greater tendency in the second group, azocollagen proteolysis in both groups increased significantly, but most pronounced in the group of patients receiving aldosterone antagonist eplerenone.

According to U.P Jorde [2019], the use of aldosterone antagonists in AMI leads to a decrease in intramyocardial aldosterone production, a decreasing in the level of type III procollagen, as well as a marker of myocardial dysfunction - brain natriuretic peptide. Development RALES studies have for the first time shown a 30% reduction in the risk of death in patients treated with long-term spironolactone treatment. The results of the EPHEBUS clinical trial using eplerenone confirmed the success of the tactics of blocking the effects of aldosterone at the receptor level. Thus, the use of eplerenone in patients with AMI leads to a decrease in the stimulation of myocardial fibroblasts, a decrease in the formation of collagen in a cardiac muscle, improvement in the contractile function of the myocardium.

The inclusion of eplerenone in the complex dictation of patients with AMI and HF contributes to the normalization of the processes of the proteolytic activity of blood plasma and leads to the formation of adequate remodeling of postinfarction myocardium, which determines the further course of clinical manifestations of HF.



**Husarchuk A.G.**

**PARAMETERS OF ENDOTHELIAL DYSFUNCTION AND IMMUNE RESPONSE IN PATIENTS WITH RHEUMATOID ARTHRITIS WITH AND WITHOUT ISCHEMIC HEART DISEASE**

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In spite of achievements of medical science etiology of rheumatoid arthritis (RA) as an autoimmune disease remains unknown, where chronic erosive arthritis results in systemic lesions of the internal organs. Endothelial dysfunction (ED) is considered as a predictor of cardiovascular diseases (CVD), and it is one of the diagnostic criteria of early detection of atherosclerotic vascular lesions. Ischemic heart disease (IHD) as one of CVDs plays a leading role in ED pathogenesis in patients with RA.

The aim is to determine changes in endothelial dysfunction and immunological response in patients with rheumatoid arthritis with and without coronary heart disease. 151 patients with RA and IHD were examined and divided into 3 groups. 1 group - 60 patients with RA, 2 group - 30 patients with RA and IHD, 3 group - 61 patients with IHD. The control group included 22 patients. ED level was assessed by means of detection of NO-synthetase content in the blood with RA, as a final metabolite of  $\text{NO}_2^-$  and  $\text{NO}_3^-$ . The level of VEGF and CD28 in the blood serum was determined by means of immune-enzyme method.

The results of the study of the levels of metabolites  $\text{NO}_2^-$  and  $\text{NO}_3^-$  in the first and second groups showed their increased content. The content of nitrite ions ( $\text{NO}_2^-$ ) in the blood was higher by 20.9% and 41.8%, respectively, for patients of the first and second groups; the content of nitrate ions ( $\text{NO}_3^-$ ) in patients of the control group and the third group exceeded the values of healthy individuals by 16.9% and 29.2%, respectively. The highest content of nitrite ions ( $\text{NO}_2^-$ ) is observed in middle-aged patients with both RA and coronary heart disease. With increasing age, the content of nitrite ions ( $\text{NO}_2^-$ ) decreases and becomes even lower than that of healthy people (by 9.5% - for the 1st group, and by 26.7% - for the 2nd group).

Analysis of the content of VEGF in the blood for patients with different durations of the disease showed that the concentration of the studied protein grows larger with increasing duration of the disease. For patients from group 1 (RA), where the duration of the disease was up to 5 years, the VEGF content increased by 32.5% or up to 265.5 nmol/l compared with the control; with the duration of RA 5-10 years - an increase of 54.9% or up to 310.9 nmol/l, and with a duration of the disease over 10 years - the value increased by 94.5% to 389.9 nmol/l. For patients with a duration of RA over 10 years, a decrease in the studied index to 5.3 nmol / l was found (26.7% less for patients with a duration of RA up to 10 years). Analyzing the content of sCD28 in the samples, it was found that the maximum concentration was found in middle-aged patients, and the minimum (the difference was significant) - in the elderly.

It was found that at a young and middle age on the background of less pronounced ED and shorter duration of RA, the content of NO metabolites in the blood of patients increases significantly. With age, and concomitant coronary heart disease, against the background of prolonged RA, ED increases, while the mechanisms of synthesis of nitric oxide weaken so that the total content of NO metabolites becomes lower than in younger patients.

As the duration of the disease increases, the content of VEGF in the blood of patients increases, which, at the same time, did not show age dependence on RA and did not change further with concomitant coronary heart disease. Detected concentrations of sCD28 are higher in patients with less prolonged RA, and begin to decrease with increasing duration of the disease. Inflated rates in young and middle-aged patients make it possible to consider them as potential biomarkers of disease activity.

**Ivanchuk P.R.**  
**“DIGITALIZATION” IN CARDIOLOGY:  
CHANGES IN ECG MARKERS DURING COVID-19**

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COVID-19 pandemic adjusts care for patients with cardiovascular disease. According to the European Association of Cardiologists Recommendations, no specific electrocardiogram (ECG) differences were found in patients with and without confirmed COVID-19. The minimal findings were rather signs of myocarditis (apparently caused by the virus itself) and a small number of arrhythmias in such patients. It is clear that the final diagnosis of COVID-19 can be made only in the presence of a positive PCR or ELISA test, and the presence of other “specific” signs of SARS-CoV-2 infection. However, this little informativeness applies to the routine ECG performed on all patients admitted to the hospital.

The aim of the study is to establish possible differences in the ECG of patients with / without a confirmed diagnosis of COVID-19 and various cardiac pathology in digital processing of routine ECG using the software-diagnostic complex “Smart ECG” and the ability to assess the course of treatment of these patients.

The routine ECG was digitally processed to determine the angle  $\alpha$  of the ST segment slope and the extension height H of the ST segment slope (ST, mV). The first derivative of the T wave with the calculation of the maximum velocities ratio (MVR) and the adjacent extreme values ratio (AEVR) were obtained. These parameters were evaluated in a patient diagnosed with COVID-19 and probable myocarditis of viral etiology.

In the analysis of the studied parameters obtained by “digitalization” of routine ECG made on the 1st, 5th and 10th days of treatment in a patient with diagnosed COVID-19 and probable myocarditis of viral etiology. The dynamics of changes in the background of therapy shows the normalization of MVR (0.393; 0.417 and 0.833), which indicates a positive effect of anti-ischemic therapy, as well as a decrease in microvascular myocardial damage COVID-19, with the development of pericyte damage, which can also lead to ischemia. At the same time, the growth of AEVR with its subsequent decline (1,167; 1,375 and 1,0), as well as changes in the angle  $\alpha$  (8,53; 6,84 and 4,54) and its continuation height H (0,37; 0,30 and 0.40), may reflect the dynamics of COVID-19 in this patient and treatment efficacy.

The use of “digitalization” of the ECG in patients with cardiovascular disease and the presence / absence of COVID-19, can significantly improve the informativeness and specificity of the classical ECG and improve its diagnostic and prognostic value in this group of patients. The dynamics of changes in the indicators obtained during “digitalization” on the background of therapy demonstrates their normalization, which indicates a positive effect of therapy, and may reflect the course of COVID-19 and concomitant cardiac pathology.

**Ivashchuk S.I.**  
**ASSOCIATION OF RED BLOOD CELL DISTRIBUTION WIDTH WITH THE ACUTE  
PANCREATITIS AND CHRONIC PANCREATITIS EXACERBATION FROM THE  
POSITION OF THE PROGNOSIS**

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The aim of the research was to investigate the association of red blood cell distribution width (RDW) with the acute pancreatitis and chronic pancreatitis exacerbation as a possible prediction factor. Moreover, biomarkers are urgently needed for patient risk stratification. This study included adults diagnosed with acute pancreatitis and chronic pancreatitis exacerbation admitted to Emergency Hospital in Chernivtsi, between January, 2017, and January, 2020. A total of 123 patients were included in the study. The clinical data were retrospectively analysed for all patients. The measures included RDW at admission or during the first 24 hours, with an elevated RDW-coefficient of variation (RDW-CV) defined as more than 14.5%.

The red blood cell distribution width is a standard component of a routine complete blood count test. RDW quantifies the variation of individual red blood cell volumes, which vary from one cell to the next and for the same cell as it circulates during its approximately 115-day lifespan. Elevated RDW is associated with an increased risk for all-cause mortality. In our opinion, increasing of the RDW-CV is also an evidence of the important pathogenetic role of disintegration processes that take place in the pancreas, and of the development of active inflammatory process in the latter.

The higher levels of RDW-CV, which exceeded 14.5%, were observed in 10.5% of the patients with chronic pancreatitis exacerbation. On the contrary to these data, in patients with acute pancreatitis with development purulent-necrotic complications in the future the exceeded 14.5% level was found in 37.3%. The severe course of acute pancreatitis with a high level of RDW-CV was confirmed clinically (the occurrence of purulent-necrotic complications), and by the laboratory examinations (increase in the level of peripheral blood leukocytes, leukocyte intoxication index, C-reactive protein). The obtained clinical observation data confirm that a higher RDW-CV may be a predictor of complicated acute pancreatitis.

Thus, the proposed method of predicting the course of acute pancreatitis by RDW-CV showed high clinical efficiency of prediction and availability, and has no contraindications. Its use will provide early prediction and stratification of a more severe course of acute pancreatitis with the development of purulent-necrotic complications.

**Kolodnitska T.L.**

**CURRENT VIEWS ON THE PM<sub>2.5</sub> EXPOSURE EFFECT ON COAGULATION,  
INFLAMMATION AND ENDOTHELIAL FUNCTION**

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Many epidemiological and clinical studies demonstrate that particulate matter (PM) increases the risk of cardiopulmonary disorders, such as asthma, bronchitis, arrhythmias, atherosclerosis, and so on, while PM-induced oxidative stress and inflammation are possibly responsible for these different diseases. There is also evidence that air pollution is related to thrombosis and endothelial dysfunction. A lot of researchers nowadays try to find the most susceptible to PM exposure people. However, mechanisms and sources of susceptibility are still unclear. This may be due to comorbidity and epigenetic states.

The aim is to analyze changes in markers of coagulation, inflammation and endothelial function associated with PM<sub>2.5</sub> exposures. Research methods are informational-analytical, content-analysis.

Exposure to PM leads to kinds of cardiopulmonary diseases, such as asthma, COPD, arrhythmias, lung cancer, etc., which are related to PM-induced inflammation. It was found that PM<sub>2.5</sub> (aerodynamics diameter <2.5 mm) exposure induces inflammatory response both in vivo and in vitro. Since the toxicity of PM is tightly associated with its size and components, PM<sub>1</sub> (aerodynamics diameter <1.0 mm) is supposed to be more toxic than PM<sub>2.5</sub>. However, the mechanism of PM<sub>1</sub>-induced inflammation is not clear.

Particulate air pollution has been associated with triggering of myocardial infarctions and increased cardiovascular mortality. Potential pathways for these effects include increased systemic cytokine-mediated inflammation, endothelial dysfunction, increased thrombosis, decreased plaque stability, and increased arrhythmias. Previous studies have found that air pollution influences markers of coagulation (such as fibrinogen), inflammation (such as C-reactive protein), and endothelial function (such as ICAM-1 and VCAM-1). Elevations in these blood markers, in turn, have been associated with an increased risk of adverse cardiovascular events.

Air pollution effects on cardiovascular disease (CVD) are stronger among subjects with fibrinogen and IL-6 gene variants. However, epigenetic modifications may be as important as genetic polymorphisms in CVD pathogenesis.

Air pollution may affect some plausible biological mechanisms that could explain some of the exacerbation of CVD morbidity and mortality. Air pollution exposure may increase systemic cytokine-mediated inflammation and prothrombotic activity. In susceptible people, ultrafine particles were able to provoke alveolar inflammation, with the release of mediators capable of increasing blood coagulability. Increased plasma viscosity is a potential mechanism explaining why high fibrinogen levels are related to increased CVD risk. Similarly, elevated C-reactive protein, ICAM-1, and VCAM-1 levels have been associated with inflammation and cardiovascular risk. An increase in C-reactive protein may reflect arterial damage from white blood cell invasion and inflammation within the wall due to air pollution exposure, thus inducing cardiovascular events.

PM exposure effect on markers of coagulation, inflammation and endothelial function. This association should be modified by race, sex, and age. The question about the most susceptible people is still not answered.

**Lukashevych I.V.**

**DYNAMICS OF INDICATORS ANTIOXIDANT PROTECTION IN PATIENTS WITH CHRONIC HEPATITIS DURING THE COMPREHENSIVE TREATMENT WITH INCLUSION “HEPTRAL” BELONGS TO DISEASE WITH CHRONIC HEPATITIS**

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The aim of our study was to study the effect of “Heptral” on the results of treatment of patients with chronic hepatitis non-viral origin. 41 patients with chronic hepatitis aged from 22 to 75 ( $51,3 \pm 14,5$ ) have been explored. According to the treatment, patients are divided into two groups. The basic group consisted of 21 patients, whom together with standard treatment prescribed pills “Heptral” 1 tablet three times a day 30 minute before meal for 15-18 days. The group for compare were 20 patients with chronic hepatitis non-viral origin, who received the standard treatment. The group for check up were 20 practically healthy volunteers. We researched the concentration in the blood of the reaction products thiobarbituric acid content of glutathione in the blood, activity of catalase, glutathione peroxidase.

As a result of research discovered a significant increase in the concentration of reduced glutathione during treatment in patients who additionally received “Heptral”. They had contents of reduced glutathione after treatment higher by 26,1% ( $p < 0,05$ ) in compare with contents before treatment. The trend to reduced activity of glutathione peroxidase observed during treatment in both groups of patients, but it was not credible. Blood catalase activity significantly increased after treatment in patients who took “Heptral” on average by 20,4% ( $p < 0,05$ ) in compare with that before treatment, in patients of the group of compare – by 13,8% ( $p < 0,05$ ). After treatment we could see decrease of concentration of reaction products of thiobarbituric acid in patients of both group, more reduction of their content noted in patients, whom to complex treatment was included “Heptral”.

During two weeks of treatment better antioxidant status was adjusted in patients with chronic hepatitis, whom in addition to standard treatment took “Heptral”. For full correction of the clinical manifestations of the disease and antioxidant status should follow the chosen schemes of treatment as the maintenance dose to begin of stable remission in outpatient stage.

**Nesterovska R.A.**

**COLCHICINE EFFICACY AND SAFETY FOR THE TREATMENT WITH ISCHEMIC HEART DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED TRIALS**

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Colchicine, an anti-inflammatory drug that has been used in rheumatology for a long time to treat gout and prevent seizures; it was firstly presented in cardiology to reduce the recurrence rate of

pericarditis. Currently, the attention of cardiologists to colchicine has again been attracted due to the study of the role of systemic inflammatory response in the development of atherothrombotic cases.

The aim of the study was to investigate the effectiveness of colchicine in inhibiting the activity of the inflammatory process in the pathogenesis of ischemic heart disease (IHD) and its acute and chronic forms. The study of the PubMed database for relevant research in the literature has been conducted. Articles on the mechanism of action of colchicine and clinical applications in IHD have been identified and reviewed.

The most studied mechanism of action of colchicine is its ability to bind to tubulins, thus blocking the formation and polymerization of microtubules. In addition, studies have shown that the biological effects of colchicine are dose-dependent (different effects occur at different concentrations of colchicine) and are directly related to the effects of colchicine on cell migration, cytokine release and intracellular movement, which play an important role in cell dysfunction which are involved in the development of inflammation. The effectiveness of prophylaxis colchicine for the prevention the risk of cardiovascular complications in patients with chronic and acute ischemic heart disease has been demonstrated in clinical trials LoDoCo (Low-Dose Colchicine trial) and COLCOT (CoLchicine Cardiovascular OuTcomes Trial). According to a randomized placebo-controlled study of LoDoCo2, colchicine at low doses (0.5 mg/day) reduces the incidence of ischemic complications and the need for revascularization in patients with stable ischemic heart disease. According to 5 randomized controlled trials, long-term use of colchicine reduced the risk of cardiovascular cases for patients with atherosclerosis significantly, as well as similar mortality from non-cardiovascular diseases (compared with placebo). On the other hand, the results of COVERT-MI (Colchicine for Left Ventricular Remeling Treatment in Acute Myocardial Infarction) were reported at the European Society of Cardiology 2021, which did not show the effectiveness of colchicine in the size of the infarction area and revealed an unexpected threefold increase in left ventricular thrombus in the group of colchicine which requires further research among this group of patients. A recent meta-analysis evaluated adverse cases in 14,983 patients. The results showed that the use of colchicine for the treatment of cardiovascular disease is associated with an increased risk of gastrointestinal adverse cases (especially diarrhea) and prevention of drugs taking associated with colchicine-associated adverse cases (mainly in relation to gastrointestinal symptoms), compared with placebo. It should be noted that among patients who have been receiving a lower daily dose (0.5 mg/day) of colchicine over a long period of time (> 6 months), the risk of gastrointestinal adverse cases is similar to placebo.

With the continuous understanding of the mechanisms of atherosclerosis, anti-inflammatory therapy is approaching clinical applications. Current studies have shown that colchicine, as an anti-inflammatory drug, is likely to become a first-line treatment for atherosclerosis and other cardiovascular inflammatory diseases in the future.

Thus, colchicine is an affordable, safe and effective drug that can be successfully used for the secondary prevention of atherosclerotic cardiovascular disease if its tolerability and benefits for the cardiovascular system are confirmed in current clinical trials.

**Peryzhniak A.I.**

**THE STATE OF THE SYSTEM OF FREE RADICAL OXIDATION AND THE ANTIOXIDANT DEFENSE SYSTEM OF THE BODY IN NEWBORNS WITH IMPAIRED FUNCTIONAL STATE OF THE CARDIOVASCULAR SYSTEM**

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According to the literature, damage to body cells, in particular myocardium, due to hypoxic exposure is caused by the activation of free radical oxidation (FRO) processes, which, with insufficient antioxidant defense components, triggers a cascade of generic oxidative stress (OS) reactions, as a result of which pathological changes occur at the molecular, cellular, tissue, organ and systemic levels. Based on a comprehensive study of the main components of the FRO and the antioxidant defense system (ADS) system, we made a conclusion regarding their significant role as

one of the links in the pathogenesis of violations of the functional state of the cardiovascular system (CVS) in perinatal pathology.

182 children were examined. Group I consisted of full-term newborns with a general state of moderate severity (65); Group II - newborns with a serious condition (57). The control (III group) included 60 relatively healthy newborns.

The results obtained showed that with an increase in the severity of the condition in newborns of groups I and II of the study, an increase in the activity of FRO processes occurred, as evidenced by an increased content of malonic aldehyde (MA) in erythrocytes and a high level of oxidative modification of proteins (OMP) in the blood plasma. Namely, the MA level in children of group I increased to  $25.14 \pm 1.31 \mu\text{mol} / \text{l}$ , in children of group II - up to  $34.97 \pm 1.83 \mu\text{mol} / \text{l}$ , which had probable differences in comparison with children of group III -  $15.10 \pm 0.77$ ,  $p < 0.05$ . The level of OMP during physiological adaptation in newborns of the III group was  $1.39 \pm 0.07$  o.o. g / ml, the increase in the severity of the condition in children of the I and II observation groups was accompanied by an increase in the indicator to  $1.81 \pm 0.09$  and  $2,66 \pm 0.14$  p.u. g / ml, respectively,  $p < 0.05$ .

Along with the activation of the FRO system in newborns, a certain insufficiency of the ADS mechanisms was observed, which was confirmed by significant differences in a number of indicators of serum and blood erythrocytes. So, if the level of ceruloplasmin in the blood serum of children of group I increased to  $455.74 \pm 224.65 \text{ mg} / \text{l}$ , in children of group II there was a significant decrease in the level of the indicator - to  $162.70 \pm 8.74 \text{ mg} / \text{l}$ , with its normal value in group III -  $253.83 \pm 13.65 \text{ mg} / \text{l}$ ,  $p < 0.05$ . Catalase activity during physiological adaptation in children of group III was  $11.66 \pm 0.61 \mu\text{mol} / \text{min}$ , in children of experimental groups I and II, the indicator probably increased - in accordance with  $32.53 \pm 1.73$  and  $43.46 \pm 2,19 \mu\text{mol} / \text{min}$ . The activity of the enzyme glutathione-6-phosphate dehydrogenase (G6-PD) significantly increased in newborns of group I - up to  $11.57 \pm 0.60 \mu\text{mol} / \text{min}$  and decreased in children of group II - to  $5.16 \pm 0.26 \mu\text{mol} / \text{min}$ , with control values in children of III groups -  $6.16 \pm 0.33 \mu\text{mol} / \text{min}$  HB,  $p < 0.05$ . The level of HS-groups in newborns tended to decrease in line with the increase in the severity of the pathology. So, if in children of group III it was  $0.78 \pm 0.04 \mu\text{mol} / \text{l}$ , in newborns of group I -  $0.46 \pm 0.02 \mu\text{mol} / \text{l}$ , then in children of group II it decreased to  $0.32 \pm 0,01 \mu\text{mol} / \text{L}$ ,  $p < 0.05$ . The  $\gamma$ -glutamyltransferase (GGT) activity in the newborns of the observation groups had a tendency to increase, taking into account the deepening of the severity of the condition -  $87.70 \pm 4.43$ ,  $90.21 \pm 4.57$  and  $94.80 \pm 4.83$  units / l, respectively, in the III, I and II groups,  $p < 0.05$ .

The results of the study indicate that the imbalance in the parameters of the FRO and ADS system leads to the accumulation of peroxides and damage to the integrity of the cell membranes of cardiomyocytes, which is one of the defining links in the development of cardiovascular disorders in perinatal pathology.

**Petrynych O.A.**

## **DEPENDENCE OF LIPID PEROXIDE OXIDATION AND ANTIOXIDANT PROTECTION IN PATIENTS WITH HYPERTENSION FROM THE FASTING INSULIN LEVEL**

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The aim of the study was to examine the features of lipid peroxidation (LPO) and antioxidant protection (AOP) in patients with hypertension (AG) depending on the level of fasting insulinemia.

44 patients with AG of I-II stages were examined. The obtained results were compared with the data of 24 practically healthy individuals, representative by age and sex, who formed the control group.

Blood for biochemical examination was taken from the ulnar vein in the morning 12 hours after the last meal. The level of fasting immunoreactive insulin (IRI) in the blood was determined using standard kits from DRG International Inc (USA) by enzyme-linked immunosorbent assay. Normal fasting insulin concentrations were considered to be up to  $25 \mu\text{IU} / \text{ml}$  for men and up to  $23$

$\mu\text{IU} / \text{ml}$  for women. The content in the blood of LPO products - compounds with isolated double bonds, diene conjugates, ketodienes and conjugated trienes - was studied by the method of I.A.Volchegorsky et al., malonic aldehyde (MA) of plasma and erythrocytes by Y.A.Vladimirov and A.I.Archakov. The activity of reduced glutathione (GR) was investigated by the titration method according to O.V.Travina in the modification of I.F.Meschishen; glutathione peroxidase (GP) and glutathione-S-transferase (GT) by I.F.Meshchishen; catalase by M.A.Korolyuk et al.

Estimation of the difference of the sample sets was performed using Student's t-test. The difference between the samples was considered statistically significant at  $p < 0.05$ .

To assess the effect of insulin levels on the processes of LPO and AOP in patients with AG, they were divided into two subgroups: with normo- (19 people) and hyperinsulinemia (25 people). In patients with AG with elevated IRI levels compared to patients with basal normoinsulinemia, there was a probable increase in the level of MA in erythrocytes by 10.80%, a decrease in GR by 8.33%. The concentration of GP and GT in patients with AG was probably lower compared to the control group (by 14.74% and 8.70%, respectively) only in the presence of hyperinsulinemia.

Thus, an increase in IRI levels in patients with AG is accompanied by an increase in LPO with a decrease in AOP.

**Prysyazhnyuk V.P.**

## **COMPLEX TREATMENT WITH QUERCETIN INCLUSION IN CHRONIC NONVIRAL HEPATITIS PATIENTS**

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Flavonoids have high antioxidant activity, which is most pronounced in quercetin, stimulate the synthesis of proteins, regulate the exchange of phospholipids and have membrane-stabilizing properties. Quercetin has pronounced anti-inflammatory properties due to a decrease in the activity of 5-lipoxygenase, which reduces the synthesis of leukotrienes from arachidonic acid.

The aim of the study was to investigate the effect of quercetin added to the basic treatment on the clinical course, biochemical parameters and indicators of the cytokine profile in chronic nonviral hepatitis (CH) patients. 55 patients with active nonviral CH were involved in the study, who according to the administered treatment were divided into two groups. The main group consisted of 25 patients with active CH who in addition to the standard treatment received pills of Quercetin in the dose of 40 mg three times daily 30 minutes before meals within 14-16 days. The comparison group consisted of 30 patients with active nonviral CH who received the standard basic treatment comparable to those of the main group by age and gender distribution. The control group consisted of 45 practically healthy individuals of the correlative age and gender. Written informed consents were obtained from all the participants. All of the observed patients and healthy individuals underwent comprehensive clinical, laboratory and instrumental diagnostic investigations. The range of indicators of biochemical blood analysis included: total bilirubin and its fractions, total protein and albumin, urea, creatinine, aspartateaminotransferase (AST), alanineaminotransferase (ALT), lactatedehydrogenase (LDG), gamma-glutamyltransferase (GGT), alkalinephosphatase (AP). The plasma levels of tumor necrosis factor- (TNF- ), interleukin 10 (IL-10), atrial natriuretic propeptide(1-98) (proANP) were investigated both in the examined patients and healthy individuals. Faster improvement of general condition, more effective reduction of general weakness and sensation of heaviness in the right hypochondrium, decreased discomfort in the heart area and shortness of breath, increased tolerance to physical activity were seen in patients who in addition to basic treatment received quercetin. According to these data significant decrease in the total bilirubin plasma concentration during treatment was observed in patients of both groups: by 33,5% ( $p = 0,008$ ) in the main group and by 26,6% ( $p = 0,02$ ) in the comparison group as compared to the indicators before the treatment. ALT activity in patients of the main group decreased by 43,7% ( $p = 0,02$ ), in patients of the comparison group – by 28,1% ( $p = 0,03$ ) after the treatment. Significant decrease of AST activity was achieved only in patients of the main group – by 27,8% ( $p = 0,03$ ). There was a significant decrease in LDG activity by 16,9% ( $p = 0,02$ ), as

ompared to appropriate rates before treatment in patients of the main group. Significant decrease of AP plasma activity (by 30,9% ( $p = 0,03$ )) was observed only in patients who received quercetin in addition to the standart treatment. Similar dynamics was characteristic for GGT activity in both groups of patients, however, in patients of the main group, this decrease was 55,0% ( $p = 0,009$ ), in the comparison group– 33,1% ( $p = 0,03$ ). Patients of the main group showed a significant decrease in TNF- content in the blood by 61,9% ( $p = 0,02$ ), while patients of the comparison group demonstrated only the tendency to reduce this proinflammatory cytokine. IL-10 before the initiation of treatment was elevated in the blood of the observed patients as ompared to practically healthy people. Additional quercetin administration to the standard treatment promoted significant decrease of proANP level in patients of the main group by 53,8% ( $p = 0,04$ ).

During two weeks of treatment clinical symptoms, functional liver parameters accompanied by a decrease in tumor necrosis factor- and atrial natriuretic propeptide blood levels were more effectively corrected in CH patients who in addition to the standard treatment received quercetin. For a complete correction of clinical manifestations of the disease, biochemical changes and the cytokine profile two-week complex treatment with quercetin inclusion is not enough, which requires longer administration of the chosen treatment course before the onset of persistent remission at the out-patient stage.

**Repchuk Yu.V.**

**THE ASSOCIATION OF HORMONAL AND METABOLIC PARAMETERS AND THE AGT GENE POLYMORPHISM (RS699) IN PATIENTS WITH ESSENTIAL HYPERTENSION**

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The aim of the study is to analyze the association of the angiotensinogen gene polymorphism (*AGT*, rs699) with hormonal and metabolic parameters in patients with essential arterial hypertension (EAH). 72 subjects with EAH and target-organ damaging (2nd stage), moderate, high or very high cardiovascular risk were involved in the case-control study. Among them there were 70.84% (51) females and 29.16% (21) males of average age  $59.87 \pm 7.98$ . Control group consisted of forty-eight practically healthy individuals with relevant age ( $49.13 \pm 6.28$ ) and sex distribution (62% females, 38% males). *AGT* (rs699) gene polymorphism was examined by Real-time polymerase chain reaction. Intact parathyroid hormone (intact PTH) and vitamin 25 (OH) D levels in blood serum were determined by chemiluminescence immunoassay (MAGLUMI).

As a result, the concentration of ionized  $\text{Ca}^{2+}$  in blood in patients with TT-genotype of the *AGT* gene (rs699) was extremely likely to be lower than in CC-genotype carriers ( $p=0.051$ ). In addition, we found out that in men with EAH who were T-allele carriers (TT- and TC-genotypes) the level of ionized  $\text{Ca}^{2+}$  in blood is probably lower than in women of the corresponding genotypes:  $1.14 \pm 0.01$  vs.  $1.17 \pm 0.015$  mmol/l ( $p < 0,05$ ) and  $1,14 \pm 0,01$  vs.  $1,19 \pm 0,02$  mmol/l ( $p < 0,05$ ), respectively. Whereas in the -genotype carriers, on the contrary, the level of ionized  $\text{Ca}^{2+}$  was higher in men than in women:  $1.18 \pm 0.01$  vs.  $1.14 \pm 0.015$  mmol/l ( $p = 0.014$ ). Against this background, the level of vitamin 25 (OH) D in the blood of the *AGT* gene (rs699) TT-genotype carriers in patients with EAH became lower than in those with the CC-genotype by 16.24% ( $p=0.049$ ), and the concentration of intact PTH on the contrary, higher, but abnormal and unexpected – by 7.30%. That is, in our opinion, a manifestation of compensatory-adaptive reactions of the body aimed at maintaining hormonal-metabolic homeostasis and calcium-phosphorus ion balance. In the control group, the difference in intact PTH was statistically significant, being higher in TT-carriers – by 28.89% and 21.26% ( $P_{\text{TT}} < 0.05$ ).

Thus, one-way ANOVA analysis of variance did not confirm the association of the *AGT* gene (rs699) with the studied hormonal and metabolic parameters.



**Riabyi S.I.**

**IMPACT OF TISSUE PROTEOLYTIC AND FIBRINOLYTIC ACTIVITIES ON THE MECHANISMS OF INTESTINAL ANASTOMOTIC LEAKAGE**

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In abdominal surgery, intestinal anastomotic leakage (IAL) is still a serious complication. The most often cases of IAL are registered after urgent operations with the range of 3,8-8,1%. The highest mortality rate (up to 22%) caused by IAL is detected after the formation of colorectal anastomosis. Known researches are devoted to the study of such risk factors of IAL as nutrition disturbances, smoking, steroids and chemotherapy, duration of surgical treatment, volume of infusion and blood transfusion etc. It has been proved that tissues ischemia, kind of suture material and technical approach have a significant impact on intestinal anastomosis healing. However, local changes of some biochemical processes in the anastomotic tissues and their role in IAL development aren't quite clear.

The aim of the research is to investigate the impact of specific changes of proteolytic and fibrinolytic activities of intestinal anastomotic area tissues on their regenerative properties under experimental conditions of IAL. The study has been performed on 72 albino nonlinear rats undergoing IAL model application. In 12, 24, 48, 72 hours and 5 days following a surgical procedure the samples of IA tissue have been taken for specific tests. The levels of proteolytic activity by the lysis of azoalbumin (AA), azocollagen (ACg), azocasein (ACs) and the indices of fibrinolytic activity: total (TFA), nonenzymatic (NFA), enzymatic (EFA) have been studied. The character of reparative processes in the anastomotic tissues has been estimated by means of microscopy of the histological sections of the sutured area.

According to the obtained data, a reliable steady activation of tissues proteolysis has been revealed in the animals of the experimental group in comparison with the control one. In 12-24h. following IAL model application a reliably higher activity of lysis of AA, ACs and ACg were detected in the animals of the experimental group ( $p < 0,001$ ). It testifies the increase of proteolytic modification of the low- and high-molecular proteins. At this period of observation in the animals with IAL there occurs a proved rise of TFA into a serous layer of the intestinal wall, both at the expense of NFA and EFA ( $p < 0,001$ ). During the of study the histological sections of the anastomotic area of the experimental group of animals, more intensive neutrophilic infiltration in the submucosal layer of the intestinal wall extending to muscle and serous membranes was revealed and venous plethora and hemorrhages into serous membrane were expressed. On the contrary, the fibrous mesh in the canal of the thread and between the serous membranes was not observed in the animals with IAL model compared with the control one. During a later period (48-72 h.) a tendency to rise of the indices of tissue proteolysis in the submucosal layer of the intestinal wall, especially indices of ACg lysis, which were one and a half-time higher than data of the control group. An elevation of the tissue fibrinolytic activity was detected in the animals with IAL, largely at the expense of EFA which exceeded twice the control data. The histological signs of regeneration defects in this period of observation were significant diastasis between the serous membranes of the intestine touching only in the area of the connected edges of the mucous membrane, also the diffuse inflammatory reaction with expressed neutrophilic and plasmacytic infiltration, edema, plethora and hemorrhages which spread to all layers of the intestinal wall. The constant signs of tissues necrosis with the advantage of disintegrated neutrophilic granulocytes and lymphoid cells over the macrophages and single active fibroblasts were revealed around the canal of the thread.

So, excessive activation of tissue fibrinolysis due to fibrin matrix lysis can lead to insufficient fixation of fibroblasts into the anastomotic area. On the other hand, prolonged intensive degradation of collagen in the submucosal layer of the intestinal wall, which provides the basic strength of anastomosis, may be in the basis of defects of anastomotic healing. Both of them can be considered as mechanisms of IAL formation in the conditions of insufficient blood circulation and require further study.

**Rusnak I.T.**

## **CARDIOVASCULAR RISK FACTORS. PHYSICAL ACTIVITY**

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There is a decrease in physical activity worldwide. Every third adult is not physically active. However, the increase in physical activity in terms of a healthy environment benefits the health of people of all age groups. The WHO provides recommendations for optimal activity levels, but even minor physical activity is better than its lack. People who suffer from lack of exercise should start with a low level of physical activity and gradually increase the duration, frequency and intensity of training. Among the factors that form the basis promoting many diseases, including cardiovascular ones, there is lack of physical activity. Approximately 3.2 million annual deaths are related to physical inactivity. Physical activity is any body movement involving skeletal muscles with energy release. Physical inactivity (lack of physical activity) is an independent risk factor for occurring chronic diseases. Healthy people are recommended to maintain appropriate levels of physical activity throughout their life. At least 30 minutes of moderate-intensity physical activity 5 times a week reduces the risk of a number of non-communicable diseases among adults. Stronger physical activity brings more health benefits and may be required to control the body weight. Physical activity helps prevent heart attacks and cardiovascular diseases. The results of all available researches demonstrate that regular exercises in moderate amount are perhaps the most effective preventive measure of heart diseases and their complications. In case of coronary artery diseases, regular exercises help the body to form more auxiliary arteries, through which the blood can flow around the body and bypass occluded blood vessels. Aerobic exercises contribute to the decrease of blood pressure, the level of triglycerides and low-density cholesterol, at the same time increasing the level of high-density cholesterol and preventing blood clotting.

The results of a large-scale investigation during 8 years of more than 84 thousand nurses are significant. Those who regularly did a complex of physical exercises presented the risk of heart attack or stroke 54% less compared to those women who had sedentary lifestyle. Modification of lifestyle is a priority in the treatment of hypertensive patients according to the recommendations of the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC). Clinical studies show that to reduce blood pressure changes in lifestyle can be equivalent to the efficacy of the drug alone and able to safely and effectively prevent the development of hypertension or delay the use of drug therapy; to prevent, if necessary, the use of it by patients with stage 1 hypertension. In addition to effecting blood pressure reduction, lifestyle changes contribute to the control of other factors of cardiovascular risk and clinical conditions. In the recommended approach to lifestyle changes regular exercise is recommended, for example, at least 30 minutes of moderate physical activity within 5 - 7 days a week. Moderate aerobic exercises are walking, jogging, cycling, and swimming.

**Sem aniv M.M.**

## **HORMONAL AND METABOLIC RISK FACTORS OF ESSENTIAL ARTERIAL HYPERTENSION DEPENDING ON POLYMORPHIC VARIANTS OF THE AGTR1 (RS5186) AND VDR (RS2228570) GENES**

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The aim of this study was to establish the role of hormonal and metabolic risk factors of essential arterial hypertension (EAH) depending on 1166A>C polymorphism of *AGTR1* gene (rs5186) and A/G polymorphism of *VDR* gene (rs2228570).

100 subjects with EAH and target-organ damaging (2<sup>nd</sup> stage), moderate, high, very high cardiovascular risk were involved in the case-control study. Among them, 70,84% females, 29,16% males of average age  $57,86 \pm 7,81$ . The control group consisted of 60 healthy individuals of relevant gender and age. All patients were observed by general physicians, cardiologists. Patients were tested for serum level of fasting glucose (enzymatic method, "CORMAY", Poland), ionized

calcium ( $\text{Ca}^{2+}$ ) (potentiometry, "SINNOWA", China), parathyroid hormone (PTH) and 25-hydroxyvitamin D (Vit D) (immune luminescent test "MAGLUMI", "SNIB", China), as well as genetic testing (qualitative real-time polymerase chain reaction (q RT-PCR, PCR)) for the detection of *AGTR1* (rs5186) and *VDR* (rs2228570) gene polymorphism was done. *AGTR1* gene genotyping was performed for 72 patients and 48 healthy individuals and *VDR* gene – for 100 patients and 60 healthy individuals.

The frequency of carbohydrate and 25-hydroxyvitamin D metabolism disorders, changes in parathyroid hormone and ionized calcium levels in hypertensive patients did not depend on polymorphic variants of genes *AGTR1* (rs5186) and *VDR* (rs2228570). EAH associates with increased parathyroid hormone ( $>65,0$  pg/ml) by 16,04% in C-allele carriers of *AGTR1* gene (rs5186) and decreased 25-hydroxyvitamin D ( $<30$  ng/ml) regardless the genotypes *AGTR1* (rs5186) and *VDR* (rs2228570) genes. Reduced serum level of 25-hydroxyvitamin D escalates the risk of EAH almost threefold; fasting hyperglycemia leads to growth of EAH risk almost 15 times. Changes in parathyroid hormone and ionized calcium concentration do not influence the risk of EAH in the examined. C-allele of *AGTR1* gene increases the risk of EAH more than 2 times, *VDR* gene is not an additional risk factor of EAH in the examined.

Therefore, reduced serum level of 25-hydroxyvitamin D ( $<30$  ng/ml) escalates the risk of EAH almost three times ( $p = 0,048$ ), and fasting hyperglycemia ( $>6,1$  mmol/l) leads to growth of the risk of EAH almost 15 times ( $p < 0,001$ ). An increase of parathyroid hormone ( $>65,0$  pg/ml) and a decrease of ionized  $\text{Ca}^{2+}$  concentration ( $1,12$  mmol/l) do not influence the risk of EAH in the examined patients ( $p > 0,05$ ).

**Slyvka N.O.**

## **IMPACT OF CHRONIC PYELONEPHRITIS ON THE SURVIVAL OF PATIENTS WITH HEPATORENAL SYNDROME**

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Hepatorenal syndrome (HRS) is a potentially reversible form of renal failure that occurs in patients with liver cirrhosis. The average life expectancy in untreated patients with HRS is about 2 weeks, and saving their lives is challenging. There are many instruments for assessing the severity of HRS in patients with cirrhosis, like hepatic failure scores, renal failure scores but their accuracy depends on the clinical situation. Recently, the concept of acute-on-chronic liver failure (ACLF) has become more recognized, i.e. development of the fulminant liver failure caused by secondary or extra hepatic causative factors - precipitating factors, such as infections and HRS in particular. In regards to this approach, the new score was developed to estimate the risk of short-term mortality in patients with sudden deterioration of the chronic liver disease – CLIF-C-ACLF score (Chronic Liver Failure Consortium of Acute-on-Chronic Liver Failure). However, this scale doesn't consider the pathophysiology of HRS type I and/or dynamics of the treatment. The aim of this study was to determine the most important predictors of the short-term mortality of patients with HRS using the CLIF-C-ACLF score, type of HRS and patients' response to the treatment.

The research enrolled 109 patients of Chernivtsi Oblast Narcology Dispensary admitted between January 2013 to August 2019. HRS was diagnosed based on criteria of EASL (European association for the study of the liver) Clinical Practice Guidelines for the management of patients with decompensated cirrhosis, 2018. All enrolled patients were prescribed 20% albumin intravenously (i/v) at the same dosage (1 g/kg per day on the first day of treatment and 20-40 g/day - in the next six days) and terlipressin (0,1mg/ml) in standard dosage by continuous intravenous administration for 7 days. They were distributed into 2 groups depending on the response to treatment: group 1 (n=57) - responders (decrease of sCr to  $133$  mmol/l), group 2 (n=52) - non-responders (decrease of sCr less than 50% of baseline). Statistical processing of the study results was carried out using the program package RStudio1.1.463.

The patients were 29 to 60 years old at the time of inclusion in the study. The average duration of the alcoholic liver cirrhosis (ALC) was ( $3.5 \pm 1.54$ ) years; average history of alcohol

abuse -  $(8.42 \pm 3.53)$  years; gender distribution was: 77.9 % (n = 85) males and 22.1 % (n = 24) - females. HRS in both groups was mostly represented with the type 1: group 1 – 89.5 %; group 2 – 90.4% (p = 0.05) and had the initial scoring by CLIF-C-ACLF scale. The estimates of the probability of survival for each of the group members were found using Kaplan Meyer's procedure. That is, for group 1, the average risk of death was  $0.153 \pm 0.026$ , and it was  $0.958 \pm 0.034$  for group 2. Risk in group 2 increased 6.26 times compared to group 1. For the multivariate analysis, we chose those clinical and laboratory parameters which have revealed a significant correlation with the short-term mortality: age, gender, response to treatment in the first 24 hours, chronic pyelonephritis, type I of HRS and CLIF-C-ACLF score. Type 1 of HRS, response to the treatment and the high baseline score by CLIF-C-ACLF scale were identified as the predictors of the short-term mortality. Improvement in renal function during treatment was observed in most patients in group 1: a decrease of the level of serum creatinine in patients with a response ranged from  $323.2 \pm 91.1$  to  $121.6 \pm 30.0$  mmol/l). There were no significant differences between the two groups in terms of the treatment duration ( $8.2 \pm 4.4$  days in group 1 versus  $9.1 \pm 5.0$  days in group 2; p = 0.05). Type 2 of HRS is more favorable for survival prognosis, as it develops more slowly and gives more time for adequate treatment measures. However, we had a very less number of such patients in our study – 10.5% of group 1 and 9.5% of group 2, as HRS type 2 is much rarer, than type 1.

The results of the study indicate that type 1 of HRS, the response to treatment in the first 24 hours, chronic pyelonephritis and high CLIF-C-ACLF score are the most important predictors of survival in patients with HRS. Monitoring of these indicators allows to identify the group of patients with the worst prognosis and to put them in priority to the liver transplantation list.

**Sydorchuk L.P.**

**ALDOSTERONE SYNTHASE CYP11B2 (-344C/T) GENE POLYMORPHISM  
INFLUENCE RISK OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH ARTERIAL  
HYPERTENSION**

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Renin-angiotensin aldosterone system (RAAS) plays a major role in blood pressure regulation. Aldosterone, synthesized in the adrenal cortex by aldosterone synthase is encoded by the cytochrome 11B2 aldosterone synthase gene (CYP11B2).

The aim of the study was to analyze the association of aldosterone synthase gene (CYP11B2) biallelic polymorphism in the promoter at position -344 (-344C/T) with Chronic Kidney Disease (CKD) in patients with essential arterial hypertension (EAH) in West-Ukrainian population. One hundred patients with EAH and target-organ damaging (2<sup>nd</sup> stage), moderate, high or very high cardiovascular risk were involved in the case-control study. Among them 79.0% (79) women and 21.0% (21) men. Their average age is  $59.87 \pm 8.02$ ; disease duration from 6 to 25 years. Chronic Kidney Disease (CKD) was diagnosed in 29 people according to the National Kidney Foundation recommendations (2012) after glomerular filtration rate (GFR) decline  $<60$  ml/min/1.73m<sup>2</sup> for 3 months (measured by CKD-EPI equations). All enrolled /examined patients signed the Informed Consent to participate in the research. Control group included 48 practically healthy individuals of relevant age. Gene's nucleotide polymorphism CYP11B2 (-344C/T) was examined by polymerase chain reaction.

The probability of EAH in observed people increased 1.49 times in T-allele carriers of CYP11B2 gene, but only in women [OR=1.90; 95%CI:1.02-3.54; =0.029], with contrary decreasing risk in C-allele women (p=0.041). No relevant dependences were observed in hypertensive men. Also T-allele increased probability of CKD (GFR $<60$  ml/min/1.73m<sup>2</sup>) in hypertensive population 1.48 times [OR=1.86; 95%CI:1.01-3.58; =0.049], especially in T-allele women 1.53 times [OR=6.51; 95%CI:1.39-30.60; =0.007] with low CKD risk in T-allele men [OR=0.15; 95%CI:0.03-0.72; =0.009], respectively. Some predictors like DM2, the 2<sup>nd</sup> and 3<sup>rd</sup> grades of Obesity, and the 3<sup>rd</sup> grade level of Blood Pressure elevation escalated the risk of CKD 2.4, 2.08-2.32 and 2.91 times as much, accordingly (p<0.05).

Thus, aldosterone synthase gene CYP11B2 (-344C/T) associates with high risk of EAH in Bukovyna region. T-allele increased risk of CKD in hypertensive population almost 1.5 times as much, especially in women.

**Voroniuk K.O.**

### **DEPENDENCE OF LIPID METABOLISM ON POLYMORPHIC VARIANTS OF THE GNB3 GENE IN PATIENTS WITH PRIMARY ARTERIAL HYPERTENSION**

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Primary (essential) hypertension (PH) is the most common cause of left ventricular hypertrophy (LVH) and is often associated with metabolic disorders. LVH and dyslipidemia are essential risk factors and indicators of morbidity and mortality, both cardiovascular and general ones.

The aim of the study was to analyze dependence of lipid panel parameters on polymorphic variants of the guanine nucleotide binding protein (G-protein) 3 subunit gene (GN 3) C825T (GN 3, 825C>T; dbSNP: rs5443) in patients with PH.

A cross-sectional study involved 72 patients with PH stage II, 1-3 degrees of blood pressure, high and very high cardiovascular risk. There were 29,16% (21) men, 70,84% (51) women among the patients. The average age of patients was  $59,87 \pm 7,98$ . The control group consisted of 48 healthy individuals of the average age ( $49,13 \pm 6,28$ ) and sex distribution (62,5% of women, 37,5% of men). GN 3 C825T polymorphism was investigated by PRL in real time. To establish LVH, all patients had undergone echocardiography. LVH was calculated by LVMM (according to the Penn Convention) and LVMMI. To evaluate LVH, LVMMI were taken 115 g/m<sup>2</sup> in men, 95 g/m<sup>2</sup> in women (ESC, ESH 2018). The lipid panel parameters, such as: TC (Total cholesterol), G (Triglycerides), LDL-C (Low-density lipoprotein cholesterol), HDL-C (High-density lipoprotein cholesterol) were investigated in blood plasma, using diagnostic kits of the company "Accent 200" (Poland). The atherogenic index (IA) was calculated by the formula:  $(TC - HDL-C) / HDL-C$ .

As a result, the following lipid panel parameters in carriers of the C-genotype of the GNB3 gene have been found: TC –  $5,50 \pm 0,79$  mmol/L, G –  $2,10 \pm 0,8$  mmol/L, HDL-C –  $1,22 \pm 0,22$  mmol/L, LDL-C –  $4,03 \pm 0,76$  mmol/L, IA –  $3,66 \pm 0,84$ . In TC-genotype carriers, patients with EH the concentration of TC was  $5,82 \pm 1,15$  mmol/L ( $p_{CC} > 0,05$ ), G –  $1,73 \pm 0,55$  mmol/L ( $p_{CC} > 0,05$ ), HDL-C –  $1,30 \pm 0,21$  mmol/L ( $p_{CC} > 0,05$ ); LDL-C –  $4,39 \pm 1,07$  mmol/L ( $p_{CC} > 0,05$ ), IA –  $3,61 \pm 0,95$  ( $p_{CC} > 0,05$ ). In C-genotype carriers, patients with EH the concentration of TC was  $6,6 \pm 0,64$  mmol/L, TG –  $2,6 \pm 1,27$  mmol/L, which was higher than in C-allele carriers according to TC – by 20,0% ( $p_{CC} > 0,05$ ) 13,79% ( $p_{TC} = 0,016$ ), according to TG – by 23,81% ( $p_{CC} > 0,05$ ) 52,94% ( $p_{TC} = 0,038$ ), respectively. The rest parameters of lipid panel have not differed significantly between genotype carriers and in homozygous carriers of the mutation T-allele had been HDL-C  $1,3 \pm 0,05$  mmol/L ( $p_{CC,TC} > 0,05$ ), LDL-C  $4,7 \pm 0,69$  mmol/L ( $p_{CC,TC} > 0,05$ ), IA  $4,0 \pm 0,69$  ( $p_{CC,TC} > 0,05$ ).

Thus, the lipid metabolism in patients with EH does not depend on polymorphic variants of the the guanine nucleotide binding protein (G-protein) 3 subunit gene (GN 3, 825C>T; rs5443).

**Yurkiv O. I.**

### **EXPERIENCE OF PROBIOTICS USE IN NEWBORN WITH PERINATAL PATHOLOGY IN DYSBIOTIC INTESTINAL DISORDERS**

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One of the most important mechanisms for the adaptation of newborns to the environmental conditions is the formation of non-specific protective barriers of the body, which are also physiological microbial ecosystems. The most common pathological conditions of the gastrointestinal tract in newborns are a violation of the composition and function of the colon microflora, which arise under the influence of perinatal factors and is a prerequisite for the development of inflammatory bowel diseases in the future. Alpha-1-antitrypsin (A1-antitrypsin)

and secretory IgA (sIgA) are indicators of the inflammatory process in the intestinal tract. Increased values are observed during exacerbations, inflammations, systemic diseases. Secretory immunoglobulin A is the most important part of local immunity against intestinal antigens. An increased IgA level confirms an active immune response in the intestinal mucosa, a low level leads to a reduced immune defense with a reduced colonization resistance, in addition, high antibody titers against food allergens are often found.

The aim of our study was to investigate the possibility of using the drug Bifi-forms Baby® in newborns with clinical manifestations of perinatal pathology and dysbiotic intestinal disorders in order to prevent pathology. The main clinical observation group consisted of 30 full-term infants with severe perinatal pathology, the control group consisted of 30 healthy newborns. Determination of  $\alpha$ -1-antitrypsin, albumin and secretory IgA (sIgA) in feces was performed using enzyme-linked immunosorbent assay (ELISA). Statistical processing of the obtained data was performed on a personal computer using the statistical program for medical and biological research "STATGRAPHICS" Plus 5.

The results of the study revealed changes in  $\alpha$ -1-antitrypsin and albumin in the first portion of meconium in newborns. Namely, if in the control group the level of  $\alpha$ -1-antitrypsin was  $99.4 \pm 4.97$  mg / g, the level of albumin -  $3.2 \pm 0.16$  mg / g, in children who had severe perinatal pathology - indicators were significantly higher and reached, respectively, the level of  $\alpha$ -1-antitrypsin  $1128.4 \pm 56.42$  mg / l, the level of albumin -  $56.3 \pm 2.82$  mg / l,  $p < 0,05$ . According to our data, the level of sIgA in the feces of newborns who showed signs of intestinal dysfunction was slightly higher compared to healthy newborns -  $534.3 \pm 26.72$  mg / g and  $373.8 \pm 18.69$  mg / g, respectively.  $p > 0.05$ . In our opinion, the increase in sIgA levels in newborns with perinatal pathology may be associated with disorders of the formation of the biofilm characteristic of this stage of microbiocenosis formation, with a predominance of opportunistic pathogens. In case of intestinal disorders in children with vegetative-visceral dysfunctions on the background of perinatal pathology, along with the usual directions of intensive care, during the early neonatal period was used the drug Bifi-form Baby®, which is a combined probiotic, which includes certified probiotics. strains of Bifidobacterium BB-12 and Streptococcus thermophilus TH-4 in oil suspension. The duration of the course was 14 days. Against the background of the treatment in newborns on the 7th day of life there was a normalization of the functional state of the intestine with the leveling of signs of the vegetative-visceral syndrome.

The obtained data indicate that against the background of treatment with the drug Bifi-form Baby® in newborns there was a significant decrease in the level of  $\alpha$ -1-antitrypsin ( $83.5 \pm 4.17$  mg / g vs.  $732.6 \pm 36.63$  mg / g) and albumin. in feces ( $4.8 \pm 0.24$  mg / g vs.  $19.2 \pm 0.96$  mg / g), however, the content remains higher than in healthy newborns. The level of sIgA also tends to decrease ( $396.2 \pm 19.81$  mg / g vs.  $634.8 \pm 31.74$  mg / g), but compared to the control group, it is higher.

Therefore, early diagnosis use of probiotics of disorders of the functional condition of the intestine in newborns will improve the condition of patients and prevent the development of chronic intestinal diseases in the future.

<b>b28013</b>	3	1	
<b>b7305</b>	2	1	
<b>b7353</b>	2	1	
<b>b7401</b>	2	1	
<b>b1343</b>	3	0	
<b>b1252</b>	2	1	
<b>s76002</b>	2	1	
<b>d2302</b>	2	1	
<b>d4501</b>	3	1	
<b>d6406</b>	2	1	
<b>e310</b>	-	+	

( ) .

40-80

3





14,3 % ( (169,38 ± 5,88) . . (145,34 ± 6,24) . . ),  
 ( ) - 8,4 % ( (168,44 ± 6,12) . . (154,33 ± 5,84) . . ,  
 <0,05). ( ) 6,2  
 % ( (97,14 ± 3,42) . . (91,12 ± 3,26) . . ), - 4,5 % ( (96,56 ± 3,41) . . (92,16 ± 3,29) %).  
 62,3 %, - 54,7 %  
 ( ) 2,6 ( 3,78  
 ± 0,48 1,46 ± 0,24, <0,05), 2,8 ( (14,29 ± 2,28)  
 (5,12 ± 0,78) , <0,05).  
 1,6 ( 3,72 ± 0,46 2,28 ± 0,27, <0,05), - 1,8 ( (14,55 ± 2,12) (7,76 ± 0,89) , <0,05).  
 <0,05), - 2 ( 2,5 ( 6,29 ± 0,48 2,52 ± 0,19, 5,46 ± 0,34 2,57 ± 0,18, <0,05).

2

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47  
 . 19 - 21,53±0,57 . ( )  
 16 (III) 13 ( )  
 ( ), - ( ).  
 ,  
 . - 72,4±3,5 / .  
 / (p<0,05 III ) - 59,3±2,5 / (p<0,05), - 62,4±2,8  
 >0 ,05), 35,6±2,8 / ( , <0,05). -23,1±2,07 / ( ), 30,8±2,86 / ( ,  
 , (p<0,05),  
 , (p<0,05).  
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2 ( 2),

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2 (2 ) .

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(1 26 )

97

52

(NO)

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HOMA-IR.

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HOMA-IR,

( )

( ),

( )

2

( ) ( 42,54%),

( 18,5%),

( 42,5%),

( 14,5%),

( 18,0%),

( 16,14%),

17,75%),

( ),

1-

( <0,05)

HOMA-IR,

2.

« - »

( )

1960-

( ), ( )

« - » -

N-N- , SDNN — RR  
144±39 .

50-100 — ; SDNN: 50 — ;  
100 — . RMSSD-  
R-R. -

27±12 . RMSSD, -  
R-R, , 50 . pNN50 -

9±7. CV - , CV=(SDNN/RRNN×100%),  
RRNN - NN. : 4,75%-7,23%. - SDNN,  
CV ,

RMSSD, . M×DMn - ,

RR

( ) - . SI - -  
: 30-50%.

: 80-150

( ) 1,5 - 2 , ( ,  
5-10 , ) - 400-600 . . , - 1000-1200 . .

**SARS-COV-2**

SARS-Cov-2

COVID-19.

SARS-CoV-2

SARS-CoV-2.

22

40

- 35

32

41

65

- 21

22

65

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38-39

5-6

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D-

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(Covid-19). , 2020 4,5-5 , 2-4 6-8 4-6 , 10 2021 2488 (9,5%) 2021 (889 ) Covid-19 2021 4,6% (114 2021 ) .

26278

12,5% 2021 . , 1 -7,2%, 1-4 -  
, 10 2021 , : 1 -7,2%, 1-4 -  
17,4%, 5-9 -19,4%, 10-14 -30,5%, 15-17 -25,5%.  
« » . 10 2021 , 153  
(13,2%), . (79,1%), (73,4%),  
(65,7%), (34,7%), (23,4%), (25,9%), (22,7%).  
, 0,04% 10-18 0,09%  
0-9 , -2,3% 60+(  
4,4%). 6 ,

12 . Covid-19 ,  
01.11.2021 . Covid-19 , 827 12 18 (6,9%),  
488 (4,1%), - 339 (2,8%).  
Covid-19,  
. . .

(312) 3-

«Solvaig» ( ). 242 .  
« » - 162 ( =10% - «-» 10%)  
(67%). - Non dipper (ND) – 117 (72,2%), - ' -  
Night picker (NP) – 45 (28%). (40 )  
(31 - D (77,5%) 9 – ND (22,5%)).  
.- « »  
: D – 87,9±1,3; ND –  
89,7±1,23; NP – 94,6±1,72; : D – 82,1±1,76; ND – 83,4±2,02 ( ). (p 0,05).  
: 29,5±0,23; 30,7±0,18; 32,3±0,28; : 26,1±0,36; 28,4±0,31 ( / <sup>2</sup>).  
« » ,  
D – 51,9±1,32; ND – 52,8±1,12; NP –  
56,8±1,18 ( ). : D – 140,1±1,05; ND –  
143,5±1,11; NP – 143,1±1,20 ( . ). : D –  
79,2±1,09; ND – 80,8±0,98; NP – 80,1±1,02 ( . ). : D –  
– 142,9±1,22; ND – 144,7±1,07; NP – 145,0±1,13 ( . ). : D –  
: D – 81,2±0,99; ND – 81,9±0,89; NP – 79,5±1,03 ( . ).  
: D – 126,6±1,18; ND – 134,3±1,24; NP – 143,1±1,26 ( . ).  
: D – 69,1±0,98; ND – 73,5±0,88; NP – 79,6±1,04 ( . ).  
( ) . – « »

«Dipper».

( )

( )

NP, :

D – 1306±124,4; ND – 1448±131,5; NP – 1718±142,8\* ( <0,05)

D.

« » D

: D – 7,2±1,02; ND – 12,3±1,21; NP – 14,6±1,18 ( ), : D – 93,6±13,62; ND – 159,9±13,86; NP – 189,8±13,97 ( H<sub>2</sub>O),

(ND NP),

: D – 33,1%; ND – 48,3%; NP – 18,6%.

(« »)

352

4 : 1-

( – 30 1 . , 160 , 2- - ), 49 ( , 23 .

, 120 , 3- – , 4- –

47,66±1,22,

– 63,01±0,88,  
– 42,73±1,82,

60,18±3,25 .  
(39 , 32,50%),

– 10 (43,48%),

– 75 (46,87%),

- 23 (46,94%).

( SCL-90-R)  
SF-36.

( SCL-90-R)

1,08+0,26, -1,16+0,36, - 0,88+0,19, - 0,80+0,19, - 1,23+0,28,  
- 0,82+0,26. (1,57+0,17 1,12+0,21)  
4-

3- -1,60+0,10 1,59+0,05,  
( =0,019). SF-36

2-

( =0,019), - 59,54+2,55 ( =0,004) - 50,31+1,44  
3- 4-  
- 48,00+3,44 48,18+5,27 ( =0,019), 4-  
-64,27+5,11 ( <0,001).

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### COVID-19

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( ) COVID-19.

COVID-19

COVID-19

COVID-19

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COVID-19

COVID-19

COVID-19. ( )

SARS-CoV-2  
COVID-19

COVID-19,

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I-II .

COVID-

19.

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37-62

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( <0,05).

52

COVID-19,

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60 130 I 30 II 30  
 « 41-2» («ICS-TECH», ) 15-  
 30- - Statistica 10.

( ) .  
 (123,4±3,5 . ) (142,8±8,9 . )  
 (113,3±3,5 . )

(p < 0,05).  
 81,1±8,2 . . 70,2±5,9 .  
 - 66,7±6,0 . . ( <0,05).  
 ( ),

(40,1%) (26,6%)  
 (30% 20% ).

( ) ( )

( , I/D) 2 (PPAR-γ2, Pro12Ala).

110

25 79 ( 53,3±6,05 ). 56,4% (62)

, 43,6% (48) ( ) – 22,7% (25), –

45,45% (50), – 31,8% (35). – 8,18%

(9), – 38,2% (42), – 53,6% (59): –

27,3% (30), – 17,3% (19), – 9,09% (10).

50

" ®". 6

: -, ID- DD- – 34,5% ( =0,01), 39,9%

( <0,001) 57,4% ( <0,001) ID- DD- 22,4%

( <0,05), – 42,4% ( =0,016), 44,9% ( =0,019) 37,7% ( =0,028)

ID- 30,6% ( <0,05). - Ala-

ProPro- PPAR-γ2 37,5% ( =0,035) 33,7% ( =0,024)

ProPro- Ala- 53,1% ( <0,05).

ProPro- 48,5% ( =0,014),

Ala- 39,9% ( <0,05).

PPAR-γ2 5,78-7,58% ( <0,05),

DD- 5,65% ( <0,05).

6 DD- Pro12-

15,4% 12,9% ( <0,05) ( )

: – 36,3%, 44,7% 52,2% ( <0,05) , D-

, - 31,5% ( <0,05), – 39,5% ( <0,05), 39,1% ( =0,016)

56,0% ( <0,001) , DD-

, ID – 24,3% ( <0,05). PPAR-γ2

Pro12- - Ala- – 45,7% ( =0,019),

( <0,05). – 45,1%

53,0% ( <0,001). , Pro12- -

Pro12- Ala- 32,3%

( <0,05).

, D- ProPro-

PPAR-γ2 ( ) , ( ) ; ( ) ,

( ) ( ) ; DD-

COVID-19  
 - ( ). COVID-19,  
 : COVID-19 - ,  
 COVID-19 .  
 ( ) / COVID-19 -  
 « - ».  
 ST («ST-slope») ST ( ST, mV) ( )  
 ( ).  
 ( ), COVID-19.  
 COVID-19. COVID-19.  
 COVID-19 COVID-19 , (0,673 1,6, )  
 , COVID-19, (0,95 1,9, ).  
 «ST-slope»: (0,56 12,58 )  
 COVID-19 (3,25 52,43 ) ,  
 COVID-19 ,  
 « » ST, .  
 COVID-19 COVID-19. , -  
 (0,222) COVID-19,  
 «COVID » «ST-slope» ( =0,55 , =12,38),  
 « » COVID-19.  
 COVID-19 COVID-19  
 (1,054 1,934, ), «ST-slope»  
 ( =1,36 , =28,5).  
 ,  
 « »  
 COVID-19  
 « » ,

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 253,19±12,68 . 47  
 6-24-48-72 . ( 39686 ).  
 . ( )  
 . ( ), ( )  
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 ,  
 .  
 . 48 .  
 . 3,38  
 . 19,1% 15,2%  
 , 8 .  
 24 48 . 72 .  
 ,  
 ;

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,  
 ( ) - ( )  
 128 ( ) . 60 85 , 6-  
 - (75±8,5) . 68 , , 40  
 1 / 5 1 /  
 20 1 / ( ) . 60  
 ( 40 1 / , 5  
 1 / ) 10 1 / ( )  
 ). 6  
 (Homeostasis model assessment), : =  
 ( / ) ( / ) 22,5.

2,53% (2,36; 2,66)		2,56% (2,35; 2,78)
	4,98% (4,55; 5,75)	11,45% (10,75; 12,20)
5,10% (4,60; 5,40)	11,40% (10,60; 12,20)	( >0,05;
		6
		)
	6-	
		2,42% (2,40; 2,50) (p<0,05;
		6
		)
		( >0,05).
	6	( >0,05;
		6
		)
		6-

**SIRT1**

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(SIRT) -

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(Sirt1-7),

SIRT1-

SIRT1

41

- 59,87+-7,98

92,68%(38)

24

, 7,32%(3)

(43,36±7,1 .) (62,5 % - , 37,5% - ). SIRT1

SIRT1

2,3

SIRT1

SIRT1

SIRT1

7

**Antofichuk T.M.**

**INTENSITY OF LIVER PARENCHYM FIBROSIS IN PATIENTS WITH ALCOHOLIC  
STEATOHEPATITIS ACCORDING TO THE PRESENCE OF DYSMETABOLIC IRON  
OVERLOAD SYNDROME**

*Department of Internal Medicine, Clinical Pharmacology and Occupational Diseases  
Bukovinian State Medical University*

The aim of the study is to establish the fibrosis reaction intensity in the liver and progression patterns of liver fibrosis in patients with non-alcoholic steatohepatitis with dismetabolic iron overload syndrome. 60 patients with non-alcoholic steatohepatitis (NASH), 25 practically healthy persons (PHIs) of the corresponding age and sex were examined. Examinations were performed in the gastroenterological, therapeutic 1 and 2, hematology departments of Chernivtsi RCNE "Chernivtsi Emergency Hospital" in 2015-2020. The diagnosis of NASH was established in accordance with the unified clinical protocols approved by the order of the Ministry of Health of Ukraine 826 of 06.11.2014. The presence of DIOS was determined in terms of NASH by three of the following laboratory markers: increase in blood ferritin content of more than 300 µg/l in men and menopausal women and more than 200 µg/l in women of childbearing age; increase in serum iron above reference values; decrease in the total iron-binding capacity of blood serum; increase in iron saturation of transferrin by more than 45%.

The study has shown activation of collagen synthesis processes with an increase in blood protein-bound oxyproline - in the presence of DIOS 1.6 times ( $p < 0.05$ ), in the absence - 1.3 times ( $p < 0.05$ ), as well as a slight increase in the intensity of collagen breakdown - with an increase in the content of free oxyproline in the blood in NASH with DIOS- 1.2 times ( $p > 0.05$ ). For NASH without DIOS, the blood content of collagenolytic activity tended to decrease ( $p > 0.05$ ). Somewhat divergent data were obtained in the CLA analysis in NASH: for SRS registered an increase in CLA by 13.8% ( $p < 0.05$ ), but in its absence, CLA in NASH was reduced by 21.3% ( $p < 0.05$ ) of the presence of a probable intergroup difference ( $p < 0.05$ ). That is, the activated processes of collagen synthesis in NASH are accompanied by inhibition of its degradation with accumulation in extracellular matrix. In patients with NASH, we also found a significant increase in the content of hexosamines in the blood: in DIOS 1.3 times ( $p < 0.05$ ), in its absence - 1.2 times ( $p < 0.05$ ), the content of sialic acids, respectively - 1.4 and 1.2 times ( $p < 0.05$ ), and accelerated degradation of fucoglycoproteins (fucose not bound to protein blood content increased - 1.8 and 1.6 times, respectively ( $p < 0.05$ )). The consequence of the registered processes was an increase in the integrated Fibro-test indicator for NASH with DIOS- 2.1 times compared to the indicator in PHIs ( $p < 0.05$ ), for NASH without DIOS- 1.6 times ( $p < 0.05$ ) with the presence of a probable intergroup

difference ( $p < 0.05$ ). It was found that in patients with NASH F0 stage of fibrosis was registered in 35.7% against 16.7% in NASH with DIOS ( $p < 0.05$ ). F1 stage was registered in 38.1% of patients with NASH against 27.7% of cases of NASH with DIOS ( $p > 0.05$ ). In patients with NASH F2, the stage of fibrosis was registered in 23.8% against 38.9% in NASH with DIOS ( $p < 0.05$ ). At the same time, F3 stage of fibrosis in patients with NASH was registered in 2.4% against 16.7% in NASH with DIOS ( $p < 0.05$ ).

Thus, in patients with NASH, the following patterns of liver fibrosis were established: activation of collagen synthesis processes (in the presence of DIOS 1.6 times ( $p < 0.05$ ), in the absence - 1.3 times ( $p < 0.05$ )), a slight increase the intensity of collagen breakdown in NASH with DIOS- 1.2 times ( $p > 0.05$ ); increase in CLA by 13.8% ( $p < 0.05$ ) for DIOS, however, in its absence, CLA in NASH was reduced by 21.3% ( $p < 0.05$ ). For patients with NASH is characterized by an increase in the content of hexosamines in the blood: for DIOS in 1.3 times ( $p < 0.05$ ) against 1.2 times ( $p < 0.05$ ), the content of sialic acids, respectively - in 1.4 against 1, 2 times ( $p < 0.05$ ), and accelerated degradation of fucoglycoproteins (1.8 to 1.6 times, respectively) ( $p < 0.05$ ). The consequence of the registered processes was an increase in the integrated Fibro-test for NASH with DIOS- 2.1 times compared to the indicator in PHIs ( $p < 0.05$ ), for NASH without DIOS- 1.6 times ( $p < 0.05$ ).

**Antoniv A.A.**

**THE COINFLUENCE OF THE STATE OF THE BLOOD LIPID SPECTRUM AND  
CONTENT OF ADIPOKINES ON THE CLINICAL COURSE  
OF NON-ALCOHOLIC FATTY LIVER DISEASE  
IN THE PRESENCE OF COMORBID CHRONIC KIDNEY DISEASE**

*Department of Internal Medicine, Clinical Pharmacology and Occupational Diseases  
Bukovinian State Medical University*

The purpose of the study was to find out the probable mutual influence of the state of the blood lipid spectrum of and content of adipokines in blood: leptin, adiponectin on the clinical course of non-alcoholic fatty liver disease combined with obesity depending on its form and the presence of comorbid chronic kidney disease. 444 patients were examined: of which 84 patients with non-alcoholic fatty liver disease with grade I obesity (group 1), which contained 2 subgroups: 32 patients with non-alcoholic hepatic steatosis and 52 patients with non-alcoholic steatohepatitis; 270 patients with non-alcoholic fatty liver disease with comorbid obesity of the I degree and chronic kidney disease of the I-III stage (group 2), including 110 patients with non-alcoholic steatosis of the liver and 160 patients with non-alcoholic steatohepatitis. The control group consisted of 90 patients with chronic kidney disease stage I-III with normal body weight (group 3). The mean age of patients was ( $45.8 \pm 3.81$ ) years.

The study shows that patients with non-alcoholic steatohepatitis and obesity without concomitant chronic kidney disease are characterized by the following changes in the blood lipid spectrum: maximum increase in blood triacylglycerols (by 2.1 times,  $p < 0.05$ ), a probable increase in total cholesterol (by 1.4 times,  $p < 0.05$ ) and proatherogenic low-density lipoproteins (by 1.6 times,  $p < 0.05$ ), a probable decrease in anti-atherogenic high-density lipoproteins (by 1.6 times,  $p < 0.05$ ), which with the addition of comorbid chronic kidney disease are likely to deepen (within 1.5-1.8 times,  $p < 0.05$ ), in addition to hyper triacylglycerol. According to the results of the study, the content of leptin in the blood was significantly increased by 1.4 times ( $p < 0.05$ ) compared with almost healthy individuals, which differed significantly from patients with non-alcoholic steatosis of the liver with chronic kidney disease and non-alcoholic steatohepatitis with chronic kidney disease ( $p < 0.05$ ). The content of adiponectin in the blood was significantly reduced by 1.4 times compared with almost healthy individuals ( $p < 0.05$ ) and also differed significantly from patients with non-alcoholic hepatic steatosis with chronic kidney disease and non-alcoholic steatohepatitis with chronic kidney disease ( $p < 0.05$ ).

Based on the results, it was found that significant metabolic prerequisites for the development of non-alcoholic steatohepatitis against the background of obesity and chronic kidney



disease are probable postprandial hyperglycemia, hyperinsulinemia, increased glycosylation of hemoglobin. Hyperleptinemia and hypoadiponectinemia are also factors in the burden of non-alcoholic steatohepatitis and obesity due to the progression of mesenchymal inflammation and cytolysis of hepatocytes.

**Biriuk .G.**

## **PECULIARITIES OF DEVELOPMENT OF THE COLON TOPOGRAPHY AT THE END OF THE FETAL PERIOD OF HUMAN ONTOGENESIS**

*Department of Disaster and Military Medicine*

*Bukovinian State Medical University*

At the current stage of development of abdominal surgery accurate data concerning individual anatomical peculiarities of sizes, shape and location of the colon are essential. A number of issues dealing with causes stipulating development of pathological processes of both the colon and abdominal organs on the whole remain unclear. The size of the colon and its spatial interrelations with adjacent complexes of organs and the abdominal wall influences on the development of its topography. Meanwhile, any disorders of such interrelations can become a morphological precondition promoting formation of developmental defects of this intestinal portion.

A doctor of any specialty facing certain pathological signs of developmental defects in the abdominal organs in children should understand the fact that genesis of an ailment is of congenital character and it requires conceptual ways to correct defects in children.

The research was carried out on 37 specimens of human neonates by means of the methods of macroscopy, thin section under the microscope -10 control, and radiography. Examination of the colon found that its ascending portion was located in the right lateral portion of the abdominal cavity passing from the caecum to the hepatic flexure. In 21 cases it was pressed against the lateral abdominal wall, that is, was located in the lateral position. In 10 cases the ascending portion of the colon was located proximally, that is, it was displaced to the side of the middle line, and in 6 cases it was located in the middle towards the right lateral abdominal wall and the middle line. Practically in all the cases the ascending portion of the colon was located in the mesoperitoneal position. Its length from the ileac fossa to the liver was from 54,5 mm to 78,0 mm.

Examination of the hepatic flexure of the colon detected three main positions towards the inferior border of the liver: 1. On 19 specimens the right flexure of the colon arose from the inferior border of the liver. 2. On 12 specimens it was located under the inferior liver border. 3. In 6 cases the flexure was half covered with the inferior liver border.

The transverse portion of the colon on the material examined was directed from the right to the left and a little distally. Close to the left lateral region of the abdominal cavity it formed left or splenic flexure. The length of the transverse portion of the colon changes within the limits from 118,0 to 200,5 mm. The transverse portion of the colon on the fetal specimens has two main positions: 1. Superior (on 21 specimens) – in its middle part the transverse portion of the colon touched the inferior border of the liver. 2. Inferior (in 16 cases) – the middle portion of the colon deflects to the umbilicus. In the majority of cases the colon is rather mobile and possesses its own mesentery from 24,5 to 43,5 mm long. The inferior border of the spleen is adjacent to the posterior border of the splenic flexure. On the majority of specimens this flexure (24 specimens) arose from under the left liver lobe, and in others (13 cases) – it was covered by this lobe.

Examination of the descending portion of the colon found that it was located in the left lateral side of the abdominal cavity. The descending portion is from 44,5 to 87,5 mm long. In the majority of cases (25 specimens) this portion of the colon similar to the ascending portion is located in the mesoperitoneal position. Meanwhile, in 12 cases the inferior part of the descending portion of the colon had its mesentery. Close to the mesenteric crest the descending portion of the colon passes into the sigmoid one.

Thus, the shape and size of the sigmoid at the end of the fetal period of human ontogenesis are individually variable. Filling of the colon with meconium produces a substantial effect on its position, mobility, diameter and color of this intestinal portion.

**Chernetska N.V.**

**INDICATORS OF CARBOHYDRATE AND LIPID METABOLISM IN PATIENTS WITH  
CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH CONCOMITANT TYPE 2  
DIABETES MELLITUS**

*Department of Internal Medicine  
Bukovynian State Medical University*

It is known that chronic obstructive pulmonary disease (COPD) is characterized by the development of a systemic inflammatory process, which results in an increase of the incidence of comorbidities, including type 2 diabetes mellitus (type 2 diabetes). It has been proven that carbohydrate and lipid metabolism disorders are more common among patients with COPD, and this is not only due to the use of medications. Recently, the pathogenetic relationships of combined pathology have been actively researched, but the issues of diagnosis and treatment have not been fully studied.

The aim is to investigate the indicators of carbohydrate and lipid metabolism in patients with COPD combined with type 2 diabetes.

**Materials and methods.** 20 almost healthy people and 80 patients who were treated in the pulmonology department of the Regional Clinical Hospital Chernivtsi were examined. Patients were divided into two representative groups: 53 patients with COPD (first group) and 27 patients with COPD associated with type 2 diabetes (second group).

All patients met the inclusion and exclusion criteria of the study and signed an informed consent for the study. The diagnosis of COPD and type 2 diabetes was made in accordance with international guidelines. The study included patients with GOLD stage 2 and 3 and groups B and C. All patients underwent spirometry (spirograph "BTL 08 SpiroPro" (UK), bioimpedancemetry (portable device BC-601 (TANITA, Japan) and exercise tolerance test (6-minute walk). The BODE index was calculated by BMI, shortness of breath, FEV1 and 6-minute walk.

Analysis of carbohydrate metabolism showed an increased level of fasting glucose in patients with COPD with concomitant type 2 diabetes compared with almost healthy individuals and patients with COPD 1.6 times ( $p < 0.05$ ). Levels of HbA1c, IRI and HOMA-IR index were probably higher in patients with COPD with concomitant type 2 diabetes than in patients in the control group and PZO (1.37; 1.9 and 3 times and 37.1%, in 1, 42, 2.6 and 4.3 times, respectively,  $p < 0.05$ ).

The analysis of blood lipid spectrum revealed a high level of total cholesterol in patients with COPD with concomitant type 2 diabetes 1.6 times compared with PZO and 32.4% - in patients with COPD ( $p < 0.05$ ). Patients in the main group had high levels of LDL CL (1.9 times and 33.0%) and low levels of HDL CL (47.6% and 34.9%, respectively) compared with PZO and patients with COPD. In the latter group, these indicators also differed from the control (LDL CL was 44.3% higher and HDL CL - 19.5% lower,  $p < 0.05$ ). At the same time, the atherogenic index (IA) in patients with COPD with type 2 diabetes exceeded in patients with COPD and PZO by 2.45 and 4.8 times, respectively ( $p < 0.05$ ).

Thus, in patients with COPD with type 2 diabetes there is a severe clinical course, lower FZD, changes in body composition (higher BMI, percentage of fat mass, visceral fat and decreased muscle mass), decreased exercise tolerance, increased fasting glucose and after 2 hours, glycosylated hemoglobin, IRI and HOMA-IR on the background of severe dyslipidemia (higher levels of CX, LDL CL, LDL CL, TG, IA at lower HDL CL).

Dudka I.V.

## CARBOHYDRATE METABOLISM DISORDERS IN PATIENTS WITH CHRONIC PANCREATITIS DUE TO COMORBIDITY WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

*Department of Internal Medicine, Clinical Pharmacology and Occupational Diseases  
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Chronic pancreatitis (CP) and chronic obstructive pulmonary disease (COPD) have many mechanisms of mutual severity. Each nosology of this pathological combination can lead to glucose metabolism disorders. With the long-term course of CP, the development of secondary diabetes mellitus (DM) is possible due to a significant reduction in the area or number of functioning  $\beta$ -cells of the islets of Langerhans and absolute insulin deficiency.

The study's objective is to determine indicators of carbohydrate metabolism in patients with chronic pancreatitis with its isolated course and with comorbid COPD and diabetes mellitus. 100 patients with chronic pancreatitis of a mixed etiology in the exacerbation stage of moderate severity were examined. The first group of patients included 36 individuals with an isolated course of chronic pancreatitis (1 group), 2<sup>nd</sup> group included 33 patients with chronic pancreatitis and COPD, 3<sup>rd</sup> group included 35 patients with chronic pancreatitis and COPD and T3cDM. The control group (CCOPD) included 30 individuals with isolated COPD, the control group (CDM) includes 32 individuals with isolated type 2 DM. The group of comparison included 30 practically healthy individuals (PHI).

The state of glycaemia and regulation of carbohydrate metabolism in patients with were assessed depending on comorbid pathology of COPD and DM. Analysis of the obtained results showed a reliable increase of glucose content on an empty stomach in patients suffering from with an isolated course 1.4 times ( $<0.05$ ) in comparison with PHI, and the level of glycaemia increased when comorbid COPD joined : 1.5 times in comparison with PHI ( $<0.05$ ). At the same time, patients suffering from with two comorbid diseases – COPD and DM – developed 3.2 times increased glucose concentration on an empty stomach in comparison with PHI ( $<0.05$ ). This parameter in the 1<sup>st</sup> and 2<sup>nd</sup> groups 2.1 and 2.2 times increased respectively ( $<0.05$ ). The state of glycaemia on an empty stomach in patients from the 3<sup>rd</sup> group is similar to that with DM. Comparison of glucose content in the blood on an empty stomach in patients with type 2 diabetes mellitus with the parameter of this group found reliable 1.3 times difference ( $<0.05$ ), that appeared to be 2.4 times higher than that of PHI ( $<0.05$ ).

A reliably higher level of postprandial (after meals) glycaemia was found in patients with from the 1<sup>st</sup> group, that was 1.2 times higher than that of the control ( $<0.05$ ). At the same time, 1.4 times increase of postprandial glycaemia was registered in patients from the 2<sup>nd</sup> group ( $<0.05$ ), in the 3<sup>rd</sup> group – 2.6 times as compared to the parameter of PHI ( $<0.05$ ), which is indicative of the dependence of a degree of tolerance disorder to glucose on comorbid COPD and manifested DM. Postprandial hyperglycemia was found in patients from the 5<sup>th</sup> group, that was 2.3 times higher than that of PHI ( $<0.05$ ), and that was 11.9 % lower than the parameters in the 3<sup>rd</sup> group ( $>0.05$ ).

Analysis of the laboratory findings concerning HbA1c content in the blood serum as a marker of persistence and intensity of hyperglycemia showed its reliable increase in patients from the 1, 2, 3 and 5 groups 1.2, 1.3, 1.4 and 1.4 times respectively in comparison with PHI ( $<0.05$ ), which confirms the role of chronic pancreatitis in the development of chronic postprandial hyperglycemia, advanced disorder to glucose tolerance, intensified glycosylation of transport proteins (hemoglobin), and further formation of DM.

Chronic pancreatitis in its exacerbation stage without comorbid pathology is associated with reliable postprandial hyperglycemia (1.2 times), an increased content of glycated hemoglobin (1.2 times), which is indicative of initial signs of carbohydrate metabolism dysfunction. These disorders are exacerbated under the conditions of accession of background COPD, and under conditions of three-component comorbidity with diabetes, decompensation of carbohydrate metabolism occurs.

**Dudka T.V.**

**ANALYSIS OF INDICATOR CHANGES IN COMPUTER SPIROGRAPHY  
IN PATIENTS WITH BRONCHIAL ASTHMA  
AND ASSOCIATED CHRONIC CHOLECYSTITIS**

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Respiratory diseases remain the most common pathology in the structure of morbidity of the population of Ukraine. In Europe the death rate from asthma has almost tripled in the last 20 years, and the frequency of emergency calls has increased. The long course of asthma causes not only its frequent combination with other diseases, but also requires long-term treatment. Every year more than 2,5 million surgical interventions are performed on the biliary tract and in 80% of cases of cholecystectomy are performed for cholesterol cholelithiasis in people of working age which in 12-20% is accompanied by a complicated course. According to various authors, the combined course of asthma and digestive diseases is observed in 8-50% of cases. In patients with chronic inflammatory diseases of the lungs and bronchi various authors describe the development of peptic ulcer disease, erosions of the stomach and duodenum, chronic gastritis, duodenitis, gastroesophageal reflux disease and sliding hernia of the esophageal orifice, duodenal dysfunction, duodenal duct etc.

Objective – to study the indicators of external respiratory function in patients with bronchial asthma depending on the stage of bronchial obstructive syndrome and the type of gallbladder dysfunction. 92 patients were involved in the study: 30 patients with mild and moderate persisting bronchial asthma (BA) (1st group), 30 patients with mild and moderate persisting BA of comorbid chronic acalculous cholecystitis (CAC) in the acute phase (2nd group), 32 patients with CAC in the acute phase (3rd group) and a control group - 30 practically healthy individuals (PHI) of the respective age. Ventilation lung function was studied by means of a computer Spirograph «Pneumoscope» company «Jaeger» (Germany), «Spirosift 3000» company «Fukuda Denshi» (Japan). The degree of disturbance in the respiratory function was evaluated through an analysis of spirometry findings and a curve «flow-volume» by comparing the findings obtained with the appropriate parameters for a given age, sex, height and weight before and after pharmacological tests with salbutamol. The range of normative parameters was considered 80-120% of appropriate.

The indicator analysis shows that in patients with an isolated course of asthma there was a probable decrease in the average values of FEV1 by 14,9% ( $p < 0,05$ ). At the same time, in patients of the 2nd group with comorbid course of asthma and the average values of FEV1 were reduced by 23,2% ( $p < 0,05$ ) which differed from that in the 1st group, probably. The indicators of the daily scope of FEV1 were also statistically significant. Thus, in patients of the 1st group the increase in the daily range by 39,2% ( $p < 0,05$ ) was found in comparison with the group of PHI, in the patients of the 2nd group the parameters of the daily range changed even more significantly, exceeding the indicator in PHI by 74,8% ( $p < 0,05$ ). At the same time, the rate of ventilation lung function after the test with salbutamol differed from those belonging to the test in all patients ( $p > 0,05$ ), according to the established severity of asthma. At patients of the 2nd group the tendency to decrease in an indicator to inhalation of salbutamol in comparison with a similar indicator at patients of the 1st group ( $p > 0,05$ ) was noted. In the 1st group the increase was 16,5% ( $p < 0,05$ ) and in patients of the 2nd group – 12,9% ( $p < 0,05$ ) which indicates a partial reversibility of bronchial obstruction in 2nd group and of patients under conditions of comorbidity.

These facts indicate the pathogenetic role of CAC in the formation and progression of bronchial obstruction syndrome in patients with comorbid bronchial asthma and CAC. The severity of bronchial asthma is found to decrease the intensity of ventilated oxygen use progressively ( $p < 0,05$ ), deepen tissue hypoxia and contribute to the development of hypoxic changes in the liver and gallbladder and lead to the development and progression of chronic acalculous cholecystitis.

**Honcharuk L.M.**

**THE ROLE OF HELICOBACTER INFECTION IN GASTRODUODENOPATHY  
INDUCED BY NONSTEROIDAL ANTI-INFLAMMATORY DRUGS IN PATIENTS WITH  
OSTEOARTHRITIS**

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Population ageing around the world in recent decades has led to an increase in the incidence of osteoarthritis (OA). The disease is usually found in patients older than 50 years. 80% of people over 75 suffer from this pathology. The action of modern drugs and physiotherapy, which are used to treat OA, is aimed primarily at relieving pain and improving function. Among pharmacotherapeutic agents, non-steroidal anti-inflammatory drugs (NSAIDs) will currently hold a firm position in the treatment of OA. Gastric or duodenal ulcers are found in 10-15% of patients who regularly take NSAIDs, and gastrointestinal bleeding and perforation during the year can develop in 1-1.5% of cases. The role of *Helicobacter pylori* (Hp) in the pathogenetic mechanisms of NSAID-induced gastroduodenopathies (GDP) in patients with OA is still debatable and needs further study.

Purpose: to investigate the features of fibrinolytic activity of blood plasma in gastroduodenopathies induced by non-steroidal anti-inflammatory drugs in patients with osteoarthritis depending on the presence of *Helicobacter pylori*. 126 patients with OA with concomitant GDP induced by NSAIDs were examined: group I a - 40 patients with Hp-positive NSAID-induced gastritis + duodenitis (GD), group I b - 30 patients with Hp-associated erosive and ulcerative gastric lesions (EVU) induced NSAIDs, group II a - 41 patients with Hp-negative NSAID-induced GD, group II b - 15 patients examined with NSAID-induced EVU without concomitant Hp infection. The control group consisted of 30 practically healthy persons (PHP). Fibrinolytic activity of blood plasma was investigated by the level of total (TFA), enzymatic (FFA) and non-enzymatic fibrinolytic activity (NFA).

The increase in the intensity of fibrinolytic activity of blood plasma was observed in all patients studied. A slightly more intense growth was observed in the presence of HP. Thus, in patients with I a, the TFA group increased by 42.6% ( $p < 0.05$ ), and in Ib - by 59.8% ( $p < 0.05$ ), compared with PHP. In Hp-negative EVU, TFA increased by 52.5% ( $p < 0.05$ ). In Ib group patients, FFA increased by 2.04 times ( $p < 0.05$ ), and in patients in group Ia - by 1.81 times ( $p < 0.05$ ) compared with PHP. In patients with I a, the FFA group increased by 17.6% ( $p < 0.05$ ) compared with the II a group.

Thus, the presence of concomitant *Helicobacter* bacterial infection leads to more pronounced changes in fibrinolysis in GDP, caused by NSAIDs, in patients with OA.

**Hontsariuk D.O.**

**CHRONIC PANCREATITIS – THE FREQUENCY OF ITS COMBINATION WITH THE  
OTHER INTERNAL ORGANS' DISEASES**

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Chronic pancreatitis (CP) can be characterized by a diverse clinical picture, which in case of a recurrent course is manifested by severe abdominal pain along with the manifestations of the inflammatory reaction. And the disease can be formed latently. One of the reasons is the gut microbiota, which changes the activity of the acinar-intestinal-acinar axis. Another reason is the formation of exocrine insufficiency in other diseases of the internal organs (eg, diabetes mellitus) without clinical manifestations of CP. The course of the disease is changed by concomitant gastrointestinal diseases (they can act as masks, especially dysfunction of the sphincter of Oddi by pancreatic type).

The purpose of the study: to determine the frequency of combination of chronic pancreatitis with other gastrointestinal diseases. To solve this problem, we used a questionnaire, which

contained questions about the primary and secondary nature of the development of chronic pancreatitis.

We examined 100 patients of different age groups (age ranged from 21 to 59 years), there were 43 women and 57 men. Recurrent pancreatitis (CRP) was found in 37 patients. The obtained results showed that 47% indicated alcoholic etiology and smoking, eating disorders in CRP, in 53% of cases the primary disease was considered by patients to be gastroenterological (according to the questionnaire). Peptic ulcer of the duodenum was noted as a cause of CP in 18% of patients, chronic gastroduodenitis - in 29% of cases, gallbladder dyskinesia and chronic non-calculosis cholecystitis with biliary sludge were indicated in 7 patients, in 3 patients the cause was chronic biliary pancreatitis (all 10 patients were female).

Thus, it is difficult to diagnose chronic pancreatitis in combination with gastrointestinal diseases, so there is often under- or overdiagnosis. In almost half of the patients, doctors considered the presence of gastrointestinal diseases to be the primary cause and did not treat the manifestations as "masks" of chronic pancreatitis (although in clinical practice this is common situation).

**Hryniuk O.Ye.**

### **TREATMENT OPTIMIZATION OF NON-ALCOHOLIC STEATOHEPATITIS IN OBESE PATIENTS ACCORDING TO COMORBIDITY WITH COPD**

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Taking into account the increase in the comorbidity of non-alcoholic steatohepatitis (NASH) and chronic obstructive pulmonary disease (COPD), there is a need to conduct studies regarding general mechanisms of development and burden interaction of these nosologies with the development of new correction methods.

The objective was to assess the Antral effectiveness and the combination of Antral with Phytostatin usage regarding to the effect on the systemic proteolysis and endogenous intoxication in patients with non-alcoholic steatohepatitis against the background of obesity with comorbidity with chronic obstructive pulmonary disease. 100 NASH patients with obesity of I degree and COPD 2-3 D were examined: 30 patients (group 1 – control group) received basic NASH therapy (Esentsiale forte N (Sanofi Avensis / Nutterman and Cie GmbH) 300 mg, 2 caps., 3 times per day) 60 days and COPD therapy (Symbicort Turbuhaler (budesonide 160 mg/d + formoterol fumarate 4,5 mg/s) (AstraZeneca AB, Sweden) inhaled 2 times per day for 60 days, Berodual (ipratropium / fenoterol (250/500 mg/ml) (Institute de Angele Italy / Boehringer Ingelheim International GmbH) nebulizer inhalation 2 times per day, azithromycin (Azithro Sandoz, Ukraine Sandoz) 500 mg, 1 time per day for 10 days). The second group (basic group, 2) consisted of 35 NASH patients with obesity of I degree and COPD 2-3 D, in addition to the same basic COPD therapy, they received Antral (Farmak, Ukraine) 200 mg, 3 times per day for 60 days as a hepatoprotector. The third group (basic group, 3) included 35 NASH patients with obesity of I degree and COPD 2-3 D, except the same basic COPD treatment, they received Antral (Farmak, Ukraine) 200 mg, 3 times per day as a hepatoprotector, and Phytostatin (Polyconazole) (OmniFarma LLC, Ukraine) 20 mg after dinner during 60 days. The average age of patients was (55,7 ± 3,22) years. The control group consisted of 30 apparently healthy persons (AHP).

The proposed therapy with Antral reduced the intensity of lysis of azoalbumin, azocasein and azocol in patients of the 3 group: at day 30, the decrease was respectively 1.3, 1.2 and 1.6 times ( $p < 0.05$ ), in patients of the 2 group: at day 30, respectively, the decrease was 1.2, 1.2 and 1.6 times ( $p < 0.05$ ) compared with the values before treatment. In the 1 group, the decrease occurred less intensively ( $p < 0.05$ ): only the Azocol values was likely to change - it decreased 1.3 times ( $p < 0.05$ ) with the presence of a significant difference with the 2 and 3 groups ( $p < 0.05$ ).

The degree of endogenous intoxication in patients with NASH with COPD of therapy programs containing Antral was also reduced more effectively. Thus, blood levels of medium molecular weight peptides at 254 nm (MMWP 254) in patients of 2 and 3 groups decreased after treatment by 1.2 and 1.3 times, respectively ( $p < 0.05$ ), and MMWP 280 - by 1.8 and 2.0 times,

respectively ( $p < 0.05$ ) with normalization of the values - against 1.3 times in the 1 group ( $p < 0.05$ )

The combined administration of Antral for 30 days resulted in a significant correction of proteinase-inhibitory homeostasis in patients with NASH associated with obesity and COPD, which was accompanied by a significant decrease in endotoxemia ( $p < 0.05$ ) and damaging effect of systemic proteolysis ( $p < 0.05$ ).

**Kaushanska O.V.**

**PATIENTS THERAPY WITH ANXIETY DISORDERS  
WITH METABOLIC SYNDROME X**

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In recent years, there has been a pathomorphosis of mental disorders in various somatic and endocrine diseases. Along with the known phenomena of asthenia, depression, anorexia nervosa, dysphoria in the structure of mental disorders in MS X, anxiety disorders of varying severity have recently become more frequent.

We conducted a 4-week study of the efficacy and safety of Afobazole in the treatment of adult patients with anxiety disorders within metabolic syndrome X (30 patients - the main group; 30 patients - control). The duration of treatment was 1 month of active therapy (later patients were transferred to maintenance therapy outside this study). For treatment used the drug Afobazole, containing in a tablet 0.01 g of active substance, prescribed 3 times a day (morning, afternoon and evening).

The study included 60 adult patients (18–65 years) (36 men, 24 women), whose clinical picture revealed mild and moderate forms of neurotic disorders observed in the therapeutic hospital and outpatient service. The main (30 people) and control (30 people) groups were formed taking into account the representativeness by sex and age ( $\chi^2_{emp} < \chi^2_{crit}$ ,  $p > 0.01$ ). The sample consisted of patients who gave voluntary written informed consent to participate in the study. The treatment was completed by 55 patients, including 28 patients in the main group and 27 patients in the control group. The therapeutic effect of Afobazole in our study was detected fairly quickly. Already at the end of the first week of therapy, there was a reduction in anxiety in the form of a decrease in irritability, anxiety and some deactualization of fears and bad feelings. Patients also reported improved sleep, greater ability to relax, and decreased anxiety, fear, and tearfulness. A feature of the therapeutic effect of Afobazole was a significant reduction by the 7th day of treatment of a significant number of viscerovegetative manifestations of anxiety disorders: patients noted relief of breathing, more stable with a tendency to normalize blood pressure and pulse, reduced tension and muscle pain, reduced or lack of dry mouth, sweating and dizziness, reduced need for food. In addition, patients noted an improvement in performance by improving the quality of cognitive functions (attention, memory). In the whole group of patients it was noted a complete recovery from the disease (38.4%) or a significant improvement (37.9%) and for most patients with mild manifestations, complete recovery was observed in 92% of cases. Among patients with moderate manifestations, a good effect was recorded in 75% of cases, in the rest, moderate and minimal effects were observed, respectively. The dynamics of the severity of the patients' condition compared to the screening was significantly positive ( $p < 0.05$ ) also from the 7th day of Afobazole therapy; similar changes were noted in the indicators of the overall effectiveness of therapy. Absence of positive changes on Afobazole therapy was noted in 3.3%, deterioration - in 3.3%. In the control group - 6.6 and 3.3%, respectively. The dynamics of somatic indicators also had positive trends in the control and main groups: the reduction was respectively: SBP - 11.0 and 18.0% ( $p < 0.05$ ); DBP - 4.4 and 14.9% ( $p < 0.05$ ); the decrease in BMI and BP was within the statistical error.

Afobazole provided high compliance and quality of life of patients; did not show a negative impact on the course of somatic pathology within the Ministry of Agriculture. The therapeutic effect of Afobazole is the reduction of viscerovegetative manifestations of anxiety disorders, including relief of breathing, normalization of blood pressure and heart rate, reduction of muscle tension and pain, sweating and dizziness.

**Khukhlina O.S.**

**CLINICAL EFFICIENCY OF ANTRAL IN THE TREATMENT OF NON-ALCOHOLIC STEATOHEPATITIS AGAINST THE BACKGROUND OF OBESITY**

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The prevalence of non-alcoholic steatohepatitis (NASH) is gaining global significance in the population of economically developed countries with a growing tendency in Ukraine. According to various authors, the incidence of NASH ranges from 20% to 35%, which directly affects the quality of life of patients, contributes to the progression of disorders of all types of metabolism and development of hepatic cell insufficiency.

The objective was to establish the effectiveness of Antral usage on the effect on the intensity of clinical and biochemical syndromes in patients with non-alcoholic steatohepatitis comorbid with obesity

72 NASH patients with obesity of I degree were examined: 35 patients (group 1 – control group) received basic NASH therapy (Esentsiale forte N (Sanofi Avensis / Nutterman and Cie GmbH) 300 mg, 2 caps., 3 times per day) 60 days. The second group (basic group, 2) consisted of 37 NASH patients with obesity of I degree received Antral (Farmak, Ukraine) 200 mg, 3 times per day for 60 days as a hepatoprotector. The average age of patients was ( $56,5 \pm 3,23$ ) years. The control group consisted of 30 apparently healthy persons.

Treatment dynamics with the Antral usage in patients with NASH with comorbid obesity on the 30th day of treatment was characterized by manifestations of asthenic-vegetative syndrome; in the 1st group - 16 (44.0%) people, in the 2nd group - 8 (21,7%) ( $p < 0.05$ ). Periodic aching pains / discomfort / heaviness in the right hypochondrium disturbed - 15 (41.0%) people in the 1st group ( $p < 0.05$ ), 6 (17.7%) people in the 2nd group ( $p < 0.05$ ). Manifestations of dyspeptic syndrome on the 30th day of treatment in patients of the 1st group - 10 (27.2%), in patients of the 2nd group - 4 (11.0%) ( $p < 0.05$ ). Cholestasis syndrome after treatment persisted in 6 patients of the 1st group (17.6%) and in 1 patient of the 2nd group (3.4%) ( $p < 0.05$ ).

In the dynamics of treatment, on the 30th day of therapy, a significant decrease in the content of total bilirubin in the blood was recorded in patients of the 2nd group: in 1.9 times ( $p < 0.05$ ), and in patients of the 1st group only in 1.3 times ( $p < 0.05$ ). The content of direct bilirubin in the blood in NASH patients significantly decreased in 1.9 times ( $p < 0.05$ ) with the normalization of this indicator, and in patients of group 2 - in 2.2 times ( $p < 0.05$ ). The content of indirect bilirubin in the 1st group decreased in 1.1 times ( $p < 0.05$ ), in the 2nd group there was a complete normalization of the indicator ( $p < 0.05$ ). We found a decrease in alaninaminotransferase activity on the 30th day of treatment in patients of all groups: in patients of the 2nd group - in 2.7 times ( $p < 0.05$ ) versus 1.7 times in patients of the 1st group ( $p < 0.05$ ). A similar dynamic was observed in all groups of patients in terms of a decrease in aspartateaminotransferase activity: in the 1st group - in 1.8 times ( $p < 0.05$ ), in the 2nd group - in 2.6 times ( $p < 0.05$ ). A decrease in the activity of gamma-glutamyl transpeptidasa was noted: in the 2nd group in 2 times ( $p < 0.05$ ) versus 1.6 times in the patients of the 1st group ( $p < 0.05$ ). Thymol test after 30 days of treatment decreased in 1.9 times ( $p < 0.05$ ) in patients of the 2nd group compared to 1.5 times ( $p < 0.05$ ) in the 1st group ( $p < 0.05$ ).

The use of Antral in the complex therapy of NASH patients with concomitant obesity is more effective than traditional therapy and contributed to the elimination of the clinical manifestations of NASH (asthenic-vegetative syndrome, dyspepsia, abdominal discomfort, cholestasis) and biochemical syndromes (cytolysis, cholestasis, mesenchymal-inflammatory syndromes), which will help reduce the risk of progression of major and concomitant diseases.



**Kotsubiychuck Z.Ya.**

**CHANGES IN BIOCHEMICAL MARKERS OF LIVER DAMAGE IN PATIENTS WITH  
NON-ALCOHOLIC STEATOHEPATITIS, DIABETIC KIDNEY DISEASE  
CONCURRENT WITH DIABETES, EFFECTIVENESS OF MEDICAL CORRECTION**

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The aim of the study was to determine the probable effect of a complex of metformin, Rosuvastatin, Essentiale forte H and Quercetin in patients with non-alcoholic steatohepatitis (NASH), diabetic kidney disease with type 2 diabetes mellitus (DM) on biochemical markers of liver damage, which are factors in the progression of these pathologies.

Studies in the dynamics of treatment in 60 patients with NASH with DM and stage I-III diabetic kidney disease (DKD) showed the following: among 48 patients (80.0%) were diagnosed with mild NASH, and in 12 (20, 0%) with NASH of moderate activity. Comorbid disease in 100% of patients with NASH was DM of moderate severity, among which 15 people (25.0%) had DM in the compensatory stage, in 45 (75.0%) subcompensated. All patients with NASH and DM had comorbid DKD, in particular, 21 cases of DKD stage I-II (35.0%), 20 people with DKD stage III (33.3%), 19 persons with stage IV DKD (31.7%).

Depending on the prescribed treatment on a random basis, the examined patients were divided into 2 groups: (1 group - control: 28 people) received a low-calorie diet with dietary restrictions 9, essential phospholipids (Essentiale forte H) 300 mg 2 caps. 3 times a day for 30 days for the treatment of active non-alcoholic steatohepatitis, for concomitant type 2 diabetes mellitus and hyperlipidemia prescribed metformin hydrochloride (Metformin-Teva) 1000 mg per day, rosuvastatin (Rosuvastatin-Teva) 5 mg once a day for a month. Group 2 consisted of patients (32 people) who, in addition to similar dietary recommendations, essential phospholipids, hypoglycemic and hypolipidemic therapy for a month, additionally received quercetin and povidone (Corvitin) 500 mg intravenously in 100 ml of isotropic solution for 10 days.

Analysis of blood biochemical parameters that indicate the dynamics of biochemical syndromes of NASH, glycemia and lipidogram indicate a higher efficacy of additional administration of Quercetin to the therapy prescribed by the protocol in patients with DM. Thus, the increased content of total bilirubin in the blood before treatment (1.8 times,  $p < 0.05$ ) in both groups probably decreased - in the 2nd group 1.4 times ( $p < 0.05$ ) due to its as unconjugated fraction, which decreased 1.4 times with normalization of the indicator, and conjugated fraction - 1.4 times ( $p < 0.05$ ). In group 1, the decrease in total bilirubin was 1.2 times ( $p < 0.05$ ) due to a decrease in only the unconjugated fraction by 1.2 times ( $p < 0.05$ ), direct bilirubin had only a tendency to decrease by 10, 3% ( $p > 0.05$ ). Although statins and metformin may adversely affect hepatocyte membrane integrity, we have not identified any adverse effects on enzymatic markers of cytolysis. On the contrary, under the influence of the prescribed therapy in patients of both groups, the activity of AST, increased before treatment by 3.0 times ( $p < 0.05$ ), decreased probably in group 1 - 1.4 times, in group 2 - in 1, 9 times ( $p < 0.05$ ), ALT activity, increased before treatment by 3.6 times ( $p < 0.05$ ), decreased by 1.3 and 1.7 times ( $p < 0.05$ ), respectively, with the presence of significant differences between indicators after treatment in groups ( $p < 0.05$ ). When comparing the indicators after treatment with these indicators in healthy individuals, it should be noted that in no group did these indicators reach the reference values ( $p < 0.05$ ). We found a significant effect of therapy only with the addition of quercetin on markers of cholestasis: for example, increased before treatment alkaline phosphatase activity by 1.9 times ( $p < 0.05$ ) and gamma-glutamyl transferase (increased before treatment by 1.4 times) ( $p < 0.05$ ) decreased only in group 2 - 1.2 times ( $p < 0.05$ ) without normalization of indicators, and in patients of group 1 indicators of alkaline phosphatase and gamma-glutamyl transferase activity even tended to increase.

Thus, complex therapy with essential phospholipids, Rosuvastatin, Metformin in combination with Quercetin in persons with comorbid NASH, DM and DKD contributes to a probable decrease in the intensity of biochemical changes in the liver, decreased development of the liver.

**Kulachek V.T.**

**THE MORPHOFUNCTIONAL STATUS OF ERYTHROCYTES IN PATIENTS WITH  
CHRONIC KIDNEY DISEASE AND RHEUMATOID ARTHRITIS**

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Rheumatoid arthritis (RA) is a chronic crippling disease that can affect various organ systems including the kidney. Renal involvement in RA is clinically meaningful because it worsens the course of primary disease and increases mortality. Subjects hospitalized for RA are significantly more likely to have a recorded cause of death due to renal failure. Proteinuria may be the first clinical sign in many renal disorders, for example, in amyloidosis patients. Erythrocytes, in addition to oxygen transport function, occupy a prominent place in the regulatory exchange processes in the body, providing microcirculation of organs and tissues, in particular, the kidneys.

The aim: to study morphofunctional properties of erythrocytes at different stages of evolution of chronic kidney disease (CKD) in patients with RA. The study involved 113 patients with RA II-III degree of activity. According to a survey of patients were divided into four groups (I-patients with RA without renal disease (n=20), II-patients with RA with CKD stage I (n=34), III-patients with RA with the presence of CKD stage II (n=31), IV-patients with RA with the presence of CKD stage III (n=28). Comparison group was 20 healthy individuals. The index of erythrocytes deformability, the relative viscosity of the erythrocyte suspension (RVES), and the peroxide hemolysis of red blood cells (PGE) were studied in addition to conventional laboratorial tests.

The progressive violations of the morphofunctional properties of erythrocytes in patients with rheumatoid arthritis with CKD I-III are determined. It has been found a significant decrease of the erythrocyte deformability index ( $p < 0,05$ ) and the increase of the RVES ( $p < 0,05$ ). It has been found the direct correlation between the RVES and the proteinuria ( $r = 0,87$ ), the inverse correlation between the RVES and the glomerular filtration rate ( $r = -0,71$ ) ( $p < 0,05$ ). PGE increased in patients with RA with the presence of CKD and its growth stage. Glomerular filtration rate and RVES can be interdependent processes that reinforce each other. Thus, the increasing of RVES promotes the formation of microthrombi in the glomeruli capillaries, impairs filtration and contributes to the progression of kidney damage and the development of CKD. At the same time, decreased GFR indirectly causes a deterioration in the rheological blood properties and an RVES increase in the glomeruli and accelerates the progression of impaired renal function.

Thus, analyzing the overall change in the morphofunctional properties of erythrocytes, it has been found that the indicators of RVES and PGE significantly increase with the presence of RA, but with the advent of kidney damage, changes are becoming progressive. Indicators of the erythrocyte deformability index are reduced in patients with RA with involvement in the pathological process of the kidneys, which can be regarded as one of the methods of early kidney damage in this category of patients. The most severe microcirculatory changes were found in patients with RA with CKD III stage. These findings indicate the important role of microcirculatory disorders in this category of patients and the necessity of their correction.

**Kulich N.M.**

**EMOTIONAL INTELLIGENCE  
AS A PSYCHOLOGICAL RESOURCE OF SPORTSMEN**

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Training programmes for athletes that are solely based on the technical and physical aspects of training have their limitations. It is only when they are also based on a proper understanding of psychology of an athlete that sportsmen and women can attain their true potential. In practical terms this means that when a sports trainer is devising a training programme for an athlete the trainer needs to recognise that the unique psychology of an individual athlete is a resource that can be used to boost the athlete's performance.

Emotional intelligence (EI) is an important part of psychology of an athlete and must therefore be taken into account when a training programme for an athlete is being devised.

Modern research into psychological training in sports raises the issue of how athlete's psychology can be used as a resource.

The need to counteract the wide range of stress factors that often arise during training and competition presents a range of challenges that an athlete's character must overcome. For example, athletes can only obtain good results in sport by adapting to high training loads and to constant competition. This demands a complex set of personal resources and qualities in an athlete.

Theoretical analysis offers many insights into how best to form and shape the personal resources of an athlete. The literature on the subject is extensive and much of it is overlapping. Nevertheless, it seems from the written materials that there are four main resources. They are motivational, cognitive, behavioural and emotional. Emotional stability, confidence and motivation, dedication, optimism, and the ability to control aggression, anxiety, the ability to concentrate and high self-esteem and the importance of having a stable psychological profile are closely linked to or are subsets of the four main resources.

The aim of this research paper is to determine the impact of physical activity on the level of EI among youth; examine the extent to which EI and sports achievements is correlated; and consider the discrepancies between EI indicators between athletes in different sport disciplines.

In essence the literature on the subject emphasizes the need for careful research into the psychological resources of an athlete. It also argues that those resources will differ from one athlete to another. The versatile use of the emotional resource capabilities of an athlete's psyche effectively increases their ability to embody their sports potential in competitions. Harnessing EI has the potential for improving an athlete's emotional resources.

In the paper, the EI of 245 young people aged 17-19 was studied. 125 of them were athletes who were systematically engaged in sports and competitions for 3½ years. The remaining 120 ones did not go into sport at all. The research is based on the methodology that Nelson-Hall devised to assess EI. It also uses various methods of mathematical statistical analysis, such as Student's t-test.

The paper shows that the extent of the development of EI in young athletes was significantly higher than that in their peers who had not done any sports. Thus, sports activities have a positive effect on the development of young people's EI.

It is clear from this finding that EI plays an important role in shaping an athlete's psychological profile. Another key finding is that in a group of athletes the results and analysis of the components of EI in a group of athletes, statistically significant differences were found in EI between athletes in the group. This was shown in the indices that measured how well they were able to manage their own emotions, their degree of self-motivation and in the extent to which they were aware of other people's emotions. The research showed that athletes with higher levels of emotional management tend to achieve better results than those with lower emotional management abilities. It is likely that this observation will hold true for athletes from across a broad spectrum of sports ability.

**Kvasnytska O.B.**

## **MODERN APPROACHES IN THE PREVENTION OF COLON CANCER**

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Colorectal cancer (CRC) is one of the most widespread pathology in the world. Every year in the world, the incidence reaches 1 million cases, and the annual mortality rate exceeds 500,000. and ranks second in mortality after malignant neoplasms among men and women. The incidence of CRC in European countries is 26-46 men and 17-28 women per 100,000 (in Ukraine, an average of 17-21 cases). It is more often found at the age of 60 years and more, but it is diagnosed only in 6% of cases in people aged 50 and less. In 95% of cases, CRC arises from adenomas of the colon, less often develops in patients with genetically determined polyposis syndrome or inflammatory bowel diseases (IBD).

The aim of the study is to analyze modern screening methods for CRC. Early detection of CRC among the population has 2 directions: detection in high-risk groups and in formally healthy people, without any symptoms. The high-risk group includes persons with a family history of CRC (relatives of the first degree); patients suffering from IBD for 10 years, people with severe obesity. Screening of high-risk individuals begins at age 40, for the remaining individuals from age 50.

The most well-known test - FOBT - detection of small amounts of occult blood in the intestinal contents. It is performed at home: for 3 days before the test follow a diet without animal protein, and then take 2 samples of feces for 3 days. The test should be repeated annually. Another method of immunochemical examination of feces for occult blood - FIT - is more convenient, does not require a special diet, it requires a smaller number of fecal samples. The methods reduce the risk of death from CRC by 15%, in addition, FOBT and FIT reduce the incidence of CRC by 20% by diagnosing large polyps and their subsequent removal by colonoscopy.

In case of positive tests for occult blood, patients should be examined additionally. The second method of screening is sigmoidoscopy, which is performed once every 5 years and reduces mortality from CRC by 60%. If a polyp or tumor was found during this method, a colonoscopy is performed. The combination of FOBT and sigmoidoscopy can reduce the risk of death from CRC by 80%. Colonoscopy is marked as the gold standard among screening methods in some countries. Periodic colonoscopies can prevent cancer in 76-90% of patients with large polyps. Colonoscopy in a healthy population is performed once every 10 years, and in patients with small polyps or solitary adenoma without severe dysplasia - once every 3 years. In patients with hereditary non-polyposis CRC colonoscopy is performed at intervals of 1-2 years.

Among the promising methods of screening and diagnosis - virtual colonoscopy - spiral computed tomography with very thin sections and 3-dimensional image. The sensitivity of the new method in the diagnosis of polyps more than 1 cm is 90%, and the specificity is 96%. The duration of the study is 10 minutes. Of the new methods, we note the fecal test for DNA. The exfoliated epithelium of the colon is isolated from the feces, DNA is extracted and its mutation analysis is performed using a panel of biological markers APC, P53, Ras, Bat-26. These data allow to differentiate adenomas with malignancy.

Thus, screening can potentially reduce the incidence of CRC. Evidence-based quality standards need to be developed at each stage of the screening process, disseminate inexpensive, easy-to-use clinical methods and implement them at the national level

**Liakhovych O.D.**

## **FEATURES OF THE CLINICAL COURSE OF OSTEOARTHRITIS IN PATIENTS WITH COMORBID NON-ALCOHOLIC STEATOHEPATITIS AND OBESITY**

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Today, non-alcoholic fatty liver disease (NAFLD) is one of the most common diseases in hepatology, which leads to poor quality of life, reducing its duration. An important problem is the comorbidity of NAFLD with obesity (Ob) and osteoarthritis (OA), which is characterized by a burdening syndrome. Osteoarthritis of large joints is a common comorbid pathology on the background of Ob. The urgency of the problem of studying OA is due to the high prevalence of OA, the rapid development of functional disorders and disability of people of all ages.

The aim was to find out the features of the clinical course of osteoarthritis depending on the presence of comorbid diseases: non-alcoholic steatohepatitis and obesity. 140 patients with NASH, OA, obesity or with their combination were examined including 30 patients with OA and normal weight (BMI = 21 – 25 kg / m<sup>2</sup>), 80 patients with OA, NASH and obesity (BMI higher than 30 kg / m<sup>2</sup>), 30 patients with NASH and obesity without OA (BMI > 30 kg / m<sup>2</sup>). The average age (63.1 ± 5.3) years. The control group consisted of 30 healthy individuals with normal body weight, including 12 men and 18 women.

A negative impact of NASH and obesity on the course of OA compared with the course of OA in persons with normal body weight consists of a significantly lower frequency of stage I (2,4

times,  $p < 0,05$ ) and higher frequency of III (4,6 times,  $p < 0,05$ ) OA radiographic stage, higher chance of OA progression from stage I to stage III (OR = 4,88 95 % CI [1,09-21,81,  $p < 0,05$ ]); reliably lower occurrence of mono-osteoarthritis (3,1 times,  $p < 0,05$ ) and higher incidence of poly-osteoarthritis (7,1 times,  $p < 0,05$ ) with an increased chance of involvement of more joints (OR = 7,50 95 % CI [1,71-32,96,  $p < 0,05$ ]), higher intensity of pain syndrome (by WOMAC) (OR = 2,81; 95 % CI [1,28-6,15,  $p < 0,05$ ]), joint stiffness (2,2 times) and a higher chance of its progression (OR = 2,19; 95 % CI [1,04-4,59,  $p < 0,05$ ]), higher exacerbation rate during the year (2,7 times,  $p < 0,05$ ) (OR = 2,63; 95 % CI [1,01-6,81,  $p < 0,05$ ]), a higher incidence of severe OA (OR = 9,75; 95 % CI [1,27-75,05,  $p < 0,05$ ]), lower frequency of first stage FJF (2,3 times,  $p < 0,05$ ) and higher frequency of II and III degrees of FJF (1,5 and 4,4 times, respectively,  $p < 0,05$ ), higher total chance of FJF progression (OR = 4,69; 95 % CI [1,05–21,01,  $p < 0,05$ ]), which progress with the increase in the degree of obesity ( $p < 0,05$ ), the degree of IP ( $p < 0,05$ ) due to a significant imbalance in the metabolism of connective tissue components ( $p < 0,05$ ).

**Nazymok Y.V.**

### **FORMATION OF THE SIGMOIDORECTAL SEGMENT INTESTINAL WALL IN THE FETUSES OF THE THIRD TRIMESTER OF INTRAUTERINE DEVELOPMENT**

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The main macroscopic and microscopic signs of the sigmoidorectal segment in fetuses and neonates are considered the following structures: narrowing of the intestinal tube in the point of transition of the sigmoid colon into the rectum; lack of evagination and epiploic appendages within the sigmoidorectal segment; the place of transition of the sigmoid colon strips into the solid longitudinal muscular layer of the rectum; the semicircle available in the form of a fold of the mucous membrane located transversally to the axis of the intestine. Practical value of the above anatomical facts is discussed in the scientific literature (A.E. Bharucha et al., 2007; F. Bretagnol et al., 2006; B.N. Zhukov, 2000). Nevertheless primary (absolute) signs of differentiation between the sigmoid and rectum should be peculiarities of the myo- and angioarchitectonics of the wall of the colon distal portions (P. Kovalsky et al., 2008), which is confirmed by the results of our research.

Objective of the research is to study histotopographic peculiarities of the sigmoidorectal segment in fetuses of the third trimester. The study was conducted on 31 specimens of the 7-9-month fetuses (305,0-420,0 mm of PCL) using a complex of morphological investigation methods. Histological examination of the sigmoidorectal segment wall found that mucous membrane in 7-month fetuses is thicker than in 8-9-month of the intrauterine development. A number of blood vessels are indicative of the vascular plexuses available in the submucous basis within the borders of the sigmoidorectal transition. According to D.W. Fawcett et. al., (1994), submucous plexus is involved into the regulation of the local intestinal secretion, absorption and muscular contraction. The loose fibrous tissue of the submucous basis penetrates partially into the muscular membrane of the initial portion of the peritoneal part of the rectum. The data obtained in our research correlate with the statement suggested by A. Shafik, et. al., (1999) concerning anatomical borders of the sigmoidorectal segment. The muscular layer of the sigmoidorectal segment in 7-month fetuses is more than a half of the wall thickness in comparison with the mucous membrane. But in the term of 8-9 months of the intrauterine development the muscular layer of the sigmoidorectal transition becomes thinner again. In 9-month fetuses certain groups of fibers in the muscular layer are partially interrupted by the layers of the loose fibrous tissue, which is indicative of enlargement of the intestinal diameter that advances the growth of the mucous membrane.

Therefore, histological transformations of the sigmoidorectal segment are indicative of the formation of the sigmoidorectal sphincter: the mucous and submucous membranes of the sigmoidorectal transition look like evagination in the intestinal lumen, the blood vessels form vascular plexuses in the submucous membrane of the sigmoidorectal transition. The circular layer of the muscular membrane in the sigmoidorectal transition is thicker than the longitudinal layer.

**Olinik O.Yu.**  
**PSORIATIC ARTHRITIS AND HYPERURICEMIA**

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Psoriatic arthritis (PsA) occurs in 13.5 - 47% of patients with psoriasis, in particular, in normal psoriasis the incidence is 6-7%, in pustular - 32%. The prevalence of psoriatic arthritis in the general population ranges from 0.01 to 0.19% depending on the geographical location (Marchuk, 2019). PsA more often occurs at a young age (15-20 years) and leads to adverse consequences in the form of temporary and permanent disability, deterioration of physical and psychological components of quality of life. The second peak of incidence is observed at the age of 55-60 years, when there are comorbidities, metabolic disorders, including hyperuricemia, which creates difficulties for proper drug treatment and requires a clear differential diagnosis.

The aim of our study was to evaluate the effect of hyperuricemia on the course of PsA and to identify related factors. The study included 16 patients with PsA and hyperuricemia. The diagnosis of PsA was established on the basis of diagnostic criteria developed by the Association of Rheumatologists and Orthopedists-Traumatologists of Ukraine (2004) on the basis of the recommendations of the Institute of Rheumatology of the Russian Academy of Medical Sciences (Badokin, 1989). The study was conducted taking into account the following aspects: demographic variables (age, sex, duration of the disease), clinical variables (affected joints, severity of psoriasis), biological factors (acute phase reagents), variables associated with treatment (nonsteroidal anti-inflammatory drugs, corticosteroids, synthetic and biological drugs that modify the disease) and comorbidities. Hyperuricemia was defined as a level of uric acid above 360  $\mu\text{mol/L}$ . Statistical analysis: factors that were potentially associated with hyperuricemia were assessed using Spearman's correlation, and data were processed using the licensed program Statistica 13.0.

In total, the study included 9 (56.25%) women and 7 (43.75%) men, mean age  $54 \pm 5.8$  years, mean disease duration  $7 \pm 1.4$  years; 4 (25%) had moderate/severe psoriasis. A high percentage of patients had concomitant cardiovascular diseases: dyslipidemia 81.25%, hypertension 50%, obesity 37.5% and cardiovascular events 25%. Hyperuricemia was significantly associated with obesity, coronary heart disease, and hypertension, but there was no correlation with the severity of cutaneous psoriasis. In determining the odds ratio was found: coronary heart disease 4.95, [95% confidence intervals: 1.47; 16.67]), obesity (3.61 [1.00; 12.98]) and hypertension (1.86 [1.04; 3.32]).

Thus, hyperuricemia is common in patients with PsA, especially in patients with longer disease duration and obesity. Hyperuricemia in PsA is more associated with metabolic syndrome than with cutaneous psoriasis, but further research is needed to identify the cause. Proper control of hyperuricemia can improve treatment and control of PsA.

**Palibroda N.M.**  
**LONG-TERM USE OF PROTON PUMP INHIBITORS: WHAT IS NEW?**

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Since the introduction of Omeprazole, the first proton pump inhibitor (PPI) in 1989, this class of medications has become a leader in the management of acid-related disorders. Their high efficacy and low toxicity resulted in the approval of the first OTC product in 2003, and nowadays they are in the top 10 most prescribed drugs and among the most widely sold medications in the world (World Health Organization, 2019). These same factors have also contributed to their overuse, misuse and long-term use. Over the years, there has been a growing concern over potential adverse effects associated with long-term therapy. Since 2010, the FDA has issued various safety warnings regarding the potential effects of long-term use of PPIs: risk of fractures, hypomagnesemia, Clostridium difficile-associated diarrhea, vitamin B12 deficiency, acute interstitial nephritis (AIN), and cutaneous and systemic lupus erythematosus. The results of several studies investigating the side effects of long-term PPI use were reviewed.

There was found a high prevalence of anti-ulcer drug prescription associated with a highly significant subsequent prescription of anti-allergic medications. The rate ratios for anti-allergic following gastric acid-inhibiting drug prescriptions are 1.96 (95%CI:1.95–1.97) and 3.07 (95%-CI:2.89–3.27). These findings are more prominent in women and occur in all assessed gastric acid-inhibiting substances. Rate ratios increase from 1.47 (95% CI:1.45–1.49) in subjects aged under 20, to 5.20 (95%-CI:5.15–5.25) in ones aged over 60.

Recent data has suggested a link between PPI use and dementia. Biologically, PPIs may increase the production and degradation of amyloid and bind to tau. The possibility of reduced levels of vitamin B12 and other nutrients may also play a role in the increased risk of dementia. These observational studies suggest an association, but no causal relationship has been established.

The meta-analysis showed (Hafiz R A et al., 2018) that PPI users have an increased risk of developing community-acquired enteric infection (pooled odds ratio [OR] = 4.28; 95% CI = 3.01-6.08). The strength of the association was similar for Salmonella (pooled OR = 4.84; 95% CI = 2.75-8.54; I2 = 58.7%; P = 0.064) and Campylobacter (pooled OR = 5.09; 95% CI = 3-8.64; I2 = 81%; P < 0.001) but lower for studies that combined all bacteria (pooled OR = 2.42; 95% CI = 0.96-6.14; I2 = 94.3%; P < 0.001).

Some local effects of long-term PPIs use include atrophic gastritis due to prolonged acid suppression, hypergastrinemia, chronic H. pylori infection and development of gastric polyps, that are risk factors for gastric cancer. There are a lot of doubts about PPIs association with an increased risk of developing gastric cancer. The Cheung study included a total of 63,397 individuals (Cheung KS, 2018), where 153 cases developed gastric cancer. PPI users had a hazard ratio of 2.44 (95% confidence interval [CI] 1.42-4.20), and the risk of cancer increased with the duration of PPI use. The Brusselaers study included a total of 797,067 individuals (Brusselaers N, 2017) where 2,219 cases developed gastric cancer. The standardized incidence ratio of gastric cancer among PPI users was 3.38 (95% CI 3.23-3.53), and the risk of cancer increased with the duration of PPI use. Therefore, chronic PPI use is associated with an increase in the risk of gastric cancer. This increase in risk is both dose and duration related.

Thus, proton-pump inhibitors provide important clinical benefits for many patients. They have favorable safety profile, however, observational studies have suggested an association between PPI use and some adverse reactions. Future studies are needed to fully explain the effect of chronic PPI use and to define the maximum duration of use of PPIs, where the risk of adverse reactions is minimum. In conclusion, PPI use must be associated with appropriate indications utilizing the lowest effective dose for the shortest duration possible.

**Pavliukovych N.D.**

## **METHODS OF LASER POLIARYMETRY FOR ERYTHROCYTE MORPHOLOGY INVESTIGATION IN PATIENTS WITH COMORBID PATHOLOGY**

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Changes in the rheological properties of blood are one of the most important moments in the pathogenesis of most diseases, especially in case of comorbidity.

The main task of the research was to investigate possible structural changes of erythrocytes membranes (EM) in patients with chronic heart failure (CHF) and diabetes mellitus type 2 (DM). Methods of optical physics reveal and objectify structural changes of EM, which can expand the arsenal of diagnostic methods of rheological disorders detection due to various pathological conditions. 60 patients with CHF the (I group) and 55 patients with CHF with comorbid DM (the II group) were included in the research. For objective assessment of EM functional state laser polarimetry of the red cell suspension smear was applied.

Intensity distribution of Fourier spectrum histogram of erythrocytes suspension smear had symmetrical “bell-like” appearance. Unlike this, intensity distribution of Fourier spectrum of erythrocytes suspension smear in patients of the II group was uneven, and histogram transformed into asymmetric dependence.

The revealed fact indicates the growth of EM anisotropic component, conditioned primarily by conformational changes of the EM protein structure due to chronic hyperglycaemia (activation of the peroxic oxidation of the biopolymers and lipids, protein molecules glycolysation, and, as a result, the change of the conformational and spatial orientation of the protein fibrils, including integrated, of the erythrocyte membrane), which is accompanied by worsening of EM morphological features. Correlation analysis showed a statistically significant direct relationship between the level of fasting glucose and anisotropy degree of the red blood cells suspension in patients with CHF and DM.

Thus, laser polymerization methods of the EM may be used for early diagnosis of erythrocytes structural changes in patients with CHF and DM.

**Prysiashniuk I.V.**

**CHANGES IN LIPID BLOOD PARAMETERS WITH T894G POLYMORPHISM OF ENDOTHELIAL NITROGEN OXIDE SYNTHASE GENE IN PATIENTS WITH CHRONIC NONCALCULOUS CHOLECYSTITIS AND HYPOTHYROIDISM.**

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Gene polymorphism of endothelial nitrogen oxide synthase (eNOS) has been the object of scientific interest for many years, since it plays a principal role in the regulation of vascular tone. NO plays a key role in vascular relaxation, reducing of migration and proliferation of vascular smooth muscle cells, inhibition of platelet adhesion of leukocytes to the endothelium, inhibiting of low-density lipoprotein oxidation. Described changes result in endothelial dysfunction manifestation, leading to the atherogenesis development. In particular, it was found out, that minor T-allele carriers of the eNOS gene show reduced activity of the eNOS enzyme and decreased NO blood level. We have not found any data about the peculiarities of chronic cholecystitis development depending on the eNOS gene (T894G) polymorphism, especially in patients with hypothyroidism who are prone to the development of this pathology.

The aim of the study was to investigate a possible association of T894G eNOS gene polymorphism with changes in lipid blood parameters in patients with chronic noncalculous cholecystitis and hypothyroidism. The study involved 52 patients with chronic noncalculous cholecystitis and hypothyroidism (average age  $46,1 \pm 14,4$  years), which were signed in research group. Disease duration since the diagnosis of hypothyroidism ranged from 1 to 10 years, chronic cholecystitis between 1 to 5 years respectively. The control group consisted of 20 practically healthy individuals correlative by their age and gender to the groups examined. Lipid profile of the blood was studied by measuring the content of cholesterol, triacylglycerols, cholesterol of high density lipoproteins, cholesterol of low density lipoproteins, cholesterol of very low density lipoproteins in plasma. Atherogenic index was calculated on the base of received data. Investigation of T894G polymorphism of eNOS gene was carried out in the state institution "Reference Center for Molecular Diagnostics of the Ministry of Public Health of Ukraine" (Kyiv, Ukraine). To determine the polymorphic variants of eNOS gene (G894T) (rs1799983) modified protocols with specific oligonucleotide primers ("Metabion", Germany) were used the method of polymerase chain reaction and subsequent analysis of restriction fragment length polymorphism.

Patients with chronic noncalculous cholecystitis and hypothyroidism T-allele carriers were characterized by 19,2% ( $p=0,02$ ) higher cholesterol of low density lipoprotein blood level compared to the appropriate indicator in patients with GG-genotype. Such peculiarities in lipid profile in patients with T-allele of eNOS gene lead to the increased value of atherogenic index by 14,4% ( $p<0,05$ ) compared with proper parameter in patients GG-genotype carriers.

Thus, carriage of the T-allele T894G of the eNOS gene polymorphism in patients with chronic noncalculous cholecystitis and hypothyroidism is associated with low-density lipoprotein cholesterol and atherogenicity index compared with the corresponding indicators in patients with GG genotype, indicating a more pronounced prerequisites for the deterioration and progression of chronic inflammatory process of the gallbladder.



**Ratsa V.V.**

**ANALYSIS OF INDICATORS OF FIBRINOLYTIC AND PROTEOLYTIC ACTIVITY OF BLOOD PLASMA IN PATIENTS WITH CHRONIC PANCREATITIS COMBINED WITH HYPOTHYROIDISM**

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Polymorbidity is recognized as a global problem in modern medical science, and its study is one of the most important ways to improve the individual approach to the treatment of patients with combined pathology and can improve large-scale socio-economic consequences at the population level.

The aim of the study is to analyze the state of proteolytic and fibrinolytic activities of blood plasma in patients with chronic pancreatitis combined with hypothyroidism. 105 people participated in our study, the 1<sup>st</sup> group of which consisted of patients with chronic pancreatitis (n=27), group 2 – patients with hypothyroidism (n=30), group 3 – patients with chronic pancreatitis combined with hypothyroidism (n=28), group 4 – almost healthy individuals (n=20). The state of fibrinolytic activity of blood plasma was studied by lysis of azofibrin, followed by determination of total fibrinolytic activity, non-enzymatic fibrinolytic activity and enzymatic fibrinolytic activity. Assessment of the state of the proteolysis system was studied by lysis of azoalbumin (breakdown of low molecular weight proteins), azocasein (breakdown of high molecular weight proteins) and azocol (breakdown of collagen).

When analyzing the results of the study, we can observe a probable increase in lysis of azoalbumin by 1.89, 1.96 and 2.16 times ( $p < 0.05$ ) in groups 1, 2, 3 compared with the group of almost healthy individuals. In patients with chronic pancreatitis and hypothyroidism, the most pronounced degradation of low molecular weight proteins was observed, which was 13.86% and 9.75% ( $p < 0.05$ ) higher than in the first and second groups. Indicators of azocasein lysis by 52.48%, 56.35% and 95.03% ( $p < 0.05$ ) were found in groups 1, 2, 3 compared with almost healthy individuals. Azocasein lysis was higher by 27.89% and 24.73% ( $p < 0.05$ ) in patients with chronic pancreatitis combined with hypothyroidism than in patients in groups 1 and 2. Azocol lysis was significantly higher by 10.85%, 12.05%, 16.87% ( $p < 0.05$ ) in groups 1, 2, 3 compared with almost healthy individuals. In addition, in patients with comorbid pathology there was an increase in lysis of azocol by 5.3% and 4.3% ( $p < 0.05$ ) compared with the first and second groups. The total fibrinolytic activity of blood plasma was 8.3%, 6.7%, 16.26% ( $p < 0.05$ ) lower in patients of groups 1, 2, 3 compared with almost healthy individuals. Non-enzymatic fibrinolytic activity of blood plasma was 44.89%, 49.64%, 66.27% higher in groups 1, 2 and 3 than in almost healthy individuals. Enzymatic fibrinolytic activity of blood plasma was 44.28%, 42.25%, 90.57% ( $p < 0.05$ ) lower in group 1, 2, 3 compared with the group of almost healthy individuals ( $p < 0,05$ ). There was a decrease in the level of enzymatic fibrinolytic activity of blood plasma by 32.07% and 33.96% ( $p < 0.05$ ) in patients with chronic pancreatitis associated with hypothyroidism compared with participants in groups 1 and 2 without comorbid pathology.

Thus, the most pronounced changes in proteolytic (increased lysis of azoalbumin, azocasein, azocol) and fibrinolytic (decrease in total, non-enzymatic and enzymatic) activities of blood plasma in patients with chronic pancreatitis associated with hypothyroidism were determined.

**Reva T.V.**

**SOME ASPECTS OF THE MOTOR CHANGES IN PATIENTS WITH GASTROESOPHAGEAL REFLUX DISEASE DEPENDING ON THE TYPE OF REFLUX**

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The symptoms of gastroesophageal reflux disease (GERD) are found in almost 1/3 of the adult population, and endoscopic signs of reflux esophagitis - in 45-80% of patients with GERD. GERD is not a progressive disease, but the activity of the disease is approximately the same

throughout life. The moderate symptoms of reflux affect psycho-emotional health, reduce productivity, so this problem is the cause of significant economic and social losses for many countries. Unfortunately, GERD is often diagnosed at the stage of complications.

The aim was to study the features of the clinical course of GERD, features of endoscopic changes of the esophageal mucosa, pH-metry and changes in gastric motility depending on the type of reflux. 60 patients with GERD were examined. The average age was  $44.5 \pm 5.3$  years. The main group consisted of 35 patients with GERD with concomitant acid reflux, the comparison group - 25 patients with alkaline reflux. The comprehensive study included a clinical examination, pH- metry, endoscopic, radiological examination.

Among the examined patients with GERD with acid reflux 60% were men, and in the group of patients with alkaline reflux female patients predominated - 76%. With acid reflux disturbed heartburn (85.7%), vomiting (71.4%). In the clinical picture of GERD with alkaline reflux more often noted: the feeling of bitterness in the mouth (80%), the feeling of a lump in the mouth (60%). Patients with GERD with alkaline reflux (40%) were more often diagnosed with concomitant lesions of the pancreatic-biliary system and obesity I-II.

In most of the examined pathological changes of the lower mucous membrane were revealed. In patients with acid reflux the pH in the esophagus was  $< 4.0$ , in the group of patients with alkaline reflux the pH was  $> 7.5$ . Reflux lasting more than 5 minutes was observed in 31.4% of patients with acid reflux, in 36% of patients with alkaline.

The non-erosive form of GERD was more observed in patients with acid reflux - 11 (59.3%). The erosive form of GERD was observed more often with alkaline reflux in 14 patients (66.7%): reflux esophagitis grade A (38.1%), grade B (19.1%), grade C (9.5%) patients.

In GERD with acid reflux, a persistent slowing of gastric evacuation is caused by persistent pilospasm. Slowing of gastric evacuation is more pronounced in patients with GERD with alkaline reflux, which can be explained by slowing of motility of the stomach and the presence of duodenostasis.

Thus, the peculiarity of the clinical course of gastroesophageal reflux disease is due to the presence of a certain type of reflux and is characterized by specific etiological factors and pathogenetic mechanisms of development, polymorphism of clinical symptoms, which worsens the psychosomatic state and quality of life of patients.

**Shorikov Ye.I.**

## **CHANGES OF AORTIC STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION AND CONCOMITANT DIABETES MELLITUS TYPE 2**

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The aim of the study was to discover the peculiarities of aorta remodeling in patents with arterial hypertension and concomitant diabetes mellitus type 2. Additionally, the trends in changes of aortic rigidity depending on the state of the left ventricle diastolic dysfunction were analyzed. 103 patients with hypertension and concomitant diabetes mellitus type 2 were examined. The basic indexes of transmitral velocity ( $V_e$ ,  $V_a$ ,  $V_e/V_a$ , IVRT) and indexes of aortic compliance at the root (Cr), ascending part (Cas) and the arch (Ca) in accordance to its diameters in the systole (Dmax) and diastole (Dmin) measured during 3 cardiac cycles were observed.

The features of remodeling, elastic and density characteristics of aorta in patients with arterial hypertension and DM type 2 were examined. It has been proved that the reliable increase of diameters of root ascending aorta and aortic arch occurs in patients with hypertension and concomitant diabetes mellitus type 2, and in people with left ventricle hypertrophy the more considerable increasing of aortic diameter was set. Structural changes at aortic remodeling were accompanied by growth both maximal, and minimal diameters at the ascending aorta and its arch level. The reliable decline of coefficient tensile strength in aorta is verified in patients with hypertension and concomitant diabetes mellitus type 2.

Concomitant diabetes mellitus 2 influenced on the reliable increase of diameters of root

( <0,05), ascending aorta ( <0,01), and arc ( <0,001). Data calculated in ANOVA educed an increase sequence of changes of diameter values (from 3,3 toward 3,59) allowed to suggest a hypothesis about existence of linear dependence of changes of diameters of aorta root depending on progress diastolic dysfunction types. The method of "Up - and - down - runs test" ( <0,01) proved the non-random character of sequence of diameters' changes of aorta root accordingly worsening of diastolic dysfunction. The result of one-sided test of Mann-Kendall ( <0,01) specifies that the increase sequence of diameter of aorta roots has linear character due to diastolic dysfunction. A result is presented as a formula:  $value = a + [b \times (a \text{ grade is in a sequence})]$ , where  $a = 2,955$ ,  $b = 0,115$  (95 C = 0,085 - 0,250),  $r = 0,02$ . This regression equation gave an opportunity to expect the percent of relative increase of size of diameter dependently to the transition from one type of diastolic dysfunction to other, that equaled 4,67 % (95 CI = 2,20 - 7,21 %).

The study conclusion can be determined as following: arterial hypertension with concomitant diabetes mellitus type 2 is accompanying with structural changes of aorta with increasing of the diameters and decline of aortic compliance. This process could be described by specific linear regression model.

**Shorikova D.V.**

### **COVID-19 INFECTION AND AUTOIMMUNE VASCULITIS: CLINICAL CASE**

*Department of Internal Medicine, Clinical Pharmacology and Occupational Diseases  
Bukovinian State Medical University*

Since the emergence of SARS-CoV-2 worldwide, various manifestations and concurrent diseases have been reported, including COVID-19-associated Kawasaki-like multisystem inflammatory syndrome in young patients. In hospitalized patients with COVID-19, myocardial injury is observed in between 23% and 27.8% of cases.

A female patient T., 32 years old, appealed to the clinic in February 2021 with complaints about intensive constricting pain behind the sternum, spreading into the left hand, shortness of breath and acute weakness. 2 months previously, in the beginning of December the diagnosis of COVID-19 infection was confirmed by polymerase chain reaction (PCR) for SARS-CoV-2. She was treated with COVID-19 in infection department during 2 weeks by standard protocol. She has Guillain–Barré syndrome in anamnesis.

A week before the present hospitalization, she suffered from fever (up to 40 °C), which reiterated her into the hospital. Over the past 3 days, there began to show the constricting pain in rest, which become intensified by any physical activity, shortness of breath, acute general weakness. The patient's general condition demonstrated a moderate severity. Consciousness is clear, oriented in space and time. Peripheral lymphatic nodes are not palpable. Bone-articular system was without visible changes. No peripheral edema was present. There were changes in acute phase inflammatory indicators: ESR was 55 mm/hour, a CRP - 48 mg/l, Fibrinogen plasma content - 7.6 g/l, D-dimer - 345 ng/ml. On the ECG the ST-segment elevation in leads II, III, AVF is recorded. Troponin I was demonstrated a weak reaction (+ \ -). The echocardiography data showed moderate enlargement of the dimensions of the both ventricles, hypertrophy of the LV walls, aorta is not expanded, and the structure of valves is seen without visible changes. The myocardial contractility is reduced, the EF is 50%. The hypokinesia of all walls of LV, with more reliable changes of interventricular septum (IVS) were observed.

On the 3rd day, despite the treatment, the patient's condition did not improve, the complaints were preserved, hyperthermia appeared, there was not dynamical changes of the signs of acute myocardial infarction appeared on ECG. The next diagnosis was established: Kawasaki disease of adult, with recurrent course and severe activity. Coronaritis (inflammatory coronary damage) with the development of multiple aneurysms of left main coronary artery, anterior descending coronary artery, diagonal branches, Left circumflex coronary artery, right main coronary artery, Posterior descending artery. Basal non-Q myocardium infarction, HF II FC. The combination of anticoagulants (enoxaparin), -blockers (metoprolol), antithrombocyte agents (clopidogrel and aspirin) used in the treatment represented standard patient scheme management with acute coronary

syndrome, but the special non-atherosclerotic inflammatory etiology of myocardial infarction required also the use of prednisone with dose 150 mg/day in parenteral administration along 7 days, then methylprednisolone 28 mg/day, as well as azathioprine 100 mg bid.

Thus, patients with COVID-19 may present with ST-segment elevation suggestive of myocardial infarction in the absence of atherothrombosis. This situation requires a specific diagnostic approach and management.

**Shuper V.O.**

## **INQUIRY OF THE NON-ADHERENCE TO THE PATIENTS THERAPY WITH CORONARY HEART DISEASE**

*Department of Internal Medicine, Clinical Pharmacology and Occupational Diseases  
Bukovinian State Medical University*

Most causes of deaths all over the world can be attributed to chronic diseases. Approximately half of patients with chronic diseases do not take their medication as prescribed. Many researches have shown that non-adherence leads to increased morbidity, mortality and the cost of healthcare. Coronary heart disease (CHD) has become a global health problem and a primary cause of morbidity and premature death worldwide. The levels of non-adherence among patients with CHD is typically in the range of 33%–50%. Non-adherence to secondary prevention medications has been associated with a 10%-40% increase in the risk of cardiac hospitalization and a 50%–80% increase in mortality.

The aim of the work was to investigate the adherence to secondary prevention medications among patients with Coronary Heart disease and identify factors associated with it. 40 patients diagnosed with CHD with age more than 50, which has been prescribed with optimal medication for 1 year during hospitalization were examined. Patients' adherence was defined according to MMS-8 Morisky values for secondary prevention medications prescribed by doctors. Also, questionnaires about individual reasons of non-compliance and for individual patient's opinion about importance and usefulness of knowledge according risk factors of the increase cardiovascular mortality was designed and proposed to the patients. Simple descriptive statistics were used to elucidate the characteristics of the patient population and results from individual adherence tools. Final score was analyzed and correlation between patients' data and level of adherence to prescribed treatment were identified. A correlation matrix (using Spearman's coefficient) was reviewed for any evidence of collinearity.

Our study demonstrated higher level of non-adherence with secondary prevention medications in patients with CHD (60.0%). This fact can be explained by the socioeconomic reasons, less informative strategies from the medical staff to the patients. Severe regress of adherence was demonstrated after discharge from the hospital due to subjective improvement of the patients' condition with absence of supervision by out-patient specialists.

Demographic characteristics of the patients suggested that some non-modified factors can affect compliance with the prescribed treatment. Better adherence was demonstrated by female married patients with higher educational level, with family history about cardiovascular death. Also, too much prescribed medications with difficult regime of usage with non-adequate out-patient supervision may significantly decrease adherence causing development of complications which may lead to re-hospitalizations and cardiovascular death.

Our investigation demonstrated also non-complete information of the patients about lifestyle and medical risk factors of the cardiovascular mortality increase.

So, results of our study can provide useful practical information on the prevalence and severity of non-adherence among patients with CHD. Analysis of the factors influencing the adherence demonstrated the main reasons from patients and healthcare professionals affecting the level of compliance with the prescribed treatment. The step towards improving adherence can be initiated by the healthcare professional to overcome the patient's concerns about the prescribed medication. It is important to continue personal monitoring of patients by healthcare professionals in the form of

regular inspections of intentional and unintentional non-adherence, including factors and reasons that may change and lead to such behavior.

**Slukhenska R.V.**

## **CREATIVE SELF-DEVELOPMENT OF FUTURE DOCTORS**

*Department of Emergency and Military Medicine*

*Bukovinian State Medical University*

Harmonious combination of humanitarian training of future specialists with their professional development is very important for medical education. One of the tasks of professional training of future doctors should be the creation of pedagogical conditions for professional and creative self-expression of medical students. This idea is based on the principle of humanization of professional training, capable of realizing one's own potential.

Despite a significant interest of scientists in the issues of development of a future specialist, the problem of forming the personality of a future doctor (including its creative potential, speech-thinking component) in the process of professional training currently remains unexplored, which is manifested in the absence of a single understanding the meaning of this phenomenon, developed model and tested pedagogical conditions.

That is why it is important to describe mental-speech component of a creative potential of future doctors and determine the criteria, indicators and levels of its formation.

The culture of a medical specialist combines the culture of behavior, communication culture, patient care culture, organizational culture, professional ethics, etc. Professional and ethical culture is the system of moral values and ethical norms, which became the inner convictions of an individual based on the altruistic imperative. The subject of research of professional ethics of medical workers are objective bases, essence, specificity, structure and main functions of morality of medical workers. The level of moral culture of an individual is detected by certain criteria, including the moral consciousness of the individual, moral norms, principles, categories, motives, value orientations, regulates the moral side of their activities in the form of appropriate representations (norms, principles, social and moral ideals, the concept of good and evil, justice and injustice).

Spiritual and moral culture of a future doctor is a complex integrated system of his personal qualities, characterizing the degree of development and self-development of his moral values, beliefs, motives, knowledge, skills, feelings and abilities, which he manifests in various situations of moral choice and moral activity in comparison with those highly humane values, principles, rules, which in the modern socio-cultural environment and activities are considered standard and (or) ideal. Thus, the doctor must be a cultured person in the broadest sense of the word.

The effectiveness of doctors is currently determined not only by their professional competence, but also by the norms of intercultural professionally oriented communication, the ability to build an effective dialogue on the rules of ethics of professional communication, correct their behavior, overcome conflicts in communication. These components of professional communicative competence should become the objects of comprehensive professional training of future doctors, the basis for their self-realization in accordance with world standards.

The professional training of specialists (including future doctors) should focus on expanding the medical horizon, forming professional consciousness of future doctors, strengthening the focus on self-development of the student's personality, which contributes to his self-realization and professional self-expression. Professional training of a future doctor is a long process of forming him not only as a specialist, but also as a person.

**Teleki Ya.M.**

**INFLUENCE OF ESSENTIAL PHOSPHOLIPIDS ON SOME INDICATORS OF  
ENDOTHELIUM FUNCTIONING IN PATIENTS WITH GASTROPULMONAL  
PATHOLOGY**

*Department of Internal Medicine  
Bukovynian State Medical University*

It is known that essential phospholipids, along with cholesterol and proteins, play an important role in ensuring the structural and functional stability of cell membranes. In patients with chronic obstructive pulmonary disease (COPD) with concomitant chronic pancreatitis (CP), the cytoskeleton is damaged due to a chronic inflammatory reaction, which causes the development of endothelial dysfunction. Therefore, the use of a drug containing these components is pathogenetically appropriate for the correction of the detected changes.

The aim of our study was to analyze influence of essential phospholipids on some indicators of endothelium functioning in patients with gastropulmonary pathology. Investigation of 52 patients with GOLD B-C groups, where the obstruction degree corresponded to GOLD 1-2 with a low risk and more pronounced symptoms (B), and also GOLD 3 with a high risk but less pronounced symptoms (C), - I group, 60 CP patients with corresponding characteristics of groups with concomitant GOLD (II group) and 19 almost healthy individuals as a referent group was carried out. Patients of group II were divided into 3 subgroups according to the obtained treatment. Patients of IA subgroup (19 persons) received basic therapy according to the MPH order of Ukraine 555 dated from 27.06.2013. 23 patients, who received "Essentials forte H" two capsules three times a day during 1/12, except generally accepted treatment, constituted IB subgroup. In patients of IB subgroup (18 patients) the basic treatment was combined with additional administration of kvartsetin in a dose of 1.0 g three times a day during 14 days. Vascular function was assessed by recording endothelium-dependent vasodilation of the brachial artery (PA) by ultrasound on the device "En Visor HP Philips".

It was found that in patients who received on the background of basic treatment "Essentials forte H" there was a decrease in the diameter of the brachial artery by 9.5%, in the comparison group by only 4.5% with the existing intergroup difference. There was also a tendency to improve under the conditions of complex therapy speed indicators in the main group by 16.1%, shear stress on the endothelium by 11.5%, in the comparison group, on the contrary, there was a slowing of blood flow on the background of basic treatment.

After treatment, the sensitivity of the brachial artery in the comparison group increased 1.36 times, in the main group 1.95 times ( $p < 0.05$ ). The positive effect of "Essentials forte H" on the vessels of patients with COPD with concomitant CP is confirmed by the obtained parameters of non-invasive examination of the brachial artery, namely the growth of endothelium-dependent vasodilation 2.1 times ( $p < 0.05$ ).

Thus, the use of essential phospholipids in the complex treatment of patients with COPD with concomitant CP helps to improve endothelial function and reduces the manifestations of endothelial dysfunction.

**Yerohova A.A.**

**APPLICATION AND PERSPECTIVES OF DISTANCE EDUCATION IN UKRAINE**

*Department of Disaster Medicine and Military Medicine  
Bukovinian State Medical University*

According to the latest research, approximately 30% of educational establishments in Ukraine agreed with the recommendations and initiated the organization of studies in a distance mode. Unlike tuition by correspondence, the distance education is open and active system of providing educational services, which is believed to contain a high-quality and intense communication between a teacher and a student with the help of modern technologies. This form of independent learning provides a student with the freedom of choice as to a place, time and the intensity of the educational process.

We firmly believe that modern computer means of communication are able to provide the knowledge transfer and fast and unlimited access to a wide range of educational information more efficiently than classical means of teaching. Such computer technologies as interactive boards, electronic bulletin boards, and multimedia hypertext are accessible through the Internet. Other important aspects are the feedback and the “teacher - student” cooperation which can be easily achieved with the high-speed opportunities of computer programs and systems of information transfer unlike the traditional methods of studies.

Some disadvantages of distance education should be also mentioned as well. Despite the fact that distance education has a considerable number of positive features, there are a number of aspects which have not been considered sufficiently yet.

1) First of all, it is complicated to identify distance students – because of the modern stage of technological development it is quite problematic to identify who exactly is taking an examination.

2) The significant problem lies in a low capacity of the network during the educational or examinational teleconferences.

3) There is insufficient direct contact between a tutor and a distance student due to the extreme professional workload of native pedagogues. Students of the foreign distance courses can receive the replies to their letters within a few hours because of the fact that the number of teachers who are experienced in implementing distance education is higher than that of students. Therefore, distance learning requires continuous being “in the know” from the providers of educational process, that is, teachers.

To sum up, one of the main tasks of the present-day education is the preparation of a specialist who has the opportunity to study when and how it is convenient for him/her. Distance education has been created as an instrument for the global educational space and with the purpose of becoming the newest educational space which has no barriers or limitations. Perspectives of further research are believed to deal with investigation of the practical application of distance education in Ukraine.

**Zaliavska O.V.**

### **I LIQ CHUAN IS EFFECTIVE IN TREATING KNEE OSTEOARTHRITIS**

*Department of Internal Medicine, Clinical Pharmacology and Occupational Diseases*

*Bukovinian State Medical University*

I Liq Chuan (literally translated as Mental-Physical Martial Art) based on Tai Chi and Chan (Zen) principles. Tai Chi is a traditional Chinese mind-body exercise that enhances balance, strength, flexibility and self-efficacy, and reduces pain, depression and anxiety in diverse patient populations with chronic conditions. As a complementary mind-body approach, I Liq Chuan may be an especially applicable treatment for older adults with knee OA.

Objective of the study was to evaluate the effectiveness of I Liq Chuan in the treatment of knee osteoarthritis (OA) symptoms. 20 individuals with symptomatic tibiofemoral OA were examined. Patients were randomly assigned to 60 minutes of I Liq Chuan (15 modified basic exercises) by a certificated instructor with more than 10 years of teaching experience or Attention Control (wellness education and stretching) twice-weekly for 12 weeks. The primary outcome was the Western Ontario and McMaster Universities OA (WOMAC) pain score at 12 weeks. Secondary outcomes included WOMAC function, patient and physician global assessments, timed chair stand, depression index, self-efficacy scale, and quality of life. Analyses were compared by intention-to-treat principles.

The 20 patients had average age of 60 and BMI 30.0 kg/m<sup>2</sup>. Compared to the control group, patients assigned to I Liq Chuan exhibited significantly greater improvement in WOMAC pain (mean difference at 12 weeks = -118.80 mm; 95% confidence interval [-183.66 to -53.94]; P= 0.0005), WOMAC physical function, -324.60 mm (CI, -513.98 to -135.22; P= 0.001), patients global VAS, -2.15 cm (CI, -3.82 to -0.49; P= 0.01), physician global VAS, -1.71 cm (CI, -2.75 to -0.66; P=0.002), chair stand time, -10.88 sec. (CI, -15.91 to -5.84; P= 0.00005), CES-Depression

index, -6.70 (CI, -11.63 to -1.77; P= 0.009), self-efficacy score, 0.71 (CI, 0.03 to 1.39; P= 0.04) and SF-36 physical component summary, 7.43 (CI, 2.50 to 12.36; P=0.004). No severe adverse events were observed.

Thus, I Liq Chuan reduces pain and improves physical function, self-efficacy, depression and health-related quality of life for knee OA.

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COVID-19

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(p<0,05) 36% , 47,5% 91,7% , 41%  
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 $(1,2 (1,1-1,3), 1,0 (1,0-1,2) 0,9 (0,8-1,0) . ./ ( =0,013),$   
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Cockroft-Gault.

$: 65,73 \pm 4,81 / \sqrt{1,73^2}$   
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, 19,3%

55,7 %.



**Grynchuk A.F.**

**DIFFERENTIATED APPROACH TO THE TREATMENT OF ACUTE PERITONITIS**

*Department of Surgery 1*

*Bukovinian State Medical University*

Acute peritonitis is one of the most crucial problems of surgery. Eloquent evidence of this is the mortality rate, which, in common forms, reaches 70%.

The aim of the study was to increase the effectiveness of treatment of patients with acute peritonitis through a comprehensive analysis of the leading mechanisms of its progression and the development of sound diagnostic and treatment measures on this basis. A retrospective analysis consisted of medical records of 169 patients, 79 of whom had postoperative complications. The analysis of variance of clinical and laboratory parameters was performed. Taking into account the results, a two-stage prognostic scale was developed. At the first stage, before the operation, indicators were selected according to the scale, that corresponded to a certain number of points. Patients were preliminarily divided into groups of normal, increased, medium and high risk of postoperative complications. This allowed us to apply measures to prevent complications at the stage of preoperative preparation.

The final risk determination was performed taking into account the data of intraoperative audit and laboratory tests, which were contained in the scale at the second stage of forecasting. Patients were divided according to risk groups.

It is essential to be guided by standard indications in patients of group of usual and increased risk for definition of indications to preoperative preparation and its volume.

The conducted research and informativeness of the prognostic scale allowed us to offer an algorithm that reflected the main stages of diagnostic and treatment measures. Its application allowed to differentiate the required amount of measures at all stages of treatment on the basis of a reasonable selection of risk groups.

The application of the developed set of measures makes it possible to prevent suppuration of the postoperative wound, to avoid intra-abdominal complications in patients with diffuse peritonitis. to reduce mortality in patients with diffuse and general peritonitis by 9%, to reduce the incidence of residual intra-abdominal infiltrates in almost 19%, to reduce the length of residence of patients with peritonitis in the hospital by an average of 2.5 days.

**Hrynchuk F.V.**

**THE PREDICTORS OF THE GASTRODUODENAL ULCEROUS REBLEEDING**

*Department of Surgery 1*

*Bukovinian State Medical University*

Nowadays, the gastroduodenal ulcerous rebleeding remains an actual problem. The frequency of recurrent ulcerous bleeding remains high, which demands further research of its prognosis and treatment methods. The aim of investigation was to analyse the risk factors for ulcerous rebleeding. 203 patients were examined. Clinical, anthropometric, biochemical, genetic, optical, histological methods of examination were used.

In most cases ulcerous defects were localized in the duodenum - 127 cases (62,3%). Gastric ulcer was diagnosed in 68 patients (33.3%). Gastroduodenal ulcer occurred in 9 patients (4,4%). The lack of ulcer history occurred in most cases (109 patients (53,4%). 10 patients (4,9%) had the ulcerative history up to 1 year, 21 patients (10,3%) - up to 1-3 years, 16 people (7.8%) suffered from peptic ulcer disease from 5 to 10 years. 39 patients (19,2%) had the ulcerous history of more than 10 years. We conducted injections around the ulcer for endoscopic haemostasis. For this we used saline sodium chloride with adrenaline in the ratio of 1:10. The relapsed rate in this case was, depending on the location and other factors, 2-5%. In case of the haemostasis achievement failure by endoscopic way, a surgery was performed.

Rebleeding was recorded in 24 cases (11,8%). 15 patients (62,5%) with relapses were diagnosed with class by Forrest. On the Glasgow Blatchford Score, 3 patients (12,5%) with a 0 number of items had relapses, 11 of them (45,83%) had the number of items below 5, and the other 10 (41,67%) - above 5. The relapses frequency went higher as the number of items on the Rockall Score, most cases happened to patients with 5-6 number of items (n=16 (66,67%) and higher indicators occurred in separate cases.

Clinical predictors of bleeding relapse were comorbid pathology, bleeding in anamnesis, body temperature, hemostatic therapy use before admission, pulse rate, pulse pressure, and hemorrhage class according to Forrest classification.

Laboratory predictors of bleeding relapse were creatinine concentration, test on availability of fibrinogen B, fibrinase level, amount of reduced glutathione, general number of leukocytes, the whole blood protein, prothrombin index, plasma recalcification time, antithrombin III, non-enzymatic fibrinolytic activity (NFA) and enzymatic fibrinolytic activity (EFA) ratio (NFA/EFA ratio) of the blood plasma, its proteolytic activity of azocollagen, oxidation degree of plasma neutral proteins, the ratio of diene conjugates (DC), ketodienes and adjoint trienes (KAT), 5G4 and G43A polymorphism of PAI-1 gene.

A new method to assess the reliability of hemostasis was created by means of irradiation of a clot by the green and red laser beams. To describe F a and b stigmata objectification method was suggested, and they should be supplied with the indices H (High risk of relapse) when there was a dominating dispersion zone of the green laser beam, or L (Low risk of relapse), when the red laser beam dispersion was dominant.

A new prognostic two-stage scale was developed which separated the groups of high and low risk of bleeding relapse. The previous scale contained clinical and endoscopic criteria (comorbidity class, history of bleeding, body temperature, use of hemostatic therapy in the prehospital stage, pulse rate, pulse pressure, bleeding class according to Forrest). A delimiting criterion was the sum of 7 points. Sensitivity of the scale was 89,66%, specificity – 86,8%. The basic main scale contained also such criteria as leukocyte count, creatinine, plasma protein, prothrombin index, plasma recalcification time, fibrinogen B test scores. A delimiting criterion of the basic main scale was the sum of 11 points. Sensitivity of the scale was 92,86%, specificity – 92,16%. The extended main scale contained also such criteria as fibrinase, glutathione reduced, antithrombin III, NFA/EFA ratio of the blood plasma, its proteolytic activity by azocollagen, oxidation degree of plasma neutral proteins, the ratio of DC, KAT, 5G4 and G43A polymorphism of PAI-1 gene. A delimiting criterion of the extended basic scale was the sum of 17 points. Sensitivity of the extended basic scale was 100%, specificity – 95,83%.

**Hyrla Ya.V.**

## **ULTRASONOGRAPHY AS A METHOD OF DIAGNOSIS OF VOCAL MOBILITY DISORDERS IN PATIENTS OPERATED ON DIFFERENT FORMS OF GOITER**

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Operations on the thyroid and parathyroid glands are known to have a high risk of damage to the recurrent nerves responsible for voice formation.

For a patient, early detection of impaired mobility of the vocal cords may be a reason for timely consultation with a phoniatician and subsequent, possibly complete recovery of vocal function. As for a surgeon, understanding the presence or absence of problems with the "vocal" nerves in patients can help to choose the right amount of surgery, and also helps to determine the need for neuromonitoring or optical techniques during surgery.

Currently, laryngoscopy is considered to be the most accurate method of diagnosing of impaired mobility of the vocal cords. However, its routine use is limited by the need for additional equipment and its disinfection, the presence of an ORL-doctor or endoscopist, as well as the risk of complications, including anaphylactic reactions when using local anesthetics. Also an important problem of subjectively unpleasant sensations in some patients, due to which it is impossible to

perform laryngoscopy. As a result of damage to the upper laryngeal nerve, impaired mobility of the vocal cords may not be recognized on time. Therefore, in the daily work of endocrinologists there is a need to find alternative, no less effective and simple methods for detecting problems with vocal cords.

One such non-invasive method is ultrasound of the larynx and vocal cords. The presence of an ultrasound device becomes a kind of good tone in surgical departments, including the departments of endocrine surgery. And sooner or later, performing the next ultrasound of the thyroid gland and regional cervical lymph nodes, doctors pay attention to the fact that, in addition to these structures, the anatomical structures of the larynx, including the vocal cords, are quite clearly visible.

Therefore, the aim of our work was to study the possibility of performing ultrasound examination of the larynx on the detection of disorders of mobility of the vocal cords and compare them with laryngoscopy, which is traditionally used for this purpose.

The study was conducted on 187 patients operated in the surgical department of Chernivtsi OKL in 2019-2020. Each patient was studied for ultrasound on detecting different structures of the larynx. The diagnostic accuracy of ultrasound on detecting disorders of mobility of the vocal cords by laryngoscopy was confirmed. An GE LOGIQ 7 ultrasound scanner with a 12 L linear ultrasonic sensor with an aperture of 4 cm (frequency 8.0 MHz) was used. Laryngoscopies were performed using Olympus BF-160 endoscopic systems or direct examination by an ENT doctor. Each patient agreed to be examined. Statistical processing of the material was performed using traditional methods for determining the sensitivity to the specificity of the techniques used.

The structures of the larynx were available for examination by ultrasound (excluding age groups and sex) in 88% of patients, and the following pattern was found: worsening of accessibility for examination in men than in women. Among them 12 patients (6.5%) had impaired mobility of the vocal cords.

According to the results of comparative analysis, the accuracy of ultrasound on the diagnosis of disorders of mobility of the vocal cords in the group of patients in whom the vocal cords were well available for examination did not differ from that of laryngoscopy.

In the course of the study, we found that laryngeal ultrasound was effective and promising for the detection of paresis of vocal cords with sensitivity and specificity of 91% and 95%, respectively. Among patients in whom vocal cords were available for ultrasound scanning, the accuracy of the proposed method could be compared with laryngoscopy and could be successfully used in the daily work of endocrinologists.

**Karliychuk M.A.**

**NEW METHOD OF POSTOPERATIVE VITREOUS HEMORRHAGE PREVENTION  
AFTER VITRECTOMY WITH FIBROVASCULAR MEMBRANES REMOVAL IN  
PATIENTS WITH PROLIFERATIVE DIABETIC RETINOPATHY**

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The most effective and proven treatment for the complications of proliferative diabetic retinopathy (PDR) is pars plana vitrectomy (PPV). Postoperative diabetic vitreous hemorrhage (PDVH) is a severe complication of pars plana vitrectomy with removal of fibrovascular membranes in patients with proliferative diabetic retinopathy. The reported prevalence of PDVH (occurring 1 or more weeks after a surgery) is between 20% and 30%. Many research studies report that intravitreal anti-VEGF drugs administered before a surgery can significantly reduce the probability of PDVH; however, other studies have contradicted these results and have shown that these drugs fail to prevent PDVH. Tranexamic acid is a synthetic reversible competitive inhibitor to the lysine receptor found on plasminogen.

The aim of the study was to evaluate the efficacy of intravitreal tranexamic acid in reduction of the probability of PDVH occurring in patients who received PPV with removal of fibrovascular membranes due to PDR.

This retrospective, observational, comparative study included 38 patients (38 eyes) who underwent concomitant phacoemulsification with posterior chamber intraocular lens implantation and high-speed (10,000 cuts per minute) 25-gauge transconjunctival sutureless PPV with segmentation and removal of combined fibrovascular membranes. After removal of the vitreous gel at the vitreous base, vitreous base shaving was performed under scleral depression, and blood clots in the peripheral vitreous skirt were also removed using this process. At the end of each surgery, air-fluid exchange was always carried out, and endolaser treatment and endotamponades were performed when required. In group 1 (20 patients, 20 eyes) after the air-fluid exchange, 0.05 ml 0.05% of tranexamic acid was injected from the limbus via the pars plana using a 30-gauge needle. For standard cases, we used air as endotamponade (9 eyes) but for complicated cases (intraoperative retinal tear and extensive fibrovascular tissue dissection), gas (C2F6) endotamponade (19 eyes) or silicone oil (10 eyes) was used. Topical antibiotics and steroids were prescribed postoperatively. The gas volume reduced to about 30% of the vitreous cavity 3 days after surgery and was reabsorbed completely in 10 days. Main outcome measure was the occurrence of recurrent early vitreous hemorrhage. Time points for postoperative examinations were first day, first week, and first month.

Patient characteristics were similar between both groups (intravitreal tranexamic acid and control (group 2)) at baseline and no statistically significant differences were noted between the groups. All 38 eyes were given intravitreal aflibercept within 10 days prior to surgery. On the first postoperative day the rate of rebleeding in the intravitreal tranexamic acid group was 10.0% (2 eyes), which is significantly lower than the control group (38.8%, 7 eyes,  $p < 0.05$ ). The incidence of early manifest PDVH in first week was also significantly lower in the intravitreal tranexamic acid group than the group 2 ( $p < 0.05$ ). Later, one month after a surgery, PDVH occurred in 3 eyes (15.0%) in group 1 and 7 eyes (38.8%) in group 2. So, the incidence of PDVH in the intravitreal tranexamic acid group was significantly lower than the control group.

So, as conclusion, we can suggest that intravitreal tranexamic acid is effective in reduction of the probability of early postoperative diabetic vitreous hemorrhage occurring in patients who received pars plana vitrectomy with removal of fibrovascular membranes due to PDR and may be recommended in clinical usage as a new method of prevention of postoperative vitreous hemorrhages.

**Kozariichuk N.Ya.**

## **DRY EYE SYNDROME IN PATIENTS WITH GLAUCOMA**

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Glaucoma is the second leading cause of blindness in the world and is expected to affect 79.6 million people by 2022.

Glaucoma medications can be associated with toxicities to the ocular surface, most often due to the nature of the preservative included in the medication; however, the incidence of toxicity can be mitigated by the use of preservative free medications, decreased preservative medications, or treatment of dry eye disease.

The aim of the study was to confirm the previously reported association between use of primary open-angle glaucoma eyedrops and corneal staining, suggesting that medications or both are damaging directly the ocular surface.

Materials and methods included the treatment of 30 patients (60 eyes): 20 women, 10 men aged 66 to 91 years (average age  $68.5 \pm 9.6$  years old) with primary open-angle glaucoma. Glaucoma duration varied from 3 to 15 years. All patients were observed on the base of Chernivtsi regional hospital (Chernivtsi). The patients were administered the following topical hypotensive drops: prostaglandin analogues (Bimatoprost, Latanoprost, Tafluprost, Travoprost),  $\alpha$ -adrenergic antagonists (nonselective and selective), selective  $\alpha$  agonists (Brimonidine), carbonic anhydrase inhibitors (Dorzolamide, Brinzolamide) or combination of two of them.

Each medication class has specific potential adverse effects on the cornea and ocular surface. Prostaglandin analogs are associated with both a higher prevalence and severity of obstructive meibomian gland dysfunction. Furthermore, prostaglandin analog therapy was shown to cause a higher rate of meibomian gland dysfunction in patients already receiving non-prostaglandin analog ocular hypotensive therapy, possibly worsening ocular surface disease. Beta blockers act on beta receptors in the lacrimal gland reducing basal tear turnover rate. Timolol has been found to alter the mucus composition in the tear film and also cause increased staining of the cornea and conjunctiva after one month of therapy. The commonly used alpha-adrenergic agonist brimonidine tartrate has a significantly higher incidence of ocular allergy compared to other topical medications and may predispose patients to ocular allergy from additional topical antiglaucoma drops. The carbonic anhydrase inhibitor dorzolamide has been found to increase corneal thickness, but the effect of dorzolamide on the corneal endothelium is still in question.

All patients underwent a clinical examination, Schirmer test, Norn test, vital staining with fluorescein and the functional state of the meibomian glands.

The signs of the “dry eye” syndrome were detected in 70.6% (42 eyes). Of these, 23.6% of patients (13 eyes) had meibomian gland dysfunction confirmed by Norn tests –  $9.7 \pm 0.1$ . Dry eye features were seen as primary complaints of dry eye (foreign body sensation, burning, stinging, dryness, soreness, and heaviness of the lids, photophobia, or ocular fatigue). The result of Schirmer test ( $20.7 \pm 0.8$  mm) allows us to conclude the presence of hypersecretion as the initial manifestation of “dry eye”. The main changes pertained to the condition of the lipid layer of the tear film: an irregular thickness with normal thickness limited only to some small areas. When prescribing treatment for the “dry eye” associated with primary open-angle glaucoma, it is important to correct the defects of the lipid layer of the tear film. Using warm lid compresses and scrubs may be helpful. Dry eye symptoms may be treated with over-the-counter medications such as artificial tears, gels, and ointments.

In conclusion, our results show that a significant proportion of dry-eye patients have a coexisting glaucoma.

**Kuchuk O.P.**

## **TREATMENT AND PROPHYLAXIS OF PARASITIC BLEPHARONCONJUNCTIVITIS**

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The cause of parasitic blepharoconjunctivitis is ticks of the genus *Demodex* - opportunistic pathogens (present in 90% of the adult population). In conditions of reduced immunity, under the influence of adverse external conditions and internal factors, diseases of the nervous, vascular, endocrine and digestive systems, metabolic disorders, demodicosis occur. Asymptomatic carrier of the parasite is possible. The tick parasitizes in the ducts of the sebaceous, meibomian glands and hair follicles. Only drug therapy of demodicosis is ineffective, as only the most superficial ticks die.

We use a comprehensive approach to the treatment of demodicosis blepharoconjunctivitis by sequential application of Spregal or Stop demodex gel on the skin of the eyelids and subsequent darsonvalization of the eyelids. The drugs should be applied to the front edge of the eyelids using an ear stick, without getting on medicine on the mucous membrane of the eye.

The method of darsonvalization has the following therapeutic effects: acaricidal and bactericidal – due to the action of spark discharge and ozone generated in the near electrode space of the apparatus for darsonvalization; analgesic and antipruritic effects – by increasing the sensitivity threshold of pain and tactile exteroceptors; immunostimulating effect also due to the action of a spark discharge, which stimulates phagocytosis, and the release of biologically active substances that stimulate the humoral part of the immune system.

Using this technique in the period of 2012-2020, we treated 56 patients using gel “Stop demodex” and 23 patients using Spregal. The course of darsonvalization with the specified means lasted 10 days with the subsequent break for two weeks and repeated treatment. This treatment regimen corresponds to the full life cycle of the mite (15 days), as all treatments act only on adults

ticks. Itching, swelling and redness of the eyelids after the first course of treatment decreased in 96.5% of patients using Spregal. If at primary eyelash microscopy in the microscope slide were revealed 8-15 ticks in the investigated area, then after the first course of treatment with Spregal their number decreased to 1-2 in the investigated area. After re-treatment, the percentage of negative microscopic eyelash tests approached 100%. Almost similar data were obtained when combining darsonvalization with topical use of gel "Stop demodex".

Darsonvalization of the eyelids gives a good therapeutic effect. This method involves contacting specific agents with the maximum number of parasites, even deep ones. In our opinion, the spark charge, due to the action on smooth muscle cells of meibomian and sebaceous glands, stimulates the release of their secretion together with the demodex mite, which is exposed to specific drugs previously applied to the skin.

To prevent recurrence of exacerbations of the disease, we recommend daily regular therapeutic eyelid hygiene. For this purpose it is necessary to carry out self-massage of eyelids about 1-2 minutes after a warm compress. The compress is usually performed using cotton swabs, immersed in hot water, squeezed and applied to closed eyelids for 1-2 minutes. Thermal procedures help to improve local metabolic processes and drain the excretory ducts of the meibomian glands.

Self-massage is performed after applying an indifferent eye gel to the eyelash growth area, which helps to clean the surface of the eyelids from toxic agents, scales and crusts.

Our proposed new combined method of treatment of demodicosis blepharitis by sequential application of specific drugs Spregal or Stop Demodex gel on the skin of the eyelids and subsequent darsonvalization of the eyelids is an easy-to-use, affordable and effective way to treat demodicosis.

Daily observance of therapeutic eyelid hygiene (self-massage with a cleansing gel after warm compresses) can significantly reduce the likelihood of exacerbation of demodicosis blepharoconjunctivitis.

**Maksymiuk V.V.**

## **POLYMORPHISM N34S OF THE SPINK1 GENE IN PATIENTS WITH ACUTE PANCREATITIS**

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The course of acute pancreatitis is stipulated by one and the same factor. An important role is played by genetically determined defence mechanisms aimed at preventing an intrapancreatic activation of enzymes. One of such basic mechanisms is the neutralizing effect of the secretory pancreatic trypsin inhibitor (the serine protease inhibitor of Kazal's type I - SPINK1).

The research involved 37 people with different forms of acute pancreatitis. Among them there were 25 men (67.6%) and 12 women (34.2%). An average age of the patients was  $48 \pm 14,4$  years. The patients were divided into 2 groups. The first group included 17 patients with acute edematous pancreatitis. The second group comprised 20 patients with acute necrotizing pancreatitis.

The length of the amplicon of N34S polymorphism of the SPINK 1 gene consisted of 320 pairs of nucleotides (pn). In the presence of the 3<sup>rd</sup> exon of the nucleotide sequence of the mentioned gene of adenine in the 34<sup>th</sup> codon, the amplification splits by PstI restrictase into fragments, measuring 320 and 286 pn. In case of transversion A - G the site for PstI restriction was lost.

The presence of the favourable "wild - type" N - allele ("wild - type", Wt) was detected in the majority of the subjects – in 73,0% cases (27). The pathological "mutant" S – variant was identified in 27,0% of people (10). Also, there were 45.9% of the cases (17) of homozygous carriers of the "wild" NN - genotype (N34), NS - heterozygotes (N34S) - 51,4 % of the cases (19). One patient (2,7%) was a homozygous carrier of the mutant S - allele (SS - genotype, 34S). A distribution of the genotypes according to the polymorphic N34S variant of the SPINK1 gene among the examinees corresponded to expected Hardy – Weinberg's equilibrium ( $p > 0,05$ ).

On distributing all the patients according to the etiological agent it was found out that the frequency of the NN - and NS - genotypes in patients with biliary pancreatitis involved 52,6% (10)

and 47,7% (9), respectively and did not differ statistically from that in patients with pancreatitis of nonbiliary genesis – 33,3% (6) and 61,1% (11) respectively ( $\chi^2 = 0,003$ ,  $p = 0,95$  and  $\chi^2 = 0,68$ ,  $p = 0,4$  respectively).

While analyzing the group of patients with acute edematous biliary pancreatitis, it was established that the homozygous carriers of the favourable “wild” N - allele and heterozygotes occurred with the same frequency - 50% (5) and 50% (5) respectively. However, a tendency towards a domination of the NS – genotype was established in patients with edematous pancreatitis of nonbiliary genesis as compared with the NN – genotype whose frequency of detection involved 85,7% (6) and 14,3% (1) respectively. However, such differences were not statistically significant ( $\chi^2 = 2,00$ ,  $p = 0,16$ ). No homozygous carriers of the mutant S - allele were detected in patients with acute edematous pancreatitis.

In patients with acute destructive pancreatitis of biliary and nonbiliary genesis the frequency of detecting genotypes NN - (N34) and NS - (N34S) did not differ significantly: 55,5% (5) and 44,5% (4) versus 45,5% (5) and 45,5% (5) respectively ( $\chi^2 = 0,001$ ,  $p = 0,97$  and  $\chi^2 = 0,114$ ,  $p = 0,74$  respectively).

Thus, the frequency of the NN - and NS - genotypes of the SPINK1 gene in the patients examined by us, did not differ significantly from patients with various forms of acute pancreatitis. The carriage of the unfavourable SS - genotype, in our opinion, may be a contributory factor for the onset of the disease and a potentiation of its further progression, as well as a prognostic marker of a severe clinical course of acute pancreatitis with the development of necrotic lesions of the pancreas.

**Moroz P.V.**

## **CURRENT ISSUES OF TREATMENT OF ACUTE PERITONITIS**

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Improving the effectiveness of treatment of acute peritonitis is one of the most difficult problems of abdominal surgery. Despite significant advances in the development of treatments for such patients, mortality remains high (from 16% to 63%) and does not tend to decrease. One of the reasons for this is the excessive activity of IL1, which carries genetic determinism, which serves to progress the inflammatory process in the peritoneal cavity and insufficient effectiveness of existing methods of peritoneal remediation, which leads to prolongation of the inflammatory process, its progression, translocation and generalization of microorganisms.

The use of laparoscopic technologies and the development of methods for predicting the occurrence of the inflammatory process in the peritoneal cavity is one of the most promising ways to improve the results of treatment of patients with acute peritonitis.

However, in diffuse and general peritonitis, laparoscopic techniques do not allow remediation of all pockets and depths of the peritoneum, therefore, preference should be given to laparotomy accesses.

All patients were recognized with a variant of the IL1 511 C / T gene, and after elimination of the cause of peritonitis, peritoneal remediation was performed by repeated washing with antiseptic solutions, preferring surfactants. We have improved the technology of flushing the peritoneal cavity by supplying the solution to the peritoneal cavity under the pressure created by oxygen. This helped to reduce the number of bacteria, especially anaerobic and provided vibromassage of tissues with oxygenated solution, which improved their microcirculation.

In patients with unfavorable CT and TT gene variants, the clearance of aerobic microflora from peritoneal exudate was 90.7%, aerobic - 64.9%, and from parietal peritoneum and fibrin layers - only 34.9% and 27.5% respectively. Due to this, the need for re-rehabilitation of the peritoneal cavity became obvious. For this purpose, at laparoscopic accesses we left special ports through which we carried out relaparoscopic remediation. At laparotomy accesses we used the programmed laparotomy for its sanitation, control of a course of inflammatory process, viability of fabrics, ability of seams and anastomoses. We have developed technologies for temporary closure of a laparotomy wound for the period between remediations, the current timing of their implementation,

indications for suturing the surgical wound. The number of programmed laparotomy operations depended on the nature of the inflammatory process and averaged  $3.2 \pm 1.4$ . According to the results of microbiological studies, the number of microorganisms before suturing the surgical wound was significantly lower than the etiologically significant concentration.

For the period between the openings of the peritoneal cavity, we used the designed method of peritoneosorption, placing in all its departments containers with sorbents, which were given antimicrobial properties, which were replaced during the next laparotomy. This allowed up to 80% of peritoneal exudate to be adsorbed together with microorganisms, reducing their peritoneal damage and preventing translocation.

Thus, the evaluation of variants of the IL1 511 C / T genotype makes it possible to predict the nature of the inflammatory process, and the use of treatment tactics through the use of improved techniques of peritoneal rehabilitation can significantly increase the effectiveness of treatment of patients with acute peritonitis.

**Penishkevych Ya.I.**

### **LABORATORY TESTING OF RETINAL PIGMENT EPITHELIUM DYSFUNCTION IN DIABETIC RETINOPATHY**

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A major complication of diabetes and a leading cause of blindness in working-age population of the developed countries is a Diabetic retinopathy (DR). It is traditionally regarded as a disorder of blood-retina barriers. There is a leakage of blood content as a major pathological characteristic of the disease. The vascular leakage through the retinal pigment epithelium (RPE) barrier in the disease has not been widely acknowledged, while the breakdown of the endothelial barrier in DR has been investigated extensively. The leakage of blood content through the RPE barrier causes excessive water influx to the retina. The resultant breakdown of the RPE barrier is likely to play a causative role in the development of some forms of diabetic macular edema. The latter is a major cause of vision loss in DR.

A causative role in DR is a breakdown of RPE barrier, particularly for some forms of DME. Currently the extent and significance of the diabetes-induced RPE barrier breakdown in humans are not clear. However, treatment of the RPE barrier breakdown should be considered as an intervention in DR for the following reason. So as the endothelial and RPE barrier are interconnected to the fluidal retina, the leakage through both barriers are additive to the overall insults.

The diabetes-induced endothelial barrier breakdown was reduced dramatically in Muller cell-specific VEGF knockout mice. This reduction in retinal VEGF is overall to approximately 50% of that in wild-type controls. Reducing the overall insults under a "pathological threshold" is essential for keeping the disease under the control.

Genetic disruption of VEGF signaling in the mouse RPE caused a measurable reduction of overall diabetes-induced vascular leakage and inflammation. Anti-VEGF therapies on the treatment of DME certainly support the beneficial effect of this idea.

A lack of progress in developing the methodology for clinical diagnosis and for research in the biology of the RPE barrier certainly makes it difficult to advance the field in a more significant way, although many achievements have been made in the biology of the RPE barrier. That is why, not as many experiments related to the RPE barrier were carried out in *in vivo* settings.

New technology of fluorescent microscopic assay is needed for imaging the RPE barrier-specific leakage in experimental animals, and perhaps in humans, as future goals. That is why active work with bioengineers is on.

The potential use of recent developments in tissue-specific gene expression tools for the RPE and animal models of RPE-specific gene knockout could be manipulated to the RPE barrier specifically. The significance of the RPE barrier breakdown in DR, as well as that in other retinal



diseases, in conjunction with a combination of approaches in vivo and in vitro, will be recognized appropriately in the near future.

**Sheremet . .**

## **DIFFERENTIAL DIAGNOSIS OF NODULAR GOITER ON THE BACKGROUND AUTOIMMUNE THYROIDITIS AND DIFFERENTIATED THYROID CANCERS**

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In modern literature there are many publications dealing with a study of nodular goiter combined with autoimmune thyroiditis (NGAIT) morphology. However, some issues remain unresolved including the question of the role of autoimmune thyroiditis (AIT) in the development of tumor processes. According to the literature, AIT leads to metaplasia processes in the thyroid epithelium, hyperplasia of lymphoid tissue, which undoubtedly can be considered as an optional precancerous condition.

The information that papillary cancer and lymphomas occur three times more frequently in patients with NGAIT confirms this idea.

The total accuracy of clinical, instrumental and laboratory diagnostic methods for the establishment of morphological origin of nodular new growths in the TG even in the most daring conclusions does not exceed 80%. This result cannot be satisfactory either for surgeons (unjustified over diagnosis of thyroid cancer) or endocrinologists (inadequate and ill-timed selection of patients for surgical treatment). Unfortunately, the chemical reagents used in the preparation of drugs for morphological studies by a standard method, block most of the antigenic determinants. That is why immunocytochemical and morphological studies of the biopsy material are performed on individual drugs, which lead to additional needle biopsies and prevent from the morphological identification of the cells reacting with antibodies. Instead, the best for PCE is the option when cytomorphological and immunocytochemical study is carried out consistently on the same smear of a puncture material. One of the mechanisms of malignant transformation and progression is a cell cycle dysregulation with apoptosis inhibition and proliferation activation.

It is quite necessary to solve these problems, because the correct choice of treatment strategy, timely surgical treatment and therefore the patient's survival largely depend on the accuracy of PCE. That is why our aim was to study the processes of proliferation and apoptosis in thyroid puncture material under NGAIT using immunohistochemical method of investigation as well as determining the proliferative activity index.

We examined 75 women with nodular NGAIT and 12 patients with differentiated thyroid cancer during 2016-2019. While preparing the smears we used a method of restoration of antigen determinants activity designed and patented in V. I. Komisarenko Endocrinology Institute laboratory. It enabled us to combine cytomorphological and immunocytochemical researches in one cytological preparation and provided a possibility to compare morphological and immunocytochemical characteristics of certain cellular elements.

The results of immunohistochemical reaction were evaluated by means of semiquantitative analysis, proposed by A.K. Khmelnytskyi, according to the intensity of color "+ -" - small "+" - poor, "++" - moderate, "+++" - pronounced. Assessment of immunoreactive cells was calculated by the formula  $(Fas, FasL, Bcl-2, P53, Ki-67) = N1 / N2 \times 100\%$ , where N1 was the number of immuno-positive cells to Fas, FasL, Bcl-2, P53, Ki-67 receptors, N2 - the total number of the cellular nuclei per 1 square millimeter. Morphometric analysis was performed by means of the microscope Bresser BioScience Bino (Germany) with a digital camera Nikon DS-Fil, personal computer with installed software NIS-Elements F 3.2.

The results showed the degree of proliferative activity in the thyroid tissue NGAIT. A high proliferative activity of lymphoid tissue, moderate proliferative activity in the area of thyrocytes lymphoid infiltration and low - outside. Marked expression of Fas and FasL in t thyrocytes in areas of lymphoid infiltration indirectly indicates that when there NGAIT immunologically caused apoptosis thyrocytes. This has been an increase in the expression of FasL in patients punctate DTC,

whereby significantly in malignant tissue ( $P < 0.01$ ). This process can be explained FasL probability of participation in the program "death signal" to p53, which is part of the pathogenesis of activating apoptosis in response to any external stress. Increasing the number of immunoreactive cells expressing Ki67 in the area of lymphoid infiltration and destruction thyrocytes, evidence of follicular epithelial regeneration is as a compensatory-adaptive response of a body. In the study differentiated cancers DTC found a high frequency of expression of Ki-67 in the follicular (100%) and papillary (78.95%) thyroid cancer. First of all, the highest expression of the power of a marker characteristic of follicular thyroid cancer.

Severe Bcl-2 expression in lymphocytes prevents the entry of cells into apoptosis and prolongs cell survival. There was high expression of p53 protein in the nuclei and follicular lumens of the thyrocytes, could be explained by mutations in the gene p53, which allowed cells to find tolerance apoptotic action of effector immune system. In tumor tissue DTC noted the greatest increase expression levels of p53 and Ki-67 in paranodular cells compared with benign tissue and altered in patients NGAIT.

Thus, compared with known methods of differential diagnosis, the proposed study allows at a preoperative stage, with a high probability to differentiate NGAIT from DTC, by examining extracts from tissues of the thyroid gland, which, in turn, determines the volume of surgery and treatment program. NGAIT - nodular goiter combined with autoimmune thyroiditis, TG – thyroid gland, PCE – preoperative cytological examination, DTC - differentiated thyroid cancer.

**Shurma A.I.**

**CHANGES IN THE PROPERTIES OF THE OPTICAL DENSITY OF VENOUS BLOOD PLASMA IN PATIENTS WITH INFLAMMATORY-DESTRUCTIVE INTRAABDOMINAL PATHOLOGY**

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The necessity to make quick decisions, often based on a fairly small amount of data, is one of the peculiarities of diagnosis in emergency abdominal surgery. The use of informative methods of examination (computed tomography, magnetic resonance imaging) is often limited, sometimes impossible, due to the necessity of special training, the presence of certain contraindications, lack of appropriate technical support, etc. Therefore, the search of new informative means that diagnosis remains a topical issue today.

To evaluate the possibility of using the determination of the optical density of venous blood plasma for the diagnosis of acute inflammatory-destructive intra-abdominal pathology, 60 patients were examined. In patients administered to the hospital, venous blood was taken by puncture of the ulnar vein. The optical density of venous blood plasma was measured by an Agilent Cary 100/300 Series UV-Vis spectrophotometer. It was established that in the infrared spectrum there was a number of characteristic maxima of the values of the optical density of blood plasma, which were localized at wavelengths  $\lambda = 310, 350, 430, 610, 670, \text{ and } 750 \text{ nm}$ . Optical density rates varied, depending on the type of underlying disease and complications. In the case of inflammatory-destructive intra-abdominal processes, the optical density of venous blood plasma increased at wavelengths  $\lambda = 470 - 755 \text{ nm}$ . Changes in the parameters of optical density differed, depending on the characteristics of the underlying disease and complications and had common patterns in the perforation of hollow organs, abscesses, peritonitis, destructive uncomplicated diseases.

Thus, determination of optical density is a promising area for improving the diagnosis of acute surgical pathology of the abdominal cavity.

**Tarabanchuk V.V.**  
**LUMINESCENCE CHANGES OF VENOUS BLOOD PLASMA IN PATIENTS WITH**  
**ACUTE PANCREATITIS**

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Informative diagnostics of different forms of acute pancreatitis and its complications is one of the most difficult problems in emergency abdominal surgery. Diagnostic probability of standard laboratory and instrumental methods does not exceed 80%, which leads to diagnostic hazard in some cases. This makes an actual problem search for new, informative diagnostic parameters.

The study involved 25 healthy donors (the first group) and 61 patients, among which 15 patients were with acute destructive cholecystitis (the second group), 13 patients with perforating gastroduodenal ulcers (the third group), 33 patients with acute destructive pancreatitis (the fourth group). In order to assess the informativeness of photoluminescent diagnostics, determination a luminescence spectra of venous blood plasma were carried. Irradiation a monochromatic laser beam of blood plasma was performed. Laser radiation source was an argon laser LGN-503, which emitted at a wavelength of 458 nm with a power of 200 mW. Statistical deviation in intensity measurements on a given apparatus was 2-3%. For decode the luminescence spectrum of human blood plasma, as the reference radiation source, a temperature lamp TRSH 2850-3000 was used.

The process was followed by the generally accepted international and national standards of research in biology and medicine, particularly provisions of the Helsinki Declaration of Human Rights, the Vancouver Convention on biomedical research (1979, 1994) and other laws which operated in Ukraine.

It was established that luminescence of human blood plasma was at the wavelength  $\lambda = 460 - 800$  nm. Thus, in the fluorescence spectra of healthy people, the characteristic maximum of intensity at the wavelength  $\lambda = 474-475$  nm was observed. In patients maximum indicators of fluorescence capacity in this area were displaced to the short-range, starting from the wavelength  $\lambda = 471$  nm, and their absolute parameters were much lower.

As a result of comparative analysis, in patients of the second, the third and the fourth groups characteristic differences of the spectral distribution of peak values fluorescence intensity were found. In particular, acute destructive cholecystitis maximum parameters were observed at the wavelength  $\lambda = 470$  nm, perforations of gastroduodenal ulcers - at the wavelength  $\lambda = 468$  nm, and acute destructive pancreatitis - at the wavelength  $\lambda = 466$  nm. That is, in the fourth group of patients the largest fluorescence intensity shifted to shorter range, when comparing with other groups. Obtained results were the basis for working on a new method of fluorescent diagnostics of acute destructive pancreatitis (invention application  $\text{u} 2011 01328$ ). Diagnostic sensitivity in our study was 90.1%, diagnostic specificity - 83.3%, diagnostic accuracy - 88.2%, diagnostic efficiency - 86.7%.

Thus, studies testify that at conditions of acute destructive pancreatitis the specific changes of photoluminescent parameters of venous blood plasma appear. This points to promising carrying out of further in-depth research in this direction. Peak values of fluorescence intensity blood plasma of healthy donors are marked at the wavelengths  $\lambda = 474-475$  nm. The patients with acute surgical diseases of the abdominal cavity maximum values fluorescence intensity of the plasma shift to the short range. At acute destructive pancreatitis is determined by the characteristic peak of fluorescence intensity at the wavelength  $\lambda = 466$  nm.

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performed for lower extremity fractures have lower LEFS score after surgery, but in the next months it is improving. In the late outcome the patients that applied for plate removal from femur comparing with those who did not showed lower LESF score -  $44.23 \pm 2.12$ . After osteosynthesis of tibia the score was  $40.15 \pm 1.72$  for the patients that applied for plate removal.

After plates osteosynthesis good and satisfactory functional results were achieved in 94.9 % (37 patients) of cases for femoral fractures and 93,2 % (69 patients) cases of tibial fractures. The osteosynthesis allows us to improve functional results due to better reduction and stability of fractures. The relation between the functional statuses of lower extremity after osteosynthesis with the removal procedures was found, as LEFS scores was significantly lower for those patients that applied for plate removal.

**Knut R.P.**

## **GROIN HERNIA: ANATOMICALLY DETERMINED RISK FACTORS FOR THE RECURRENCE**

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The analysis of scientific publications of last 5 years shows that the questions of anatomical preconditions, role of gender and physique in recurrences of groin hernias after mesh hernia repair remain up-to-date. Considered as a “gold standard”, tension-free hernioplasty has many advantages comparing to tissue repair, but the question of the graft’s size remains a subject of discussions.

The aim: to substantiate anatomical parameters influencing choice of graft’s size and shape in groin hernia repair. In the research took part 74 patients of both gender with primary groin hernias. All the patients were divided into 3 groups due to type of physique: 26 patients (35.1%) of endomorph type, 20 patients (27%) of ectomorph type and 28 patients (37.8%) of mesomorph type. An in-depth analysis of anatomical parameters of the groin region was performed in these groups. Received data were used to calculate the optimal sizes of the prosthetic mesh for the groin hernia repair depending on the physique and gender.

Results of the study show that the anatomical parameters of pelvis and groin regions in particular vary not only in people of different gender and type of physique, but sometimes may vary in one person. That leads us to necessity of individual approach to the choice of size of hernia mesh in every individual case. Based on the obtained data the optimal size of the allograft for the groin hernia repair for the patients of different physique and gender were calculated. We may conclude that groin allografts of standard size (6×11 cm) correspond not to all patients. During the operation, surgeons have to modify the size of standard graft with the scissors or to use a bigger piece of mesh to form the graft of necessary size. All that may lead to mistakes and raise the risk of complications and recurrence.

The anatomical sizes of groin regions vary not only in people of different gender and body structure, but sometimes may also vary in one person, and require an individual approach to the choice of size of hernia mesh in every individual case.

**Kozlovska I.M.**

## **THE ROLE OF PREOPERATIVE PREPARATION IN THE ANAL FISSURE TREATMENT**

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Preoperative preparation of the patient is of great importance in the prevention of early and long-term complications of surgical intervention, and thus plays the integral role in their quick recovery after the proposed surgical treatment to the state of working capacity.

Taking this into account, it is extremely important to improve the preoperative preparation of the patient for surgical excision of the anal fissure to prevent possible complications and achieve a favorable treatment result.

Therefore, the aim of the given study was to improve the results of anal fissure treatment by developing and introducing into practice new methods of preoperative preparation based on the pathogenetic aspects of this pathology.

In the main group (54 patients) intratissue electrophoresis was performed for 5 days before surgical treatment with a current density of 0.05 mA/cm<sup>2</sup> for 60 minutes (Ukrainian patent of utility model No.87377). During procedure 5 ml of antiseptic solution with anesthetic was injected into the rectum through an active drainage electrode. In the control group (52 patients) standard methods of preoperative preparation were used.

The use of intratissue electrophoresis with an antiseptic-anesthetic solution in the preoperative period leads to a decrease in the manifestation of hemodynamic disorders, acute inflammatory reactions in the tissues of the anal fissure in patients of the main group and stimulates the development of young granulation tissue in the area of the wound edges and the resection edge.

Already after one intratissue electrophoresis procedure the pain level decreased by 42.56% (1.43 times), after 3 sessions by 51.94% (2.17 times relative to control). Within five days intratissue electrophoresis pain at rest was completely absent as well as reduced manifestation of hemodynamic disorders and acute inflammatory reactions in the tissues. In contrast to the control group, the pain level after surgery in the main group was 1.78 times less on the 2nd day, and from the 4th day the patients did not need painkillers, whereas in the control group, pain relief was prescribed for 7-8 days after the operation. In the main group in the postoperative period, the wound healed much faster.

Analyzing the long-term results of treatment (5 years of follow-up after surgical treatment), recurrence of anal fissure in the control group was noted 1.8 times more often, and insufficiency of the anal sphincter - 2.8 times more often, compared with the main group. Cicatricial strictures were not observed in patients of the main group, and the period of complete healing of the surgical wound, using the developed therapeutic approach, was lowered by 27.6%.

Thus, the use of intratissue electrophoresis in the complex treatment of anal fissures with an antiseptic and anesthetic solution according to the developed method reduces the manifestation of the inflammatory process, stimulates reparative processes in the area of the fissure, accelerates epithelialization and the healing period of the postoperative wound, quickly eliminates anal spasm and postoperative pain syndrome.

The proposed treatment method is technically simple, has no contraindications, and is available for inpatient and outpatient use in medical institutions of any level.

**Kulachek Ya.V.**

## **THE ROLE OF PROVIDING PROPER MEDICAL CARE IN “GOLDEN HOUR” FOR VICTIMS WITH DOMINANT ABDOMINAL TRAUMA**

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Providing qualified and timely care to victims with abdominal trauma, i.e. is one of the urgent problems of emergency surgery. This is due to the increase in the number of man-made disasters, consistently high rates of road accidents, adverse effects of patient treatment with multiple and combined injuries. Therefore, the aim of the given study was to improve the provision of medical care for abdominal injuries with the active use of time as a prognostic and quality care factor.

The study was conducted on the basis of data collected as the results analysis for treating 19 patients with dominant abdominal trauma. The study involved the retrospective data assessment at the pre-hospital stage of medical care for victims of abdominal trauma, as well as examination and treatment of victims at the hospital stage, taking into account the time criteria for diagnosis and treatment.

Depending on the injuries received, the victims were distributed as follows: liver injury was presented in 9 cases (47.37%), whereas spleen injury in 10 cases (52.63%). The gender distribution among victims of splenic trauma was 6 males (31.58%) and 3 females (15.79%); 8 males (42.11%) and 2 females (10.53%) were observed with liver injury. The exclusion study criteria were children and

people over 65 years. Among the abdominal trauma patient's infusion therapy at the prehospital stage was performed in 11 victims (57.89%).

The standard of the "golden hour", which starts from the moment of injury to the provision of qualified or specialized medical care, remains generally accepted. The late patient admission is due to various reasons, but proves the urgent need for anti-shock treatment at the scene and should continue during the transportation of the victim to the hospital. The presence of multiple internal injuries in the victims has led to conclusion that blood loss, shock and hypovolemia require mandatory infusion therapy in most patients.

However, excessive fluid intake in elderly victims can lead to rapid decompensation of the cardiovascular and respiratory systems. While treating victims with a dominant abdominal injury and taking into account the time criteria, it should be noted that 10 victims (52.63%) were taken to a qualified department up to one hour after the injury, 7 victims (36.84%) after more than 1 hour and 2 victims (10.53%) after more than 12 hours. Surgical treatment was applied to 15 victims (78.95%) and 4 victims (21.05%) were treated with non-surgical methods. The complicated course of the dominant abdominal injury was evident in 3 cases (15.79%), those were infectious complications and all of them occurred during hospitalization more than one hour after the injury.

Thus, measures of aggressive intensive care for victims with dominant abdominal trauma should begin at the prehospital stage simultaneously with the most complete physical examination. Management for abdominal trauma patients in admission to the hospital should be of a short diagnostic nature and effective anti-shock and surgical interventions should be distributed as soon as possible to eliminate life-threatening conditions and prevent complications in the postoperative and post-traumatic period.

**Kurikeru M.A.**

## **EPIDEMIOLOGY AND QUALITY ASSURANCE OF MEDICAL CARE FOR PATIENTS WITH ACUTE TRAUMATIC BRAIN INJURY IN CHERNIVTSI REGION**

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Introduction: traumatic brain injury is one of the most pressing problems of modern medicine. According to the WHO, more than 10 million people worldwide receive TBI each year, 250-300 thousand of which end in death. In Ukraine, the frequency of TBI is annually in different regions from 2.3 to 6 cases (average 4-4.2) per 1000 population. Every year in Ukraine 10-11 thousand people die from trauma - the death rate is 2.4 cases per 10 thousand population (in the US - 1.8-2.2). Traumatic brain injury is often called a "silent epidemic" and in Ukraine it is 196 cases per 100,000 inhabitants. The most common mechanisms leading to trauma in Ukraine are falls, traffic accidents, and cases related to attacks. According to the WHO, by 2030 TBI will be the leading cause of disability and death worldwide (due to rising accidents in developing countries and an aging population - an increase in the number of falls).

Materials and methods: the epidemiology of trauma in the Chernivtsi region for the last 5 years (2016-2020) has been studied. An expert assessment of medical care in 108 patients with acute trauma in Chernivtsi region.

The experience of Ukraine has shown a 1.5-fold reduction in mortality after the introduction of unified clinical protocols for medical care for trauma. The results of trauma treatment are determined by the timeliness of medical care at the prehospital stage and the timely hospitalization of patients in specialized departments (neurosurgical, neurological).

Thus, according to the current unified protocols for the provision of medical care, all patients with acute trauma, regardless of its severity, should be examined in neurosurgical, as the best equipped, hospitals. The current unified protocols for providing medical care to patients with trauma need to be revised in 2021 with the introduction of clear criteria (indicators) for the quality of their implementation. Further study of the epidemiology of trauma is a necessary component of the organization of rational care for patients and the development of measures for primary and secondary prevention of traumatic lesions of the central nervous system.

Kvasniuk D. .

## USING OPTIO-POLARIZATIONAL METHODS AND ARTHROSCOPY IN EARLY DIAGNOSTICS AND TREATMENT OF SEPTIC ARTHRITIS

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The use of optical-laser methods for differential diagnostics of reactive synovitis with deformed gonarthrosis of the 2nd-3rd stage and septic arthritis.

Objective: to improve the differential diagnosis of changes in synovial fluid using a method of laser multiparameterpolarimetry, phaseometry and spectrophotopolarimetry of microscopic images of synovial fluid films. Twelve patients aged 26 to 76, including 7 women and 5 men, participated in the study. The synovial fluid was removed with puncture of the upper spin of the knee before treatment, 1 ml of which was then used to prepare the smear. Investigation of synovial fluid films by the above-described methods was carried out in the Stokes polarimeter scheme, a phase-beam beam of helium-neon laser with a wavelength of 0.6328  $\mu\text{m}$ , a power of 5 mVt and subsequent digital processing of the data.

The average duration of a separate optic-laser study of synovial fluid smear for one patient is 1.5 - 2 hours. The medical informativity of the methods was demonstrated by identifying the sensitivity and specificity of a separate methodology and group of patients. The obtained results indicate that the highest sensitivity and specificity is demonstrated by the method of spectropolarimetry where, respectively, the sensitivity is 92-93% and the specificity of the method is 82-86%. The sensitivity of the laser-microscopic imaging method is 82-83%, and the specificity of 73-76%. The Stokes polarimetry method generally exhibits the lowest sensitivity (43-56%) and specificity (38 - 46%), but is the basis for phasometric and spectropolarymetric studies.

The results obtained in the study of synovial fluid in septic arthritis are presented in Table.

Statistic moments	Polarization		Phaseometry	Spectral
	(azimuth)	(ellipt)		
Average	1,47 $\pm$ 0,27	0,73 $\pm$ 0,08	0,87 $\pm$ 0,13	0,031 $\pm$ 0,005
Dispersion	0,21 $\pm$ 0,037	0,23 $\pm$ 0,037	0,145 $\pm$ 0,023	0,38 $\pm$ 0,063
Asymmetry	0,44 $\pm$ 0,069	1,15 $\pm$ 0,21	2,09 $\pm$ 0,34	0,41 $\pm$ 0,073
Access	1,12 $\pm$ 0,24	0,88 $\pm$ 0,16	2,23 $\pm$ 0,36	3,48 $\pm$ 0,57

Arthroscopic treatment of patients in the early stages of arthritis was performed after the obtained results. The purpose of the treatment of infectious arthritis is the rehabilitation of the hearth of infection and early re-mobilization. Arthroscopic treatment was proposed by JARRET in 1981. The expediency of localization of the process was only within the joint. The task of arthroscopy in infectious arthritis is decompression of mechanical cleansing of the joints by washing the removal of necrotic tissues and fibrin.

Repeated endoscopic lavage - repeated rinsing through an arthroscopic tunnel with a large volume of liquid (not less than 6 -10 liters, control of hydrostatic pressure). Installation of vacuum drainage. Setting of a constant rinse drainage with a suction and subsequent rinsing, if in doctor's opinion, one rinse is not enough.

Comprehensive application of optic-laser techniques for microscopic imaging of synovial fluid films, along with commonly used survey methods, can significantly accelerate objective diagnosis and differentiation of pathological states of joints. Arthroscopic treatment of infectious arthritis in the early stages allows to adequately heal the infection center by lavage. Low invasiveness of the method reduces neuromuscular disorders in the inflamed joint. The need for immobilization is significantly reduced, allowing for quicker rehabilitation and rehabilitation.

**Marchuk O.F.**  
**THE PECULIARITIES OF DIFFERENTIAL DIAGNOSTICS OF TRANSIENT  
SYNOVITES IN CHILDREN**

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The relevance of this research has been stipulated by the fact that transient synovitis is rather common in the form of a short-term non-specific inflammation of the synovial membrane of the hip joint (less often of the knee joint) in children, especially boys. The development of this process is frequently associated either with a minor injury or any disease with a low sub-febrile fever, such as bacterial diseases of the respiratory tract and oral cavity (tonsillitis, pharyngitis) during long walks. Transient synovitis of the joints in children occurs quite often, however the pathogenesis of this disease has not been sufficiently investigated. Basically, synovitis progresses in children from one and a half years old and up to their puberty.

The purpose of this paper was to determine the major difference in diagnostic criteria, typical of transient synovitis, on the basis of considering 267 cases of the disease. From 2018 to 2020, 195 children, diagnosed coxitis (105 boys and 90 girls) were treated in the Department of Pediatric Traumatology of the Emergency Hospital of Chernivtsi. Their average age was  $5,0 \pm 2,7$  years old. Four clinical groups have been distinguished in the course of the treatment. The first group comprised the patients with no significant changes in laboratory and instrumental parameters after the examination. Therefore, they were diagnosed transient synovitis. The second clinical group contained 12 children with juvenile rheumatoid arthritis. The third group was made up of 10 children with Legg-Calvé-Perthes disease (LCPD). The fourth group consisted of 47 patients with juvenile epiphyseolysis, hematogenous osteomyelitis and tumors.

Most observations indicate that transient synovitis is usually marked with an acute onset and rapid development. It is accompanied with pain in the morning, as well as restricts both active and passive movements in the joint, which is very similar to the symptoms of juvenile rheumatoid arthritis.

The child finds it difficult to perform any movements in the joint. What is more, he/she tries to fix the leg in a gentle position. The limb is in a position of flexion, reduction and internal rotation, while the child resists to any attempts of passive movements due to muscle spasms. This process is mostly of a unilateral nature, though occasionally it might be bilateral.

These children almost always limp and suffer from pain in the joint on palpation. The temperature is usually normal or slightly elevated, but rarely high. As a rule, the duration of the disease is 10-14 days.

Nevertheless, since the pathogenesis of this disease has not been sufficiently investigated, it is necessary to conduct thorough diagnostics before prescribing the treatment. Differentiation helps to detect in the anamnesis a prior illness with a sub-febrile fever. When analyzing the data of laboratory tests, it is essential to point out the almost complete absence of changes in both general and biochemical blood tests. The acute phase indicators, like C-reactive protein, antistreptolysin-O, sialic acids and others, also remain intact. This eliminates the danger of a great number of inflammatory and destructive diseases of the joints.

Radiography allows visualizing the expansion of a joint crack, whereas the ultrasound research of joints shows the increase in the amount of synovial liquid. In case the diagnosis might seem doubtful, it is advisable to perform the puncture of the joint, the microbiological culture of synovial fluid, as well as magnetic resonance imaging of the affected joints.

Thus, the differential approach to diagnosing and treating children with coxitis enabled to identify clinical groups with specified diagnoses, on which further treatment tactics depended.

**Moskaliuk O.P.**

## **THE REPRODUCTIVE FUNCTION CHANGES IN MEN WITH INGUINAL HERNIA**

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According to the data, 20 men out of 1000 are hernia carriers (2%), of which inguinal hernias are diagnosed in about 75%. Nowadays, infertility is a very important medical and social problem. The share of infertile marriages is increasing every year and currently is about 15%. One of the etiological factors of male infertility is the presence of inguinal hernia. That is why the aim of the given study was detailed upon the inguinal hernia effect on male reproduction.

The study included 10 healthy volunteers (control group) and 49 patients with oblique inguinal hernia (main group). All patients were of reproductive age from 18 to 45 years old (average age of men in the main group was  $32.7 \pm 6.69$  years, and in the control group was  $33.1 \pm 6.98$  years).

Tests of blood circulation in the testicular arteries were performed on an ultrasound scanner. Hemodynamic parameters were studied: peak systolic blood flow velocity (PSFV), terminal diastolic blood flow velocity (TDFV), mean linear blood flow velocity (MLFV) and resistance coefficient (RC). The study was performed on the healthy and affected sides.

Analyzing the obtained data, no significant difference in blood flow was found in the control group. Instead, the data obtained in the main group show a significant decrease in all indicators of blood flow velocity, namely PSFV –  $18.9 \pm 0.49$  cm/s against  $21.7 \pm 0.57$  cm/s in healthy individuals, TDFV –  $5.1 \pm 0.33$  cm/s against  $7.2 \pm 0.46$  cm/s in healthy individuals and MLFV –  $9.7 \pm 0.31$  cm/s against  $12.0 \pm 0.42$  cm/s in healthy individuals ( $p < 0.01$  for all indicators). Along with these indicators, the R is significantly increased –  $0.73 \pm 0.018$  against  $0.67 \pm 0.019$  in healthy individuals ( $p < 0.05$ ).

Doppler examination of blood circulation in the testicular arteries showed that in comparison with the unaffected side, the preserved blood flow was only in 61.3% of patients. That is explained by inguinal hernia worsening arterial blood supply to the testis, which was observed with increasing duration of hernia, especially of more than 36 months.

The volume of the testis on the affected side was lower, approximately  $18.5 \pm 0.36$  cm<sup>3</sup> ( $p < 0.05$ ) comparing with the same indicator in healthy individuals,  $21.6 \pm 0.44$  cm<sup>3</sup>. These data once again prove the negative impact of the inguinal hernia on the condition of the testicles. Antisperm antibodies were detected in 30.1% of patients in the main group, while in the control group antisperm antibodies were not detected in any of the subjects. The obtained data can be explained by the destruction of the blood-testicular barrier structures, mainly at the pressure of the contents of the hernia on the elements of the spermatic cord.

Male reproduction changes can be explained by the pressure of the hernia sac on the vessels of the spermatic cord, which increases with a long herniation period and impairs testicular blood supply. That is why the need for early surgical treatment of inguinal hernia is a must, especially in people of reproductive age.

**Raylyanu S.I.**

## **MORPHOLOGICAL CHANGES OF TISSUES IN PATIENTS WITH CHRONIC INGUINAL HERNIAS**

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*Bukovinian State Medical University*

During last years the incidence of inguinal hernias grew significantly. The complications development in these patient after inguinal hernioplasty reached, 6-18%. It can be explained by the fact that during surgery and postoperative period surgeons don't take all the aspect of complications pathogenesis in elderly patients into consideration.

Objectiv of the study was to evaluate the morphological changes of hernia sac and hernia-sarrounding tissues with inguinal hernias.

For the research purpose we used biotates of hernia tissues of 24 patients (aged 60-83, mean  $67.47 \pm 2.54$  yrs.), obtained during the inguinal hernioplasty. Special attention was paid to evaluation of the muscular tissue atrophy and development of cicatrize and inflammatory changes. The following tissues were evaluated hernia sac, subcutaneous cellular tissue, muscular tissue and, in some cases, preperitoneal cellular fat. Fragments of tissues were preserved and processed in accordance to histological standards.

Principal sings of chronic inflammation of the hernia sac in all 24 patients were studied. In 8 (33.3%) patients isolated inflammation of hernia sac tissues were found, and in 16 (66.7%) patients it was associated with chronic inflammatory changes of hernia-surrounding tissues. In 6 (25.0%) patients with the recurrent inguinal hernias the inflammatory changes of hernia sac and hernia-sarrounding tissues were very pronounced and associated with their cicatrize changes. In all patients pronounced atrophic changes of the muscular tissues were determinated. Use of suture-free techniques in elderly patients may greatly reduce inflammatory changes impact on healing, though not providing complete protection.

Inflammatory and cicatrize changes after the suture methods of hernioplasty cause ischemia, atrophic and cicatrize changes in muscles during postoperative period, making these methods of surgery not sufficiently effective.

**Rotar O.V.**

### **CHANGES OF INTESTINAL MICROBIOTA AT ACUTE PANCREATITIS**

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Gut is recognized as main source of bacterial translocation during severe acute pancreatitis (SAP). Besides other factors changes of intestinal microbiota directly influence on rate of microorganisms spreading from intestine and may serve as prognostic factor of severity pancreatic infection.

To investigate the changes of luminal and mucosal microbiota of gut during SAP. In 70 Wistar rats SAP was induced by intraperitoneal injection of 250 mg/100 g of 20% L-arginine solution twice during 1 hour. Concentration of luminal and mucosal bacteria in colon and distal ileum were investigated during 24-120 hours by bacteriological methods.

In colon amount of autochthonous physiologically useful microflora decreased during all period of SAP: after 72 hours *E. feacalis* eliminated, after 120 hours *Bifidobacteria* spp. disappeared and *Lactobacteria* spp. were found only in 2 from 7 animals. In such condition concentration of autochthonous facultative and allochthonous microorganisms *Staphylococcus* spp., *Clostridia* spp., *Enterobacteria* spp. and *Candida* spp. reached 3,5-4,5 log CFU/g. In distal ileum concentration of *Lactobacteria* spp., *Bifidobacteria* spp., *E. feacalis* felt from 6,51-6,81 log CFU/g till 3,57-4,8 log CFU/g after 24 hours, and they absolutely disappeared after 48 hours until 7 day. Due to profound deficit of physiologically useful microflora amount of *Peptococcus* spp., *Staphylococcus* spp., *Clostridia* spp. and especially *Enterobacteria* spp. (*Klebsiela*, *Edwardsiela*, *Proteus*, toxic strains of *E. coli*.) reached higher level than in colon.

During SAP changes of distal ileal microbiota, especially mucosal, were more significant than in colon. Thus bacterial translocation from distal ileum may occur in a higher level.

**Shutka V.Ya.**

### **MODERN METHODS OF TREATMENT OF BRAIN TUMORS**

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Brain tumors account for 6 to 8.6% of the total number of human tumors. The aim of our work was to study additional methods of treating brain tumors, namely, modern non-invasive technology of radiation therapy Cyber-knife. Cyber-knife is a modern non-invasive technology of radiation therapy, which allows to provide an alternative to surgery for the localization of gliomas in the median parts of the brain. Although the very name of the method may be associated with a



scalpel and traditional surgery, this method refers to radiation therapy, that is, the use of radiation to destroy tumors. There are no incisions, scars or complications associated with surgery.

Materials and methods: the expert evaluation of the treatment of 6 patients with brain tumors by non-invasive radiation therapy and 32 patients by traditional surgical method for 2019-2021 was studied and conducted. We analyzed the results of treatment of glial tumors of the brain in 38 patients, men - 26 and women - 12 aged 36 to 65 years. It was found that the survival time for traditional treatment (surgery, radiation therapy and chemotherapy) is on average from 9 months to two years, and for therapy using a cyber-knife from 6 months to 1.5 years.

Therefore, according to our data, the main method of treatment is the surgical method. For a long time it was believed that surgical removal of a brain tumor is associated with high risk and complications, but in the last 15-20 years there has been a revolution in the technique of neurosurgical operations. However, surgery is not always possible, for example, due to the large size of the tumor, or due to the location of the tumor in a vital area of the cortex. If surgery is not possible, as well as after surgery, in order to destroy cancer cells that may remain in the operating field radiation therapy is conducted. Radiation therapy is selected individually and depending on the cell composition of the tumor, its size and location.

**Solovai M. M.**

## **PHASE TOMOGRAPHY OF THE POLYCRYSTALLINE OF BLOOD FILMS**

*Department of General Surgery*

*Bukovinian State Medical University*

Our study is aimed at developing the principles of differential diagnosis of the severity of the septic process by using a digital technique of phasometric mapping of microscopic images of blood films of laboratory rats. This technique is based on determining the medical-relevant relationships between the phase maps of microscopic images of blood films of laboratory rats and the severity of the septic process. The experimental measurement of the coordinate distributions of the magnitude of the phase shifts was carried out at the location of the laser micropolarimeter. The structure of the study of the polycrystalline component of rat blood biological films in the differential diagnosis of septic severity by digital polarization-phase microscopy consists of the following experimental and analytical steps: 1. Representative samples of polycrystalline blood films of the following groups of rats are formed: Intact rats - "control" group 1 (39 samples); Sick rats (sepsis – light form) - "research" group 2: duration 12 hours. (39 samples) - "experimental" subgroup 2.1; duration 48 hours. (39 samples) - "experimental" subgroup 2.2. Sick rats (sepsis – middle form) - "research" group 3: duration 12 hours. (39 samples) - "experimental" subgroup 3.1; duration 48 hours. (39 samples) - "experimental" subgroup 3.2. Sick rats (sepsis – severe form) - "research" group 4: duration 12 hours. (39 samples) - "experimental" subgroup 4.1; duration 48 hours. (39 samples) - "experimental" subgroup 4.2. Within each of the four groups for each sample of blood films carried out: measurement of the coordinate distribution of the magnitude of the phases in pixels of a digital microscopic image calculating the size of the set of statistical moments of the 1st – 4th orders characterizing the average  $S$ , dispersion  $D$ , asymmetry  $A$ , and excess  $E$  of phase size distributions. For the obtained group sets (average  $S$ , dispersion  $D$ , asymmetry  $A$  and excess  $E$ ), average values and fluctuations of the statistical moments of the 1st – 4th orders are determined/For all groups of biological preparations, a cross-analysis of the statistical reliability of the obtained data is carried out and objective criteria for differential diagnosis of the presence of the septic process and its severity are determined by polarization-phase microscopy. From the obtained results it follows that for septic conditions, a decrease in the phase-shifting ability of the polycrystalline component of rat blood films from all research groups is inherent. This fact is indicated by a decrease in the average and dispersion of phase shifts at the points of microscopic images. Such a transformation of the statistical structure of phase maps is associated with necrotic degradation (anemia) of optically anisotropic hemoglobin structures, as well as with a decrease in the number of optically active red blood cells in rat blood altered due to the inflammatory process with different severity of the inflammatory process.

A structural-logical scheme and design of a phase-metric study of microscopic images and blood films of laboratory rats has been developed. A model analysis of the polycrystalline structure of blood films of laboratory rats is proposed. Experimentally tested the optical arrangement of the system of phase-metric mapping of microscopic images of blood films of laboratory rats. An album of maps of the distribution of phase magnitude of the points of the digital microscopic image of polycrystalline blood films of rats from control group 1 and research groups 2–4 with different severity of septic pathology was obtained. The statistical confidence of the differentiation of phase maps of the microscopic image of polycrystalline blood films of rats from control group 1 and research groups 2 - 4 with different severity of septic pathology was determined. The most diagnostic-sensitive statistical criteria for differentiating phase maps of the microscopic image of polycrystalline blood films of rats from control group 1 and research groups 2–4 with different septic pathology severity were found. The operational characteristics of the diagnostic strength of the method of polarization- phase microscopy of polycrystalline blood films of rats of the control and experimental groups are determined. Set balanced accuracy: differentiation of healthy and sepsis-infected rats; intergroup differentiation of the severity of the septic process in sick rats; intragroup differentiation of rat sepsis patients.

**Sydorchuk R.I.**

## **EARLY POSTOPERATIVE CHANGES OF PRIMARY HAEMOSTASIS UNDER ABDOMINAL SEPSIS**

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Violations of hemostasis play significant role in pathogenesis of sepsis e.g. multiple organ damage caused by sepsis is created in part by the tight relationship between haemostasis and inflammation. Markers of coagulation have been found to have pathogenetic and prognostic value in sepsis patients. Both clinical and experimental studies prove importance of further investigation of coagulation haemostasis including its prognostic and therapeutic potential for abdominal sepsis.

The aim of the study was to analyze changes in the system of primary thrombocyte-vascular haemostasis in patients with peritoneogenic and pancreatogenic abdominal sepsis in early postoperative period.

The study covers 52 patients with peritoneogenic and pancreatogenic forms of abdominal sepsis, aged 18-69 years ( $41.93 \pm 3.47$ ). The control group consisted of 17 patients who underwent elective surgery not related to abdominal cavity. Primary haemostasis analyzed according to prostacyclin (6-keto-PGF<sub>1</sub>), thromboxane<sub>2</sub> (TX<sub>2</sub>) and soluble fibrin monomer complexes (ELISA). Bioethics requirements were strictly obeyed.

According to the obtained data, in control group patients the TX<sub>2</sub> level during 1 day after surgery was  $156.11 \pm 12.19$  pg/ml (n=9), and 6-keto-PGF<sub>1</sub> –  $166,56 \pm 6.92$  pg/ml (n=9). Under pancreatogenic sepsis, these figures grew: TX<sub>2</sub> – 48% (p<0.01, n=5), 6-keto-PGF<sub>1</sub> to  $177.67 \pm 12.33$  pg/ml (n=5); in peritoneogenic sepsis TX<sub>2</sub> was  $209.50 \pm 16.99$  pg/ml (p<0.05; n=8) and prostacyclin –  $172.75 \pm 19.05$  pg/ml (n=8).

Severe course of abdominal sepsis was marked by the highest concentration of TX<sub>2</sub> ( $384.11 \pm 49.52$  pg/ml, p<0.001; n=9) with lowest level of 6-keto-PGF<sub>1</sub> ( $86.89 \pm 19.75$  pg/ml, p<0.001; n=9). Soluble fibrin monomer complexes grew significantly:  $5.40 \pm 0.31$  mkg/ml (control, n=15);  $12.40 \pm 1.73$  mkg/ml (pancreatogenic sepsis, n=5; p<0.001);  $22.40 \pm 4.67$  mkg/ml (peritoneogenic sepsis, n=5; p<0.001);  $54.50 \pm 5.21$  mkg/ml (heavy sepsis, n=9; p<0.001). In addition, statistically reliable regressive dependencies between the soluble fibrin monomer complexes content in blood and TX<sub>2</sub> concentration (positive correlation) and the level of 6-keto-PGF<sub>1</sub> (negative relationship) were identified.

Significant changes revealed in the system of primary haemostasis in abdominal sepsis patients during the first 24 hours after surgery demonstrate the need for the active correction of thromboxane-prostacyclin system's violations to prevent postoperative thrombotic complications.

**Tulyulyuk S.V.**

**EXPERIENCE OF BLOCKING METALLOPOLIMERY INTRAMEDULLARY  
OSTEOSYNTHESIS TREATMENT OF FRACTURES OF LONG BONES**

*Department of traumatology and orthopaedic  
Bukovinian State Medical University*

The Department of Traumatology, Orthopaedics and Neurosurgery Bukovina State Medical University, Professor Rublenyk I.M. and his students, employees, since 1978, is an intense and inventive scientific work on the development of technologies blocking intramedullary metalopolimery osteosynthesis (BIMPO). Technology BIMPO designed for surgical treatment of femur, tibia and humerus bones, made fundamental biomechanic, clinical and radiological study.

Purpose: Publication of experience in the application blocking intramedullary metalopolimery osteosynthesis in the treatment of fractures of long bones. In hospitals Chernivtsi, Khmelnytsky, Dnipropetrovsk regions for the period from 1980 to 2019 conducted in 1200 operating interventions with different options BIMPO controlled electron-optical converter (EOC). Patients ranged in age from 12 to 90 782 patients operated because of fresh fractures, 418 - because of their effects (slow and improperly consolidating fractures and pseudarthrosis, bone defects). In 80% of patients experienced a splinter fractures. Disorders of reparative osteogenesis were observed in 10.7% of patients. Dynamic option BIMPO used in 91% of patients, static - in 7.6%, and detenziynyy - 2.4%. Open the BIMPO used in surgical treatment 48.4% of patients, half open - in 29.2%, closed - in 22.4%. In one case the operation was not carried dynamism.

Results of the treatment of the patients indicate that good results were observed in 82.14% of patients, satisfactory - in 12.5% of patients, and unsatisfactory consequences that require further treatment, recorded in 5.36% of patients. The frequency of satisfactory and unsatisfactory results due mainly nature of injury. Analysis and synthesis of the results of BIMPO showed that metalopolimerni locking latches have several advantages: the ability to use BIMPO in reconstructive surgery of the musculoskeletal system; there is no need to use expensive cost of navigational structures and X-ray television equipment.

Interlocking intramedullary osteosynthesis metalopolimery has all the characteristics to take their rightful place in the arsenal of methods of operative treatment of fractures and their consequences.

**Vizniuk V.V.**

**ASPECTS OF NEPHROPROTECTION THERAPY OF PATIENTS SUFFERING FROM  
BENING PROSTATE HYPERPLASIA**

*Department of Urology and Neurosurgery  
Bukovinian State Medical University*

Morbidity of benign prostate gland hyperplasia (BPH) occupies the third place after urolithiasis and heterospecific inflamantary diseases in the structure of diseases of urology profile. BPH is the most widespread disease among men of elderly and senile years, which determines quality of their life. However the characteristic complex of symptoms, clinical signs and macrostructural changes in the prostate gland develops rarely enough and depends on the stage of the disease (only 40-50 % men at the age of 50-64 have symptoms of the disease).

The functional state of the kidneys is important for the choice of tactics and method of treatment and significantly affects the treatment of the disease. In patients with BPH at the I-II stage of the disease, in most cases, the onset of chronic renal failure is diagnosed, but there are no pronounced clinical symptoms, since urination depends on the retraction ability of the bladder detrusor.

To provide highly effective nephroprotection therapy the basic links of physiopathological mechanisms should be considered, which are found in kidneys in case of obstructive uropathies. It results in underlying universality of pathogenetic mechanisms of kidney parenchyma damage without substantial dependence on aetiologic factors. In the last few years single scientific reports

have appeared concerning nephroprotection action of angiotensin transforming enzyme inhibitors, calcium channel blockers, L - arginine.

Nephroprotection action of these groups of preparations consists of elimination of disorders of lipid peroxidation, microvascular circulation of blood and improves antioxidant properties of the organism.

A great number of medicinal preparations of different action targeted at treatment of BPH is indicative of the fact that none of these medications is effective enough with monotherapy, that is why there is a necessity to introduce a complex therapy of kidney parafunctions.

**Vladychenko K.A.**

## **ANALYSIS OF SPERMIOLOGICAL RESEARCH INDICATORS AND MAR-TEST**

*Department of Urology and Neurosurgery*

*Bukovinian State Medical University*

Antisperm antibodies are detected in 3% to 25% of cases in men and women diagnosed with infertility. They can also be diagnosed in 1–10% of healthy fertile men. The presence of a high titer of antisperm antibodies is one of the factors of male infertility, which can be "hidden", is not cause symptoms and deterioration of the overall spermogram.

The aim of the study is to analyze the results of sperm testing in men with antisperm antibodies, which were detected by MAP test. A retrospective analysis of the results of the examination of 555 men was conducted on the basis of the Medical Center for Infertility Treatment in Chernivtsi. Spermograms were examined according to WHO recommendations in 2000, using an inverted microscope Olympus CKX41 in a Macler chamber. Determination of the percentage of sperm coated with antisperm antibodies was performed using the MAR-test (MAR-test, MAR-mixed antiglobulin reaction).

The average age of men included in the study was  $32.48 \pm 7.96$  years. In all patients, the results of laboratory tests for genital infections were negative, but a history of 198 men (35.7%) have positive tests for chlamydia (31 patients – 15.7%), mycoplasmosis (67 patients – 33.8%), trichomoniasis (34 patients – 17.2%), ureaplasmosis (66 patients – 33.3%). The previous infections of the genital system in this cohort of patients are regarded as a probable etiological factor of AST production. There is a tendency to the predominance of IgA over IgG. Allergic history was burdened in 23 patients (4.1%). 47 men (8.5%) had a history of surgical interventions on the organs of the reproductive system, namely: unilateral orchopexy – 4, Ivanisevich's operation on the left – 36, Marmar's operation on the left – 2, for hydrocele – 5. If we calculate the percentage of patients, which can be assumed to be related to the presence of antisperm antibodies with delayed surgery, infections of the genital system and a burdensome allergy history, we will get only 48.3% of cases. It has been found that most changes in sperm counts correlate with the percentage of sperm that are coated with IgG. These data indicate that increased IgG levels play an important role in the development of pathospermia. A negative medium-strength correlation was found between the percentage of Category A sperm and the percentage of IgG-coated sperm. Persistence of IgG in semen is accompanied by a probable decrease in the morphological quality of sperm. During the regression analysis, the trend line shows the prognosis - in the presence of 30% of sperm that are coated with IgG, with a probability of 95% of patients in the ejaculate will be 100% of pathological forms of sperm.

In 52% of patients it was not possible to establish the etiological factor for the presence of Ig in the ejaculate. It has been found that most changes in sperm counts correlate with the percentage of sperm that are coated with IgG. It has been determined that an increase in the level of IgA and IgG leads to a probable increase in the percentage of pathological forms and a decrease in sperm motility. In the presence of 30% of sperm that are coated with IgG, with a probability of 95% of patients in the ejaculate will be 100% of pathological forms of sperm.

**Zaitsev V.I.**

**INFLUENCE OF CHRONIC URINARY INFECTION ON THE MUSCLES ACTIVITIES OF BLADDER AND PERINEUM IN THE PATIENTS WITH URINARY INCONTINENCE**

*Department of Urology and Neurosurgery  
Bukovinian State Medical University*

The problem of urinary incontinence remains rather actual. A lot of unsuccessful outcomes of treatment induce further investigations of this disease. One of uncertain questions is the causes of these failures. We supposed that presence of chronic urinary infection might lead to deeper changes in the nervous and muscular apparatus of bladder and perineum.

The purpose of our study was to compare 2 groups of women with urinary incontinence: with and without of chronic infections. We have examined 96 women with different forms of urinary incontinence. All patients were divided into two groups. The first one (40 pts.) consists of women with chronic urinary infection. The second one consists of women without infection (56 pts.).

The first discrepancy was revealed in dysuria manifestations. 37,5% of patients from first group and 28,6% from second have had severe voiding disorders. On the other hand, incontinence was presented in only 10% from first group and in 30,4% patients from second group. So, voiding problems were more actual in women with chronic urinary infection. Another discrepancy was in the location of the bladder floor on retrograde cystography. Its normal motionless position was found in almost the same percentage in both groups (65% and 69,7%). But during the voiding only 5% of patients in the first group have had the normal location of bladder floor (in comparison with 39,3% in the second group). We think that it testifies the neuro-muscular disturbances in bladder neck and perineum. The treatment effectiveness of voiding disturbance on uroflowgram was also much lower in the group with chronic infection. Thus maximum and mean flow rates were 56,3% and 55,2% less, acceleration was 2,72 times less and hesitancy was 1,98 times more in the first group in comparison with the second one.

So we found that chronic urinary infection leads to more severe voiding disturbances, weakness of perineum, diminishing of effectiveness of bladder emptying. These data may be explained by effecting neuro-muscular apparatus of detrusor and pelvic floor by toxins or direct influence of infectious agents. Failure of conservative or operative methods of incontinence treatment may be caused by insufficient attention to presence of urinary infections.

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**Andriychuk N.J.**

**PECULIARITIES OF ACCUMULATION OF SILVER NANOPARTICLES IN THE  
INTERNAL ORGANS OF RATS**

*Department of Hygiene and Ecology  
Bukovinian State Medical University*

Silver nanoparticles are widely used in our every day life, medicine etc, but a comprehensive understanding of how Silver nanoparticles are presently one of the most frequently used nanomaterials in consumer products because of their proposed antimicrobial properties. Silver in the form of Ag<sup>+</sup> ions has toxic effects on many pathogens, including bacteria, viruses, and fungi. Because of its relatively low toxicity in humans, silver has been used in various medical applications. Silver nanoparticles distribute in the body and the induced toxicity remains largely unknown. The present study was designed to investigate the distribution and accumulation of silver nanoparticles in rats with intraperitoneal injection. The toxicology of silver and its compounds has been studied for decades.

The aim of the present study was to investigate the organ distribution and localization of silver in rats following 14 days repeated intraperitoneal injections of decahedron-shape silver nanoparticles via luminescence intensity in preparation of internal organs of experimental animals. Three groups of animals (8 rats in each group) were daily intraperitoneally administered with a silver nanoparticles solution (5 mg/kg, 1 mg/kg and 0.1 mg/kg concentration). Fourth group - biological control for 14 days. On 14<sup>th</sup> day, the animals were removed from the experiment by decapitation under mild ether anesthesia. Luminescence intensity in the green range was determined using computer microdensimetry on a scale of 256 gradations in a computer program GIMP on digital microphotographs obtained using a microscope and a digital camera.

It was observed increasing of luminescence intensity of definite preparations that testifies to dose dependence accumulation of silver nanoparticles in kidneys, liver, heart, lungs and brain. Besides these, gender-related accumulation of silver nano- particles was revealed in kidneys, i.e. luminescence intensity was 6-8 reference units higher in epithelium of kidney's convoluted tubules of female rats than male rats.

Therefore, target organs: kidneys, liver, heart, lungs and brain. Gender-related accumulation of silver nanoparticles.

**Atamaniuk Y.A.**

**ADAPTATION PROCESS, LEVEL OF CELLULAR REACTIVITY AND NONSPECIFIC  
REACTIVITY OF PATIENTS WITH ACUTE BRONCHITIS**

*Department of Microbiology and Virology  
Bukovinian State Medical University*

An important task of clinical tactics and health economics is to stop the tendency of acute bronchitis occurrence through preventive measures, substantiation of factors and mechanisms of both nonspecific and specific immune protection. The key role in it is played by the levels of adaptive stress, cellular reactivity and associated nonspecific resistance of the body of patients with acute bronchitis.

Clinical and laboratory examination of 35 men with acute bronchitis was made in accordance with the recommendations of the Order of the Ministry of Health of Ukraine 128 dated 19.03.2007. "On approval of clinical protocols for medical care in the specialty "Pulmonology". Patients with acute bronchitis underwent a complete clinical and paraclinical study according to the protocol. The control group consisted of 17 healthy individuals of the appropriate age. The type of adaptive response (stress, response to training, reaction of quiet activation, increased activity, periaction) was determined by a relative amount of lymphocytes and

segmental neutrophilic granulocytes of the peripheral blood. In patients with acute bronchitis the adaptation index was  $0.75 \pm 0.07$  u., which corresponds to the adaptive response with increased activation. It was higher than the control indicator by 10.29 %, which corresponds to an increased level of activation of adaptive processes. The final in the development of acute bronchitis is cellular reactivity, the level of which in patients increases by 87.44 %, which reduces intoxication by 64.14 %, and indicates a decrease in endogenous intoxication and the absence of tissue breakdown. Increase of the ratio of the total pool of leukocytes and erythrocyte clotting rate by 2.8 times confirms the presence of endogenous intoxication associated with infectious process rather than autolysis.

In patients with acute bronchitis, immunological reactivity is 5.36 times higher than nonspecific one, which is the evidence of the formed nonspecific resistance. The formed nonspecific anti-infective protection is in the final stage, and the specific immune response is in the early stages of formation.

The basis of nonspecific pre-immune anti-infection protection of the body is humoral (complement system, interferon, lysozyme, natural killers, monocytes / macrophages, etc.). The key role in nonspecific anti-infection protection belongs to neutrophilic granulocytes – the largest population of immunocompetent cells in patients with acute bronchitis. The activity of the complement system is 2 times reduced and the titer of natural antibodies by 23.68 % increased, which inhibits granulocytes by 7.41 %, and the exciting ability of phagocytes decreases by 44.56 %. Phagocytosis disturbance was found at the final stages. The natural bactericidal activity of phagocytic cells is reduced by 17.06 %, and stimulated by 25.33 %. At the same time, the secretory activity of neutrophilic granulocytes against preimmune proinflammatory cytokines increases: tumor necrosis factor - , interleukins - 1,6,8.

**Blinder O.O.**

## **PREVALENCE OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS AMONG AMBULANT PATIENTS WITH PURULENT SKIN DISEASES**

*Department of Microbiology and Virology  
Bukovinian State Medical University*

Despite a slight decrease in the prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) strains in most high-income European countries in recent years, these bacteria belong to the group of pathogens with acquired antibiotic resistance that pose the greatest threat to hospitalized patients. These strains are: *Enterococcus spp*, *Staphylococcus aureus*, *Klebsiella pneumonia*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter species*. At the same time, in recent years, the spread of MRSA was associated not only with medical institutions (hospitals acquired / HA MRSA), but also outpatient departments, so-called community acquired / CA MRSA. Staphylococci, as representatives of the skin microbiome, are very often the cause of various inflammatory processes in this biotop.

The aim of our study was to study the prevalence of MRSA among clinical strains of staphylococci, that were isolated from ambulant patients with purulent skin diseases of Chernivtsi city.

**Material and methods.** 48 clinical strains of *S. aureus* from outpatients with purulent skin diseases were studied. The presence of methicillin-resistance in isolated strains was determined by a surrogate test with cefoxitin. In all the strains, sensitivity to  $\beta$ -lactam antibiotics, aminoglycosides, fluoroquinolones, macrolides, clindamycin, tetracycline and co-trimoxazole was determined as well. Technique for antibiotic sensitivity determination was conducted according to the CLSI recommendations, 2017. Discs with antibiotics, manufactured by Oxoid, were used.

**Results and discussion.** In our studies, *Staphylococcus aureus* was isolated from the purulent content on an average in 12.53 %. As we think, the nature of the lesion determines the frequency of detection of this pathogen. In our work this figure in outpatients with purulent skin diseases was close to the frequency detection of *S. aureus* in healthy people. Whereas, according to the literature, in patients of surgical hospitals, the incidence of *S. aureus* is from 18 to 26 %, and in the case of

burns up to 98 % of cases. According to our data, 4 strains out of the 48 isolated strains of *S. aureus* resistant to methicillin were found which is equal to 8.33 %. And when studying their sensitivity to antibiotics, it was found that 1 of them (which is 25 %) was resistant to antibiotics of 4 different groups.

Therefore, with a relatively low prevalence of *S. aureus* among outpatients with purulent skin lesions, the proportion of MRSA among them is not small and has a significant epidemic risk as the spread of multiple resistance to antibiotics.

**Dzhuryak V.S.**

### **PROGNOSIS OF CHRONIC KIDNEY DISEASE DEVELOPMENT IN HYPERTENSIVE PATIENTS DEPENDING ON THE CYP 11B2 GENE ALLELIC STATE**

*Department of Microbiology and Virology  
Bukovinian State Medical University*

Considering a high mortality from cardiovascular diseases (CVD) and disabling lesions of target organs caused by essential arterial hypertension (EAH), the need to improve the effectiveness of early prediction of HMOD, unfavourable course of the disease, risk of chronic kidney disease (CKD) or diabetes with EAH occurs in order to correct treatment and secondary prevention.

The aim of the study was to assess the risks of chronic kidney disease in patients with essential arterial hypertension depending on the Cytochrome 11b2 Aldosterone Synthase Gene (CYP11B2, rs1799998) allelic state.

100 hypertensive patients with hypertensive-mediated target-organ damage (2<sup>nd</sup> stage), moderate, high or very high cardiovascular risk were enrolled in the case-control study and underwent a complex of clinical-laboratory investigations with the following epidemiological analysis. The patients' average age was 59.87±8.02 years. CKD was diagnosed according to the National Kidney Foundation recommendations (2012) after glomerular filtration rate (GFR) decline measured by CKD-EPI equations after Creatinine, or Cystatin-C blood level. The control group included 48 practically healthy individuals of a relevant age. Gene's nucleotide polymorphism *CYP11B2* (-344C/T) was examined by polymerase chain reaction in 72 EAH patients and in the control group.

The probability of CKD in the *T*-allele carriers of the *CYP11B2* gene (rs1799998) increases after GFR decrease (cystatin-C) almost 1.5 times [OR=1.86; 95 % OR:1.01–3.58; p=0.049], especially in women [OR=2.23; 95 % OR:0.99–5.90; p=0.052]. The presence of type 2 diabetes mellitus in EAH patients increases the CKD risk 2.4 times [OR=3.29; 95 % OR:1.06–10.19; p=0.034], the obesity onset increases risk 2.08 and 2.32 times [OR=3.30; 95 % OR:1.33–8.16; p=0.009 and OR=3.58; 95 % OR:1.02–9.34; p=0.048, respectively], 3<sup>rd</sup> degree blood pressure elevation increases the probability of CKD almost three times [OR=5.06; 95 % OR:1.942–13.23; p<0.001]. Hyperaldosteronemia increases the CKD risk in EAH patients 1.3 times [OR=5.29; 95 % OR:1.15–24.37; p=0.02].

The CKD risk (after creatinine) in the mutation *T*-allele carriers' women increases 6.5 times (p=0.007) with the lowest probability of such changes in *T*-allele carriers' men [OR = 0.15; p=0.009].

**Gavryliuk O.I.**

### **COMPOUNDS AS THE BASIS OF MEDICAL DRUGS**

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Heterocyclic nuclei form the basis for the construction of numerous homologous series containing hydrocarbon residues in the form of side chains, as well as various functional groups. Heterocyclic compounds include, in addition to those mentioned, many other important natural substances. These are, for example, alkaloids - nitrogen-containing plant physiologically active substances. Among them are strong poisons (strychnine, nicotine), and important drugs (quinine, reserpine). Heterocyclic nuclei form the basis of many antibiotics, such as penicillin, tetracycline

and vitamins (B vitamins, etc.). Purine and pyrimidine bases are a part of nucleic acids - material carriers of heredity, which play a crucial role in the processes of protein biosynthesis.

Among various heterocyclic compounds, aromatic heterocycles have become widespread in nature, and they form the structural basis of the molecules of many drugs. The most important of these are pyrrole, pyrazole, imidazole, pyridine, pyrimidine, furan, thiophene, indole, purine, benzimidazole, and others.

Thus, heterocyclic compounds have the widest potential for diversity, and they are indeed common (especially in nature). It is no coincidence that many of the published works on organic chemistry deal with heterocyclic compounds. This is also due to the fact that they are of great interest to chemists as convenient models for the study and development of theoretical principles of organic chemistry and the theory of structure.

Numerous drugs and most heterocyclic compounds that have practical application are not extracted from natural raw materials, but produced industrially. However, the source of inspiration for organic chemists is the study of natural products, which formed the basis for further research. Examples include the discovery of vat dyes based on the indigo structure and the ongoing search for new antibacterial drugs based on the  $\beta$ -lactam structure of penicillin.

Heterocyclic compounds are of great importance. Many of them are the basis of alkaloid molecules - important drugs, involved in the construction of some amino acids that are part of proteins. Some heterocycles are the basis of natural dyes, such as green matter of plants - chlorophyll and others.

The importance of heterocyclic compounds is obvious. Suffice it to say that they ensure the very functioning of life on the Earth, making a decisive contribution to the mechanisms of heredity, respiration, the action of the central nervous system and a number of enzymatic systems. Today, heterocycles are many hundreds of highly effective drugs, antibiotics, pesticides, the basis for the creation of valuable dyes, phosphors, heat-resistant fibers and many other practically useful substances.

It is logical to expect that with such great importance in the chemistry of living things, they should have found application in medicine. This is true. According to the latest data, of the 1,070 most widely used synthetic drugs, 661 (62 %) were heterocycles. Everything stated above is a small part concerning the interest in heterocycles.

**Iftoda O.M.**

## **GENDER ASPECTS OF CONNEXIN 26 (GJB2) GENE POLYMORPHISM IN CHILDREN WITH HEARING LOSS**

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Nowadays, hereditary hearing impairments with the development of deafness are most associated with the connexin-26 gene GJB2 (gap junction protein), localized in 13q11-q12. Mutation of 35delG is deletion of one of the six nucleotides of guanosines (G) between positions 30 and 35, including the formation of a stop codon in nucleotide 38, resulting in premature cessation of connexin protein 26. It results in disorders of endolymph homeostasis in the inner ear, leading to hearing loss mainly of sensorineural origin.

The aim of the study was to analyze the gender characteristics of the frequency distribution of polymorphic variants of connexin 26 genes (GJB2, c.35delG) (rs80338939) in children with hearing impairments of sensorineural and conductive genesis.

The prospective study included 102 children aged 8 to 18 years (average  $11.5 \pm 3.15$  years) with hearing impairments, whose parents signed an informed consent to participate in the study, followed by a set of anamnestic-clinical and laboratory-instrumental examinations (otoscopy, speech audiometry, tone audiometry, tuning fork examinations, tympanometry). Study of gene polymorphism of GJB2 (c.35delG) was performed by polymerase chain reaction using Taq-DNA polymerase and specific primers. The obtained results were statistically processed using the

program "Statistica 7.0" software with the definition of Student's criteria (t) and non-parametric  $\chi^2$ . The differences were considered significant at  $p < 0.05$ .

Among the examined children 68 (66.7%) ones had sensorineural hearing loss, 34 (33.3%) - conductive hearing loss. There were 36 girls (35.29%) and 66 boys (64.71%), an average age of children was  $13.90 \pm 3.11$  years. The control group consisted of 60 practically healthy children, with the appropriate distribution by sex: girls - 22 (36.67%), boys - 38 (63.33%) ( $\chi^2 < 1.0$ ,  $p > 0.05$ ). According to the age criterion, the comparison groups were comparable ( $p > 0.05$ ).

The analysis of the obtained results showed that the mutation of the GJB2 gene in the homozygous state occurred among children with sensorineural hearing loss - in every second (50.0%), among children with conductive hearing loss - in 11.77% of cases, while in the control group - with a frequency of 5.0% ( $\chi^2 = 38.32$ ,  $p < 0.001$ ). Among children with sensorineural hearing loss, mutation of the GJB2 gene (c.35delG) in boys was significantly more common than among girls - by 20.58% ( $\chi^2 = 7.69$ ,  $p = 0.005$ ). While the absence of mutations was more often observed in children of the control group and with conductive hearing loss - both boys and girls than in those with sensorineural hearing loss: 25.98% ( $\chi^2 = 8.71$ ,  $p = 0.003$ ) and 19.02% ( $\chi^2 = 5.91$ ,  $p = 0.015$ ), and 26.47% ( $\chi^2 = 6.56$ ,  $p = 0.01$ ) and 11.76% ( $p > 0.05$ ), respectively.

Thus, mutation in the GJB2 gene (c.35delG) is significantly more common in boys with sensorineural hearing loss than in girls.

**Kushnir O.V.**

## **PROSPECTS FOR APPLICATION OF OMEGA-3 POLYUNSATURATED FATTY ACIDS IN IMMUNONUTRITIONAL PREVENTION OF RESPIRATORY DISEASES**

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The theory of immunonutritional prevention of viral diseases is gaining considerable popularity among scientists and clinicians. In the context of increasing socio-economic burden of respiratory diseases, omega-3 polyunsaturated fatty acids (PUFA) are of great importance in nutritional immunocorrection.

The aim of the study was to analyze research data on the sources of omega-3 PUFA, their impact on human health and prospects for their application for immunocorrective nutrition in the pandemic COVID-19.

PUFAs are precursors of glycolipids, phospholipids, eicosanoids, which form a complex regulatory matrix to maintain intracellular homeostasis at the appropriate level [Xue H., Wan M., 2006]. They are an important source of energy, structural components of cell membranes, as well as regulators of gene expression that affect the metabolism of lipids, carbohydrates, proteins, cell growth and differentiation [Gula NM, Margitich VM, 2009].

A significant role in inhibiting the inflammatory process is played by eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which are present at the site of inflammation and are transformed into special mediators (resolvins, proteins, maresins) under the influence of enzymes [Basil et al., 2016; Rogero M. et al., 2020].

Omega-3 fatty acids have been shown to reduce the amount of reactive oxygen species and proinflammatory cytokines (tumor necrosis factor  $\alpha$ , -interleukin (IL) IL 1, IL 6, IL 8), reduce NF- $\kappa$ B activation, thereby preventing translocation of nuclear p65 NF- $\kappa$ B, as well as minimize the synthesis of cyclooxygenase 2. EPA and DHA help to resolve the inflammatory process and accelerate the repair of various tissues, including SARS-CoV 2-induced damage to the respiratory system [Messina G. et al., 2020; Rogero M. et al., 2020].

F.BourBour et al. (2020) believe that a balanced diet and supplements that contain "pure" nutrients may play a leading role in the prevention of COVID 19. It has been suggested that omega-3 fatty acids can reduce the severity of inflammation, correct respiratory disease, prevent development of thromboembolic complications in SARS-CoV 2 infection [Sorokin A. et al., 2020].

A number of scientists believe that optimizing the status of omega-3 fatty acids can prevent the development of infectious diseases, including COVID 19, and recommend that diet should be supplemented with EPA and DHA [Weill R. et al., 2020; Calder R. et al., 2020].

Adequate omega-3 fatty acids can be achieved by intake of certain foods (flaxseed, soybean, rapeseed oil, cold sea fish, fish oil) and / or taking dietary supplements.

Unfortunately, neither optimal doses of omega-3 fatty acids nor a required duration of their intake, which can contribute to optimal immunocorrection, are known yet. According to R. Calder et al. (2020), the ideal daily dose of omega-3 fatty acids is 250 mg, whereas M.Husson et al. (2020) recommend the use of higher doses - 500 mg / day. The minimum duration of omega-3 fatty acids, according to various authors, ranges from 2 months [Husson M. et al., 2016] to 1 year [Watson H. et al., 2020].

**Masikevych A. Yu.**

## **WAYS TO MINIMIZE AN ENVIRONMENTAL HAZARD TO THE RIVER SYSTEM OF THE POKUTSKO-BUKOVYNIAN CARPATHIANS**

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The aim of the research was to investigate the ecological condition and to develop a system of engineering measures to minimize the environmental hazard to the river system. As a benchmark for comparing the impact of anthropogenic activities on the state of mountain ecosystems, we have chosen the protected areas of the Vyzhnytskyi National Nature Park (hereinafter NNP). To prevent microbiological contamination of streams and watercourses, we used a fibrous carrier type "Via" (TU 995990), made of textured plait thread (TU 6-06-C116-87, tex 350). Earlier, a number of authors (Hvozdiak, 2003; Hvozdiak and Sapura, 2009) found that the fibrous carrier "Via" can be successfully used for the construction of "bioreactors" for surface degree of purification. Water sampling was carried out in the Cheremosh and Siret river basins, which flow into the Pokutsko-Bukovynian Carpathians and is part of the Ukrainian part of the Danube basin. Coli-index, total number of microbes count was determined by generally accepted methods in accordance with methodological guidelines (Nakaz MOZ Ukraine 284, 2007). To confirm the morphological and other properties of the culture of microorganisms used the method of microscopy with subsequent identification according to the determinant of Bergi.

An increase in the content of suspended solids in the river system of traditional economic landscapes is shown, which is accompanied by a decrease in free oxygen in water and an increase in biochemical oxygen consumption and chemical oxygen consumption and total oxidation. At the same time, the content of chlorides and nitrites (salts of hydrochloric and nitric acids) increases in water, which leads to acidification of the river system pH = 5.8 (below the norm San PiN 4360-88; Surface Water Directive EES). Based on the monitoring observations, it can be stated that there is a progressive trend of pollution of the river system in the territories of traditional economic landscapes, which are outside the protected areas and where there is active anthropogenic activity. The use of a bioreactor based on fibrous carrier "Via" for surface water treatment has shown that during the season the carrier becomes overgrown with invertebrates (so-called periphyton). Bacteria and algae also accumulate on the lashes. To reduce the inflow of discharges into the river system of waste from alcohol and food enterprises, in the absence of centralized treatment facilities in the region, a reagent method of cleaning discharges based on sodium hypochlorite was quite effective. The optimal dosage of sodium hypochlorite, which is used for wastewater treatment, is 0,45 dm<sup>3</sup>/m<sup>3</sup> of untreated wastewater. The proposed method does not require a radical restructuring of existing treatment facilities and significant material costs to create new ones using our proposed technology. Sodium hypochlorite, used as a reagent, is accumulated in large quantities at the Kaluga plant for the production of sodium metal as a waste that requires additional costs for disposal. In this situation, it can be claimed about combination of economic and environmental components of sustainable development. To reduce the pollution of the river system with waste from the forest processing cycle, we proposed the use of a modified method of obtaining fuel pellets and briquettes



using sulfate soap, the main component of which is lignin. Sulfate soap is accumulated as a waste of pulp and paper production and requires mandatory disposal. This approach allows to significantly reduce the working pressure in the equipment where the pellets are formed, and to involve in the production of low-grade wood waste. In the process of extrusion method of obtaining granules, to improve their quality, we used a lignin binder. Thus, it is proved that one of the ways to reduce the pollution of the river system with wood waste can be the creation of the production of fuel pellets and briquettes - a valuable energy product.

As a result of research, two types of environmental threats to surface waters of the region were identified: microbiological pollution of streams and watercourses and pollution of the hydrosphere by effluents of processing enterprises, which are a common industry in the study region. A number of engineering and technical solutions to increase the level of ecological safety of the mountain ecosystem are proposed.

**Popovich V.B.**

## **MICROBIOME OF THE COLON CAVITY OF THE ADULT POPULATION IN BUKOVYNA REGION**

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The colon is the main reservoir of the symbiotic human microbiota. About 60% of symbiotic microorganisms of the human body persist in the distal parts of the intestine. The colon microbiome completes the fermentation of undigested food residues, participates in the process of peristalsis, secretion of biologically active substances, food absorption and protection of the mucous membrane against pathogenic microbiota, forming its colonization resistance.

The understanding of the complexity of the polytaxonomic structure of the intestinal microbiome has greatly expanded in recent decades after the development and implementation of highly productive bacteriological, molecular and metagenomic research methods. Due to their use in 2011 by a group of scientists from the European Laboratory of Molecular Biology, the intestinal microbiome is classified into three main variants or enterotypes, which are determined by the dominant bacteria in the microbiota. Each enterotype appeared to have not only its own genus of bacteria (*Bacteroides*, *Prevotella*, *Ruminococcus*), but also differs in the ratio of individual representatives of this taxon.

Study of taxonomic composition, population level and microecological indicators of "host-microbiome" ecosystems, by the index of permanence, frequency of occurrence, Margalef indices of species richness, Whittaker species diversity, Simson, Berger-Polydaker and Parker indices of species dominance found that leading microorganisms in the Bukovynan region are bacteria of the genus *Bacteroides*, which were found in all subjects not only among healthy people, but also in patients with various diseases of the intestines and other organs.

Bacteria of the genus *Bacteroides* in all healthy people were found in a high population level (from  $8.97 \pm 0.47$  to  $9.98 \pm 0.81$  lg CFU/g), which confirms their dominant role in the microbiome in taxonomic composition, as well as the coefficient of quantitative dominance both in healthy and sick. *Bacteroides* in the intestine have a high coefficient of quantitative dominance, a coefficient of significance and one of the key taxa involved in the self-regulation of the intestinal microbiome. It should be noted that this enterotype among the inhabitants of Bukovyna region was formed due to a specific diet. The latter includes foods rich in animal fats.

**Rotar D.V.**

## **SENSITIVITY OF P. FREUDENREICHII TO SUBSTANCES FOR THE SORTING OF FABRICS IN THE TEXTILE INDUSTRY**

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The human skin is in constant direct contact with the environment, including exogenous microflora. The concentration and species composition of the skin microflora depend on the content

of sebum, humidity and acidity of the environment. The secretion of sweat glands, neutral pH and heat increase the degree of seeding by microorganisms. The most common representatives of the skin microflora are various species of the genera *Corynebacterium*, *Staphylococcus*, *Micrococcus* and *Propionibacterium*.

Sometimes the representatives of the normal microflora can be dangerous to the immunosuppressive organism or in the background of quantitative and qualitative disorders in the microbiocenosis, becoming pathogens. Thus, a representative of the normoflora of human skin *Propionibacterium* may have pathogenicity in excessive colonization in the background of disorders in the skin microbiome. A typical species of the genus *Propionibacterium* is *P. freudenreichii*.

Our skin is in constant contact with clothing, that is open areas have a more volatile microflora, and closed areas are dependent on textiles and conditions of its use. The purpose of our study is to determine the effect of substances for fabric sorting on the representative of the normal microflora of human skin *P. freudenreichii*.

The aim of the study was to determine the sensitivity of *P. freudenreichii* to substances treated with the studied flaps of different textures. The task of the study was to determine the effect of the studied flaps on the number and viability of *P. freudenreichii* and to establish the ability of the culture of *P. freudenreichii* to recover after interaction with the sample examined.

12 samples of different textile flaps were taken for the study treated with different substances to organize them. All the samples were coded. Flaps 1 cm<sup>2</sup> were cut from the fabric under aseptic conditions. The experimental study is aimed at determining the effect of substances the textile flaps are treated with on the representative of the normal microflora of the human body *P. freudenreichii*. The study is divided into two stages: the first aims to determine the impact of the studied flap on the number and viability of *P. freudenreichii*, the second - to determine the ability of the culture of *P. freudenreichii* to recover after changing the nutrient medium. *P. freudenreichii* reference strain of the microorganism is a member of the family of propionic acid bacteria. Thioglycol sterility control medium was used for its cultivation.

Thus, the experimental study found the effect of the studied flaps of fabrics treated with various substances on the number and viability of *P. freudenreichii*. The test culture was mostly affected by 10<sup>7</sup> CFU/ml 3, 5 and 9, which reduced the number of bacteria on 5 orders, with the recovery of cultures was at a minimum level - 10<sup>2</sup>-10<sup>3</sup> cells/ml, which indicates irreversible changes in the vital processes of *P. freudenreichii*. The experiment with 10<sup>8</sup> CFU/ml *P. freudenreichii* also isolated samples 3, 5 and 9, namely substances with which these samples were treated were effective even at an order of magnitude higher microbial load. The most promising was the sample 9, because it acted equally in the first and second microbial load, and significantly disturbed the vital activity of the reference culture and limited the opportunities for its recovery. The next step was to determine the toxicity of substances for textile treatment and to determine the sensitivity of other test cultures of microorganisms to the studied tissue samples. The obtained results are of practical importance in the manufacture of medical textiles and patient care products.

**Sydorchuk I.Y.**

## **TAXONOMIC COMPOSITION AND MICROBIOLOGICAL INDICATORS OF MICROBIOTA OF INFECTIOUS-INFLAMMATORY PROCESSES OF SOFT TISSUES**

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Microbiological examination was performed in III patients with infectious-inflammatory processes of the soft tissues: post-infectious abscess (32.43 %), carbuncle (16.21 %), panaritium (10.81 %), appendicular filtrates, purulent cyst and phlegmon (8.11 %), mastitis (7.21 %) and others. The test material was purulent-serous exudate of the focus, in some patients with their consent, the wall of the inflammatory focus was selected to determine the concentration of microbiota in the exudate and tissue.

From the clinical material taken from III patients, 171 strains of opportunistic bacteria belonging to 11 different taxonomic groups were isolated and identified. According to the constancy index, frequency of occurrence, Margalef species richness index, Whittaker species diversity and Simpson and Birger-Parker species dominance, the leading pathogens of infectious-inflammatory processes in modern conditions are *Staphylococcus aureus* (constancy index 68.47 % 0.6 index, diversity 14.15, species dominance of Simpson 0.467 and Berger - Parker 0.685). *Streptococcus pyogenes* (persistence index 20.72 %), *Escherichia coli* (19.82 %), and *Proteus mirabilis* (persistence index 15.32 %) are important in the formation of infectious and inflammatory processes in the soft tissues. In addition to anaerobic facultative and aerobic bacteria, obligate anaerobic bacteria (*Bacteroides fragilis*, *Peptostreptococcus prevoti*, *Prevotella melaninogenica*) are isolated in 8.10 % of patients. In 50 (45.05 %) patients the infectious-inflammatory process was formed by monoculture of *S. aureus* in 19.33 patients, *E. coli* in 13.46 %, *S. pyogenes* in 11.54 % of patients and rarely *S. epidermidis* and *P. mirabilis*. Associations consisting of two taxa were found in 61 (54.95 %) patients. The most frequent associations were *S. aureus*, *P. mirabilis* (11.54 %), *S. aureus* and *P. aeruginosa* (8.65 %), *S. aureus* and *S. pyogenes*, and *S. aureus* and *E. coli* (7 each), 69 %). *S. aureus* and *E. cloacae* (6.73 %). Infectious and inflammatory processes caused by the association of different taxa had a more severe course.

The localization of the causative agent of the infectious-inflammatory process of the soft tissues (in the exudate or in the tissue of inflammatory process) is of key importance for the development of treatment tactics. *S. aureus* and *E. coli* were found to be mainly localized in tissue ( $6.81 \pm 0.37$  lgCFU / g and  $5.31 \pm 0.41$  lgCFU / g) and to a lesser extent in exudate ( $5.27 \pm 0.47$  lgCFU / g and  $3.87 \pm 0.29$  lgCFU / g), respectively; *P. mirabilis* is localized in the soft tissues in a concentrate of 4.90 lgCFU / g, and in exudate only 3.00 lgCFU / g. *S. pyogenes* and *S. epidermidis* are found in higher concentrations in the exudate ( $6.17 \pm 0.49$  lgCFU / g and  $3.78 \pm 0.17$  lgCFU / g). However,  $4.78 \pm 0.31$  lgCFU/g and  $3.08 \pm 0.16$  lgCFU / g, respectively. In patients, the etiological agent is *S. aureus*, *E. coli* and *P. mirabilis*. It is advisable to use galvanization to deliver the antimicrobial agent to the tissue.

**Sydorchuk L.I.**

## **DESTABILIZATION OF COLONIC LUMINAL MICROBIOME IN CHRONIC OBSTRUCTIVE BRONCHITIS**

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The state of dynamic equilibrium between the organism, its microbiome and the environment, which has developed evolutionarily, and due to which the human body is at the optimal level, is called eobiosis (normobiosis). Disturbance of eobiosis, which is expressed in the development of destabilization in different biotopes and is associated with changes in the normal taxonomic composition and function of the symbiotic microbiota, means dysbiosis or dysbacteriosis. Chronic obstructive bronchitis is one of the most common inflammatory human diseases. Close anatomical location, physiological relationships, and general systemic immune responses suggest that changes in the respiratory microbiota should be associated with destabilization of the colon microbiome.

In 63 patients with chronic obstructive bronchitis by bacteriological and mycological methods the taxonomic composition and population level of the colonic microbiome were studied, its microecological indices in the "host-microbiome" ecosystem was established. The control group consisted of 20 practically healthy individuals.

Obligate anaerobic bacteria of the genus *Bifidobacterium* (in 20 (31.75 %) patients), *Propionibacterium* – (in 5 (7.94 %) were found to be the most important in the colon microbiome in patients with chronic obstructive bronchitis concerning representation and multifunctional role. Under such conditions, the colonic biotope is contaminated and colonized by pathogenic enterobacteria: enteropathogenic *E. coli* - in 5 (7.94 %) patients, enterotoxigenic *E. coli* - in 4 (6.35 %), enteroinvasive *E. coli* – in one (1.59 %) patient, *E. coli* Hly + - in 12 (19.05 %), *E. coli*

*Lac-* - in 16 (25.40 %) patients. In addition, other opportunistic enterobacteria (*P. vulgaris*, *P. mirabilis*, *K. pneumoniae*, *E. cloacea*, *C. freundii*, *S. marcescens*, *H. alvei*), obligate anaerobic anaerobic opportunistic bacteria (*Bacteroides*, *P. niger*, *Clostridium*), facultative anaerobic and aerobic bacteria (bacteria of the genus *Staphylococcus*, *Enterococcus*) and yeast-like fungi of the genus *Candida* (*C. albicans*, *C. tropicalis*) appear in the biotope.

Studies of the population level of colonic microbiome have shown specific changes in the number of microbial populations. There is a deficiency of bacteria of the genus *Bifidobacterium* by 78.89 %, bacteria of the genus *Lactobacillus* - by 22.62 %, *Propionibacterium* - by 51.10 %. Under such conditions, the population level of opportunistic bacteria increases significantly: bacteria of the genus *Clostridium* - 3.11 times, *P. niger* - 2.14 times, bacteria of the genus *Bacteroides* - by 51.10 %. Bacteria and yeast-like fungi of the genus *Candida* in the colonic microbiome of patients with chronic obstructive bronchitis reach by taxonomic composition, microecological indices (constancy index, frequency of occurrence, Margalef's index of species richness, Whittaker's diversity, species dominance of Simpson, Barger-Parker and quantitative dominance coefficients, significance and role of the taxon in the self-regulation of the colon microbiome) determined degrees of destabilization in the microbiota (dysbiosis/dysbacteriosis). Dysbiosis was found in 32 (50.79 %) patients, dysbacteriosis - in 31 (49.21 %). None of the normoflora was established in contrast to the control group. The first degree of dysbacteriosis/dysbiosis was found only in 4 (6.35 %), the second - in 6 (9.52 %), the third and fourth - 53 (84.13 %) including the fourth degree in 20 (31.75 %) patients.

Thus, the course of chronic obstructive bronchitis is accompanied by profound disorders of the colonic microbiota, which are expressed in qualitative changes in taxonomic composition and quantitative changes in population levels of individual taxon, as well as contamination and colonization of this habitat by pathogenic and opportunistic microorganisms.

**Yavorenko K.**

**IMPACT OF AMBROSIA ARTEMISIIFOLIA L. ON THE HEALTH OF CHERNIVTSI REGION RESIDENTS. COMPREHENSIVE PROGRAM OF AMBROSIA ARTEMISIIFOLIA L. ELIMINATION IN CHERNIVTSI REGION**

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*Ambrosia artemisifolia* L. is an allergen weed that is the first among the top most dangerous quarantine plants in Ukraine, which in 75 years has passed all stages of expansion: primary penetration, resettlement and subsequent naturalization.

Due to pollution of more than 70% of the landscapes of Ukraine with ragweed, the number of allergic diseases among the residents of Chernivtsi region is constantly growing. In Chernivtsi region the centers of this quarantine weed occupy the total area of 804,49 hectares. At 0.1 m<sup>2</sup>, during the flowering season, this plant produces 8 billion pollen grains, repeated inhalation of which causes allergies, accompanied by symptoms such as fever, tearing, conjunctivitis, impaired vision and pulmonary edema. Moreover, during this period, asthmatics suffer from its pollen, which exacerbates asthma attacks.

"Devil's pollen" can damage the mucous membranes so much that even a previously completely healthy person are at risks of becoming a lifelong allergy sufferer after two weeks of inhaling air in the "foci" of ragweed flowering.

According to the World Health Organization, every fifth inhabitant of the planet, including those in Ukraine, suffers from allergic diseases or has allergy symptoms. Unfortunately, there are currently no universal pharmacological drugs for the prevention and protection of human health against allergies to ragweed. Ragweed seeds are transferred with waste, straw, vehicles, animals and people, water during irrigation, showers and floods. Seed viability can be maintained for up to 40 years. The most appropriate comprehensive measure to control quarantine weeds is the disposal of this allergenic plant using agronomic, mechanical and chemical methods.

That is why the Main Department of the State Food and Consumer Service in Chernivtsi region and co-developers of the Department of agro-industrial development of the regional state administration developed a program to eliminate ragweed in Chernivtsi region for 2019-2023. The main objective of the program is to draw the attention of the population and the public to the problem of the spread of ragweed and to take comprehensive measures to eliminate it in settlements, roadsides and agricultural lands.

A chemical control method will be applied to the main part of the ragweed-covered, which will be carried out at the expense of landowners and land users. Chemical methods of ragweed control is the usage of herbicides, which are included in the List of pesticides and agrochemicals approved for usage in Ukraine. The application of herbicides should be carried out in strict accordance with the requirements of the State Sanitary Rules of Particleboard 8.8.1. Transportation, storage and use of pesticides in the national economy. Mechanical methods are weeding, manual removal or mowing. Mowing is provided with a garden petrol trimmer. If possible, it should be carried out as low as possible because with a high cut of ragweed on the surviving part of the stem is able to form lateral branches on which the generative organs are based.

Agrotechnical measures: weeding, digging or plowing the soil with crushing of plant residues; in the foci of ragweed create artificial phytocenoses from perennial or gas grasses.

To completely destroy ragweed, it is necessary to apply simultaneously and systematically for at least 5 years a set of quarantine, agronomic, mechanical, chemical and social measures aimed at making every citizen aware of the scale of the harmfulness of ragweed. Implementation of the Comprehensive Program for the elimination of ambrosia in the Chernivtsi region for 2019 - 2023 will solve the problem of neutralization of this quarantine weed.

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*Lactobacillus* 19,71%, *Propionibacterium* – 77,15%. 65,56%, *Bifidobacterium* –

**I**

(*N.gonorrhoeae*, *T.vaginalis*)

(*E.coli*, *C.albicans*, *S.aureus*, *Peptostreptococcus*)

*Lactobacillus*,

**I** - *C.albicans*,

*S.aureus*, *T. vaginalis*,

*N.gonorrhoeae*

( $6,89 \pm 0,37 \lg$  / ), *S.aureus* ( $5,43 \pm 0,19 \lg$  / ), *S.epidermidis* ( $5,58 \pm 0,12 \lg$  / ), *E.coli* ( $5,44 \pm 0,17 \lg$  / ), *C.albicans* ( $4,83, \pm 0,37 \lg$  / ).

3,00 lg / .

I

( *Lactobacillus, Bifidobacterium, Propionibacterium*)  
(*N.gonorrhoeae, T.vaginalis*),  
(*S.aureus, S.epidermidis, E.coli, C.albicans* ).

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: *S. aureus* 209, *E. coli* O 55, *S. flexneri* 1a, *P. vulgaris* 4636, *C. utilis* – 01.

( / )

	I	II	III
<i>S.aureus</i> 209	3,9	1,95	1,95
<i>E. coli</i> O 55	250	125	125
<i>S. flexneri</i> 1a	125	62,5	31,2
<i>P. vulgaris</i> 4636	62,5	125	125
<i>C. utilis</i> – 01	62,5	31,2	31,2

1,95-3,9 / , *S.aureus* 209, *C. utilis* – 01 : 31,2-62,5  
 / . : 31,2-125 / *S. flexneri* 1a 62,5-125 /  
*P. vulgaris* 4636. *E. coli* O 55.

5-

*S. aureus*,

5-

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( )

- 0,97 / 250 / ,

2548 0,97 / 62,5 / ,

2385 - 7,8 / 125 / , 2393 3061 - 7,8 / 250

/ , 2287 - 1,95 / 125 / , 3062 - 0,97 /

250 / , 2424 - 31,25 / 250 / .

15

2548,

2287 3062,

( )

38,41±8,87 /

41,73±15,93 / .

3061 2424,

100,52±22,86 / 122,92±11,60 / .

5-

*S. aureus* 198 (

17,85±4,96 / ),

*S. aureus* 182 (

142,86±29,61 / ).

5-

2548, 2287 3062,

*S. aureus* 198

( 17,85±4,96 / ).

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( ),

( , , ' ). , -9, -11

(D. Kritchevsky, 2004).

(F.B. Hu, 2001;

J.E. Chavarro, 2007; . . , 2012; . . , 2016).



2%,

8% ( 4445:2005

( - 45%, - 31%),  
1,4-5,4% ( . . . , 2004; . . . , 2008).

( - 1,8-40,6%, - 2,7-35,2%).  
( - ) , - ,

2 / ( . . . 7 / , 2006).

1%  
( . . . , 2016),

( , *Nipah henipavirus*, *Nipah virus*)

( )

- , - 2001 . . . 1998 . . .  
, 2021

*Henipavirus* (*Hendra henipavirus*),  
(*Paramyxoviridae*).  
1999 ( , , , , )

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4 , 61,3% – ( ), 20% – 1  
 , 1 , 30,7% .  
 , , -

**6- [2,1-B][1,3]**

6-

[2,1-b][1,3] 3a-h

*Trichophyton - Trichophyton interdigitale* ATCC 9533  
*Candida, Candida krusei* ATCC 6258, *Candida tropicalis* ATCC 20336.

1000 / .

96-

( ) ( )

( )  
 1,95-500 / .

6-

[2,1-b][1,3] 3a-h :

	<i>Candida krusei</i> ATCC 6258		<i>Candida tropicalis</i> ATCC 20336		<i>Trichophyton interdigitale</i> ATCC 9533	
	( / )	( / )	( / )	( / )	( / )	( / )
3a	31,25	62,5	62,5	62,5	31,25	31,25
3b	31,25	31,25	31,25	62,5	31,25	31,25
3c	31,25	62,5	62,5	62,5	31,25	62,5
3d	31,25	31,25	31,25	31,25	31,25	31,25
3e	62,5	62,5	62,5	62,5	62,5	125
3f	62,5	125	125	125	62,5	125
3g	62,5	62,5	62,5	125	62,5	125
3h	31,25	62,5	31,25	62,5	31,25	62,5

b][1,3] , 6- [2,1-  
*T. interdigitale* ATCC 9533  
 : *C. krusei* ATCC 6258 *C. tropicalis* ATCC 20336 .

31,25 / 125 / . 31,25 / 125 /  
 [2,1-b][1,3] 6-

**Babiy N.V.**

**THE IMPORTANCE OF DIAGNOSING PREECLAMPSIA AND THE DEVELOPMENT OF HEART FAILURE**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

Preeclampsia, formerly called "toxycosis" or "gestosis", is a complication of pregnancy characterized by high blood pressure and the presence of significant levels of protein in the urine. The frequency of this complication of pregnancy is about 2%. As a rule, the first signs of preeclampsia appear after the 20th week of pregnancy. One of the most significant manifestations of preeclampsia is a decrease in the intensity of blood flow from the mother to the placenta, which leads to insufficient supply of oxygen and nutrients to the fetus. This condition can be associated with serious short-term or long-term complications in both mother and baby.

The aim of the study was to analyze the contemporary data about the role of natriuretic peptide B-type at pregnancy. For this, the recent scientific publications were analyzed.

Natriuretic peptide B-type (BNP) belongs to the family of peptide hormones, similar in structure and involved in the regulation of blood volume, blood pressure (a powerful vasodilator) and water-salt balance of the body. BNP is produced by the cells of the ventricle - cardiomyocytes in the form of a precursor, proBNP, in response to overload of the heart by volume or pressure. Under the action of a specific protease, proBNP is cleaved into two fragments - a physiologically active C-terminal fragment (BNP77–108) and an N-terminal fragment (NT-proBNP). All three peptides - BNP, NT-proBNP and proBNP - are present in the bloodstream. B-type natriuretic peptides are secreted in the ventricles of the heart, directly reflecting the load on the myocardium. With the development of heart failure, the level of synthesis and secretion of BNP and NT-proBNP increases significantly and can reach 10 ng / ml in the case of BNP and several tens of ng / ml in the case of NT-proBNP. The importance of determining BNP and NT-proBNP for the diagnosis and treatment of congenital heart disease in infants and children in the first months of life is currently widely discussed.

The level of NT-proBNP in newborns with congenital heart defects is found to significantly increase compared with the control group. In neonates with congenital heart disease with concomitant low left ventricular contraction, NT-proBNP levels are significantly elevated compared with infants with congenital heart disease. Thus, elevated levels of NT-proBNP can be used to diagnose congenital heart disease in newborns. Measurement of NT-proBNP or BNP cannot replace cardiac imaging techniques (including echocardiography, angiography, and magnetic resonance imaging), but provides additional independent and very important information for assessing neonatal heart function.

Attention is now drawn to the diagnostic value of determining NT-proBNP and BNP during preeclampsia. Therefore, this issue remains open today.

**Bakun O.V.**

**ROLE OF GENITAL ENDOMETRIOSIS AND ASSOCIATED DISEASES ON INFERTILITY ACCORDING TO RETROSPECTIVE ANALYSIS OF CASE HISTORY**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

The problem of infertility is of great socio-medical importance, due to the sharp decline in birth rates in the current crisis. Despite many years of research, endometriosis remains a disease of unknown etiology. Its prevalence is constantly growing and is 15-50% of the total female population of reproductive age. A high social significance of the endometriosis problem is

We analyzed the case histories of patients diagnosed with external genital endometriosis and adenomyosis, who were treated at a medical infertility center during the period of 2017-2019.

In women with infertility associated with endometriosis, pain was found to occur in 43 patients (61.16%). The dependence of the pain syndrome on menstruation was registered (94% of cases). According to case histories, it was found that 42 women had no pregnancies in the past. They were diagnosed with Infertility I, which constituted 66.6%. According to the results of cytological examination, type II was found to predominate in 28 women (73.6%), which indicated an inflammatory process. According to repeated ultrasound data, internal genital endometriosis was not suspected, so it is not reasonable to rely on ultrasound data as an additional method of research, and this requires the use of new diagnostic methods.

Thus, modern medicine must continue to study in detail the diseases that cause infertility. Scientists should investigate the causes of infertility in order to further prevent and successfully treat them.

**Berbets A.M.**

### **CHANGES OF LEVELS OF MELATONIN, CYTOKINES AND PLACENTAL GROWTH FACTOR IN THE UMBILICAL BLOOD TAKEN FROM WOMEN WITH FETAL GROWTH RESTRICTION**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

The aim of the study was to investigate changes in melatonin, cytokines' and placental growth factor's concentrations in umbilical blood in case of presence of pathology of pregnancy and childbirth associated with placental dysfunction, manifested by fetal growth restriction.

Changes in melatonin, cytokines' and placental growth factor's (PIGF) levels in umbilical cord blood were studied in 14 mothers with placental dysfunction (PD), which was realized in the form of intrauterine growth restriction syndrome (IUGR). The diagnosis was set on the basis of ultrasound fetometry at a gestational age of 36 weeks. The control group consisted of 13 women with physiological gestation and labor. Levels of melatonin, placental growth factor and cytokines were monitored in venous umbilical cord blood, which was collected during the third period of labor immediately after birth. After the pulsation of the umbilical cord had stopped, it was cut, and blood from the placental end of the umbilical cord was taken to a Vacutainer vacuum tube.

The results of the study of melatonin's, cytokines and PIGF's levels showed that in umbilical cord blood taken during the third period of childbirth in a woman with placental dysfunction, there was a significant decrease in melatonin concentrations comparing to mothers with physiological pregnancy: 7.50 pg / ml (95% confidence interval for median 3.08 – 13.40 pg / ml) versus 14.60 pg / ml (95% confidence interval for median 9.58 – 23.79 pg / ml,  $p = 0.0101$ ). There were no significant differences between the groups in the levels of pro-inflammatory and anti-inflammatory cytokines in umbilical cord blood. Instead, we found that the concentration of PIGF in umbilical cord blood taken to the mother with PD, which manifested itself in the form of IUGR, was 1.57 times lower comparing to mothers with physiological pregnancy: 99.15 pg / ml (95% confidence interval for the median 84.38 – 153.92 pg / ml, in the control group – 155.30 pg / ml (95% confidence interval for the median 98.78 – 354.21 pg / ml,  $p < 0.05$ ).

Thus, the levels of melatonin in umbilical cord blood taken during the third period of labor from mothers whose pregnancies were complicated by IUGR were significantly lower comparing to mothers whose pregnancies had no complications. Therefore, in the blood of the fetus in the case of placental dysfunction, the level of melatonin is also reduced. The pineal gland of both the fetus and the mother does not compensate for the melatonin deficiency that occurs in case of placental dysfunction. In addition, placental growth factor is likely to decrease in umbilical cord blood, and not only in the venous blood of the mother, as we established. Although no statistically significant changes in the cytokines' concentrations were found (possibly due to the small sample size), we found that in placental dysfunction, melatonin correlates moderately with one of the major

proinflammatory cytokines: IL-1- . This suggests that melatonin acts as a moderator of the inflammatory reaction of placental tissue, which is observed in placental dysfunction.

**Byrchak I.V.**

**SEARCH FOR NEW APPROACHES TO THE TREATMENT OF PRIMARY  
PLACENTAL DYSFUNCTION IN PREGNANT WOMEN WITH A HISTORY OF  
HABITUAL MISCARRIAGE**

*Department of Obstetrics, Gynecology and Perinatology  
Bukovynian State Medical University*

The development of new treatments for primary placental dysfunction is an extremely relevant research topic in modern obstetrics, considering the role of this pathology in the structure of perinatal morbidity and mortality.

Placental dysfunction (PD) is a clinical syndrome that is associated with impaired placental function (trophic, transport, endocrine, metabolic), which, in its turn, occurs due to morpho-functional changes in the placental tissue initiated by disorders of uteroplacental endothelial perfusion. Placental dysfunction is the cause of fetal distress (distress), growth retardation, pathological conditions and diseases of the newborn. In 60% of cases, PD leads to the formation of fetal growth retardation syndrome. Perinatal mortality in women who experienced PD is 10.3% among full-term infants and 49% among premature infants.

Primary PD is known to develop in early pregnancy (14-18 weeks) under the influence of genetic, endocrine, infectious and environmental factors. Enzymatic insufficiency of decidual tissue, disturbance of structure and localization of the placenta, and defects of vascularization and disturbance of morphology of a chorion play a great role in development of primary PD. In primary PD more often fetal malformations, chromosomal abnormalities and intrauterine infection are detected.

According to the literature, the frequency of placental dysfunction in habitual miscarriage ranges from 50 to 77%. The World Health Organization treats habitual miscarriage as a "three or more consecutive miscarriages by the 20th week of gestation." ASRM experts believe that habitual miscarriage is the occurrence of two consecutive miscarriages, which in its turn increases the prevalence of pathology among married couples of a reproductive age to 5%.

Risk factors for habitual miscarriage: 1. Genetic factors. 2. Anatomical disorders. 3. Congenital anomalies. 4. Microbiological factors. 5. Endocrine factors. 6. Immunological factors. 7. Blood coagulation disorders.

Considering complicated biological processes underlying habitual miscarriage, as well as the significant heterogeneity of research published on this topic, there is widespread uncertainty concerning the optimal individual diagnosis and treatment of women with this pathological condition. Therefore, to improve the quality of care for women with a history of habitual miscarriage and primary placental dysfunction, it is necessary to find a new sound approach to treatment.

**Hresko M.D.**

**DIFFERENTIATED APPROACH TO A COMPREHENSIVE EXAMINATION AND  
MANAGEMENT OF PATIENTS WITH CLIMACTERIC SYNDROME**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

In Ukraine, the scientists dealing with menopause, try to destroy the dominant point of view of non-intervention in the natural biological process of aging and passive observation involutive processes. Clinicians do not always pay due attention to the effects of estrogen deficiency in menopause remote time, shown the development of metabolic syndrome, increased risk of cardiovascular disease, osteoporosis. Until now there was no consensus on tactics differentiated approach in the indication of hormone replacement therapy (HRT) in view of the existing systemic disorders in women.

The aim of the study was to analyze the contemporary data about the examination and management of patients in case of presence of climacteric syndrome.

There are many issues that require comprehensive study: first assessment of benefit and risk in longer HRT due to cancer, physician vigilance by the reaction of hormone target organs (endometrial, breast) in the treatment and others.

A new approach to a comprehensive examination and management of patients in menopause such as menopause management should be implemented in clinical practice - a holistic approach to the health and preservation of quality of life for women in menopause, which implies a healthy lifestyle and appropriate therapy, which should help to improve the quality of life and effectively eliminate menopausal symptoms (hot flashes, sleep disturbances, mood swings), provide a protective effect on the bone tissue, positively affect sexual function and libido, reduce the number of side effects due to low dose, and have favourable cardiovascular profile.

This change in lifestyle and hormonal therapy is the main method preventing hormone-dependent diseases and maintain a high quality of life for women in menopause.

**Kalinovska I.V.**

### **ULTRASOUND ASPECTS OF FETAL DEVELOPMENT AND EXTRAEMBRYO STRUCTURES IN PREGNANT WOMEN WITH RECURRENT MISCARRIAGE**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

Miscarriage is a serious problem in modern obstetrics, which is one of the most common causes of perinatal loss. That is why the issue of early diagnosis of this pathology occupies an important place.

The aim of the study: to establish the value of ultrasound changes in pregnant women with miscarriage in the first trimester of pregnancy as a prognostic sign. Ultrasound study of 40 pregnant women with miscarriage was made.

A retrospective analysis showed that in pregnant of the main group 82.3% of the observed phenomena were threat of interruption of pregnancy, and 52% - in previous pregnancies. In 69.1% of pregnant women in previous history there were spontaneous abortions in the period to 13 weeks, as well as 13.5% of late spontaneous abortions in the period of 22-25 weeks. In 34.5% pregnancy was associated with blood smear in the early embryonic period and partial detachment of the chorion. In 16.2% of cases pregnant women in their previous history had dead pregnancy in the term before 10 weeks. With the aim of identifying characteristics of growth and development of a fertilized egg in the first trimester of pregnancy at the time of ultrasonic research of rating agencies embryo was conducted, indicators of cardiac activity embryo and the volume retrochorial hematoma were estimated. Observations in 11 (27.5%) patients with a history of miscarriage found coccygeal-parietal size (CPS) from the expected values by 6-10 days. At repeated ultrasound scan performed after 2 weeks, in 9 (22.5%) observations there was a positive increase in embryometric parameters and their compliance with gestational age. In 3 (7.5%) pregnant women, the embryo's CPS lagged behind the gestational age by no more than 7 days. At dynamic ultrasonic control and carrying out fetometry fluctuations of biometric parameters of a fruit within normative limits for term are noted. At the same time, in 7 (17.5%) patients, a progressive decrease in the CPS of the embryo in combination with a decrease in the volume of the ovum (VO) allowed to diagnose growth retardation of the embryo, which was a clinical symptom of miscarriage. Subsequently, these observations diagnosed various complications of the gestation process: undeveloped pregnancy - 4 (10.0%) and miscarriage within 10 weeks - 3 (7.5%). Of the 40 pregnant women, 9 (22.5%) had an embryo CPS lag of more than 2 weeks of gestation during the first ultrasound examination. It should be noted that in 4 observational data with CPS of the embryo less than 18 mm, all pregnancies ended in miscarriage. At the same time at CPS more than 18 mm in any supervision (5) there was no involuntary termination of pregnancy. It should be noted that the delay of embryometric parameters (CPS) was diagnosed in the presence of the threat of abortion. At the same time, there was a clear tendency to improve the growth of embryometric parameters after the

relief of symptoms of miscarriage. Thus, according to the obtained result, the values of the CPS of the embryo are the most informative for the prediction of the course and outcome of the gestational process in the first trimester of pregnancy. When assessing the heart rate of the embryo in the group of pregnant women with habitual pregnancy loss in most cases (70%), the dynamics of changes in heart rate (HR) of the embryo corresponded to the parameters of physiological pregnancy. Thus, the heart rate of the embryo gradually increased from 6 weeks of gestation ( $107 \pm 12$  beats / min) to 9-10 weeks ( $176 \pm 11$  beats / min), then to 12 weeks decreased to  $159 \pm 6$  beats / min. The highest heart rate (180 beats / min;  $p < 0.05$ ) was also observed at 9 weeks of pregnancy. However, in 3 (5.71%) cases with CPS of the embryo of 14 mm and more (14-26 mm) no cardiac activity of the embryo was registered, which allowed to diagnose a non-developing pregnancy.

The ultrasound picture in pregnant women with miscarriage in the first trimester of pregnancy is an important prognostic sign.

**Lisova K.M.**

## **NEW GESTOSIS PREVENTION METHODS IN PREGNANT WOMEN WITH MISCARRIAGE**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

Late gestosis is one of the most common complications of pregnancy and is accompanied by significant hemodynamic and metabolic disorders, which are largely determined by changes in renal function and water-salt homeostasis.

Aim of study: to study pathogenesis and development of new methods of corrective therapy for late toxicosis of pregnant women is the most important task of modern obstetrics. The study of the kidneys function, water and mineral balance in pregnant depending on the form of late toxicosis and those transformations was conducted. 377 pregnant women with late toxic goat aged 18 to 48 years were examined, of which 221 were first-born and 156 were reborn. All pregnant women, depending on the lane Eden therapy were divided into two groups: the control included 161 pregnant women, who treated according to the classical scheme, the main group - 216 pregnant women, among whom was applicable anomalies targeted to corrective therapy in 153, and maintenance in 63.

A study of these indicators was also conducted in 40 healthy non-pregnant women and 48 pregnant women. All women underwent a general clinical examination, the dynamics of the level of electrolytes and trace elements in plasma and erythrocytes of blood and urine was determined. The content of natriuretic factor was expressed in conventional units, which were calculated by the change in sodium excretion (in  $\mu$  / mol / h) in test rats after administration of appropriate amounts of blood plasma of the examined women. The results of our studies indicate a profound disorder of renal function, water-mineral balance and acid-base balance in severe forms of late toxicosis of pregnant women and dictate the need for targeted correction of these disorders. It was also found that after the main course of effective therapy remained reduced until discharge from the hospital glomerular filtration in the kidneys ( $84.84 \pm 3.34$  ml / min), their excretion of sodium and potassium (respectively  $101.6 \pm 5.11$  and  $64, 13 \pm 1.78$  mmol / s) and increased excretion of calcium and magnesium ( $6.45 \pm 0.08$  and  $4.38 \pm 0.21$  mmol / s, respectively). Osmotic pressure of urine, as well as total blood protein ( $57.2 \pm 1.8$  g / l) and disturbed - the ratio of protein fractions in the direction of coarse (albumin-globulin ratio  $-0.9 \pm 0.04$ ) remained underestimated. The above material convincingly shows that the reversibility of clinical, functional and biochemical changes under the influence of treatment is not the same and in clinical recovery the function of some organs and metabolic processes are not normalized and clearly indicate trace pathogenetic disorders that require constant monitoring and continuation of therapy.

The consequence of underestimation of these data is recurrence of toxicosis, and in more severe forms. Thus, in the control group they were observed in 23.4% discharged after recovery from the hospital. These facts made it possible to review existing regulations on the management of patients with toxicosis and to outline treatment measures for early and more complete regression of



late toxicosis and clinical recovery of pregnant women. The use of targeted and corrective and supportive treatment of late toxicosis of pregnant women is not only justified but also necessary. Naturally, the proposed principles of treatment and rehabilitation measures do not solve this problem, but attempts to accelerate the regression of toxicosis, prevent recurrence and achieve more complete rehabilitation of impaired functions during pregnancy seem appropriate to us. It is in this that we see the reserves for a possible improvement at the end of pregnancy and childbirth for mother and fetus.

**Marynychyna I.M.**

## **PLACENTAL MORPHOMETRIC INDICES IN WOMAN WITH PLACENTAL DYSFUNCTION**

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Placental dysfunction (PD) is a key problem of obstetrics, neonatology and pathological anatomy, diseases of ante- and perinatal period, since functional failure of this organ leads to threatening miscarriage, fetal growth and developmental retardation (FGDR) or its death.

A morphometric study of placentas from 30 lying-in women, who had the background of placental dysfunction (study group) and 25 lying-in women with physiological pregnancy (control group) in gestation period of 36-40 weeks was carried out. Methodical recommendations on placental morphometry methods, introduced by A.P. Milovanov and A.I. Brusylovsky, were used in the study.

Having assessed the form of placentas, we found out that in women with placental dysfunctional complications the placentas were round in shape in 7 (28%) cases, whereas in women with physiological pregnancy this morphological parameter was observed in 19 (63.3%). 18 (72%) placentas in the main group were oval; it's twice higher than the same parameter in control group – 11 (36.7%).

Studying the umbilical attachment variations we researched that in women with placental dysfunction central attachment occurred only in 8 (32%) lying-in women, and in women with physiological pregnancy course it was noted in 18 (60%). Lateral umbilical cord attachment was observed in 13 (52%) pregnant of the main group, but in physiological pregnancy only 10 (33,3%) pregnant had this variation of umbilical attachment. The marginal attachment rate is rather high in women with PD in comparison with the control group – 4 (16%) to 2 (6.8%). According to the literature data, such umbilical cord attachment anomalies are accompanied by dysplastic changes of bloodstream and restriction of compensatory-adaptive reactions of the placenta.

An average weight of the placenta in patients with placental dysfunction was  $388.58 \pm 12.4$ , in the control group –  $492.8 \pm 24.4\%$  ( $p < 0.05$ ). Difference between an average weight indices and gestation norm probably may occur due to the fact that the effective implementation of the placenta compensatory-adaptive reactions is possible only with adequate functioning of the utero-placental vessels. An average area of the placenta in the lying-in women of the main group was  $241.21 \pm 5.16$  cm, in the control group –  $234.8 \pm 5.2$  cm. The tendency of the placentas to become thinner was also observed –  $1.77 \pm 0.2$  cm and  $1.9 \pm 0.4$  cm. Macroscopically the afterbirth flattening and thinning was observed in this pathology.

Placental-fetal index (PFI) in the main group was  $0,138 \pm 0,003$ , and in the control group  $0.159 \pm 0.009$ , that indicates a reduction in the volume of placental tissue per weight unit of a newborn with the placental dysfunction. External examination of placentas of the main group of patients showed the isolated bleeding centers on the maternal surface, frequent calcifications, deep cotyledon divisions.

The analysis of placentas morphometric peculiarities showed that in women with placental dysfunction placentas differ in shape, among which oval is dominant. The eccentric umbilical cord attachment is more frequent; flattening and thinning of the afterbirth occurs, it indicates reduction of weight, size and thickness of the placenta.

**Nitsovyh I.R.**  
**INTRAUTERINE INFECTION OF THE FETUS AT DIFFERENT STAGES OF  
PREGNANCY**

*Department of Obstetrics and Gynecology  
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Intrauterine infection of the fetus is one of the most important problems in obstetrics, because, in the absence of adequate diagnosis and treatment, there is a complicated course of pregnancy, childbirth, the postpartum period. The spread of intrauterine infection of the fetus is facilitated by polyetiology, the lack of a relationship between the clinical manifestations of infection in the mother and the degree of fetal damage, the multifaceted effect of the infectious agent on the fetus, although there are a number of patterns. In the development of the infectious process in the fetus there are important types of pathogen, its virulence, ways of infection from mother to fetus, protective reserves of the mother and the ability of the fetus to respond immune, which complicates the diagnosis, treatment, prognosis.

The purpose of the work was to establish the relationship between the term of pregnancy and the presence of the pathogen that causes the pathological process. The course of 70 pregnancies was analyzed: the main group - 50 pregnant women with intrauterine infection of the fetus, the control group - 20 healthy pregnant women. Methods used - clinical, microbiological, bacteriological, serological, statistical, ultrasound of the fetus.

The main group of pregnant women is divided into two subgroups - the first at 18-24 weeks (25 pregnant women), the second subgroup at 28-34 weeks (25 pregnant women). In pregnant women of the control group lactobacilli and in 10% yeast-like fungi of the genus *Candida* were found in discharge from the vagina and cervical canal. Statistical analysis of changes in vaginal microcytosis in two subgroups of the main group was performed. There was a significant difference ( $p < 0,05$ ) of gram-negative diplococci, morphologically similar to gonococcus (36%), *Streptococcus agalactiae* (20%) in the third trimester.

*Ureaplasma urealyticum* (32%), *Chlamidia trachomatis* (36%) show their aggression in the second trimester (first subgroup), as no microorganisms were detected in the second subgroup. *Trichomonas vaginalis* (28% in the first subgroup, 36% in the second subgroup) and *Mycoplasma hominis* (28% in the first subgroup, 20% in the second subgroup) are equally aggressive. *Herpes simplex* (Ig G) and *Cytomegalovirus* (CMV) (Ig G) were detected in 16% in acceptable quantities, so they cannot be considered the cause of complicated pregnancy in this period.

Thus, intrauterine infection is caused by both pathogenic and opportunistic microflora. In the second trimester of pregnancy there is a tendency of intrauterine infection with opportunistic pathogens, while in the third trimester - pathogenic microflora. The greatest danger is Gram-negative diplococci, morphologically similar to gonococcus (34%), *Trichomonas vaginalis* (32%), *Chlamidia trachomatis* (36%).

**Pecheriaha S.V.**  
**RESULTS OF PREVENTION OF PLACENTAL DYSFUNCTION WITH LOW  
PLACENTATION**

*Department of Obstetrics, Gynecology and Perinatology  
Bukovinian State Medical University*

Factors that negatively affect maternal and perinatal mortality include abnormal chorionic position, including low-lying placentation. With low placentation, the thin wall of the lower segment of the uterus does not provide the necessary conditions for sufficient vascularization of the placental place, gestational adjustment of the myometrial segments of the spiral arteries, resulting in decrease of the arterial blood supply to the placenta and fetus. This leads to limited gas exchange and metabolism in the fetoplacental complex, disturbance of placental maturation, reduced synthesis and imbalance of placental hormones. These changes reduce the compensatory-adaptive capabilities of the mother-placenta-fetus system, promote the development of primary placental dysfunction, and slow down the growth and development of the fetus, causing a complicated course

of pregnancy and childbirth. Although there are significant achievements in the prevention and treatment of placental dysfunction, this issue continues to be relevant and continues to be one of the most important in modern obstetrics.

Objective is to evaluate the effectiveness of the developed method to prevent pregnancy complications with low placentation from early gestation. 119 pregnant women with low placentation were examined. The diagnosis was made at 6-7 weeks of gestation on the basis of echographic examination. The main group consisted of 64 pregnant women with low chorionic location who underwent prevention against pregnancy complications in early gestation by the complex of medicines developed by us and a control group -55 women with low placentation who had not undergone complications prophylaxis during early gestational periods. The prophylactic complex included Luteina, ginkgo biloba extract, folio and biolectra. To assess the effectiveness of the therapy in the study groups, we analyzed the course of pregnancy in early and late gestation, as well as complications of pregnancy and delivery.

The frequency of pregnancy pathologies in the main group, where pregnancy complications from early gestation with low placentation were prevented, was significantly lower than in the control group. According to the study, the risk of abortion with bleeding and without bleeding in the first and second trimesters significantly decreased in the main group of pregnant women ( $p<0.05$ ). In the third trimester of gestation in the group where the prevention of pregnancy complications was significantly reduced, the incidence of preterm birth, premature detachment of the low-lying placenta, fetoplacental dysfunction, fetal developmental retardation syndrome and fetal distress during pregnancy ( $p<0.05$ ) were lower. The percentage of premature births and births by means of cesarean section in the main group were lower as well.

The place of attachment of the placenta in the uterine cavity is closely related to its function, the development of placental dysfunction, pregnancy and delivery. Studies have shown the effectiveness of our proposed comprehensive drug prevention of complications of pregnancy with low placentation, which in its turn has led to improved pregnancy and delivery and has become an effective means of preventing placental dysfunction.

**Semenyak A.V.**

## **PECULIARITIES OF PREGNANCY IN THE PRESENCE OF OPPORTUNISTIC MICROFLORA**

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Intrauterine infection of the fetus ranges from 6-70%, with fecal streptococcus, epidermal staphylococcus, mycoplasmosis, ureaplasmosis, bacterial vaginosis, gonorrhea, chlamydia, candidiasis, trichomoniasis can lead to infection of the fetus. Penetration through the placenta is possible for rickettsiae, toxoplasma, viruses, minor penetration in gonorrhea, chlamydia and trichomoniasis, but this is not an obstacle to placental abruption or the development of changes caused by the presence of inflammation (shortening of the cervix, premature birth). There are situations when it is not the presence of the infectious agent itself, but the consequences of the invasion of microorganisms - congenital malformations, placental dysfunction, fetal growth retardation, placental dysfunction, accompanied by a decrease in all indicators of fetal biophysical profile, increased frequency of preterm birth, implantation and placentation, the presence of blood secretions.

The aim of study: to identify the features of pregnancy in the presence of opportunistic pathogens. Analysis of the course of pregnancy at 18-24 weeks (70 cases): the main group - 50 pregnant women with the presence of opportunistic pathogens in the vaginal discharge and cervical canal, the control group - 20 pregnant women with vaginal normocinosis. Methods used - clinical, microbiological, bacteriological, serological, ultrasound of the fetus.

In pregnant women of the main group, a complicated course of pregnancy is observed in 42%. Clinical signs of inflammatory process in the vagina, increased number of leukocytes in smears were observed in 24 pregnant women (48%), in the rest - the number of leukocytes in

smears of vaginal discharge did not exceed 20 in the field of view. Pregnant women did not complain of an inflammatory process in the female genitals, however, they noted the presence of periodic vaginal discharge before pregnancy, which disappeared on their own a few days or after local treatment. Microorganisms such as *Trichomonas vaginalis*, *Gardnerella vaginalis*, intracellular microorganisms and *Faecal enterococci* may be present in the female genitalia without clinical manifestations, indicating the need for screening.

The main group revealed various manifestations of intrauterine infection of the fetus: polyhydramnios (24%), changes in the structure of the placenta (82%), enlargement of the pelvic system of the kidneys (52%), intestinal hyperechogenicity (60%), hepatomegaly (4%), and progressive shortening of the cervix by 30%, which can be regarded as a termination of pregnancy.

Thus, it is established that in pregnant women, in the presence of opportunistic pathogenic microflora, complicated pregnancy is observed in 42%. Clinical signs of inflammatory process in the vagina, increased number of leukocytes in smears, is observed in 24 pregnant women (48%). The absence of clinical manifestations indicates the need for screening bacteriological examinations. Progressive shortening of the cervix in 30% in the presence of opportunistic pathogens requires screening transvaginal cervicometry at 18-20 weeks of pregnancy. The main manifestations of intrauterine infection in the presence of opportunistic pathogens are polyhydramnios (24%), changes in the structure of the placenta (82%), enlargement of the pelvic system of the kidneys (52%), hyperechogenicity of the intestine (60%).

**Solovei V. .**

## **THE STRUCTURE OF SOMATIC PATHOLOGY IN WOMEN WITH MISCARRIAGE THREAT AT EARLY TERMS OF GESTATION**

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The issue of reproductive loss in modern obstetrics is on one of the leading places. According to literary data miscarriage rate at early periods of gestation reaches 75-80%.

Objective of the study was to conduct clinical-statistical analysis of the somatic pathology structure in women with miscarriage threat at early terms of gestation.

According to the purpose and tasks of the research the clinical-statistical analysis of 30 individual medical cases of pregnant women with miscarriage threat up to 12 weeks of gestation (the main group) were studied. The control group included 15 women with physiological pregnancy registered at the antenatal maternity consulting clinic of the Municipal Maternity Home 2 in Chernivtsi. Including criteria were: age of 18-40 years, the signs of miscarriage threat at early terms, and unigeminal pregnancy. Exclusive criteria were: developmental defects of the female reproductive organs, congenital fetal defects found, pregnancy due to accessory reproductive technology, multiple pregnancy, and severe extragenital pathology. Analysis of the places of residence in the groups of the research showed that 21 (70 %) pregnant women from the main group were urban residents, 9 (30%) women were rural respectively. In the control group 12 (80%) pregnant women were urban residents and 3 (20%) ( $<0.05$ ) were rural ones. An average age in the main group was  $30.16 \pm 5.27$ , and in the control group –  $27.8 \pm 3.1$  years ( $<0.05$ ). Analysis of extragenital pathology in women from the main and control groups found the following diseases: cardiovascular – 28 (93%) in the main group, and 6 (40%) in the control group, respiratory – 2 (6.6%) in the main group, and none in the control group, digestive – 3 (10%) in the main group, and 1 – (6.6%) in the control group, endocrine – 9 (30%) against 2 – (13.3%) respectively, diseases of blood and hematopoietic organs 15 (50%) against – 4 (26.6%), skin diseases – 1 (3.33%) in the main group and 1(6.6%) in the control group, kidney and urinary diseases – 25 (83.33%) against 8 – (53.33%) respectively. Diseases of the cardiovascular system are on the top in the structure of extragenital pathology among pregnant women with miscarriage threat at early terms of gestation both in the main and control groups: 93% in the main group and 40% in the control one. Therefore, this index in the main group was 2.25 times statistically reliably higher concerning the control

group ( $p < 0.05$ ). Diseases of the kidneys and urinary tract are on the second place in both groups (83.33% in the main group and 53.33% in the control one); and in the main group this index was 1.56 times higher than that of the control group ( $p < 0.05$ ). The third position in the rate of extragenital pathology belonged to diseases of the blood and hematopoietic organs in both groups: 50 % in the main group and 26.6% in the control one. This index in the main group was 1.87 times higher than that of the control ( $p < 0.05$ ). Diseases of the endocrine system were distributed in both groups in the following way: 30% in the main group and 13.3% in the control one, which is 2.25 times statistically higher ( $p < 0.05$ ). Other diseases (including respiratory, digestive and skin diseases) in the structure of extragenital pathology among pregnant women with miscarriage threat at early stages did not differ statistically in the groups of comparison.

Therefore, the main diseases in the structure of extragenital pathology both among pregnant women with miscarriage threat at early terms of gestation and in the control group are: diseases of the cardiovascular system, kidneys and urinary tract, blood and hematopoietic organs, endocrine system. The rate of these diseases in the main group was statistically higher than that of the control group ( $p < 0.05$ ).

**Tsysar Yu.V.**

## **MENSTRUAL IRREGULARITIES IN THE BACKGROUND OF SOME ENDOCRINE PATHOLOGY**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

Pubertal uterine bleeding is one of the leading disorders of menstrual function during the formation of the menstrual cycle in girls of pubertal age. Therefore, studies of the hemostasis system in adolescent girls in combination with the determination of hormonal status are not only medical but also of great social importance.

The aim of the study: to investigate the effectiveness of non-hormonal therapy in the treatment of uterine bleeding in adolescent girls in the background of concomitant pathology of the thyroid gland. We examined 57 adolescent girls, who were divided into two groups: Group I (main) - 30 adolescent girls with menstrual disorders in the background of concomitant thyroid pathology, who were treated in the gynecological department of the Municipal clinical maternity hospital 1 Chernivtsi, and 27 practically healthy teenage girls (control group).

All adolescent girls diagnosed with pubertal menorrhagia, regardless of concomitant pathology, as well as patients with thyroid pathology were treated in the gynecological department of Chernivtsi according to the standard scheme, which is generally accepted in accordance with the developed clinical protocol treatment of uterine bleeding, approved by the Order of the Ministry of Health of Ukraine from 15.12.2003, 582, which included: oxytocin 5 IU - 1 ml every 8 hours, sodium etamsylate 2% - 2 ml every 6 hours, vikasol 1% - 1 ml every 6- 8 years, askorutin 1-2 tablets. All adolescent girls were consulted by an endocrinologist. Girls of pubertal age with existing thyroid pathology were observed at the dispensary register with an endocrinologist and received iodine preparation - potassium iodide at 100-200 mg / day.

The complex method of treatment, which we proposed, included a conventional method of treatment, in the form of: uterotonic drug, namely a tool that increases the tone and contractile activity of the myometrium, a derivative of the natural alkaloid of ergot (ergometrine) - methylergometrine in / 1.0 ml twice day, a drug that strengthens the vascular wall - askorutin 1-2 tablets. 3 times a day, antianemic iron-containing drug maltofer - a complex of iron hydroxide with poly maltose 1-2 chewable tablets once a day (depending on the level of Hb, starting therapy at a level of Hb below 119 g/l); hemostatic drugs proteolysis inhibitor - tranexamic acid 10-15 mg/kg every 6-8 hours and vikasol 1% - 1 ml every 6-8 hours and homeopathic medicine "Dysmenorm".

We found a positive dynamics of the clinical course of the disease from objective data in both groups where a comprehensive method of treatment was proposed, namely: disappearance or reduction of major complaints, improvement of general condition and well-being in patients of group I from day 2, significant reduction bloody discharge and reduction of symptoms of anemia

(fatigue, dizziness and vertigo), which was confirmed in the laboratory on the 3-4th day (stabilization of hemoglobin). The volume of blood loss with the applied complex method was reduced by half on the 2-3rd day (from 120 ml to 60 ml), in contrast to the standard method of treatment, where on the 2-3rd day the volume of blood loss was 100-80 ml, and only on the 5-6th day reached 60-70 ml.

Therefore, it is established that the comprehensive treatment developed and implemented in practical medicine is more effective and can be recommended for widespread use in the treatment of girls with pubertal menorrhagia with concomitant thyroid pathology. Clinical studies indicate that we used a comprehensive method of treatment in adolescent girls with pubertal menorrhagia with concomitant thyroid pathology contributes to the gradual normalization of serum sex and thyroid hormones, reduces the duration of treatment in the hospital, contributes to the normalization of the maternal profile with concomitant pathology of the thyroid gland.

**Voloshynovych N.S.**

**ASSESSMENT OF THE OBSTETRIC COMPLICATIONS RISKS AS A RESULT OF SURGICAL TREATMENT OF OVARIES IN ANAMNESIS**

*Department of Obstetrics and Gynecology*

*Bukovinian State Medical University*

Ovarian surgery is the most common of all gynecological surgeries. Undoubtedly, the consequences of surgical treatment affect the further performance of ovarian function in patients of reproductive age. A balanced approach to the choice of surgical technique, its feasibility, as well as rehabilitation measures are favorable factors for maintaining the reproductive potential of patients in their future.

The aim of study was to study the effects of surgery ovarian interventions in the pre-pregnancy period for reproductive health and gestational complications in women. Individual case histories of 250 pregnant women, including birth histories for the period from 2019 to 2021, were studied. The medical documentation was selected by the continuous sampling method and consists of 50 women with a polycystic ovary syndrome (PCOS) (25 - after surgery and 25 - after conservative therapy); 100 patients treated for ovarian apoplexy (60 - after surgery and 40 - after conservative treatment); 100 women with benign ovarian tumors (50 patients after surgery and 50 women after conservative treatment).

The most common obstetric complications in pregnant women with ovarian pathology in a history were such as the threat of abortion, placental disorders, preeclampsia, anemia and premature birth. Analysis of gestational indicators in women after surgical and/or conservative treatment of the ovaries, showed the presence of several significant differences in a sample of patients with benign ovarian tumors. Thus, during pregnancy after medical treatment, in the case of conservative therapy, three times or more often there was a risk of early abortion.

The threat of late abortion is recorded in every third, and the threat of premature birth and preeclampsia – in every fourth patient with operated on for benign tumors of ovaries in anamnesis. In addition, placental abnormalities were three times more common in the sample in women after surgery than after conservative therapy ( $p < 0.005$ ). In pregnant women after a surgical approach to treatment, compared with patients after conservative therapy of benign tumors of ovaries, the syndrome of intrauterine growth retardation of fetus was recorded five times more often.

As a result of the analysis of pregnancy in patients with ovarian pathology in the anamnesis, only in the group of women after surgery, in contrast to the cases of conservative treatment of benign ovarian tumors, there is a significant risk of obstetric complications.

**Yuzko V.O.**

**COMPARATIVE CHARACTERISTICS OF PATIENTS WITH INFERTILITY WHEN  
APPLYING MELATONIN IN COMPLEX PREPARATION FOR ASSISTED  
REPRODUCTIVE PROGRAMS**

*Department of Obstetrics and Gynecology  
Bukovinian State Medical University*

Objective of the study was to conduct a retrospective comparative characterization of patients with infertility who took or did not take melatonin with assisted reproductive technologies (ART). 89 women were examined. The first (control) group included 13 healthy women oocyte donors who got pregnant on their own and gave birth to their own healthy children, the second group - 33 patients with infertility, who took 3 mg of the preparation "Vita-melatonin" produced by "Kyiv Vitamin Plant" at the same time before bedtime, two weeks before and during ovulation stimulation, the third group - 43 patients with infertility who did not take melatonin preparation before and during ovulation stimulation. There were no women who worked night shifts among the patients. Medical documentation of women of the control group and those with infertility, data of gynecological, ultrasound examination, hormones blood were analyzed. Ultrasound examination of the pelvic organs was performed on all patients with the device "Mindray DC-80 X-Insight", and measurements were performed using a transvaginal sensor. The thickness and structure of the endometrium were evaluated, and the number of antral follicles (NAF) ranging in size from 2 to 10 mm was counted in each ovary. All patients were tested for serum levels of antimullerian hormone (AMG), follicle-stimulating hormone (FSH), luteinizing hormone (LH), estradiol (E2), prolactin (PRL), progesterone (P), thyroid-stimulating hormone (TSH), triiodothyronine (T4).

An average age of women in the first (control) group was  $27.08 \pm 12.38$  years, the second (taking melatonin) -  $33.12 \pm 8.18$  years, the third (not taking melatonin) -  $30.95 \pm 7.07$  years ( $p > 0.05$ ), i. e. the age of the patients of the examined groups was equal. It should be noted that in the examined patients of both groups, the occurrence of primary infertility exceeded the secondary infertility 2.7 times in the second group ( $p = 0.05$ ) and 1.7 times in the third ( $p = 0.05$ ).

Infertility factors such as reduced ovarian reserve, habitual miscarriage and infertility of unknown origin were more common in patients of the second group, and endometriosis, tubal factor and male factor in the third, although the difference was not significant. The available extragenital pathology did not differ in the patients of the examined groups. The number of antral follicles was significantly higher in both ovaries of women in the control group compared with patients of the second and third groups. While the thickness of the endometrium did not differ significantly in groups, although in women of the control group it was slightly less.

Regarding the study of hormonal status, it should be noted that we did not find a significant difference in the levels of hormones in blood of the women we examined. Exceptionally, there was a significant difference ( $p < 0.001$ ) in progesterone content between the second ( $0.62 \pm 0.052$  nmol/l) and third ( $181.63 \pm 13.87$  nmol/l) groups. The patients of the third group had significantly ( $p < 0.05$ ) higher levels of FSH in blood ( $8.25 \pm 0.63$  mUn/ml) compared with the control group ( $4.93 \pm 0.69$  mUn/ml).

Thus, the examined women in the control group, as well as infertility patients who received melatonin two weeks before the expected menstruation and during ovulation stimulation, and infertility patients who did not receive this preparation in similar programs, did not differ in age, occurrence of primary and secondary infertility, the factor that led to infertility, concomitant extragenital pathology, ovarian reserve and hormone levels of the reproductive panel. That is, they were equal in our study.

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**Filipets O.O.**

**THE TRENDS OF STROKE INCIDENCE IN CHERNIVTSI: ANALYSIS OF  
EPIDEMIOLOGICAL DATA FOR A TEN-YEAR PERIOD AND ASSESSMENT OF  
STATISTICAL CALCULATION**

*S. M. Savenko Department of Nervous Diseases, Psychiatry and Medical Psychology  
Bukovinian State Medical University*

Cerebral stroke is a great medical, social and economic burden for every country. Every year up to 130 000 stroke cases are registered in Ukraine. Stroke incidence rates are among the highest in the European region and more than 1/3 of stroke patients are under 60 years of age. Stroke mortality rates are also dramatically high and they exceed the rates of some European countries more than two-fold. An important indicator of stroke care, a 30-day case fatality is more than 30%. Inadequate medical care leads to high disability of patients, thus, 40% of stroke survivors remain with severe disability and only 20% return to work.

High incidence of stroke in our country is influenced by several factors such as an increasing demographic crisis, poor control of risk factors, and low awareness of the population about stroke risk. High level of stroke mortality in Ukraine is explained by the difficulties in the health care system, which are delayed in medical care and insufficient medical resources.

Assessment of stroke incidence among the urban population of Chernivtsi for a 10-year period. Another goal was to analyze the existing system of statistical calculation of stroke and to identify the current needs for its improvement.

We conducted a retrospective epidemiological study of stroke incidence in 2009-2018 in Chernivtsi with the population about 240 000 people. We analyzed annual reports of two municipal hospitals providing acute stroke care. We also studied the documentation from five municipal outpatient clinics, as well as the official reports of the Ministry of Health and State Statistics Service of Ukraine.

In total, 4060 people in the selected population experienced first-ever or recurrent strokes over a 10-year period. 52% of patients were women, their mean age was 69 years vs. 66 years in men. Ischemic strokes comprised 77%, while hemorrhagic – 23% of all cases. This differentiation was made only in 52% of cases when CT or MRI results were available. The remaining 48% had undefined type of stroke. The rate of patients who underwent neuroimaging was unacceptably low in 2009 – less than 40%, then it notably increased by 2018. Hospital admission rates in acute period of stroke were relatively high – 87-89%.

The incidence of total stroke during the studied period almost 12% decreased. It showed non-significant downward linear trend because of fluctuations of incidence within the study interval. Annual stroke incidence in Chernivtsi was 1.5 lower than the official rates for total population of Ukraine. The most significant changes were seen in 2014 when the incidence in the region increased by 9%. The same was noticed in some other regions for this year. At the same time the total stroke incidence in Ukraine decreased by 11%. This discrepancy is possibly related to the loss of statistical data from the temporarily occupied territories in east and south of the country.

Evaluation of epidemiological data found some limitations in the system of statistical calculation. They were lack of registration of first-ever stroke cases, which is not included in routine statistical monitoring. And it is the number of incident strokes that is valuable for identifying high-risk populations and planning preventive interventions. Epidemiological data are not structured by age and sex that precludes standardization and international comparisons. Definition of stroke subtype was largely based on clinical presentation due to low availability of neuroimaging.

The state programs for the primary prevention of stroke should be based on real epidemiological indicators in each specific region of Ukraine, and they have to become a priority in

decreasing stroke burden. Routine collection of epidemiological data should be expanded to approach the international standards for stroke statistics, including the registration of first-ever strokes, subtypes of stroke and age-sex structure of incidence and mortality.

**Grinko N.V.**

### **COMMUNITY-BASED PARTICIPATORY RESEARCH METHODS**

*S. M. Savenko Department of Nervous Diseases, Psychiatry and Medical Psychology  
Bukovinian State Medical University*

Community-based participatory research (CBPR) has emerged in the last decades as a transformative research paradigm that bridges the gap between science and practice through community engagement and social action to increase health equity.

CBPR expands the potential for the sciences to develop, implement and disseminate effective interventions across diverse communities through strategies to redress power imbalances; facilitate mutual benefit among community and academic partners; and promote reciprocal knowledge translation, incorporating community theories into the research.

Research strategies which emphasize participation are increasingly used in health research. Breaking the linear mould of conventional research, participatory research focuses on a process of sequential reflection and action, earned out with and by local people rather than on them. Local knowledge and perspectives are not only acknowledged but form the basis for research and planning. Many of the methods used in participatory research are drawn from mainstream disciplines and conventional research itself involves varying degrees of participation. The key difference between participatory, and conventional methodologies lies in the location of power in the research process. We review some of the participatory methodologies which are currently being popularized in health research, focusing on the issue of control over the research process. Participatory research raises personal, professional and political challenges which go beyond the bounds of the production of information.

"Participation" is rapidly becoming a catch-all concept, even a cliché. 'Participatory' research methods can be used not only to enable local people to seek their own solutions according to their priorities, but also to secure funding, to co-opt local people into the agendas of others or to justify short-cut research within a top-down process. Conceptual blurring around the terms 'participatory', 'participation' and 'participant' creates a space for a range of applications, as well as for confusion.

Frameworks for assessing the extent, level and scope of participation in research projects offer a series of continua along which applications can be placed.

Biggs, writing in the field of agriculture, distinguishes four modes of participation: contractual (people are contracted into the projects of researchers to take part in their enquiries or experiments); consultative (people are asked for their opinions and consulted by researchers before interventions are made); collaborative - researchers and local people work together on projects designed, initiated and managed by researchers); collegiate (researchers and local people work together as colleagues with different skills to offer, in a process of mutual learning where local people have control over the process).

One of the characteristics of participatory approaches lies in innovative adaptations of methods drawn from conventional research and their use in new contexts, in new ways, often by as well as with, local people.

**Herasymiuk I.G.**

### **OMORBIDITY OF RECURRENT DEPRESSIVE DISORDER AND CHRONIC SOMATIC PATHOLOGY**

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Currently, depressive disorders are a serious health problem. Depressive disorders are present in the population in 3.2% of patients without concomitant somatic diseases and from 9.3% to 23.0% in patients with chronic diseases. It is the fourth leading cause of disability worldwide and



is likely to become the second leading cause of disability after cardiovascular disease over the next decade.

Significant frequency of comorbidity of mental and somatic disorders, its severe individual and social consequences, the impact of somatic pathology on the course of mental disorders determine the relevance of their timely detection and effective correction.

In our work, we focused on trying to assess the prevalence of comorbid somatic pathology, as well as its impact on satisfaction with its functioning of patients with recurrent depressive disorder, who were treated on the basis of Chernivtsi Regional Psychiatric Hospital. We examined 120 patients aged 35 to 64 years (mean age  $49.5 \pm 8.9$  years) with depression.

Groups of patients with various somatic diseases can be compared by the number of patients. Patients with a disease duration shorter than 5 years accounted for 37.5% of the total number of examined patients, more than 10 years - 34.2% of patients. In other observations, the duration of the disease ranged from 5-10 years - 28.3%.

Every fourth patient in the main group had severe depression, although in the control group such cases were not observed. The gender aspect is also interesting. The proportion of severe depression among women was 30.3%, and among men - 16.8%.

Differences in the severity of depression and the type of comorbid somatic disorder were revealed. When assessing the severity of depressive disorder, it was found that more severe depression was more common in patients with concomitant nephrological (54%) and endocrinological (37%) pathology. Neurological and respiratory diseases and cardiovascular pathology were often associated with patients in remission or in a mild depressive episode.

Depressed patients with comorbid somatic pathology, despite the relative effectiveness of antidepressants, the prognosis of mental disorder is less favourable, and remissions are less stable compared with patients with depression without comorbid somatic disease. The somatic disease is considered a marker of therapeutic resistance to depression, and therefore two therapeutic strategies are recommended: on the one hand, patients with somatic diseases should be examined for depression, and on the other - depressed patients with comorbid somatic disease require more intensive antidepressant treatment.

**Ivanova N.M.**

### **CORRELATION OF ANXIETY-DEPRESSIVE DISORDERS AND COGNITIVE IMPAIRMENT DUE TO STROKE. FEATURES OF EARLY DIAGNOSIS AND TREATMENT**

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Topicality of the issue: the frequency of acute cerebrovascular disorders in economically developed countries is, on an average, 150 per 100 thousand of the population. In Ukraine, 283.2 MI were registered in 2010, in 2012 - 297.8 MI per 100 thousand of the population, during 2019 about 150 thousand people were transferred to acute cerebrovascular accident. Persistent neurological focal deficiency is observed in 27–33% of people who have suffered from stroke, 18–27% of patients lose language skills, 30–47% - cognitive functions. A quarter of patients after stroke presented advanced cognitive impairment, as well as anxiety and depressive disorders. Recent studies suggest that neuropsychiatric complications of acute cerebrovascular disorders, regardless of phenomenology (emotional, behavioral and cognitive) negatively affect not only social functioning but also the overall quality of life.

Objective: to increase the effectiveness of comprehensive medical care for anxiety and depressive disorders that occur in the background of acute cerebrovascular disorders, as well as early diagnosis and correction of cognitive impairment, which aims to improve quality of life and reduce the risk of disability in this group of patients introducing modern schemes of treatment, diagnosis and prevention.

34 patients of the main group with an anxiety-depressive disorder of the genesis of anxiety were examined. An average age of patients in the main group was  $62.2 \pm 3.6$  including men (21

individuals - 61.7%). In the control group, patients had a different structure by age and sex, an average age -  $53.5.3 \pm 1.68$ , (10 females - 62.5%). Among the examined patients with anxiety and depressive disorder, 26 people in the main group had a history of ischemic heart disease, in the control group their number was 9, in the main group 8 people had hypertension, in the control group - 7. Percentage of existing chronic traumatic situation (conflict at work, family problems) were observed as follows: more often in the main group (88.2% - 30 people) compared with the control group (56.25% - 9 people). In the main group of individuals, depressive disorder in the acute period after undergoing GPMK was diagnosed in 6 patients, which is 17.6%; in the remote period - in 15 patients (44.2%). The Hamilton Scale and the Melancholy Scale after 3 and 6 weeks of therapy were significantly higher than in the control group. As depressive symptoms have an extremely negative effect on functional recovery, therapy should be prescribed as early as possible to avoid long-term disorders. The recommended duration of treatment is 4-6 weeks or longer. There is a persistent comorbidity between post-stroke depression and anxiety. In the main group of patients the combination of anxiety and depressive syndromes was observed in 79.4% of cases (27 patients), which is 41.9% more than in the control group - 37.5% (6 patients).

Thus, the results may indicate a negative impact of acute cerebrovascular disorders as a background for the development of severe anxiety and depressive disorders, which are usually combined with cognitive deficits and cause maladaptation, complicate the rehabilitation of patients in this group, and significantly reduce quality of life. All this requires the development of new algorithms for early diagnosis and timely treatment of the above disorders.

**Nika O. .**

### **ANXIETY AND DEPRESSION SYMPTOMS IN PATIENTS WITH MIGRAINE**

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Nowadays, migraine is considered one of the most common diseases. Rate of this disease in the population often differs significantly due to the use of different diagnostic criteria. According to epidemiological studies, in developed countries of Europe and America, migraine affects about 16% of the population, and according to some data - up to 30%, 18% of women suffer from migraine, 6% of men and 4% of children. Current scientific researches are aimed at studying the relationship of migraine with other diseases and choosing the most effective prevention and treatment of this disease.

Mental comorbidity of migraine is a significant component of this chronic disease and highly affects disadaptation level in patients. In our research we studied 38 patients with migraine (14 men, 24 women, the age of patients ranged from 18 to 51 years). For measuring migraine disability outcomes Migraine Disability Assessment Scale (MIDAS) was used in our research. To evaluate anxiety and depression levels Hospital Anxiety and Depression Scale (HADS) was used. Patients were divided into two groups: first group included 21 migrainers with aura; the second - 17 patients with migraine without aura.

The results show that patients with migraine with and without aura have an increased level of anxiety (68% of patients) and depression (43%). Rate of anxiety among patients in the first group was 9,5 point and in the second group it was 10.2 points. The depression level according to HAD scale in the first group was 8 points, and in the second group - 8.8 (0-7 = normal, 8-10 = borderline abnormal, 11-21 = Abnormal).

As a result of this study, we can assume that for the treatment of migraine patients, both with aura and without aura, who have comorbid pathology in the form of moderate and mild depressive disorder selective serotonin reuptake inhibitors should be recommended, as they pathogenetically affect both diseases and lead to reduction in migraine attacks and depressive symptoms.

**Savka S.D.**

## **QUALITY OF LIFE IN PATIENTS AFFECTED BY SCHIZOPHRENIA AND COMORBID CARDIOVASCULAR DISORDERS**

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The concept of quality of life is widely and increasingly used as an important outcome measure in the evaluation of treatment of patients with mental disorders. The reduction of symptoms is a desirable treatment outcome, but it is important to assess how recovery translates to the daily life of an individual and their quality of life. Quality of life is a subjective and multidimensional construct that captures an individual's life satisfaction and overall well-being. An ideal and complete measurement of health would assess an individual's physical, functional, social, and psychological health. Schizophrenia runs a chronic course and is a disabling mental disorder. Quality of life indicators in patients with schizophrenia are significantly lower compared to the general population.

The aim of this study was to examine the effect of comorbid cardiovascular disorders on quality of life in individuals with schizophrenia. Sixty patients with a diagnosis of schizophrenia, who attended mental hospital for follow-up visits between 2019 and 2021, were examined in the course of this study. The study was approved by the ethics committee of the hospital and written consents were obtained from the patients. These researches were carried out in agreement with the basic bioethical principles of the Council of Europe Convention on Human Rights and Biomedicine (dated 04.04.1997), the Helsinki Declaration of the World Medical Association on the Ethical Principles of Scientific Medical Research with Human Participation (1964-2013), the Order of the Ministry of Health of Ukraine 690 (dated September 23, 2009).

Patients with the diagnosis of schizophrenia and aged between 18 and 65 years were subject of the study. Exclusion criteria were as follows: age less than 18 years and over 65 years, malignant neoplasm, concomitant other mental and narcological diseases. The patients of basic clinical group included 40 participants with schizophrenia and comorbid cardiovascular disorders. The control group of comparison included 20 patients with schizophrenia without concomitant cardiovascular disorders. The patients from basic and control clinical groups were examined using the Quality of Life Index (QLI). QLI developed by Mezzich et al. was also used. Quality of life was assessed by the 10 indicators: physical well-being, psychological/emotional well-being, self-care and independent functioning, occupational functioning, interpersonal functioning, social-emotional support, community and services support, personal fulfillment, spiritual fulfillment, and overall QLI.

The basic group included 40 patients mean age  $41,9 \pm 1,82$ , among which women predominated (31 persons – 77,5%). The control group included 20 person (mean age  $39,3 \pm 1,68$ ), among whom females dominated as well (15 persons – 75,0%).

The study showed that the quality of life in patients with concomitant cardiovascular disease was significantly reduced compared to the control group in terms of psychological / emotional well-being, interpersonal interaction, social and emotional support, community and service support. The overall assessment of quality of life in the surveyed basic clinical group was  $54.1 \pm 1.67$ , and in the surveyed control group –  $61.7 \pm 1.41$ .

Therefore, the results obtained may indicate a negative impact of comorbid cardiovascular pathology on the quality of life of patients with schizophrenia.

**Vasylieva N.V.**

## **PSYCHOGENIC MOVEMENT DISORDERS: COMPREHENSIVE REVIEW OF THE LITERATURE**

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Psychogenic movement disorders (PMD) are a group of heterogeneous disturbances manifested by deliberate slowness or a variety of other motor abnormalities, such as shaking,

jerking, spasmodic and others, often bizarre, movements, postures or gaits that cannot be explained by organic conditions, frequently occurring in association with underlying psychological or psychiatric disturbances. Psychological or physical stress often plays a certain role in precipitating and maintaining the movement disorder, even though specific acute or chronic stressors are not always initially identifiable by the patient, partially because of lack of insight or denial. While the term “functional” is occasionally used to describe this group of disorders, the term implies normal function rather than dysfunction and, therefore, the term “psychogenic” seems more appropriate.

The epidemiology of PMD has not been well studied, largely because of lack of consensus on diagnostic criteria, the use of different methodologies to ascertain cases and the frequent coexistence of organic movement disorder.

Using the above criteria, we enrolled 32 patients with PP, including 17 (53%) women, with an average age of  $48 \pm 8.6$  years and mean duration of symptoms of  $5.24 \pm 1.2$  years. A precipitating event was identified in 56% of our patients and included job related stress in 11 (34%), personal life stress in 4 (13%) and physical trauma in 4 (13%); 13 (41%) had a combination of multiple stressors. The majority of our patients (56%) had a history of comorbid psychiatric disorder, with depression being the most common. A family history of tremor or parkinsonism was present in 9 (28%) patients.

In contrast to tremor in patients with organic Parkinson’s disease (PD), the tremor in PP often starts not in the hand, as is typical of PD, but may be present as a unilateral leg tremor. Furthermore, tremor associated with PP usually does not disappear with movement of the limb. Similar to psychogenic tremor without parkinsonism, in addition to marked distractibility, the frequency of tremor in PP varies in rhythmicity and direction of oscillation. Rigidity, if present, is often associated with active resistance against passive movement and there is usually no cogwheeling. While slowness of movement (bradykinesia) is present in almost all patients with PP, there is usually no decrementing amplitude on rapid succession movements, typically seen in PD. Patients with PP often demonstrate slow and deliberate movement when asked to perform a particular task but are able to function normally when distracted or when they do not think they are being observed. For example, they can dress and perform other activities of everyday routine without any perceptible slowness. The handwriting is often laboured and irregular but without the typical micrographia. On a pull test, the patient’s response is often inconsistent, manifested either by minimal displacement or by an extreme response associated with flinging of the arms and reeling backward, but never falling. When asked to walk fast or to run, the gait often becomes stiffer and the short stride is maintained, but there is no freezing. Some patients with PP also manifest features of psychogenic gait, including bouncing, buckling of the knees and astasia–abasia. Speech in a patient with PP often becomes stuttering, “baby-like” or demonstrating a foreign accent. If the patient has “levodopa related dyskinesia” the hyperkinetic movement is often bizarre and incongruous with typical levodopa induced stereotypy, chorea or dystonia.

In conclusion, the long term prognosis of PMDs, including PP, is usually poor and the adverse impact of these disorders on quality of life is often similar to that of organic, neurodegenerative PD. Patients with PMD often require much from available healthcare resources and many undergo unnecessary, expensive diagnostic tests, surgical interventions and other potentially life threatening procedures. As a result, this group of disorders has been referred to as a “crisis for neurology”.

**Yaremchuk O.B.**

**PARKINSON DISEASE IN CHERNIVTSI REGION OF UKRAINE: CLINICAL AND EPIDEMIOLOGICAL STUDY**

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Parkinson disease (PD) is the most common neurodegenerative movement disorder. In Europe, prevalence and incidence rates for PD are estimated at approximately 108-257/100000 and 11-19/100000 per year, respectively. Risk factors include age, male gender and some environmental

factors. Currently available treatments offer good control of motor symptoms but do not modify the evolution of the disease. Epidemiology of non-infectious diseases is one of the most important trends in modern medicine. Epidemiological studies not only allow you to find out the prevalence of disease in a given region and help plan the organization of care for patients, but also identify etiological factors or risk factors for disease, helping to look for ways of prevention and more effective treatment.

The study prevalence and peculiarities of clinical characteristics of PD in Chernivtsi region of Ukraine among different gender and age groups. We used the Register of Neurological Diseases in Chernivtsi region during 2015-2019 years. Patients' status was evaluated according to UPDRS. Stage of PD was examined according to Hoehn and Yahr scale.

According to the Register, as of 01.01.2020, patients were registered: PD - 384 patients, secondary parkinsonism - 204 patients, neurodegenerative diseases with PD - 26 patients. Among them 46,25% were men (132 patients), 53,75% - women (330 patients) Most patients were registered in older group - 45,60 % (280 patients), of which 55% are women and 45% - men. We have found increase UPDRS index depends on age and PD's stage. Indicator of disorders of motor aspects of daily activity in older group was 2,4 times more than in young group ( $p=0,0453$ ). Our study has found direct correlational interconnection between age and severity of clinical manifestations, although directly proportional interconnection was between stage of PD (according to Hoehn and Yahr scale) and UPDRS index. It was found just 55,8% of patients follow the medical recommendations. 16,2% of patients are treated by dopamine receptor antagonists, 21,8% of patients - by levodopa, 13,3% - by cholinolytics drugs, 10,5% - by amantadine, 38,2% by combination of two or more antiparkinson drugs.

Our research confirmed that PD was more frequent among women. The most frequent age is coincident for men and women between 60 and 74 years old. The majority of patients in the first examination already have stage 2 PD according to Hoehn and Yahr scale. Probably this is the consequence of inadequate awareness about early peculiarities of parkinsonism among population.

**Yurtseniuk O.S.**

## **THE FREQUENCY OF NEW CASES OF NON-PSYCHOTIC MENTAL DISORDERS AMONG STUDENTS OF HIGHER EDUCATIONAL INSTITUTIONS**

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The trend of increasing mental disorders, especially due to borderline disorders, which has been observed in recent years, requires the search for new approaches to maintaining mental health, prevention and, in particular, early diagnosis of non-psychotic mental disorders (NPD).

The aim of the study was to investigate the frequency and structure of new cases of non-psychotic mental disorders in students of higher education institutions. During 2015-2017, we conducted a continuous comprehensive survey of 1,235 students in compliance with the principles of bioethics and deontology. Applied methods: clinical, clinical-psychopathological, clinical-epidemiological, clinical-anamnestic, experimental-psychological and statistical. The groups examined did not have significant differences in gender and age, place of residence, form of education. The survey was conducted in the intersessional period. Evaluation of primary cases of NPD, which were detected during re-examination, was performed among practically healthy students based on the results of the first examination and compared the data with the structure of NPD, which we diagnosed in the entire cohort of subjects studied in the first cross section.

The majority of students in whom the initial examination found no mental pathology remained virtually healthy after a year (858 people, 93.46%). Analyzing the structure of NPD, which occurred during this period in this group, was narrower in comparison with the identified patients at the initial examination. Mainly, NPD were represented by affective disorders (F30.0, F32.0, F34.0) and neurotic, stress-related and somatoform disorders (F40.1, F41.2, F42.0, F43.20, F43.21, F43.22). An interesting fact was that in the structure of NPD detected during the re-

examination there were no other, than previously diagnosed during the initial examination, the category of mental pathology according to ICD-10.

Thus, mainly NPD of affective (1.2%) represents the structure of new cases of NPD diagnosed during the year of study and neurotic registers (5.34%) (In the ratio 1/5, respectively), so other forms of mental pathology occur more quickly in period before the beginning of training or at long training. Therefore, it is advisable to focus on psychoprophylactic measures to increase the stress resistance of students and their adaptive capabilities.

**Zorii I.A.**

**CLINICAL-ELECTRONEUROMYOGRAPHIC PECULIARITIES OF SPASTIC SYNDROME IN CHILDREN WITH INFANTILE CEREBRAL PALSY**

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Organic lesions of the central nervous system (CNS) are a group of nervous-psychic disorders occurring due to effect of various pathological factors on the brain. Infantile cerebral palsy (ICP) is the most spread neurological disease diagnosed in children at an early age. 80 % of children with ICP suffer from spastic forms, the main symptom of which is overactive muscular tonus – spasticity. This syndrome can be objectivized by means of electroneuromyographic (ENMG) examination which enables to get qualitative and quantitative assessment of the nervous-muscular system state.

The aim: to determine clinical and electroneuromyographic peculiarities of spastic syndrome of ICP children depending on the intensity of motor disorders. 122 ICP children are examined (an average age  $8,8 \pm 3,7$  years), distributed into groups by the results of Gross Motor Function Classification Expanded & Revised (GMFCS E&R). All the patients underwent careful neurological examination and ENMG examination. To assess supra-segmental and segmental levels of nervous system lesions the parameters of H-reflex and F-wave were analyzed.

Spastic forms of ICP were diagnosed in the majority of the examined children. Orthopedic pathology was found more often among ICP children with marked motor disorders including equinovalgus position and planovalgus feet deformity. According to ENMG parameters ICP patients presented conductive disorders manifested by an increased amplitude of -response, especially in testing the tibial nerve, increased m / m ratio and the amplitudes of -reflex and F-wave.

According to the results of the study conducted, ENMG parameters changed in the side of deterioration depending on the degree of motor activity disorders by Gross Motor Function Classification.

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**Andriychuk D.R.**  
**CLINICAL COURSE OF ULCER DISEASE IN CHILDREN DEPENDING ON THE**  
**DURATION OF THE DISEASE**

*Department of Pediatrics and Medical Genetics*  
*Bukovinian State Medical University*

One of the most serious diseases of the gastroduodenal area in children is ulcer disease of the stomach and duodenum. The incidence of this disease in Ukraine and worldwide continues to increase. If in 2000-2001 in the structure of digestive diseases in children ulcer was 4,9%, in 2013 it was 7,9%.

We conducted a clinical examination of 120 children with ulcer disease, aged 7-18 years, who lived in Chernivtsi and Chernivtsi region. The study was conducted using simple randomization.

The average age of children with ulcer disease was  $14,8 \pm 2,0$  years. 53,5% of examined children suffering from ulcer disease, were boys. There were almost equal numbers of children with the duration of UD less than one and over 3 years. Verification of clinical diagnosis was carried out in accordance with the treatment of children in “Children’s Gastroenterology” (Ministry of Health of Ukraine 59 of January 29, 2013). All children were interviewed with studying of anamnesis, genetic, social, environmental, household and other characteristics of their habitat. Clinical studies were performed by the standard method of patient examination. Particular attention was paid to children’s complaints on pain, its location, seasonality, the nature of the factors that enhance and ease the pain.

Pain was observed in 100% of sick children, mostly had aching in nature and was located mainly in the epigastrium and pyloroduodenal areas, regardless of the duration of ulcer disease. Pain, which appeared on an empty stomach and after 1-1,5 h after the meal was dominant at the time of occurrence. The significant difference of pain intensity in children was noted. So, for children who were sick less than 1 year, intensive pain syndrome was observed in  $83,3 \pm 7,7\%$ , in children with disease duration 1-3 years –  $13,3 \pm 2,3\%$  and in aching patients with disease duration more than 3 years –  $34 \pm 0,4\%$  of cases, ( $p < 0,05$ ).

The leading symptom of the dyspeptic syndrome among pediatric patients was nausea (90,8%). In children with the duration of ulcer disease up to 1 year was shown a tendency to constipation (83,3%), in patients with disease duration more than 3 years – a tendency to diarrhea (85,3%) and decreased appetite (100%).

The main symptoms of astenovegetative syndrome in children with the duration of ulcer disease up to 1 year were: emotional lability in 92% of cases, headache, weakness, drowsiness, fatigue in 83%, in 25% – heart pain and in 42% – poor sleep. With increasing ulcer disease duration grew and prevailed symptoms of vagotonia: emotional lability (100%), excessive sweating (93,3%), chill (90,0%). In addition, in all children of 1-3 years duration of disease were observed weakness, flabbiness, fatigue, drowsiness and headache – in 83% and 92% of children. There were emotional lability, weakness, drowsiness and fatigue in 100% of children suffering from ulcer disease more than 3 years, 83% of children complained about headache, 93% – sweating and 90% of patients – chill.

Thus, with increasing disease duration, quantity of children with pain syndrome (22,5%) decreased and number of patients with dyspeptic (68,3%) and astenovegetative syndromes (62,5%) increased.

**Bilyk G.A.**

## **EVALUATION OF TREATMENT TACTICS IN CHILDREN WITH BRONCHITIS DEPENDING ON ITS CLINICAL FEATURES**

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Respiratory diseases always account for a significant proportion of visits to the pediatrician or family doctor, and bronchitis is usually a frequent clinical manifestation of acute respiratory diseases. The doctor often faces the question of how to objectively assess the clinical picture of bronchitis, and now the assessment of respiratory symptoms is often based on criteria such as cough, shortness of breath or wheezing on auscultation. However, today there are practically no data on the severity of bronchitis in children depending on the above criteria.

The aim of the work was to study the clinical features of bronchitis in children with varying severity of inflammation of the bronchial tree and to assess the effectiveness of standard treatment tactics to optimize the management of these patients.

A cohort of 158 children with bronchitis was created at the pulmonology and allergology Department of the Municipal Medical Institution “Regional Children’s Clinical Hospital” in Chernivtsi. The average age of the examined children reached  $6.6 \pm 0.30$  years. 63.3% of the surveyed children were boys and 36.7% - girls, most of the patients lived in rural areas (60.1%). The severity of bronchitis was assessed at the beginning and on the 3rd and 7th days of inpatient

using the Bronchitis Severity Score (BSS). According to this scale, mild bronchitis was verified in 30 patients which formed the I clinical group, and 128 children had moderate bronchitis (II clinical comparison group).

Acute bronchitis occurred in 34.8% of cases, in 65.2% there was a recurrent nature of bronchitis. In 21.6% of patients the simple nature of bronchial tree inflammation was verified, in 78.4% - obstructive, and in 5.7% of cases signs of purulent endobronchitis were found. At the same time, in children of group II with moderate bronchitis in 6.2% of cases have a history of allergic reaction to drugs, and in patients of group I drug allergy was not observed. On average, children of the first clinical group were ill  $11.2 \pm 1.66$  days before inpatient treatment, and the second group -  $6.7 \pm 0.68$  days ( $p = 0.05$ ). Aggressive inflammation of the bronchi in children with moderate inflammation of the bronchial tree compared with patients with mild bronchitis was accompanied 1.6 times more often by recurrence, a history of episodes of community-acquired pneumonia in 9.4% of patients, long-term inpatient treatment (odds ratio 2.6) and halving the duration of the outpatient treatment period. The study of clinical severity of bronchitis in children of the comparison groups made it possible to establish an increase in the chances of a more severe course of the disease on the 7th day of hospitalization in children with moderate bronchitis (odds ratio 4.8) with persistence of cough in 68.7% of children in this group (odds ratio 3.8). Evaluation of inpatient treatment tactics indicated the need to increase the volume of complex therapy in patients with moderate bronchitis relative to children with mild disease (odds ratio 12.0, relative risk 8.8), as well as increasing the risk of the need for antibacterial therapy (odds ratio 3.7, relative risk 2.8) and the appointment of parenteral antibiotics for more than 3 days (odds ratio 5.0, relative risk 1.1).

Thus, patients with a moderately severe course of the disease, in comparison with patients with mild bronchitis, require a larger volume of complex deobstructive therapy (odds ratio 12.0), 1.6 times more often have indications for prescribing antibacterial drugs (odds ratio 2.5) and longer need to use parenteral antibiotic therapy (odds ratio 5.0). Every third child of the II clinical group (35.2%) need to continue deobstructive therapy at the outpatient-polyclinic stage, and markers of the local inflammatory process in such children were associated with statistically worse results of complex inpatient treatment, assessed on the clinical scale of bronchitis severity.

**Bodnar G.B.**

## **SPECIFICS OF ELEMENTAL STATUS IN CHILDREN WITH CHRONIC CONSTIPATION**

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Diseases of the large intestine (LI) occupy a significant place in the structure of chronic diseases of the digestive system. Along with functional pathology and inflammatory diseases, conditions caused by developmental abnormalities and the position of the LI cause concern, among which the most frequent one is dolichosigmoid (45-50%) that indirectly creates the basis for the development of chronic inflammatory and functional diseases not only of the LI, but of the entire digestive system.

We had examined children with CC against the background of congenital anomalies of the large intestine, who were born and live in Chernivtsi. We have checked the levels of 33 chemical elements (9 toxic, 8 potentially toxic and 16 vital) using the method of inductively coupled plasma atomic emission spectrometry in Price B.

The analysis of findings has revealed probable decrease in the levels of essential micro- and macro-elements as compared to the values in the reference group. Hence, all the patients showed various degrees of deficiency of such mineral components as magnesium, selenium, chromium, zinc, and manganese. The study of the micro-elemental status of the children from the main group revealed a pronounced deficiency of microelements in whole blood. Thus, the majority of patients ( $70.35 \pm 3.48$  %) showed a probable ( $>0.05$ ) decrease in the levels of selenium. Selenium is a microelement, which serves the function of protecting cell membranes from the effect of free radicals and reactive oxygen intermediates. In this case, the deficiency of selenium can testify to the

decrease of antioxidant defense. The deficiency of zinc, which is part of more than 200 metalloenzymes of the body, has been found in  $50.58 \pm 3.81$  % of patients. Lower levels of chromium, the main functions of which is to ensure the transport of glucose through cell membranes, participation in the synthesis of lecithin, cholesterol, fatty acids, detoxification of the body, building muscle bulk and muscle strength, has been found in  $69.77 \pm 3.50$  % of patients. We have found reduced levels of manganese, which is essential for the formation of connective tissue, activation of mitochondria, ensuring higher levels of ascorbic acid in the body, in  $50.0 \pm 3.81$  % of patients. The deficiency of such a macro-element as magnesium, which actively participates in the synthesis and maturation of collagen, has been found in the majority of patients  $80.81 \pm 3.0$  %.

Therefore, as a result of studying the elemental status of children with chronic constipation caused by the congenital elongation of the sigmoid colon, it has been established that the deficiency of magnesium, chromium and selenium leads to the progression of the pathological process and acceleration of decompensation development, which can be used as a prognostic index – a marker of elemental deficiency. In the event of selenium and zinc deficiency, we can observe the development of non-specific non-ulcerative colitis in children with chronic constipation. The level of selenium in blood can be used as an informative indicator of adaptive abilities of the body and the decrease of the compensatory ability, i.e as a so-called mineral predictor.

Therefore, a comprehensive assessment of functional disorders of the bowels allows having an in-depth understanding of the condition of the large intestine: motor-evacuation disorders; trophic base, infrastructure, quality and quantity composition of the microflora, its metabolic activity; epithelial energy supply; factors of specific and non-specific defense of the body. The data received help determine the mechanisms of functional and organic pathology formation in the bowels against the background of the congenital elongation of the sigmoid colon, which in turn will allow working out a protocol of choosing an adequate, comprehensive, conservative therapy.

So, a decrease in the levels of collagen-specific bioelements of magnesium, chromium, manganese, selenium and zinc is typical for all the children with chronic constipation caused by dolichosigmoid. Dependence has been established between the specifics of the clinical course of chronic constipation and the elemental status, which will allow implementing individual approach to the choice of pharmaceuticals and nutraceuticals for the correction of diselementosis.

**Bogutska N.K.**

## **THE ASSOCIATION BETWEEN PEDIATRIC TYPE 1 DIABETES MELLITUS AND COVID-19**

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COVID-19 outbreak modified type 1 diabetes management both in adults and children. The pediatric population is affected by COVID-19 in a milder manner, but the possibility of SARS-CoV-2 acting as a trigger for the autoimmune destruction of the beta-cells and leading to an increase in the incidence of type 1 diabetes is still unknown.

The aim of the study was to assess the possible impact of the COVID-19 pandemic in the pediatric population with diabetes mellitus and its association with new cases due to the literature review. Material and methods: Web of Science search for medical publications was performed in English for 2019-21; the search terms that were used included “COVID-19” and “diabetes mellitus”, 67 publications were obtained, only every third publication was included in the study.

Due to recent reports, the association between type 1 diabetes mellitus and increased morbidity and mortality rates during COVID-19 infection in adults was demonstrated. New-onset cases of diabetes mellitus and severe metabolic complications of preexisting diabetes, including diabetic ketoacidosis and hyperosmolarity have been observed in both adult and pediatric patients with COVID-19. SARS-CoV-2 can trigger severe diabetic ketoacidosis at presentation in individuals with new-onset diabetes. However, there is no hard evidence that SARS-CoV-2 induces type 1 diabetes mellitus on its own accord. Children and adolescents with diabetes mellitus are strongly encouraged to adhere to preventive and protective measures against the viral spread, if



hospitalization is needed, the health care team should be aware so as to modulate management, particularly in children with type 1 diabetes mellitus and hypoglycemia. The current recommended drugs for the treatment of severe COVID-19, dexamethasone, and remdesivir, may cause hyperglycemia, an adverse effect that doctors should keep in mind when caring for patients with diabetes mellitus and COVID-19. Adverse impact on glycaemic control and lifestyle was seen mostly in some groups of pediatric patients (pubertal adolescent boys), while other researchers have shown that glycemic control during the coronavirus lockdown can be adequately achieved and be comparable to the pre-lockdown period in children with type 1 diabetes mellitus. In an Indian study, no strong evidence to suggest higher mortality rates in children with type 1 diabetes mellitus in comparison with their healthy peers was shown but poor outcomes and more deaths were recorded in diabetic adults after the second wave of COVID-19 infection. However British researchers have shown that the direct comparison of longitudinal data from before and during the first COVID-19 wave clearly demonstrated the increased severity of presentation of newly diagnosed type 1 diabetes in children in the context of high circulating COVID-19 cases in the community. This may be indirectly due to the delayed presentation or directly due to the emerging complex relationship between SARS-CoV-2 infection and glucose metabolism or diabetes pathogenesis. There are few reports presenting patients with multisystem inflammatory syndrome in children (MIS-C) associated with COVID-19 and new onset diabetes. Pediatric outcomes and prognosis in case of COVID-19 and diabetes mellitus association seem to be similar to their non-diabetic-peers and consistently milder than adults with diabetes. Patients with diabetes mellitus are at a high risk of poor prognosis with COVID-19 and vaccination should be prioritized for them.

New-onset diabetes and severe metabolic diabetic complications have been observed in children during the COVID-19 pandemic.

**Buryniuk-Hloviak H.P.**

**PECULIARITIES OF BRONCHIAL ASTHMA COURSE DEPENDING ON THE  
FUNCTION OF THE PARATHYROID GLANDS IN PATIENTS WITH VARIOUS  
AMOUNT OF BASIC THERAPY BY MEANS OF INHALATION  
GLUCOCORTICOSTEROIDS**

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Bronchial asthma (BA) remains the most widely spread disease of the respiratory system in spite of other diseases modern medicine deals with, and it can deteriorate the quality of life of patients. A leading role in the treatment of the disease belongs to inhalation glucocorticosteroids (iGCS), though the issue of their safe administration still remains important.

Objective of our research was to study peculiarities of bronchial asthma course depending on the function of the parathyroid glands in patients with various amount of basic therapy including iGCS. 72 children suffering from persisting bronchial asthma (pBA) were examined comprehensively on the base of Chernivtsi Regional Children's Clinical Hospital. An average concentration of the parathyroid hormone (PTH) in the blood serum of children was  $22,68 \pm 5,58$  pg/ml, which was within the normal limits (according to the producer's figures the norm is 10,4-66,5 pg/ml). Meanwhile, distribution of the indices obtained enabled to determine that 32,2% of patients had zero value, 20,0% of them did not reach the lower limit of the norm, 8,9% - had indices higher than that of the upper limit, and only 38,9% were within the normal range. PTH concentration in the blood serum of patients with uncontrolled pBA was found to differ reliably ( $11,08 \pm 4,5$  pg/ml) from that of the patients with a controlled course of the disease –  $51,5 \pm 3,5$  pg/ml ( $Pt < 0,05$ ), which was indicative of an inconsiderable tendency (within the normal values) to decrease the function of the parathyroid glands with an uncontrolled course of BA.

Considering this tendency, two groups of comparison were formed for the study of peculiarities of persisting BA in patients depending on parathyroid hormone concentration in the blood serum. group included 32 patients with PTH concentration in the blood serum higher than 10,0 pg/ml, and – 40 children suffering from pBA with lower values indicative of the parathyroid

function. Clinical-instrumental peculiarities of asthma course were studied considering the norm of PTH in the blood serum within the range of 10,4-66,5 pg/ml (according to the producers' figures).

Natural changes of PTH content in the blood serum of patients depending on the doses of iGCS were not found except the range of high doses. Thus, in case of a low concentration of PTH in the blood serum children received therapy with low and average doses of iGCS: OR = 3,6 (95% C 1,9 - 6,6), OR = 2,0 (95% C 1,6 - 2,5),  $r = 0,31$ . High doses to certain extent might promote osteoporosis development and calcium remove from the bones, which in its turn stimulated synthesis of the parathyroid hormone.

Therefore, a conclusion can be drawn that 52.2% of schoolchildren suffering from bronchial asthma do not have normal values of the parathyroid hormone in the blood serum, and in case of an uncontrolled course of bronchial asthma its concentration 5 times decreases and correlates with the period of administration of systemic GCS during BA attacks ( $R=0,72$ ). Patients with parathyroid hormone concentration in the blood lower than that of the norm require 2,5 times less commonly high doses of iGCS with underlying disorders of the ventilation function (Hensler index less than 70,0%) of the respiratory passages (OR=5,4).

**Haras M.N.**

### **NEONATAL COVID-19 AS A NEW EXPERIENCE IN THE PANDEMIC ERA**

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Biologically plausible routes of perinatal SARS-CoV-2 transmission include transplacental, contact with infected secretions during delivery and with respiratory droplets after delivery, and breast milk. Low rates of virus positivity in relevant biological specimens suggest that perinatal transmission is uncommon, but accumulating evidence indicates that some neonates who are born to mothers with SARS-CoV-2 do obtain positive test results for the virus.

The purpose of the study was to analyze the peculiarities of coronavirus disease COVID-19 in the neonatal period on the example of 2 clinical cases. The newborn full-term girl was under inpatient observation from the 4th to the 17th days of life. The girl was born from SARS-CoV2 positive and COVID-19 respiratory symptomatic mother (by RT-PCR). The child's grandmother was the first member, who suffered from pneumonia caused by SARS-CoV2, who was the source of novel coronavirus infection in the family. Immediately after birth, nasal and oral swabs were taken, the result gRT-PCR RNA-SARS-CoV-2 was positive. During the observation, the child was breastfed and showed signs of physiological adaptation of the newborn without health abnormalities. Cells blood count (CBC) was within normal ranges, also C-reactive protein (CRP) level didn't elevate. Another full-term breastfed newborn was hospitalized with mild respiratory symptoms (coryza, dry cough and pharyngitis) and low-grade fever on the 24<sup>th</sup> day of life (2<sup>nd</sup> day of disease onset). The child's mother had the same symptoms. Swabs' results of both mother and newborn (gRT-PCR RNA-SARS-CoV-2) were positive. CBC and CRP levels were within normal ranges. All symptoms were reduced in 5 days. In both cases, the mothers and children received two negative gRT-PCR RNA-SARS-CoV-2 results. The presented cases demonstrated the asymptomatic COVID-19 in the early neonatal period where the child was born from symptomatic PCR confirmed COVID-19 mother; and mild symptomatic COVID-19 in a child that was infected by symptomatic mother in the late neonatal period.

**Horbatiuk I.B.**

### **CLINICAL AND PARACLINICAL MARKERS OF INFLAMMATORY ACTIVITY IN ACUTE TONSILLOPHARYNGITIS IN CHILDREN**

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The objective is to study clinical and paraclinical markers of inflammatory activity in acute non-streptococcal and streptococcal tonsillopharyngitis in children to address rational treatment tactics.

To achieve this goal, we conducted a comprehensive examination of 102 children with acute tonsillopharyngitis, who were divided into two clinical groups depending on the isolation of beta-hemolytic streptococcus group A due to the culture of smears from the mucosa of the tonsils / pharynx. The first (I) clinical group included 68 patients in whom bacteriological examination did not reveal BGSA - ATP of non-streptococcal etiology (nATP). 34 children in whom the streptococcal etiology of the disease was determined formed the second (II) clinical group - streptococcal acute tonsillopharyngitis (sATP).

The presence of a subfebrile body temperature in the child increased its post-test probability by 27.4%, and higher fever figures reduced the probability of non-streptococcal ATP by only 4.3%. The absence of symptoms of intoxication syndrome in children with a high degree of specificity - 91.4% confirms the non-streptococcal nature of the disease. Expressive layers on the tonsils are more characteristic of streptococcal ATP, and the assessment of their severity <3 points was much more common in patients with non-streptococcal disease. Using the determination of the content of C-reactive protein <50.0 mg / l in the venous blood of children as a test, allowed to verify the non-streptococcal nature of acute tonsillopharyngitis with fairly high sensitivity - 73.5% (95% CI 63.7-81.8), however, low specificity - 35.3% (95% CI 26.0-45.5).

Indicators of local inflammation and clinical manifestations of the general inflammatory reaction were less pronounced in patients with non-streptococcal ATP. Indicators of C-reactive protein <50.0 mg / l in venous blood with high sensitivity (73.5% (95% CI 63.7-81.8) and relative risk 1.2 (95% CI 1.0- 1,5) probably testified in favor of the nonstreptococcal nature of acute tonsillopharyngitis.

**Khulunovska L.Yu.**

### **CLINICAL CASE OF SPINAL MUSCULAR ATROPHY**

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Spinal muscular atrophy is a group of hereditary neuromuscular diseases based on the primary damage to the motor neurons of the anterior horns of the spinal cord and the nuclei of the brainstem in the form of their progressive degeneration and death. There are 5 types of disease. Type I, or acute malignant infantile amyotrophy of Werdnig-Hoffmann, is the most severe and common form. Frequency - 1:10000-1:6000 infants, characterized by early onset (up to 6 months) and death from respiratory failure up to 2 years. The genetic basis of the disease is a mutation in the SMN1 gene (motoneuron survival factor gene). The diagnosis of Spinal muscular atrophy can be confirmed by detecting the deletion of the 7th and / or 8th exon of the SMN1 gene in a homozygous state.

Purpose of the study: verification of the diagnosis of Spinal muscular atrophy of the 1st type by molecular genetic diagnosis.

Material and methods: DNA isolation and studies of deletions of the 7th and 8th exons of the SMN1 and SMN2 genes by polymerase chain reaction.

The geneticist was invited to consult a one-month-old boy in the neonatal pathology department of the Chernivtsi Regional Children's Clinical Hospital, who was delivered by an ambulance crew at the age of 29 days with parents' complaints about the sudden decrease in extremities movements. From the anamnesis, it is known that the boy from the first pregnancy, which took place against the background of anemia, the threat of miscarriage, toxicosis, polyhydramnios. Childbirth at 40 weeks of pregnancy. Heredity through mother and father is burdened by oncopathology. At birth, the child weight was 3600, length - 55 cm. The child's condition on the admission is of moderate severity.

At inspection the child is weak, physiological reflexes are not caused, the tone of muscles is diffusely lowered, active movements in hands are minimum, in legs - are absent. When traction by the hands, the head sags back, the head does not hold. The skin is jaundiced, more on the face, torso and proximal limbs, the sclera were subicteric. The abdomen is enlarged, the liver is +3.5 cm. Type I Spinal muscular atrophy was suspected.

Electroneuromyography was performed, myopathic syndrome was detected. The level of creatine phosphokinase in the blood - 340 IU / L. DNA diagnostics was recommended, deletion of the 7th and 8th exons of the SMN1 gene in the homozygous state was revealed. The child was examined by a neurologist (hypoxic-ischemic encephalopathy, acute period, CNS depression syndrome. Spinal muscular atrophy type I. Differential diagnosis included Pompe disease, galactosemia and intrauterine cytomegalovirus infection. The family received recommendations for further treatment and diagnosis of the child. In Italian clinics, the boy received treatment with Zolgensma, which is FDA-approved, based on a viral vector to replace the defective SMN1 gene with a working copy.

So, timely verification of the clinical diagnosis of Spinal muscular atrophy allowed clinicians to correctly interpret the neurological symptoms in a patient with myopathic syndrome and to conduct timely treatment.

### **Korotun O.P.**

#### **DIAGNOSTIC VALUE OF SOME CLINICAL INDICATORS IN IDENTIFYING THE RISK OF BRONCHIAL REMODELING IN CHILDREN WITH BRONCHIAL ASTHMA**

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Respiratory remodeling according to the Inflammatory Theory of the disease is considered to be a multifactorial process that is realized with the participation of many cytokines, chemokines and growth factors. Remodeling is initiated by damage to the epithelium in the process of chronic bronchitis with the subsequent development of such characteristic manifestations as (1) changes in the epithelium and loss of their integrity, (2) thickening of the basement membrane, (3) subepithelial fibrosis, (4) enlargement of the goblet and submucosal glands. (5) hypertrophy and hyperplasia of smooth muscle cells, (6) increased vascularization, especially around the large bronchi.

The study aimed to assess the value of clinical indicators in identifying the risk of bronchial remodeling in children with bronchial asthma. To achieve the goal of the method by simple random sampling, a cohort of 53 children was formed, in which the severe persistent course of asthma was determined. Depending on the characteristics of the rate of acetylation processes, patients were divided into 2 clinical groups: the first (I) group included 25 patients, the second (II) group was formed by 28 school-age children.

The birth-weight of a child less than 2500 g showed high specificity of 97.4 (95% CI 92.0-99.6)% and a moderate predicted value of a positive result of 75.7% (95% CI 41.1-95.7), however, low sensitivity of 8.1% (95% CI 3.5-15.3) showed the probability of bronchial remodeling. The mentioned above birth-weight of a child indicates increased the post-test probability of possible bronchial remodeling by 24.3%, and higher birth weight was associated with a decrease in the probability of this event by 1.5%. The risk ratio with a positive test result was 3.3 (95% CI 0.79-13.7), BP = 1.56 (95% CI 0.4-6.1) with an absolute risk of 0.27.

Indications for passive smoking of children had a moderate specificity 65.8 (95% CI 55.6-75.0)%, but low sensitivity 54.0 (95% CI 43.7-64.1)%, PCPR 61.2 (95% CI 50.2-71.4)%. The posttest probability of this test was + 11.2% and -8.8%. The ratio of the risks of bronchial remodeling with a positive test value reached 2.26 (95% CI 1.3-4.0) with a relative risk value of 1.5 (95% CI 1.1-2.1) and absolute risk - 0.2.

In cases where the source of the harmful effects of tobacco smoke on the child was the mother, the test had a high specificity of 86.8 (95% CI 78.5-92.8)%, but a low sensitivity of 27.0 (95% CI 18.6-36.8)%. The accuracy of this test in detecting bronchial remodeling was 56.9 (95% CI 49.7-69.4)%, relative risk + - 2.05, and probability- - 0.8. probability of positive result increased by 17.2% and decreased by 4.3%. Indications for maternal smoking were associated with a probable risk of formation of structural changes in the bronchi: chances ratio = 2.4 (95% CI 1.17-5.04) with absolute risk = 0.2 and relative risk = 1.5 (95% CI 0.8) -2.7).

Thus, the results of a comprehensive examination of children used as diagnostic tests were mostly reliably specific, but low-sensitive with an unsatisfactory likelihood ratio. The data suggest that none of the proposed tests used to detect a high risk of alteration of bronchial structures had sufficient diagnostic value to detect a high risk of remodeling with a positive result, and, moreover, the exclusion of this risk with a negative test result. Therefore, for this purpose, they should probably be used either in combination (in parallel) or dynamics (sequentially).

**Lastivka I.V.**

### **CLINICAL CASE OF TUBEROUS SCLEROSIS**

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Tuberous sclerosis is one of the phacomatosis genetically caused by a defect in embryonic development with the formation of tumor-like formations, with damage of all organs and systems, but primarily of the skin and nervous system. Frequency among infants - 1:6000-1:10000. Tuberous sclerosis is inherited by autosomal dominant type. 80% of cases are the result of a de novo mutation. The development of Tuberous sclerosis is determined by two genes: TSC1 (encodes the protein hamartin), and TSC2 (encodes the protein tuberin). Used diagnostic criteria were proposed by Roach E.S. in 1999. Treatment is symptomatic. Prevention and early prenatal diagnosis of the disease are important due to the high degree of disability.

Purpose and objectives of the study were to verify the diagnosis of tuberous sclerosis by molecular genetic diagnosis in a child with epilepsy. Material and methods: targeted high-throughput sequencing of clinically important genes, Sanger sequencing.

Clinical case: the family of a 4-year-old boy, who is under the supervision of neurologists for symptomatic epilepsy, consulted a geneticist. Parents were complaining about the presence of spots on the child's skin (from birth), seizures (from 4 months old), feeding problems. The child was born from the second pregnancy, ran on a background of anemia, the threat of miscarriage in the 1st trimester. Childbirth at 38 weeks of pregnancy finished by cesarean section. The baby from the first pregnancy is healthy, the mother is currently pregnant. Parents' anamnesis is burdened by oncopathology.

Examination of the child: on the skin of the buttocks, torso - multiple dense matte white macules up to 0.6 cm and depigmented spots. MRI of the brain: MRI picture of cortical and subcortical focal changes of the brain, characteristic of tuberous sclerosis. DNA diagnosis: mutation p.1869del (p.Asp624Thrfs \* 74) of the TSC2 gene. This mutation was not detected in parents and native siblings. In addition, the patient and his mother were found to carry a pathological mutation p.220C> T (p.Arg74Cys) of the SGSH gene, which is responsible for the development of mucopolysaccharidosis type IIIA. The family was provided with recommendations for further monitoring and planning of subsequent pregnancies. Results: a mutation p.1869del (p.Asp624Thrfs \* 74) of the TSC2 gene was detected in a proband using high-throughput sequencing.

So, the use of modern sequencing methods allowed to identify the pathogenic mutation of Tuberous sclerosis, confirm the clinical diagnosis and conduct medical and genetic counseling in the family.

**Lozyuk I.Ya.**

### **FREQUENCY OF HELICOBACTER PYLORI INFECTION IN CHILDREN WITH INFLAMMATORY DISEASES OF THE GASTROINTESTINAL TRACT**

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Prior to the discovery of *H. pylori* and its relationship with the development of inflammatory diseases of the upper area of gastrointestinal tract (IDUGIT) the main etiological factor in the development of diseases was considered hyperproduction of hydrochloric acid, so all approaches to treatment were aimed at reducing acid-peptic factor using evolutionary anticholinergics, H<sub>2</sub>-histamine blockers and histamine blockers. proton pump. However, studies of their effectiveness in

the treatment of *Helicobacter pylori*-associated pathology have shown a direct correlation between the duration of remission and the course of the drug.

Given the leading place in the structure of digestive diseases in children IDUGIT, one of the determining predictors of the development of which is *H. pylori*, in order to determine its regional frequency retrospectively analyzed 368 "Medical cards of inpatients" children aged 7-18 years who were hospitalized in the gastroenterology department of the regional children's clinical hospital in Chernivtsi during 2010-2014.

The analysis showed that 216 children were infected with *H. pylori*, which is 58.7%. The dynamics of the frequency of *H. pylori* (+) IDUGIT for a five-year period showed fluctuations: a gradual decrease from 2010 to 2012 (from 59.1% to 56.7%) with a further increase in 2014 (60.6%). There was a difference in the frequency of *H. pylori* infection among children with IDUGIT depending on the place of residence. Despite the preservation of the general trend of the dynamics of the prevalence of *H. pylori* among children in Chernivtsi and districts of the region, significantly higher rates were found among people in the regional center (68.5% vs. 31.5%,  $p < 0.05$ ).

The prevalence of *Helicobacter pylori* was analyzed for infection in children depending on age. It was found that among children aged 7-11 years the frequency of infection is slightly higher than among persons aged 12-18 years (68% and 57.2%,  $p > 0.05$ ). However, the analysis of the dynamics of the indicator established an inverse correlation of weak strength between the age of the child and the frequency of *H. pylori* infection ( $r = 0.107$ ).

The structure of *H. pylori* infection in children with IDUGIT is represented by such nosological forms as chronic gastritis (CG), chronic gastroduodenitis (CGD), chronic duodenitis (CD), peptic ulcer (PUD) and duodenal ulcer. The highest frequency of *Helicobacter pylori* infection was found in people with HGD, in the second place - with VH, the third - with HG.

According to the results of retrospective analysis, it was found that the frequency of *H. pylori* infection among children of Chernivtsi region with IDUGIT is 58.7% with probably higher rates among patients with CGD and a tendency to decrease in frequency with age.

**Marusyk U.I.**

**MARKERS OF ATOPIC REACTIVITY IN THE PUPILS,  
WITH SEVERE BRONCHIAL ASTHMA**

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One of the most pressing problems of modern pediatric is allergic disease in children, including bronchial asthma (BA). In different regions of Ukraine this figure ranges from 5 to 9% of child population. Imposing the controlling asthma therapy in children should be considered a feature of the phenotype, defined heterogeneous mechanisms of development, however, is almost identical clinical symptoms. Based on the above, taking into account the performance of atopic reactivity in children that reflect the specific pathogenic mechanisms of realization of asthma, in a comprehensive study of patients will personalize the treatment of asthma and thereby improve treatment of the disease.

Considering this fact the objective of our scientific study was to increase the effectiveness of treatment phenotype of severe asthma in school-age children, taking into account the diagnostic value of indicators atopic reactivity. 60 school-age children with asthma in the remission period were comprehensively examined in the Pulmonology Department of Chernivtsi Regional Children's Clinical Hospital.

Over the course of the disease the patients were divided into two clinical groups. The first (I) clinical group consisted of 30 patients who had been registered severe asthma. The second (II) clinical group formed 30 patients, which was defined moderately severe asthma. For the main clinical features group were not differ. All children performed immunological blood test II - III levels. The contents of serum total immunoglobulin E (IgE), interleukin-4 (IL-4) and interleukin-5 (IL-5) was determined by enzyme-linked immunosorbent assay (ELISA).

The content of total Ig E in serum virtually all surveyed our patients (95,1%) higher than the population normal of healthy children (120 IU/ml), but in patient of the first clinical group it was somewhat higher. Thus, the concentration of total immunoglobulin E in serum pupils with severe asthma was 813,5 IU/ml, and those of other clinical 685,3 IU/ml ( $p>0,05$ ). Whey content of total IgE, which exceeded 545,3 IU/ml, was recorded in 56,6% of children first clinical group and only in 43,4% of the second ( $p>0,05$ ) comparison group.

Comparative analysis of the IL-4 and IL-5 concentration in serum by clinical students in both groups revealed no differences likely, however, marked a half of growth in single patients for severe asthma. Thus, the average concentration of IL-4 in serum of first clinical group children was  $10,6\pm 2,1$  pg/ml, and in those of the second group -  $7,2\pm 2,5$  pg/ml ( $p>0,05$ ). The average content of interleukin-5 in the clinical group was  $35,8\pm 15,7$  pg/ml and  $8,6\pm 4,3$  pg/ml ( $p>0,05$ ), respectively, and testified four times a day in excess of the marker first clinical group. Despite the lack of significant differences of these cytokines concentration in the blood serum of children at the comparison groups, nearly one in three patients (36,4%) on the phenotype of severe asthma recorded significantly increased content of IL-4 (more than 10,0 pg/ml), while the patients the second group - only 15,5% of cases ( $p < 0,05$ ). This specificity (SP) of the above concentrations of IL-4 in peripheral blood of pupils as the verification test of severe asthma phenotype was 84,6% (95% CI 75,9-91,1), but sensitivity (Se) - only 36,4% (95% CI 26,9-46,6), the odds ratio was 3,1 (95% CI 1,5-6,2). On the one hand, it highlights the presence of other inflammatory subphenotype in children with severe asthma phenotype, and the other site the high specificity of this test in the verification of asthma-phenotype.

Thus, concentration of total immunoglobulin E in serum exceeding 545,3 IU/ml in 2 times increased the chances of the presence of severe asthma in children. For the phenotype of severe asthma in 3,1 times increased the risk of high concentration of IL-4 and IL-5 in serum, but this paraclinical test rather suitable for verification of this phenotype (SP – 84,6% (95% CI 75,9-91,1)) than for its detection (Se– 36,4% (95% CI 26,9-46,6)).

**Myslytska H.O.**

## **SELECTED ANAMNESTIC AND IMMUNOLOGICAL RISK MARKERS IN SCHOOLCHILDREN FOR ATOPIC BRONCHIAL ASTHMA**

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Bronchial asthma (BA) in child patients remains an urgent medical and social problem whose prevalence, according to epidemiological studies conducted in child populations, ranges from 5% to 10%, and reaches up to 30% in some countries. It has become obvious that childhood asthma cannot be regarded as a single disease with established mechanisms and laws of development and progress, so studying clinical and paraclinical features of the course of its individual phenotypes is an unsolved but urgent task, since it concerns the identification of predictors and elaboration of differentiated treatment approaches.

To study anamnestic features and increase of total serum IgE, interleukins-4 and -5 concentrations as risk factors for atopic phenotype of bronchial asthma in school-aged children.

A cohort of 64 school-aged children with persisting bronchial asthma (PBA), receiving inpatient treatment for acute conditions in the Chernivtsi Regional Children's Clinical Hospital, was formed by simple random sampling, in order to achieve the set objective. Clinical group I consisted of 38 children with atopic phenotype of BA (APhBA), which was verified taking into account the history of atopic diseases, i.e. atopic genotype realized in the amount of not less than one positive response in prick-tests by non-bacterial allergens). Clinical group II included 26 patients with PBA without any signs of atopy. The groups were comparable in the main clinical characteristics.

Among the school-aged children with BA without manifestations of atopy, BA severity correlated significantly with the frequency of daytime symptoms ( $r = 0.68$ ,  $p < 0.01$ ), episodes of short-acting selective  $\beta_2$ -agonists use ( $r = 0.85$ ,  $P < 0.01$ ), restricted exercise tolerance ( $r = 0.56$ ,  $p <$

0.05) and exacerbation frequency ( $r = 0.51$ ,  $p < 0.05$ ). We have analyzed the prognostic role of elevated total IgE in blood serum and IL-4 and -5 concentrations, whose biological effect was associated with regulation of immunoglobulin E synthesis and support of eosinophilic inflammation in the respiratory tract in the child patients, depending on their atopic status. It has been found that the serum total IgE concentration in the groups exceeded the healthy children population norm (120 IU/ml) and was  $701.3 \pm 56.0$  IU/ml in the schoolchildren with the atopic phenotype of PBA while it was  $491.7 \pm 36.2$  IU/ml ( $Pt < 0.01$ ) in Group II. At the same time, IgE concentrations with more than 125.0 IU/ml were found in 82.6% of Group I cases and 68.7% of Group II cases ( $P > 0.05$ ), with clinical and epidemiological risk indices of atopy: CI = 2.16 (95% CI 1.11-4.22), OR = 1.53 (95% CI 1.3-1.79), AP = 0.19. Besides, a strong probable correlation between the concentration of IL-5 and IgE ( $r = 0.9$ ;  $p < 0.05$ ) in the blood serum of children with the atopic asthma phenotype has been found.

However, the average concentration of IL-4 in blood serum was  $8.6 \pm 1.8$  pg/ml in the children with APhBA, and  $12.9 \pm 3.6$  pg/ml ( $Pt > 0.05$ ) in the patients of Group II; the average concentration of IL-5 in Groups I and II was  $21.3 \pm 17.2$  pg/ml and  $29.6 \pm 9.5$  pg/ml ( $Pt < 0.05$ ) respectively. However, despite the lack of significant differences in the average serum concentrations of these cytokines in children with different inflammatory phenotypes of BA, elevated levels of IL-5 (more than 1.2 pg/ml) were recorded in almost all (94.7%) cases of Group I and only in 87.5% cases of Group II ( $P > 0.05$ ), which increased the risk of atopy as follows: SS = 2.55 (95% DI 0.9-7.34), ORS = 1.74 (95% DI 1.6-1.91), AR = 0.22.

Schoolchildren with atopic persisting bronchial asthma have the most significant skin sensitization to household allergens (house dust, pillow down and feathers, etc.), and the least sensitization to food allergens. Family history with allergic pathology increases the risk of atopic asthma phenotype by 1.85 times and correlates with inadequate control of the course of the disease in the form of nocturnal symptoms and the need for rapid therapy.

**Ortemenka Ye.P.**

## **THE EFFECT OF LONG-TERM USAGE OF INHALED CORTICOSTEROIDS ON PHYSICAL DEVELOPMENT OF CHILDREN WITH BRONCHIAL ASTHMA**

*Department of Pediatrics and Children Infectious Diseases  
Bukovinian State Medical University*

The low adherence of children with bronchial asthma (BA) to long-term control treatment is partly associated with the patients' fear of obesity and growth retardation due to the use of inhaled corticosteroids (ICS).

The aim of the study was to evaluate the physical development of children who have had background long-standing controller therapy of asthma by low/medium or high-dose ICS.

At the pulmonological department of the Regional Children's Clinical Hospital in Chernivtsi city, 50 school-aged patients with persistent BA have been examined. The anthropometric examination has been performed for all patients. The assessment of physical development with the calculation of the body mass index (BMI) of patients has been done by a centile method, taking into account the age of the patients. In the I<sup>st</sup> clinical group, 21 patients under the long-term usage of low/medium doses of ICS were enrolled, and the second (II) group consisted of 29 patients who used long-lasting high-dose ICS to control asthma. These survey results have been analyzed by parametric ( $Pt$ , Students' criteria) and nonparametric ( $P$ , Fisher's angular transformation) methods of biological statistics, and by the methods of clinical epidemiology, considering the odds ratio (OR) and attributive (AR) risks of implementation of the event with the estimation of their 95% confidence level (95%CI).

Analysis of the data has shown that a patients' height was, on average, 50±4,4 percentile, which was corresponding to the average age-related normative values. At the same time, height below (10-25 percentiles) average regarding the age was recorded in 12% of all examined patients, but a low (5-10 percentile) or very low (<5 percentiles) height were noted in only 4 patients (6% and 2% respectively among all patients). Meanwhile, it has been found that the average BMI in the



examined patients was  $20,4 \pm 0.5$  kg/m<sup>2</sup>, which was corresponding to the normostenic structure. Meanwhile, only 5 of examined patients (10%) were overweight (BMI > 25 kg/m<sup>2</sup>), and only one person out of them (2%) had clinically significant (BMI > 30 kg/m<sup>2</sup>) obesity.

From the perspective of evidence-based medicine, the negative impact of the long-term use of ICS, including high doses, on the growth and the body weight of asthmatic children and adolescents had not been confirmed. Thus, the AR of excessive (BMI > 25 kg/m<sup>2</sup>) body weight was 24% and the OR=3.2 (95% CI: 0.33-30.94), but at the same time the AR of short stature (height <10 percentiles) was 18% and the OR=2.3 (95% CI: 0.22-23.88).

Thus, prolonged background therapy by low/medium or high-dose ICS had not had a statistically significant influence on the physical development of school-aged asthma patients.

**Ryznychuk M.O.**

## **THE STATE OF THE CARDIOVASCULAR SYSTEM IN ADOLESCENTS WITH HYPOTHALAMIC OBESITY**

*Department of Pediatrics and Medical Genetics*

*Bukovinian State Medical University*

Hypothalamic syndrome of puberty (HSP) is a symptom-complex of neuroendocrine disorders, expressed by polyglandular dysfunction with disorders of metabolic trophic processes, puberty, cardiovascular, nervous system and occurs as a result of hypothalamic dysfunction.

The aim of our study was to investigate the functional state of the cardiovascular system in children with hypothalamic obesity.

We examined 76 children with hypothalamic obesity (34 girls (44.7%) and 42 boys (55.3%)) who were hospitalized in the endocrinology department of the Chernivtsi Regional Children clinical hospital (RCCH). The average age of the patients was  $15.4 \pm 0.45$  years (11-18 years). The parameters of physical development, state of endocrine, cardiovascular systems in children, state of cerebral vessels with this pathology were studied. 76.3 children lived in the districts of the region and 23.7% in the city of Chernivtsi.

Adolescents with hypothalamic obesity most often complained of excessive body weight (92.1%), increased appetite (89.5%), headache (85.5%) of different intensity, increased blood pressure (89.5%) (10.5%), cardialgia (47.4%), irritability (39.5%). On objective examination, there was uniform obesity of different degrees (overweight, 26.3%; grade I, 40.8%; grade II, 32.9%).

Striae occurred on the hips in 52.6% of children, on the arms in 23.7%, on the chest in 19.7%, and on the back in 6.6% of children. Acrocyanosis occurred in 36.8% of children. Red dermographism was detected in 89.5% of cases, occurring for 2 sec and disappearing for 9 sec. Hyperhidrosis of the palms and feet was found in 76.3% of cases.

The pulse was synchronous on both hands, in all subjects. It was fast, high, of low tension and filling in 28.9% of the subjects. In 71.1% of investigated subjects, the pulse was of usual filling, tension, size and form.

Children's HR was mostly normal in 71.1%, tachycardia was observed in 28.9%. The apex thrust on palpation was within the age norms. In 89.5% of cases, its area was 2 cm<sup>3</sup>, of average height and strength. Blood pressure level was normal at the moment of examination in 89.5% of cases, but with episodic elevations, and in 10.5% of cases there was the 1<sup>st</sup>-degree persistent arterial hypertension.

On biochemical examination, cholesterol levels in 36.8% corresponded to the upper limit of the norm, and 28.9% revealed hypercholesterolemia (5.6-6.0 mmol/l). Elevation of high-density lipoproteins was detected in 34.3% of children. Glucose tolerance test: flattened glycemc curve occurred in 23.7% of cases, and impaired glucose tolerance was detected in 15.8% of cases. The blood insulin level was  $52.4 \pm 0.3$  mIU/ml in 15.8% (the norm was 10-20 mIU/ml), in 23.7% the level was  $31.8 \pm 0.3$  mIU/ml, and in 60.5% of patients, the level was  $17.2 \pm 0.3$  mIU/ml.

All patients underwent ECG. All cases had sinus rhythm, and 85.5% had sinus brady or tachyarrhythmia. Amplification of biopotentials in the left ventricle was detected in 19.7% of cases.

Left bundle branch block was observed in 10.5% and right bundle block in 7.9%. Respiratory arrhythmia was detected in 52.6% of cases.

Treatment was performed according to the Protocol No. 254 of the Ministry of Health of Ukraine dated April 27, 2006.

So, most adolescents with hypothalamic obesity have obesity of the gynoid type, hyperinsulinism is noted, and persistent arterial hypertension, a predictor of metabolic syndrome development, was found in 10,5% of cases.

**Sazhyn S.I.**

## **SPIROMETRIC INDICES TO PREDICT THE SEVERITY OF VIRUS-INDUCED ASTHMA EXACERBATION**

*Department of Pediatrics and Children Infectious Diseases  
Bukovinian State Medical University*

Bronchial asthma (BA) remains a topical medical and social problem. In terms of prevalence, severity, issues in diagnosis, treatment and rehabilitation, BA is the leading disease of the 21st century. A huge economic impact directs health efforts to improve management of the disease and the quality of life of patients and their parents.

Airway hypersensitivity to direct and indirect (including infectious agents) triggers with the appearance of typical symptoms of the disease (wheezing, breathlessness, non-productive cough, etc.) is a pathomorphological consequence of chronic inflammation. The management of exacerbation of bronchial asthma changed due to the COVID-19 pandemic. International documents recommend limiting unscheduled visits to medical establishments during asthma exacerbations and adhering to remote management during the asthma attack.

The aim of the study was to analyze dynamic spirometric indices to predict the severity of asthma attacks and improve patients' management.

On the base of the pulmo-allergological department of the Chernivtsi Regional Children Clinical Hospital, 47 patients hospitalized for virus-induced asthma exacerbation were observed. Depending on the severity of the obstructive syndrome, two groups of monitoring have been formed. The first (I) group included 22 patients with mild to moderate symptoms of BA, the second (II) clinical group formed 25 patients with severe episodes of asthma attack. No significant differences by sex, age, duration of the disease have been shown, indicating that clinical groups comparison were formed correctly.

The spirometric study included the calculation of bronchospasm indices (IBS) after dosed physical exercise and bronchodilation (IBD) after inhalation of a short-acting  $\beta_2$ -agonist at the level of small, medium and large bronchi. The prognostic value was evaluated taking attributive (AR), relative risks (RR), odds ratio (OR) and their 95% confidence intervals (CI).

It was found that among patients of the first clinical group, the average rate of IBD at the level of the small diameter of airways was significantly lower compared with patients with severe asthma exacerbation ( $15,7\pm 4,5\%$  versus  $53,1\pm 4,2\%$ ,  $< 0,05$ ). Average values at the level of the medium and proximal airways were also lower in children of the first clinical group although the difference wasn't significant ( $19,0\pm 4,3\%$  versus  $24,3\pm 4,3\%$  at the level of medium bronchi,  $8,0\pm 3,7\%$  versus  $11,4\pm 4,0\%$  at the level of large bronchi,  $> 0,05$ ). There was no significant difference in IBS among patients of the I and II clinical groups:  $16,8\pm 4,2\%$  versus  $16,6\pm 4,4\%$  in distal,  $21,4\pm 4,2$  versus  $22,8\pm 4,1$  in medium, and  $11,5\pm 3,8\%$  versus  $11,8\pm 4,0\%$  in proximal airways,  $> 0,05$ ). The IBD at the level of small airways with a cut-off point of 45.0% and higher was characterized by an AR of more severe exacerbation within 38,4%, RR – 2,9 (95% CI 1,3-6,9) and OR – 8,2 (95% CI 3,1-27,4).

The dynamic spirometric parameters in particular the index of bronchodilation predict the severity of virus-induced asthma exacerbation in children. Index of bronchodilation higher than 45,0% is a prognostic factor of more severe attack of the disease. Patients with similar spirometric characteristics require more aggressive therapy for bronchial asthma exacerbation including earlier administration of systemic glucocorticosteroids.

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43 , ( ) 19 ,

6,8. GINA , -

23,4 21,9 % , - 44,6 47,3 % ( 0,05). 18,2 % 15,8 %

( 0,05) 51,5 57,9 % ( 0,05). 9,1 % 8,3 % , 63,6 % 66,7 %

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SNAPII, SNAPPEII.  
PELODII, SOFA, PEMOD,

CRIB.

1-

CRIB - 9 , SNAP - 15 , SNAP - 10  
SNAPPEII - 21 , PEMOD - 7 , PELOD - 9  
SOFA - 5

CRIB 36,6%  
23,3% (P<0,05).  
SNAP 50,0% 11,5% (P<0,05),  
SNAPII - 70,0% 46,1% (P<0,05), SNAPPE - 36,6% 26,9%  
( >0,05), PEMOD- 50% 30,7% ( >0,05), PELOD- 80,0%  
30,8% ( >0,05), SOFA - 80,0% 7,7% (P<0,05)

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invivo,



S.appa et all. (2020), 22%  
 (Spoorthy MS, Pratapa SK, Mahant S., 2020).  
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**COVID-19**

COVID-19

6-10%

COVID-19

COVID-19

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SARS-COV-2

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(32,4±0,40 ) ( <0,05).

3297,3±115,84 52,5±0,75

1810,9±80,46

42,2±0,69

( <0,05).

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(r=0,33, p=0,01).

, (r=0,85, p=0,03)

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(91,8%

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(43,5%),

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(57,8%),

(93,7%),

(90,6%)

35,9 ± 3,7%.

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### COVID-19

SARS-CoV-2

COVID-19  
SARS-CoV-2

2,5

5 %

SARS-CoV-2.  
263

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2020  
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263  
( 28 ) - 1,9 %,

12 ) : 25,4 %, (1-3 ) - 13,6 %,  
(3-7 ) - 15,9 %, (7-12 ) - 17,1 %,  
(12-18 ) 25,8 % .  
6,4±0,35, 50,9%.  
65,3%

SARS-CoV-2  
61,9 %, 36,1 %  
1,5

%  
- 47,9 %

20,9 %, -23,1 %, 6 %  
COVID-19 , 16,3 %  
- 83,6 %.

SARS-CoV-2,

COVID-19

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55 12-18 , ,  
 88 « » - 24 .  
 « » 12 . ,  
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- SCL-90-R. (89,4%): , ,  
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 (21,1%), - , ,  
 (94,6%): , , ,  
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 , (34,6%). (46,8%) - (53,2%) (45,2%).

SCL-90. (22,1%), (33,7%) (24,5%),

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 - 66  
 - 34 , - 70,5%), - 32 ( - 13,4 ±0,8 ,  
 ( - 12,1 ±1,1 (p>0,05), - 81,2% (p>0,05).  
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6,2%, 87,5%, 6,3%  
 - 6,7% ( $>0,05$ ), 33,3% ( $<0,05$ ), 60,0% ( $<0,05$ )

6,0-24,8). - 3,0 (95% : 1,4-6,5) - 12,3 (95% :  
 / 78,5% 2 / 21,4%  
 50,0% 57,2% ( $>0,05$ ).  
 2- 2 / 50,0%  
 78,9% (71,4%) ( $<0,05$ ). (21,4%;  $<0,05$ )  $>1$   
 - 3,3 (95% : 2,4-4,6) - 9,2 (95% : 4,8-17,5).

« - 70 » ( 8,6±0,57 , 54,3%  
 13.01.2005 . 18. « », (47,1%) (40,0%), - (8,6%)  
 4,3% - (60,0%), 31,4% -  
 8,6% - (74,3%)  
 (25,7%), 1,4% 94,4%  
 (80,0%).  
 : 0-3 ( ), 4-7 ( ), 8-10  
 ( ), 11 ( ).  
 2 : (42 ),  
 (28 ).

$9,1 \pm 0,67$  ,  $- 8,0 \pm 1,01$  ( 0,05), 57,1% 50,0%  
 ( 0,05),  $- 59,5\%$  67,9% ( 0,05).

2,8, 15% 1,6 (95% : 1,06-2,41), 24,8%.

16,0% ( 0,05). 9,0 / 10,0%

( 0,05),  $161,0 \pm 29,52$  /  $95,4 \pm 13,86$  /  
 $- 189,0 \pm 8,33$  /  $124,5 \pm 19,92$  / ( 0,05).

140 / 4,5 1,6.

( ) , 5 17 5 5

2020 .

$8,3 \pm 1,2$  , 80,0% (n=8), - 20,0% (n=2).

7-11 .  
 $4 \quad 6$  (  $4,6 \pm 0,4$   
 90,0% , - 1

).  
 (10,0%). 2 3 (  $2,7 \pm 0,7$  ).  
 - («Statistica 8.0» StatSoft Inc.)

(90,0%) , , ,  
 : 40,0%  
 (40,0%) (20,0%),  
 4 (40,0%). 6- 40,0% .  
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 (90,0%), (80,0%),

(50,0%).  
 (r= 0,67), (r= 0,62), (r= 0,41).  
 -0,88),

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( ) 12 1 10  
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 «Elabscience» (USA).

NO t-1 ( . )  
 NO  
 (r=-0,41, p<0,05).

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1 ( )	9,9±0,5	1,21±0,05
1-3 ( )	8,3±0,4*	1,34±0,04*
3- ( )	7,3±0,4*	1,49±0,05*

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 1 (p<0,05)

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13,8%,

- 51,5% (95% 41,8-61,5)

, - 1,8.

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**Babintseva A.G.**

## **OXIDATIVE STRESS AND NEONATAL ACUTE KIDNEY INJURY**

*Department of Pediatrics, Neonatology and Perinatal Medicine*

*Bukovinian State Medical University*

Neonatal acute kidney injury (AKI) is a frequent consequence of hypoxic encephalopathy (HE) and is associated with worse outcomes. Oxidative stress (OS) is the main factor responsible for the development of typical infant diseases, including both HE and AKI (Cavallin F. Et al., 2020; Lembro C. Et al., 2021).

The objective of this research is to study different components of pro-oxidant system and antioxidant defense system in full-term critically ill newborns without and with AKI.

Sixty six full-term critically ill neonates were selected for this prospective study. The first group included 36 neonates without AKI, the second group included 30 neonates with AKI. The definition of AKI proposed by Jetton and Askenazi based on the Neonatal Acute Kidney Injury classification was used: increase of SCr by 0.3 mg/dl (25.6  $\mu$ mol/l) or by 150-200% from the previous value and/or level of urine output less than 0.5 ml/kg/h for 6 to 12 hours.

The level of oxidative modification of proteins (OMP) and concentration of malonic dialdehyde (MDA) in erythrocytes as pro-oxidant markers were established. The concentration of

ceruloplasmin (CR), activities of catalase (CT) and gamma-glutamyl transpeptidase (GTP) in plasma, activities of glucose-6-phosphate dehydrogenase (G6PD) and glutathione reductase (GR) in erythrocytes as antioxidant markers were established. The parametric methods were used for statistical analyses.

The analysis of more than 50 possible perinatal risk factors promoting development of AKI in critically ill full-term infants was made. Mother's age more than 35, chronic urinary pathology and gestational pyelonephritis in mother, Apgar scoreless then 3, arterial hypotension, and prescription of some medications are statistically significant.

In the first group the level of OMP was  $1.04 \pm 0.02$  optical density per milliliter of erythrocytes, in the second group was  $1.16 \pm 0.01$  optical density per milliliter of erythrocytes,  $p < 0.001$ . The results of adduct formation on the protein level may be associated with numerous cytotoxic consequences including the disturbance of cell signaling, altered gene regulation, inhibition of enzyme activity, mitochondrial dysfunction, impaired energy metabolism, altered tertiary structure and finally loss of cytoskeletal formation.

The concentrations of MDA in erythrocytes were  $24.2 \pm 0.39$   $\mu\text{mol/l}$  and  $24.9 \pm 0.48$   $\mu\text{mol/l}$  respectively,  $p > 0.05$ . Additionally, we noticed that cut-off level of urine MDA  $12.9$   $\mu\text{mol/l}$  had high specificity (91.4 %) for identification of AKI. MDA is a toxic final product of lipid peroxidation and most of the time reactive compound. Thus, the high lipoperoxidation of membrane lipids in these newborn may lead to alteration in the functional properties of the lipid bilayer of cell membranes, with consequent deep changes in its permeability and develop of the pathological cascade of OS.

Our results have shown a considerable imbalance between different components of antioxidant system in newborns with AKI. In the first group the level of CP was  $222.2 \pm 6.04$  mg/l, in the second group was  $197.3 \pm 3.15$  mg/l,  $p < 0.001$ ; activities of Ct were  $7.03 \pm 0.32$   $\mu\text{mol/min}\cdot\text{l}$  and  $9.8 \pm 0.29$   $\mu\text{mol/min}\cdot\text{l}$  respectively,  $p < 0.001$ ; activities of GTP were  $107.5 \pm 1.19$  UI/l and  $66.6 \pm 3.17$  UI/l respectively,  $p < 0.001$ . The activity of G6PD in the first group constituted  $1.56 \pm 0.04$   $\mu\text{mol/min}\cdot\text{l}$ , in the second group –  $1.88 \pm 0.06$   $\mu\text{mol/min}\cdot\text{l}$ ,  $p < 0.001$ ; GR activities were  $2.27 \pm 0.06$   $\mu\text{mol/min}\cdot\text{l}$  and  $2.09 \pm 0.06$   $\mu\text{mol/min}\cdot\text{l}$  respectively,  $p = 0.041$ .

The full-term neonates with severe HIE and AKI were characterized by imbalance of the components of pro-oxidant system and antioxidant defense in comparison with those who did not have it. Nevertheless, our study is restricted to some extent: a single-center study; a small patient cohort; other mediators may possibly be more important; it would be useful to indicate oxidative markers in patients with therapeutic hypothermia.

**Bodnar B.M.**

## **ONLINE DIAGNOSTICS AND MANAGEMENT OF HEMANGIOMAS IN CHILDREN**

*Department of Pediatric Surgery and Otolaryngology  
Bukovinian State Medical University*

Hemangiomas constitute 80% of all benign tumors in children. There are no clear diagnostics criteria enabling to evaluate growing or regress of this kind of tumors. This leads to choosing of wrong tactics by general practice doctors of unreasonable "waiting". We have found that family physicians, emergency physicians who do not pay enough attention to this disease, in most cases recommend observation during a year, which is unacceptable, as precious time is lost.

Our aim is to draw the attention of the medical community and parents to the problem of hemangiomas in children. Treatment should begin from the first doctor's physical examination, after diagnosis verification.

The Department of Pediatric Surgery created an on-line service "Surgiderm" - "Together we will defeat the disease" for providing preventive work among parents of Chernivtsi region, timely diagnosis, treatment and rehabilitation of children.

This allows receiving a highly qualified remote consultation from the city and any district of the region, the consultant's e-mail is provided. If a child is diagnosed with hemangioma on any part of the body, regardless of age, parents should measure it with a simple ruler, take a photo on a

Smartphone and send this photo to the e-mail of the Department of Pediatric Surgery and receive a remote specialist's opinion.

In case of the diagnosis confirmation, parents need to contact a family doctor which will fulfill the e-appointment to the Children's Clinical City Hospital, Department of Pediatric Surgery.

The child receives a necessary treatment and appointment to the supervision of a family doctor with clear recommendations for further treatment in an outpatient care. Further monitoring can be provided on-line.

The online system provides fast and qualified aid to parents, pediatricians and family doctors. Practitioners can obtain through the online system the necessary verified information about hemangiomas in children. Children can receive a highly qualified remote consultation from the city and any district of the region, and receive the necessary treatment without losing of time.

The organization of the remote online system makes it possible in real time to improve diagnostics process, prevent losing of time of the treatment. It creates an opportunity to organize constant parents-child-doctor-child-parents contact, which will provide an opportunity to work together to defeat the disease.

**Bodnar O.B.**

## **LOCAL IMMUNITY STATUS AFTER SURGICAL TREATMENT OF PAYRE'S DISEASE IN CHILDREN**

*Department of Pediatric Surgery and Otolaryngology  
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Surgical treatment of Payre's disease in children should be comprehensive and consist of three stages: preoperative preparation, surgery, postoperative period. The success of treatment significantly depends on the state of local immunity status in the colon, disturbance of which leads to colitis, advance of endogenous intoxication syndrome and complications of the postoperative period. The formation of local immunity is significantly influenced by the intestinal microflora, under the influence of which the immune response is formed. Lysozyme and other active compounds that stimulate the immune system are released with the participation of microorganisms.

The aim of the research is to define the indicators of the immunity status before and after surgical treatment of Payre's disease in children and to compare with healthy children local immunity status.

Local immunity status of 20 children with Payre's disease before and after operation and healthy children (n-30) was compared. Secretory immunoglobulin A and lysozyme of children with Payre's disease and 30 practically healthy children were examined. The concentration of secretory immunoglobulin A and the level of lysozyme in coprofiltrates of children were studied as immunological markers.

The concentration of secretory immunoglobulin A in children with Payre's disease before surgery was 11% lower in comparison with the index in healthy children. Lysozyme concentration before the operation was 21% lower in comparison with concentration in healthy children. However, after the operative treatment, the concentration of secretory immunoglobulin A 10% increased in comparison with previous indicator but not gained the indicator of concentration of secretory immunoglobulin A in healthy children. Lysozyme concentration indicator reached the level of healthy children after performing surgery.

In children with Payre's disease there is a decreasing of specific (secretory immunoglobulin A) and nonspecific (lysozyme) factors of local immune protection to 11% and 21% respectively. Surgical treatment of Payre's disease allows to increase the indicator of concentration of secretory immunoglobulin A to 10% and indicator of concentration of lysozyme to normal level.

**Bohdanova L.O.**

**TREATMENT OF CARDIOVASCULAR DISEASES IN CHILDREN ACCORDING TO  
THE FEATURES OF CIRCADE RHYTHMS**

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The theory of biorhythms has a thousand-year history. It is known that in all pathological conditions, desynchronosis occurs in the body, which correlates with the severity of the disease. Therefore, it becomes necessary to use drugs taking into account the rhythm of the body's sensitivity to their effects, that is, chronopharmacodynamics.

In the human body, the most noticeable in terms of rhythmic activity, which is manifested by the rhythms of changes in heart rate and blood pressure, is the cardiovascular system.

In most children with primary arterial hypertension (PAH), the highest blood pressure (BP) is observed between 12:00 and 18:00. With increasing severity of arterial hypertension (AH), the shift of acrophase increases towards nighttime.

When prescribing antihypertensive drugs, it is recommended to use a preventive chronotherapy regimen (taking the drug 1.5-2 hours before acrophase of blood pressure or minute volume of blood circulation. Blood pressure stabilization with chronotherapy occurs 6-9 days earlier than with traditional therapy. It has been proven that short-acting antihypertensive drugs are best used 1.5-2 hours before the acrophase of blood pressure, and prolonged ones - 4-8 hours. If blood pressure is high at night, then prolonged-acting drugs should be used, if low, then short-acting drugs in the 1st half of the day.

It is noted that the use of prolonged angiotensin-converting enzyme inhibitors (ACEI) in patients with hypertension leads to a decrease in blood pressure and to the normalization of its circadian rhythm. In this case, the drug is prescribed once a day. Thus, the use of ramipril in the evening (at 9 pm) has a more pronounced decrease in blood pressure at night, and when it is administered in the morning, morning and afternoon rises in blood pressure are better controlled. In the treatment of hypertension in children with metabolic syndrome (MS), the use of beta-blockers (BB), short-acting calcium antagonists (CA), and thiazide diuretics is not indicated. ACEI are widely used (mainly 2nd and 3rd grade). With the evening appointment of an ACEI, a deeper decrease in blood pressure occurs at night.

The appointment of prolonged dihydropyridine CA is justified, which ensures adequate daily blood pressure control. In patients with a dippers-type blood pressure profile, amlodipine and prolonged-release nifedipine do not disturb the daily blood pressure profile, no matter what time of day (morning or evening) the drug was administered. However, in patients with "non-dippers" desynchronosis, these drugs help to normalize the daily blood pressure profile. Taking into account the circadian rhythm of hypertension, ACEI, CA, ARB (angiotensin receptor blockers) act most effectively in the evening, and BB in the morning. With a hyperkinetic type of blood circulation, preference should be given to beta-blockers, with a hypokinetic type - an ACEI.

When studying the chronoeffectiveness of cardiac glycosides in patients with heart failure, it was found that the maximum therapeutic effect is achieved when strophanthin is prescribed in the morning, korglikon - in the afternoon, digoxin - in the evening. Due to the presence of more unfavorable shifts in hemodynamic parameters in the second half of the day in chronic heart failure, it is proposed to use inotropic drugs and peripheral vasodilators mainly in the evening hours.

In hypertension of heart failure, a violation of oxidative phosphorylation and the development of energy deficiency with destabilization of cell membranes (pacemakers of circadian rhythms) is a pathogenetic basis for the use of L-carnitine preparations. When using them, it must be borne in mind that in the morning hours they enhance energotropic processes in the body, and in the evening - trophotropic ones.

Chronotherapy in pediatrics makes it possible to individualize the treatment of each patient to the maximum extent, to increase its effectiveness and safety. Prescribing drugs, taking into account the circadian sensitivity of the body to them, increases the effectiveness of treatment at significantly lower course doses.

**Dronyk . . .**

## **CLINICAL MARKERS OF GASTROENTEROLOGICAL DISORDERS IN NEWBORNS WHO HAVE UNDERGONE PERINATAL PATHOLOGY**

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According to scientific publications, the prevalence of digestive pathology occupies one of the leading places in the structure of morbidity among children, in particular, functional disorders of the gastrointestinal tract (GIT) occupy from 60% to 95% in the overall structure of gastrointestinal pathology. Premature babies have an immature gastrointestinal tract, a lower ability to digest nutrients than full-term babies, which can impair their absorption and is a major problem in their care.

The study aim is to investigate clinical markers of gastrointestinal disorders in newborns who have undergone perinatal pathology. An examination of 148 premature infants was conducted. The first group consisted of 91 children, 29-36 weeks of gestation, who had a difficult condition after birth, the second group included 57 relatively healthy children, 35-36 weeks of gestation.

Based on the results of somatic health and obstetric and gynecological history depicted mothers having a set of risk factors, the implementation of which led to the birth of children with perinatal pathology, namely: combined somatic and gynecological pathology of the mothers, burdensome obstetric history, complications of pregnancy and childbirth. Disorders of adaptation in the neonatal period were caused by manifestations of respiratory distress syndrome in 91 cases (100.0%), asphyxia in 25 children (27.47%), neonatal encephalopathy in 65 children (71.43%), prematurity in 91 cases (100.0%), multiple organ failure in 42 cases (46.15%), anemic-hemorrhagic syndrome in 23 cases (25.27%). In the neonatal period there were clinical symptoms of perinatal pathology, which was accompanied by a syndrome of vegetative-visceral dysfunction, that in turn, included disorders of the gastrointestinal tract, in particular 44 newborns of group I (48.35%) showed a significant decrease in sucking reflex, 47 cases (51.65%) showed lack of sucking reflex, decreased food tolerance was evident in 83 cases (91.12%), vomiting in 70 newborns (46.92%), intestinal paresis in 48 cases (52.75%), delayed meconium excretion in 20 newborns (21.98%), flatulence in 43 babies (47.25%). 41 cases (45.05%) were diagnosed with functional disorders of the gastrointestinal tract in premature infants with severe perinatal pathology as one of the manifestations. In addition to conventional methods, the newborns underwent additional coprofiltrate testing to determine markers of inflammation: albumin level, alpha-1-antitrypsin level, secretory immunoglobulin A level, fecal elastase-1 level, PMN-elastase level, calprotectin level, content of fat, starch and food remnants as well as indicators of the biochemical spectrum of blood which characterize the functional state of pancreas: the activity of amylase, lipase, trypsin, leucine aminopeptidase in serum; determination of amylase levels in urine.

Adverse factors of the perinatal period can lead to the development of hypoxia, impaired adaptation of the newborn and provoke, in particular, the development of gastrointestinal pathology. In newborns who have undergone perinatal pathology, clinical markers of dysfunction of the gastrointestinal tract have been identified, which, in turn, requires the development of directions for prognosis, diagnosis, prevention and correction to notify the development of chronic gastrointestinal pathology.

**Frunza A.V.**

## **THE ROLE OF URINARY 2-MICROGLOBULIN IN PREDICTING TUBULAR DAMAGE IN PREMATURE INFANTS OF DIFFERENT GESTATIONAL AGES**

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Premature newborns (PN) are at higher risk of development severe renal damage, especially acute kidney injury (AKI). This syndrome is independently associated with pathological consequences and increased mortality (McCaffrey, 2015). The incidence of AKI is higher in PN with very low birth weight (VLBW) and extremely low birth weight (ELBW). It is also varied by

gestational age (GA), occurring in 48% of patients born at 22-29 weeks, 18% of patients born at 29-36 weeks (Jetton et al., 2015). ELBW PN also showed different aspects of glomerular or\and renal dysfunction. Many modern studies show that there are perspective biomarkers for identification of early stages of renal impairment, for example, cystatin-C (urinary and plasma measurement), kidney injury molecule-1 (KIM), urinary 1-microglobulin (U 1-MG), urinary 2-microglobulin (U 2-MG), urinary albumin (UAlb) (Askenazi et al., 2016).

Objectives: the aim of our study was to identify the role of U 2-MG in prediction of tubular dysfunction/injury in PN with different GA (24 - 36 weeks). Our study included 68 PN admitted to the NICU at the Clinical Maternity Hospital 2 (Chernivtsi, Ukraine) in 2018-2020. The inclusion criteria were as follows: the GA is more than 24 weeks and less than 37 weeks; birth body weight (BBW) is more than 500 g and less than 2500 g; presence of clinical signs of severe perinatal pathology. The inclusion criteria were as follows: the GA is less than 24 weeks and more than 37 weeks; BBW is less than 500 g and more than 2500 g; preterm neonates with any congenital abnormalities of the kidneys and urinary tract; early neonatal sepsis. The evaluation of severity of perinatal pathology was performed by using neonatal Therapeutic Intervention Scoring System (nTISS) (Richardson et al., 1993). All patients had a nTISS score at least 10 points or more and demonstrated moderate or severe heterogenic perinatal pathology with multiple clinical signs. The patients were divided into three groups: the Group I was - 25 PN at the GA of 24-31 weeks, the Group II – 25 PN at the GA 32-33 weeks, the Group III – 18 PN at the GA of 34-36 weeks. U 2-MG was measured using the competitive immuno-luminescence assay. Statistical analyses were performed using the statistical software Statistica.

U 2-MG is a protein with low molecular weight, normally excreted by all nuclear cells and filtered at the glomerulus. Total reabsorption by proximal tubular cells is the last phase of U 2-MG metabolism. The elevation of levels U 2-MG is an early marker of tubular dysfunction, especially in case of ischemic or reperfusion renal damage. The main researchers (Askenazi et al., 2011; Jetton et al., 2015) described that U 2-MG decreased with increasing GA. In our study we established opposite result with increasing levels of U 2-MG in PN with lower GA (Group I - 4.89 [2.86; 6.99] mg/l, Group II - 3.4 [2.9; 3.8] mg/l; Group III - 6.15 [4.11; 6.85] mg/l; Kruskal-Wallis test, p-value = 0.0014).

Our results demonstrated that PN with severe heterogenic perinatal pathology has different aspects of tubular dysfunction. According to changes in urinary levels, analysis demonstrated direct correlations between GA and U 2-MG ( $p < 0.05$ ), however, longer longitudinal cohort studies on PN are required to establish the predictive and diagnostic role of U 2-MG in these patients.

**Godovanets O.S.**

## **PECULIARITIES OF THE BIOCHEMICAL SPECTRUM OF BLOOD IN PREMATURE NEWBORN IN CONDITIONS OF PERINATAL PATHOLOGY**

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Antenatal hypoxia has a significant and often irreversible effect on various aspects of fetal life and adaptation of the newborn, especially in cases of premature birth. Although, according to some authors, moderate intrauterine hypoxia contributes to a certain degree of adaptation of the newborn, our observations of newborns during the implementation of perinatal risk factors are a prerequisite for the deterioration of the child's ability to adapt to environmental conditions. The combined effect of adverse factors is the cause of severe forms of maladaptation, accompanied by significant metabolic disorders.

The purpose and objectives of the study: to determine the features of the biochemical spectrum of blood in premature infants depending on the severity of the condition in the early neonatal period.

A comprehensive clinical and paraclinical examination of 102 newborns from gestational age from 30 to 37 weeks who had impaired adaptation or nosological forms of pathology in the first week of life. The first group consisted of 25 children who had clinically moderate maladaptation

after birth, the second group - 25 children whose condition was moderate, and the third group - 25 newborns in serious condition. The control group included 27 relatively healthy children born at 34-36 weeks of gestation.

Determination of serum biochemical parameters of children (levels of total protein, albumin, total bilirubin and its fractions, glucose, urea, uric acid, cholesterol, triglycerides; activities of ALAT, AcAT, LDH, LF, GGT; concentration of calcium ions from the use of iron, iron) "ULTRA" analyzer from "Kone" company (Finland) and "PARAGON" electrophoresis device from "Bekman" company (Austria). Statistical processing of the obtained data was performed using a package of applications for medical and biological research "STATGRAPHICS" (2017) on a personal computer.

Intrauterine hypoxia of the fetus causes a restructuring of the main metabolic processes in the body of the premature newborn, which is confirmed by changes in the biochemical spectrum of serum, which are more pronounced in terms of perinatal risk factors. Thus, in children of the first group of observation, compared with relatively healthy premature infants, there was a sufficient level of glucose, total protein and albumin with a decrease in the enzymatic activity of ALT, AST and LDH. This indicates a certain compensatory activation of the metabolism of newborns under conditions of mild hypoxia. In children of the II group there was a decrease in glucose levels, excessive activation of LDH, AST and ALT enzymes, along with an increase in total bilirubin. The presented biochemical changes indicate a violation of energy-generating mechanisms and suppression of cellular functions in moderate oxygen deficiency. In children of the III group there was a decrease in the level of total protein and albumin, an increase in the level of urea and uric acid, along with an increase in glucose levels. These changes were accompanied by biochemical manifestations of cytolytic syndrome and hypercholesterolemia.

Thus, clinical manifestations of maladaptation in premature infants are accompanied by significant changes in blood biochemical parameters, the depth of which correlates with the severity of the newborn, which requires in-depth study to improve the direction of intensive care in perinatal pathology.

**Kalutskyi I.V.**

### **LEVEL OF DYSBIOTIC CHANGES IN PATIENTS WITH CHRONIC PURULENT SUPERCHAIN SINUSITIS**

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The aim of the study was to determine the effectiveness of probiotics in the treatment of patients with chronic purulent maxillary sinusitis.

81 patients with chronic purulent maxillary sinusitis (CPMS) in the acute stage were observed aged from 15 to 68 years without concomitant pathology. Clinically, exacerbation of CPMS was manifested by typical local and general symptoms in all the patients. The diagnosis took into account the data of X-ray examination, and the main criterion for diagnosis was a diagnostic and therapeutic puncture of the maxillary sinus, which was performed in 81 patients. The sinus volume, which was reduced in all subjects, and the nature of the pathological contents in the lavage fluid were assessed. Upon admission to the hospital in patients with CPMS in the acute stage, purulent exudate was taken from the maxillary sinuses, which was subjected to microbiological examination, and isolation and identification of microorganisms persisting in the exudate were performed. The species composition and population level of viable (colony-forming) microorganisms in 1 ml of exudate were detected in each pathological material.

The study of the species composition of the microflora of the exudate from the maxillary sinuses found that the leading microorganisms released from the exudate in patients with CPMS are str. pneumonie, Escherichia coli, moraxella catarallis, Staphylococcus aureus, pseudomonads and pyogenic streptococcus. In some patients the disease was found to be caused by associations of opportunistic pathogens.

Considering the fact that a significant number of inflammatory processes occur in the background of reduced body resistance and dysbiotic changes of the intestine, all patients with exacerbation of CPMS underwent a microbiological examination of the colon cavity in order to determine the species composition and population level of autochthonous and allochthonous representatives, and degree of dysbiotic changes.

The results of microbiological study show characteristic changes in the species composition of anaerobic and aerobic autochthonous, facultative and allochthonous microflora of the contents of the colon cavity, significantly differing from the species composition of the microflora of the colon cavity within normal limits.

In patients with CPMS, the main part of the microflora of the colon is represented by bacteroids, lactobacilli, non-pathogenic *Escherichia coli*, proteas. Physiologically beneficial bifidobacteria are completely eliminated from the colon in 12.7% of patients with sinusitis. Against this background, the percentage of patients with facultative opportunistic anaerobic (peptococcus, clostridia) and aerobic (staphylococci) bacteria is increasing. This fact necessitated the determination of the population level of all viable microorganisms isolated from the cavity contents of the colon of patients with CPMS.

Characteristic of microbiocenosis of the colon cavity of patients with CPMS is a pronounced deficiency of autochthonous obligate physiologically useful bifidobacteria and lactobacilli. Thus, the population level of bifidobacteria decreases by 51.04%, lactobacilli - by 23.46%. At the same time, the number of anaerobic gram-negative bacteroids and aerobic non-pathogenic *Escherichia coli* significantly increases in the content of the colon cavity (by 17.59% and 21.49%, respectively). At the same time, the population level of optional opportunistic anaerobic and aerobic microorganisms - clostridia, peptococcus, proteins, staphylococci - increases.

The results suggest that in CPMS, all patients develop intestinal dysbacteriosis or dysbiosis, mainly of the second degree due to elimination and severe deficiency of indigenous viable bacteria, which reduces the immune status of patients, affects the severity of clinical manifestations of the underlying disease, including CPMS course. Probiotic drugs have a therapeutic effect not only due to the direct effect on the opportunistic microflora, but also due to the stimulation of non-specific resistance factors.

**Khashchuk V.S.**

## **ADHESIVE BOWEL OBSTRUCTION SIMULATION AT DIFFERENT SURGERIES IN EXPERIMENTAL TRIALS ON RATS**

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According to scientific studies surgery performed on adhesive bowel obstruction account for 2.4% of the total number of operations on the abdominal cavity organs. There is no need to peritoneal defects, because the mesothelium present in the abdominal cavity located on these defects, is implanted and prevents the formation of adhesions. Obstruction that develops later than 3 weeks after surgery is associated with the transformation of new connective tissue into fibrous scar tissue. Adhesive bowel obstruction can be suspected on the basis of symptoms, physical examination and risk factors. Usually to confirm the diagnosis, identify the location of the obstruction and complications such as ischemia, necrosis and perforation modern methods of examination are required. Adhesions are not always symptomatic; however, in many patients, adhesions lead to a wide range of complications that occur months or even many years after surgery. Adhesion-related complications include small bowel obstruction, infertility in women, chronic abdominal or pelvic pain, and difficulty in relaparotomy.

In experimental investigation we assessed intraperitoneal adhesions with different surgical pathologies, such as anastomosis of the small intestine, anastomosis of the large intestine and intestinal ischemia. The purpose of investigation is to study stages of abdominal adhesions in rats according to Zühlke scale (0-4) at that surgeries.



Distribution of operated rats with surgical pathologies (n=30): first group – 10 rats with anastomosis of the small intestine, second group – 10 rats with anastomosis of the large intestine, third group – 10 rats with intestinal ischemia. First open surgery included simulation of surgery type, second step – relaparotomy for adhesion development assessment. Terms of relaparotomy, assessment of adhesions and observation of them from 5 to 7 days after second operation without dividing them according to the age and gender were carried out.

In I group (10 rats) in the first 7 days after surgery with adhesion syndrome had 2-3 mark according to Zühlke scale. In II group (10 rats) adhesion syndrome over 7 days of postoperative period at rats had 0-1 point of estimating. In III group (10 rats) over 7 days of postoperative period had 3-4 point of estimating. Du to statistic data indication the most vulnerable process after surgery is ischemic bowel injury.

According to the research, the most pronounced adhesion process was found in the 3rd experimental group (intestinal ischemia), which is 3-4 points according to the Zühlke classification. The lowest severity of adhesion process was in group 2 (0-1 points). And 2-3 points in the 1st group - anastomosis of small intestine. This trial indicates a high risk of adhesions development in small intestine ischemia.

**Khodzinska Yu.Yu.**

### **LIFE QUALITY INDICATORS OF SCHOOLCHILDREN BEFORE AND DURING THE IMPLEMENTATION OF HEALTH PROGRAMS.**

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Quality of life is a multifactorial and includes physical, mental, emotional, and social functioning. Its development depends on the socioeconomic factors, moreover educational level is the most significant one. Education implies learning: knowledge, behaviours, skills and attitudes that can influence health and wellbeing. The health-promoting program has an aim to provide support and preventive measures to improve the health of school children, which can be associated with their cognitive development, learning, and academic performance. It is a process that lead to increase young people's competencies in understanding and influencing lifestyles as well as living conditions. Instruments for children must be short, simple, and easy to complete, taking into account cognitive developmental level in reading skills and emotional maturity to match different developmental stages. An affordable and common method of assessment quality of life is using standard surveys, but some of them are focused on a specific disease and do not pay enough attention to healthy children.

The goal of the research was to identify variation of the health-related life quality indicators during the health-saving program at school. Such program was implemented in secondary school of Chernivtsi region and include the elements of breathing exercises according to the Strelnikova method, jogging, eye gymnastic. In general, 45 children of both sexes in age 10-15 years were examined. The general condition, self-assessment of health, physical and psychoemotional functioning was evaluated. Positive associations were found between childrens' weekly total physical activity at school and total health-related quality of life. The schoolers felt less fatigue in the classroom and have a better night's sleep, better indicators of spirometry "flow-volume".

To conclude, the health-promoting program at school is a crucial tool for providing a healthier environment, using interactive learning methods, building better communication and seeking partners and allies in the community, to promote schoolers' health and well-being.

**Kovtyuk N.I.**  
**FEATURES OF QUALITY OF LIFE IN CHILDREN**  
**DEPENDING OF THE NOSOLOGY**

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Quality of life is one of the components of health which is based on subjective perception. Any disease can significantly affect the psychology and behavior of the child. Without understanding the internal picture of health, it is impossible to understand the picture of the disease, to form an idea of the child's reaction to the disease. These aspects describe the indicators of quality of life, which are increasingly being implemented in medical practice. The study of the constituent factors allows to determine the level of quality of life (QOL) of both an individual child and whole groups. To date, there is a significant increase in neurological pathology among school-age children, including epileptic syndrome and epilepsy. According to data, epilepsy occurs in 4-5% of the child population. Fortunately, in childhood, thanks to the achievements of modern science, the treatment of epilepsy has become effective in 70-80% of cases. Despite this, the disease often becomes chronic and in some cases leads to disability. In the treatment of children with neurological diseases, the main attention is paid to clinical indicators and practically does not take into account the subjective component. Most nootropic drugs used in pediatrics cause general stimulation of nervous activity without affecting the subjective perception of the environment.

The aim of this study was to determine the presence of hopantothenic acid on the QOL of children with epilepsy. To achieve this goal, we examined 42 children. The mean age of the patients in the sample was 11.2 years. Children were randomly divided into two groups comparable in age and clinical indicators - the main (22 children) and control (20 children) depending on the nootropic drug. The first examination was performed after the adaptation period (1-2 days) in the hospital, the second - in 4 weeks. The quality of life of children was assessed by the adapted questionnaire CHQ-SF87v.3. Statistical processing of the results was performed using standard methods of variation statistics and correlation analysis using the software package Statistica 6.0 for Windows and QuattroPro 12.0 for Windows. The probability of difference was assessed by Student's test at  $p < 0.05$ .

Indicators of quality of life in children of the main group had a positive trend, which was associated with increased activity and efficiency of children, improving emotional balance. The frequency of such subjective manifestations as feelings of anxiety and insecurity has decreased. This generally led to an improvement in the overall rate of QOL ( $73.2 \pm 4.9\%$ ), which after the course of treatment did not have a significant difference ( $83.1 \pm 5.2\%$ ,  $p > 0.05$ ).

As can be seen, the use of nootropic drugs in epilepsy has a positive effect on the psychological state of children. We believe that during the diagnostic and treatment process of neurological patients, the doctor's attention should be focused not only on providing objective diagnostic and therapeutic options, but also on improving the parameters of quality of life.

**Levytska S. .**  
**HEREDITARY DETERMINED LEVEL OF PRODUCTION OF IL-1BETA AND IL-4 AS**  
**THE RISK FACTORS OF CHRONIC SINUSITIS IN CHILDREN**

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Pediatric sinusitis is a common problem treated by primary care physicians and otolaryngologists. Although this disorder has been addressed for many centuries, full appreciation for its scope, pathophysiology, diagnosis, treatment, and complications has been realized only relatively recently. Children with occasional episodes of acute sinusitis following a routine cold are treated with short courses of antibiotic therapy with good results. However, treatment of chronic and recurrent sinusitis can be more challenging for physicians and frustrating for families. In these cases, the physician must not only treat with an appropriate antibiotic but must also address the associated conditions contributing to the problem.

Mutations of the interleukins genes may determine the balance between cytokines production and affect the development of chronic sinusitis.

A hundred of children with chronic sinusitis (CS) were genotyped for the IL-1 (C-511T) single nucleotide polymorphism (SNP) and the IL-4 (C-590T) SNP as well as 35 children of the control group (CG).

The mutant T-allele of -511 SNP of IL-1 gene was associated with increasing of IL-1 production ( $71,17 \pm 3,23$  pg/ml vs.  $62,21 \pm 2,17$  pg/ml;  $p < 0,05$ ) as well as T-allele of -590 SNP of IL-4 gene - with increasing of IL-4 production ( $65,73 \pm 3,98$  pg/ml vs.  $46,03 \pm 1,37$  pg/ml,  $p < 0,05$ ). Significantly higher frequency of the T-allele of the IL-4 SNP was revealed in CS-children (43,5% vs. 24,3%,  $p < 0,05$ ). The CC-genotype of the IL-1 dominated in the CS-children (46% vs. 22,9%, OR - 2,9 (CI-1,2-6,9)) as well as domination of the CT-genotype (65% vs. 42,9%, OR-2,5(CI-1,1-5,4)) and TT-genotype (11% vs. 2,9%, OR-4,2 (CI-0,5-33,8)) of the IL-4 SNP was found in CS-patients.

Thus, T-allele of the IL-1 (C-511T) SNP decreases and T-allele of IL-4 (C-590T) SNP increases the risk of the development of chronic sinusitis.

### **Mabrouk Ben Othmen**

## **THE FEATURES OF CLINICAL MANIFESTATIONS IN CHILDREN WITH ACUTE OBSTRUCTIVE BRONCHITIS AND THEIR ASSESSMENT**

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The Broncho-obstructive syndrome is one of the most urgent problems of pediatrics. Its relevance is primarily caused by high prevalence of this pathology, especially among infants. Acute obstructive bronchitis (AOB) often has lingering course, recurrent episodes of bronchial obstruction are observed in some children. Therefore, it is important to carefully study the features of clinical manifestations in children with AOB and their assessment for early diagnosis of pathogenic changes leading to repeated episodes of obstruction.

Goal of the study was to assess the features of clinical manifestations of acute bronchitis in children with obstruction and without it. The Study was conducted with 143 participants aged 7 to 16 years (83 boys and 60 girls). Participants were divided into 3 groups: 48 participants with obstructive bronchitis, 30 without obstruction and 45 healthy participants. The study included an assessment of physical activity habits, tests of the functional state of the cardiorespiratory system and the readiness of the child's body for physical activity (Ruffier and volitional breath-holding tests), and the assessment of the BSS-ped which is a short version of the Bronchitis Severity Scale (BSS). The following three items were selected from the BSS for the BSS-ped: coughing, pulmonary rales at auscultation, and dyspnoea. Their presence is to be assessed in each case according to a 5-point scale: 0 = absent, 1 = mild, 2 = moderate, 3 = severe, 4 = very severe. The points are summed up to form a total score that can amount to between 0 and 12 points and should indicate the overall severity of AOB. Statistical analysis conducted with program Statistica.

Physical activities play a role in the occurrence of bronchitis. The frequency of children involved in sports in the 1<sup>st</sup> group was 84% and in the 2<sup>nd</sup> group was 85% which was less than in the 3<sup>rd</sup> group =97%. Physical activities are a key to improving the health of the children population. Smoking parents is one of the most important risk factors for developing bronchitis. Frequency of smoking fathers was 48% in 1<sup>st</sup> group and 13% smoking mothers, in 2<sup>nd</sup> group smoking fathers were 41%, smoking mothers were 1%, a noticeable lower frequency of smoking parents in healthy children, which was 11% in fathers and absent in mothers. BSS-ped parameters, cough  $2.76 \pm 0.89$  for 1<sup>st</sup> group,  $2.20 \pm 0.66$  for 2<sup>nd</sup> group, wheezing  $2.69 \pm 0.90$  in 1<sup>st</sup> group,  $2.53 \pm 0.86$  in 2<sup>nd</sup> group and dispnoe which was  $2.33 \pm 0.78$  in 1st group and  $1.73 \pm 0.63$  in 2nd group, thus shows that the manifestation of symptoms of acute bronchitis is more pronounced in participants with bronchial obstruction. Moreover, the total BSS-ped score is higher in the 1<sup>st</sup> group, which was 7.78 more than in the 2<sup>nd</sup> group, which was 6.46. Thus, symptoms of the bronchitis are more severe in children with obstruction. Breath-holding test on inspiration (test Stange) was  $28,6 \pm 1.14$  sec, on exhalation (test

Genchi)  $19.5 \pm 1.09$  sec in 1<sup>st</sup> group while in 2<sup>nd</sup> group was  $32,8 \pm 1.88$  sec for test Stange and  $19.26 \pm 1.36$  sec for test Genchi, however were less than in 3<sup>rd</sup> group which was on inspiration  $38,95 \pm 1.51$  sec and on exhalation  $28.73 \pm 1.30$  sec. In children with AOB and, to a lesser extent, with non-obstructive bronchitis, a noticeable decrease in the Stange and Genchi tests was noted. Level of evidence was statistically significant ( $P < 0.05$ ).

Thus, a regular physical activity in children and adolescents promotes health and fitness. Smoking cessation of parents should always be recommended. Clinical manifestations of acute obstructive bronchitis are more pronounced than in acute bronchitis without obstruction. The functionality of the cardiovascular system decreases in acute obstructive bronchitis.

**Mazur O.O.**

## **THE ROLE OF MICROBIAL ASSOCIATIONS IN CHRONIC PURULENT RHINOSINUSITIS IN PATIENTS FOR TYPE 1 DIABETES MELLITUS**

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The aim of the study was to determine the species and population composition of the microbiota of chronic purulent maxillary rhinosinusitis in patients with type 1 diabetes mellitus of moderate severity, type 1 diabetes mellitus (DM) and 10 patients with chronic purulent rhinosinusitis (CPRS) of the same age without concomitant pathology.

Bacteriological and mycological methods were used to study the species, population level, quantitative characteristics of the microbiota and associates of the maxillary sinus biotope in 38 patients with CPRS and type 1 diabetes mellitus (DM) and 10 patients without CPRS of the same age pathology.

In patients with CPRS, combined with type 1 diabetes mellitus of a moderate severity, bacteria of the genus *Bifidobacterium* and *Lactobacillus*, as well as bacteria of the genus *Streptococcus* (*S.salivarius*, *S.sanguis*, *S.mitis*, *L.lactis*), *Corynebacterium* were determined. Against this background, the contents of the maxillary sinus cavity are contaminated with pathogenic and opportunistic bacteria of the genus *Prevotella*, *Fusobacterium*, *Streptococcus* (*S.pneumoniae*, *S.pyogenes*, *S.viridans*), *Staphylococcus* (*S.aureus*, *S.epidermidis*), *H.influenzae catarrhalis*, *E.coli* and yeast fungi of the genus *Candida*. Such changes have led to disturbances of the dominance of indigenous obligate bacteria in the microbiocenosis.

CPRS in patients with type 1 diabetes disturbs microbial associations. In patients with CPRS, the number of associations consisting of 3 species increases 2.7 times, but the number of associations consisting of 4 species of microorganisms decreases 1.4 times. The number of associations consisting of 5 species in patients decreases by 3.5 times.

Among the most numerous associations consisting of 3 species of pathogenic and opportunistic autochthonous facultative microorganisms, the associations of the following representatives are more common: *M.catarrhalis*, *S.aureus* and *Bacteroides* spp.; *Prevotella* spp., *S.viridans* and *S.salivarius*; *M.catarrhalis*, *Prevotella* spp. and *S.epidermitis*; *H.influenzae*, *Prevotella* spp. and *S.epidermitis*. Associations consisting of 4 species were found in 34% of patients and consist of *S.pneumoniae*, *M.catarrhalis*, *S.pyogenes*, *Fusobacterium* spp; *S.pneumoniae*, *E.coli*, *S.aureus* and *Candida* spp.; *S.pneumoniae*, *E.coli* Hly+, *S.viridans* and *Candida* spp.

The dominant pathogens of chronic inflammatory process in the maxillary sinuses are *S.pneumoniae*, *H.influenzae*, *M.catarrhalis*. Other bacteria (*S.pyogenes*, *S.aureus*, *E.coli* Hly+, *B.fragilis*) are additional or accidental (*E.coli* Hly+, *B.fragilis*) pathogens. All leading pathogens persist in the habitat in the association.

In patients with CPRS, combined with type 1 diabetes mellitus of a moderate severity in the contents of the maxillary sinus cavity, the imbalance of autochthonous obligate, facultative and allochthonous microorganisms is formed due to the elimination or formation of a pronounced deficiency of autochthonous obligates, genus *Balibacterus sanguis*, *S.mitis*, *S.mutans*, *L.lactis*, etc.) and a significant increase in the number and dominant role of pathogenic and opportunistic

*S.pneumoniae*, *Bacteroides* spp., *S.epidermidis*, *M.catarrhalis*, *H.influenzae*, *Prevotella* spp., *S.viridans*, *S.pyogenes*, *S.aureus* and others.

Therefore, the severity of type 1 diabetes in patients with CPRS negatively affects the species composition, population level, qualitative and quantitative dominance of autochthonous obligate and facultative, as well as allochthonous for the habitat of microorganisms and their associations. The above may indicate the influence of not only the etiological agent, but also a certain association of microorganisms on the severity of CPRS with type 1 diabetes mellitus, which must be taken into account when choosing etiologic treatment.

**Popeliuk N.O.**

## **FEATURES OF DIAGNOSIS AND TREATMENT OF ATYPICAL RESPIRATORY DISEASES IN CHILDREN**

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Respiratory infections occupy a leading place in the structure of morbidity in children of early age around the world. At an early age, there is a functional immunodeficiency condition, which is called immunodeficiency maturation. The proportion of acute respiratory viral infections (ARI) is 65% of all registered diseases. SARS is commonly developed against the background of various pathological states, among which functional disorders of the digestive system are the most common.

An urgent problem is a significant violation of functional disorders in SARS, which is manifested by the deterioration of the processes of secretion and absorption.

The work aims to optimize the treatment of SARS in children with functional disorders of the digestive tract.

According to the data of the pediatric department of the City clinical hospital, 616 children were treated for SARS in 2019. Among patients of an early age group, constipation made up 24.5%, intestinal colic - 22.9%, tendency to loose stools - 19.4%, vomiting - 16.3%. Macroscopically in the stool of 32.0% of children mucus and undigested food remains were observed. The patients with digestive system disorders required a gentle approach to the treatment of SARS. The use of drugs of natural origin that stimulate local factors of immune protection was more preferable. The main effect is to increase the production of interferon and lysozyme, and also to promote the production of immunoglobulins.

Patients were divided into two groups according to the tactics of therapy. In 319 patients the inducers of interferonogenesis - proteflazidum in combination with laferon intramuscularly and/or endonasal were used. In 297 children the treatment with isoprinosine orally started in the outpatient phase, was continued.

Clinical criteria for the effectiveness of therapy were the reduction of intoxication, decrease, and normalization of temperature, reduction of hospitalization period. In both groups, there was no significant difference in the duration of symptoms of patients' intoxication, catarrhal manifestations, or complications of SARS (ear inflammation, bronchitis, acute stenotic laryngitis). In the first group complications of SARS occurred in 19.2% of patients, in the second group, respectively - 20.8%. Instead, in the group of children receiving isoprinosine drugs orally, the period of hospitalization was longer by 2 days and made up  $9.04 \pm 0.6$  days due to the development of gastrointestinal side effects, manifested by diarrhea, flatulence, or vomiting on the provoked premonitory condition.

Thus, a gentle approach to the treatment of SARS in children with functional disorders of the digestive system demonstrated high efficiency, especially in children in the first year of life. A combination of proteflazidum in combination with laferon may be suggested as an optimal approach to the treatment of SARS in children with functional disorders.

**Prokopchuk .V.**  
**CRITERIA OF THE DIGESTIVE SYSTEM DYSFUNCTION IN NEWBORNS  
CONCURRING PERINATAL PATHOLOGY**

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Introduction. Severe forms of perinatal pathology in newborns are accompanied by clinical signs of multiorgan dysfunction, with dysfunction of the digestive system, which is manifested by exo- and endocrine insufficiency of the pancreas and dysfunction of the intestine.

The study aim was to determine perinatal factors and clinical manifestations of the digestive system functional disorders in newborns suffering from critical conditions. An examination of 205 newborns was conducted, including: Group I (experimental), which was divided into two subgroups - IA (consisting of 73 newborns with manifestations of perinatal pathology of moderate severity) and IB (consisting of 82 children with manifestations of severe perinatal pathology); Group II (control), which included 50 relatively healthy newborns.

According to the data, the risk factors for developing adaptation disorders in newborns are: Somatic pathology in mothers: pathology of the cardiovascular system is 36.59, 65.75 ( $p < 0.05$ ) and 44.00%, blood diseases compensate 56.10, 61.64 and 56.00%, gastrointestinal pathology is responsible for 13, 41, 28.77 ( $p < 0.05$ ) and 8.0%, pathology of the excretory system refers to 26.83, 24.66 and 36.00%, pathology of the respiratory system is 9.76, 5.48 and 6, 00%, diffuse goiter refers to 20.73, 27.40 and 20.0%, oncological and gynecological pathology conclude 19.51, 24.66 and 14.00 in IB, IA and II study groups. Pregnancy complications: threat of abortion concludes 29.27, 28.77 and 30.00%, placental dysfunction - 12.20, 8.22 and 4.0%, miscarriages/abortions - 23.17, 30.14 and 20.0%, oedema of pregnant women - 18.29, 9.59 and 20.00%, preeclampsia - 4.88, 4.11 and 2.00%, polyhydramnios - 9.76, 6.85 and 2.00%, isosensitization by AB0 TA Rh factor refers to 10.98, 13.17 and 18.00% in groups IB, IA and II. Pathology of childbirth: OAA concludes 17.05 ( $p < 0.05$ ), 8.22 and 2.00%, umbilical cord entanglement around the neck refers to 6.10, 5.48 and 4.00%, respectively, in IB, IA and II groups. According to the study, the most severe cases of perinatal pathology in newborns were caused by such conditions as: respiratory disorders - 95.12% (required mechanical ventilation - 82.93% of children), perinatal CNS lesions - 82.93%, multiple organ failure - 28, 05%, meconium aspiration syndrome - 45.12%, convulsive syndrome - 19.51%, cerebral edema - 19.51%, severe asphyxia - 10.98% and moderate asphyxia - 20.73%. Clinically combined disorders of the digestive system in newborns with perinatal pathology were characterized in IB and IA groups, respectively: reduced food tolerance - 86.59 and 35.62%, vomiting/stasis - 80.49 and 30.14%, paresis/weak peristalsis - 57.32 and 9.59%, suppression of the sucking reflex - in 16.44% in IA group and lack of reflex - 3.66% in IB group.

Thus, the study of the medical cards has showed the most significant associations of tolerance disorders in newborns with sentimental conditions in mothers and asphyxia in childbirth. It should also be noted that the violation of food tolerance in critically ill newborns correlated with a more pronounced severity of perinatal pathology.

**Randiuk R.Y.**  
**PAIN AND WOUND HEALING DURATION ACCORDING TO DIFFERENT METHODS  
OF SURGERY CONCERNING PILONIDAL SINUS TREATMENT IN CHILDREN**

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Pilonidal sinus (PS) in children is a frequent disease which occurs in 5% of children population. It is generally accepted, that treatment of PS can be only surgical. Despite of long history of development of surgical treatment of PS in children, this pathology is associated with a significant pain and long duration of wound healing. The basic goal of surgery is removal of main inflammation source with all primary holes, damaged tissues and secondary fistulas. The question of searching a method which can provide the least pain intensity and the shortest duration of wound

healing remains relevant. Surgical method has to provide: minimal duration of hospitalization, be as painless as possible, complete cure with minimal risk of recurrence.

The aim of the study is to determine and compare duration of pain, pain intensity and postoperative wound healing according to the different methods of operative treatment of pilonidal sinus in children. 40 cases of PS in children, operated in Children's Clinical City Hospital were analyzed. Despite of surgery method, before operation all children underwent a cleansing enema and shaving of surgical field. Operations were performed under general anesthesia in the prone-jack knife position. The methods of skin-fascial plastic and classical method (sewing to the fascia) were compared. Duration of postoperative wound healing, duration of pain and pain intensity were determined.

Postoperative wound healing rate was 50% shorter in cases of use of skin-fascial plastics in comparison with the fascia method. Duration of pain was 25% less in children, operated with a skin-fascial plastic method. Skin-fascial plastic provides less pain intensity to 60% at the first day after operation and 70% at the fifth and seventh days according to the pain rate of classical method.

Skin-fascial plastic method provides less pain intensity to 50%, less duration of pain to 25% and provides less pain intensity up to 70% in comparison to classical method.

**Sapunkov O.D.**

### **MAXILLARY SINUSITIS AND DIABETES MELLITUS**

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Diabetes mellitus (DM) is a very common disease. Specialists of various profiles, including otolaryngologists, deal with this problem. It should be noted that not much attention has been paid to the state of the ENT organs with diabetes, although the pathology is found in 59% of patients with diabetes. The treatment of such patients is not an easy task for both the otolaryngologist and the endocrinologist. Patients with diabetes are known to have a more severe course of ENT diseases and a poorer prognosis of surgery.

In the structure of morbidity in ENT pathology, a leading place belongs to acute sinusitis (5-10%).

According to the data of an epidemiological study, the prevalence of chronic sinusitis among patients with diabetes at the age of 18–44 years is 28.4%, compared with 18.4% among the rest of the population of the same age.

The main causative agents of acute rhinosinusitis are *Streptococcus pneumoniae* and *Haemophilus influenzae*. In chronic sinusitis, *P. aeruginosa*, *S. aureus*, *Actinomyces*, as well as fungal pathogens are more often detected.

In patients with diabetes, the most common causative agents of sinusitis are the gram-positive bacteria *S. aureus*, *S. epidermidis*, *S. pyogenes*, *S. pneumoniae*; gram-negative bacteria *E. coli*, *P. aeruginosa*, *M. catarrhalis*, *H. influenzae*; anaerobic *P. mirabilis*, *Peptostreptococcus*, *Bacteroides* spp.; fungal microorganisms of the genera *Aspergillus*, *Mucor*. It is noteworthy that 30% of diabetics carry *S. aureus* in the nasal cavity, compared with 11% in the general population. In patients with diabetes, acute fungal sinusitis is often observed, which is facilitated by metabolic disorders. This is especially due to the acidic environment of tissues rich in glucose and an increase in iron content due to disturbance of its connections with transferrin in the blood.

Moreover, a significant decrease in nasal mucociliary clearance and pH of nasal secretions is determined. Thus, the nasal mucociliary clearance in patients with diabetes was 2.5 times higher than in healthy individuals, and the pH of the nasal secretion increased to  $7.96 \pm 0.75$  (compared with the norm of  $6.43 \pm 0.67$ ).

Sinusitis in diabetes occurs in the background of decrease in the activity of the main antimicrobial factors of immunity, the affinity of produced antibodies, opsonizing properties of serum, phagocytic and bactericidal activity of neutrophils. A decrease in the bactericidal activity of neutrophils is associated with disorders of both oxygen-dependent and oxygen-independent antimicrobial systems. Patients with diabetes are vulnerable to a rapid progression of ENT infection

and its subsequent complications. Clinical manifestation of purulent sinusitis in patients with diabetes is characterized by a long and sluggish course, the involvement of other paranasal sinuses in the process, atypical X-ray picture and the frequent development of complications - rhinogenic meningitis and phlegmon of the orbit. In the blood of these patients, in contrast to patients without diabetes, there is an increase in the relative and absolute number of stab and segmented neutrophils, a sharp increase in ESR. The disease proceeds in the background of pronounced changes in the immune status, which affect all the links of immunity, including a significant decrease in phagocytosis indicators and an increase in the content of circulating immune complexes of small size.

Thus, the course of purulent-inflammatory diseases of the upper respiratory tract in diabetes mellitus is peculiar and atypical, often leads to the development of formidable complications and even death. Effective treatment of foci of inflammation in the ENT organs in the background of diabetes mellitus decompensation is practically impossible. Particular attention should be paid to the study of the etiopathogenetic mechanisms of the development of diseases of the ENT organs in patients with diabetes with the development of new therapeutic algorithms. It means that only close cooperation of two specialists - an otolaryngologist and an endocrinologist will help maintain health and prolong the patient's life.

**Yakovets K.I.**

## **CHARACTERISTICS OF MICROBIOTA OF THE UPPER JAW IN CHRONIC SINUSITIS IN PATIENTS WITH TYPE 1 DIABETES MELLITUS**

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The aim of the study was to determine the qualitative and quantitative composition of the microbiota in patients with chronic purulent maxillary sinusitis with type 1 diabetes mellitus. Bacteriological and micrological methods were used to determine the qualitative and quantitative composition of the microbiota of the biotope of the maxillary sinus cavity in 50 patients with chronic purulent maxillary sinusitis with type 1 diabetes mellitus and 37 patients with chronic purulent maxillary sinusitis of the same age without concomitant pathology.

In the contents of the cavity of the maxillary sinuses of patients with chronic purulent maxillary sinusitis, combined with type 1 diabetes, 175 strains of different species of microorganisms belonging to 24 different taxonomic groups were isolated and identified, which in the biotope form different qualitative microbial associations consisting of 3 of different species in 58% of patients, of 4 species in 34.0% and of five different taxa - in 8.0% of patients.

Chronic purulent maxillary sinusitis in patients with type 1 diabetes disturbs microbial associations. In patients with chronic purulent maxillary sinusitis, the number of associations consisting of 3 species increases 2.7 times, but the number of associations consisting of 4 species of microorganisms decreases by 11.76%. The number of associations consisting of 5 species in patients decreases by 3.5 times.

Among the most numerous associations consisting of 3 species of pathogenic and conditionally pathogenic autochthonous facultative microorganisms, the associations of the following representatives are more common: *M. catarrhalis*, *S. aureus* and *Bacteroides* spp. ; *Prevotella* spp., *S. viridans* and *S. salivarius*; *M. catarrhalis*, *Prevotella* spp. and *S. epidermitis*; *H. influenzae*, *Prevotella* spp. and *S. epidermitis*.

Associations consisting of 4 species were found in 34% of patients and consisted of *S. pneumoniae*, *M. catarrhalis*, *S. pyogenes*, *Fusobacterium* spp; *S. pneumoniae*, *E. coli*, *S. aureus* and *Candida* spp. ; *S. pneumoniae*, *E. coli* Hly +, *S. viridans* and *Candida* spp.

In patients with chronic purulent maxillary sinusitis combined with severe type 1 diabetes, there were associations consisting of *S. pneumoniae*, *M. catarrhalis*, *Candida* spp. and *S. epidermitis*; *S. pneumoniae*, *M. catarrhalis*, *S. pyogenes*, *S. epidermitis*; *Bacteroides* spp., *H. influenzae*, *S. pyogenes*, *Enterobacter* spp.; *Bacteroides* spp., *H. influenzae*, *S. pyogenes*, *Candida*



spp. The above may indicate the influence of not only an etiological agent, but also a certain association of microorganisms on the severity of maxillary sinusitis combined with type 1 diabetes.

Associations of microorganisms consisting of 5 species were found in patients with chronic purulent maxillary sinusitis combined with severe type 1 diabetes mellitus. Their composition was different, but the pathogen *S. pneumoniae* in a high population level, opportunistic obligate anaerobic bacteria of the genus *Bacteroides* and *Prevotella*, *Fusobacterium*, streptococci and *Staphylococcus aureus* were isolated and identified.

Thus, according to the Berger-Parker index of constancy and dominance, the dominant pathogens of chronic inflammation in the maxillary sinuses are *S. pneumoniae*, *H. influenzae*, *M. catarrhalis*. Other bacteria (*S. pyogenes*, *S. aureus*, *E. coli* Hly +, *B. fragilis*) are additional or accidental (*E. coli* Hly +, *B. fragilis*) pathogens. All major pathogens persist in the habitat in association. Microorganisms, depending on their role in the normobiocenosis, can inhibit the pathogenetic activity of the leading pathogen or, conversely, activate its pathogenetic role, which must be taken into account when choosing treatment tactics.

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**Andrushchak A. V.**

**FORMATION OF VOLUME AND OSMOREGULATORY FUNCTION OF THE KIDNEYS  
IN PATIENTS WITH COMPENSATED SEPSIS-INDUCED HYPOTENSION**

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Current views on intensive infusion therapy for sepsis clinical course are focused on recommendations concerning priorities of crystalloid drugs use. Taking into account sepsis pathogenesis polymorphism, polyorganism and mutual burdensomeness, it should be considered that such arsenal of intensive care does not always satisfy the pathogenetic substantiation of the basic constituent of the intensive care program. In this connection, attention was paid to the properties and action spectrum of the derivatives of polyatomic alcohols, namely sorbitol, on the volume- and osmoregulatory function of the kidneys in patients with sepsis-induced hypotension.

Objective - to investigate the response of volume- and osmoregulatory function of the kidneys to Reosorbilact action in dopamine-dependent compensation of sepsis-induced hypotension.

Inclusion criteria - patients with purulent-septic complications with dopamine-dependent compensation of sepsis-induced hypotension (5-10 µg/kg min) and appropriate infusion therapy according to the starting indices: AAP>70 mmHg, APS>95 mmHg, CVP>4 mmHg, diuresis>30ml/h. Control studies - patients with systemic inflammatory response syndrome (SIRS: IDC-10: SIRS, ICD-10: R-65.2). Patients are divided into 4 groups: gr.I and gr.II - control studies (SIRS, n = 25); gr. and IV gr. - sepsis-induced hypotension (n = 28). Patients of II gr. and IV gr.

additionally received Reosorbilact infusion load in the amount of 7-8 ml/kg at a rate of 18-20 ml/min

The results of the studies of Reosorbilact effect on the volume- and osmoregulatory function of the kidneys in patients with sepsis-induced hypotension are characterized by activation of diuresis ( $224 \pm 58.9\%$ ; ,  $P < 0.05$ ), increased sodium clearance ( $317 \pm 52.5\%$ ; ,  $< 0.05$ ) and clearance of osmotically active substances ( $240 \pm 68.6\%$  ,  $0.05$ ). At the same time, the glomerular filtration rate increases  $54 \pm 11.7\%$  ( ,  $P < 0.05$ ). The processes, inhibiting the reabsorbed sodium fraction  $1.58 \pm 0.29\%$  ( ,  $P < 0.05$ ) and the reabsorbed fraction of osmotically active substances  $4.2 \pm 1.40\%$  ( ,  $P < 0.05$ ), are in the base of Reosorbilact activating effect.

It has been registered that depression of the volumetric-and osmoregulatory function of the kidneys in dopamine-dependent compensation of sepsis-induced hypotension in terms of clearance characteristics, are observed. Reosorbilact infusion load in patients with compensated sepsis-induced hypotension promotes homeostatic adaptation of compensatory volume-dependent reactions, volume-and osmoregulatory function of the kidneys.

**Apakitsa V.V.**

## **FEATURES OF CEREBRAL STROKE COURSE IN PATIENTS WITH DIABETES MELLITUS**

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According to official statistics, in Ukraine cerebrovascular diseases are the cause of death 2 (100,000-110,000 deaths, about 14% of all deaths). There are 100,000–110,000 strokes each year (more than a third of them are in people of working age), 30–40% of stroke patients die within the first 30 days and up to 50% within a year of the onset of the disease; 20–40% of surviving patients become dependent on outside care (12.5% of primary disability) and only about 10% return to full life. The presence of diabetes increases the risk of stroke by 1.8-6 times. Mortality from stroke is much higher in patients with diabetes than in those without it, and is, according to various data, 40-59%. The numerous researches of the effects of hyperglycemia on cerebral circulation found that a sharp rise in glucose in the blood plasma of animals is accompanied by a decrease in regional cerebral blood flow.

To study the clinical features of acute stroke in patients with diabetes mellitus. An analysis of medical histories of patients who suffered from acute stroke (AS) was performed. 109 case histories of patients who were treated in the intensive care unit (ICU) were analyzed. Patients were divided into 2 groups: I - patients with established type 2 diabetes (37 patients), and II - patients without diabetes (72 patients). Age of patients - from 32 to 89 years. General and anthropometric indicators, as well as comorbidities in patients did not differ significantly.

During the research it was established that the first group dominated by Ischemic stroke (35 out of 37, or 94.6%), respectively, Hemorrhagic stroke - 1 out of 37, or 2.7%, and subarachnoid haemorrhage - 1 out of 37, or 2.7%. Patients without diabetes were also dominated by ischemic stroke (49 out of 72, or 68%), but had a slightly higher percentage of haemorrhagic strokes (18 out of 72, or 25%"; subarachnoid haemorrhage - 5 out of 72, or 7%). In both groups there was approximately the same percentage of speech disorders, however, in stroke associated with diabetes, a higher percentage of movement disorders (31 out of 37, or 75.7%), while in the second group - 49 out of 72, or 68.1%. Impairment of consciousness was also more common in group I (31 out of 37, or 83.8%), and slightly less in group II (58 out of 72, or 80.6%). It should be also noted that during the research in the group of patients without diabetes, a number of patients with transient hyperglycemia ( $> 6.1$  mmol/L) were identified, which was corrected a few days after treatment.

Diabetes mellitus lead to a significant deterioration of the general condition in patients with acute stroke. Consequently, in patients with stroke it is very significant timely detection and diagnosis of diabetes mellitus and latent forms of carbohydrate metabolism, adequate treatment of

diabetes and careful monitoring of blood glucose levels, especially in the acute period of stroke, to prevent an increase in the area of the lesion and recurrent stroke.

**Dobriansky V. V.**

## **RISK FACTORS FOR RECURRENT HYPOGLYCEMIA IN PATIENTS WITH TYPE II DIABETES MELLITUS IN THE PREHOSPITAL STAGE**

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About 500 million people worldwide have diabetes, about 90% of whom have type II diabetes. According to WHO statistics, in 2019, more than 1.5 million deaths were caused by diabetes and its complications, among which one of the most common is hypoglycemia. In most patients receiving insulin, hypoglycemia develops with varying frequency; in 30% of cases, there is severe hypoglycemia. According to the Center of Emergency Medical Care and Disaster Medicine (CEMCDM) in the Chernivtsi region, the number of calls about hypoglycemia is 10-15% of the total number of calls per year. A lot of them are complicated and recurrent, so it is important to understand and study the risk factors of recurrent hypoglycemia in a prehospital setting.

Purpose: to investigate and analyze the risk factors for recurrent hypoglycemia in patients with type II diabetes. 33 ambulance call cards and the annual report on the work of CEMCDM of Chernivtsi were analyzed. The results of general clinical and laboratory research methods are studied, the general methods of statistics are used.

The sample consisted of 33 patients with type II diabetes who were on insulin therapy, of which 19 (57.5%) were men and 14 (42.5%) were women aged from 17 to 76 years. The moderate diabetes was detected in 16 people (48.5%), mild - in 10 (30.3%), and severe - in 7 patients (21.2%). Among those surveyed, the glycemic level was on average 2.27 mmol/l (0.5-2.9 mmol/l). Aftercare, the average blood glucose level was 7.3 mmol/L. There were 3 cases (9%) of very severe hypoglycemia (less than 1.0 mmol/l). This group of patients was characterized by risk factors such as old age, prolonged diabetes, cardiovascular disease, difficulty recognizing symptoms and alcohol abuse, glucose resistance, and recurrent episodes in anamnesis. Repeated calls accounted for 21.2% of the total number of call cards analyzed, most of them for patients with severe and moderate diabetes who were on insulin therapy. For these patients, in addition to standard treatment (administration of 80-100 ml of 40% glucose), 200 ml of 5% glucose was added. The average time of arrival of an ambulance (TAA) was 28 minutes, including 17.4 minutes in the city and 41.1 minutes in the countryside. A direct correlation was found between TAA and the amount of 40% glucose administered ( $r = 0.6$ ). It was also found that 66.6% of respondents abused alcohol. The incidence of severe hypoglycemia was higher in patients with severe diabetes and who did not follow a diet. In women, the incidence was slightly lower than in men, but they had lower glucose levels compared with men ( $p < 0.05$ ).

The risk of recurrent hypoglycemia is high in patients with older age, long and severe diabetes, comorbidities, in people who abuse alcohol. A direct correlation was established between the NPV and the amount of 40% glucose administered. Thus, it is important to provide timely care for hypoglycemia in patients with type II diabetes, as well as hospitalization of patients with the above risk factors to specialized hospitals.

**Malaiko S.S.**

## **FREQUENCY OF PULMONARY EDEMA DEVELOPMENT IN PATIENTS WITH ACUTE CORONARY SYNDROME AND DIABETES TYPE 2**

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Pulmonary edema is a liquid accumulation in the tissue and air spaces of the lungs. It leads to impaired gas exchange and may cause respiratory failure. It is due to either failure of the left ventricle of the heart to remove blood adequately from the pulmonary circulation. On the basis of the data of the register of acute coronary syndrome to study the incidence of pulmonary edema that

arose during hospitalization in the intensive care unit of the Regional Clinical Cardiology Center, Chernivtsi. Data analysis of 84 cards of patients hospitalized in cardiac intensive care. The parameters studied included age, pulmonary edema (PE), normal or impaired carbohydrate metabolism (type 2 diabetes mellitus), and newly diagnosed diabetes mellitus (NDDM), impaired glucose tolerance (IGT) The diagnosis of impaired carbohydrate metabolism (CM) was made on the basis of the WHO recommendation.

From 184 patients, 38 (21%) indicated a history of type 2 diabetes mellitus. Of 38 patients with an indication of diabetes mellitus, 23 (63%) had decompensation of carbohydrate metabolism (glycemia exceeded 11.1 mmol / l). Upon admission to a hospital with ACS hyperglycemia was detected in 46 patients. For the first time, an impaired CM was detected in 29 (15.9%) of 184 patients, of which NDDM was in 4 (15.3%), IGT - in 4 (30.7%). The total number of patients with impaired carbohydrate metabolism was 68 (36.9%). Normal carbohydrate metabolism was observed in 115 patients (63.1%). At the time of admission to reanimation department, out of 184 ACS patients, PE was registered in 14 (8.39%) patients, of which 5 patients (men (M) -3, age -  $68.5 \pm 2.5$ ; women (F) -2, age -  $78.1 \pm 2.5$ ) with DM2 , 3 patients (M-1, age -  $87.0 \pm 2.5$ ; F-2, age -  $74.8 \pm 2.5$ ) with the NDDM; ; 1 patient (M-1 age -  $74.0 \pm 2.5$ ;) with ITG and 5 patients (M-3, age- $65.6 \pm 2.5$ ; F-2, age -  $70.6 \pm 2.5$ ) with normal CM. Based on the data of the S register of Regional Cardiological Centre, Chernivtsi, patients hospitalized in BCC with ACS pulmonary edema occurs in 8.39% of cases. When analyzing groups of patients with normal or impaired carbohydrate metabolism is very significant but due to the small sample, difference,  $t = 1.5$ ,  $p < 0.07$ . In the group of patients with ACS with NDDM, pulmonary edema occurs in 21.7% of cases, with an obvious type of diabetes mellitus - 16.5%, NTG - 15.6%, norma M - 3.5% of cases. The highest percentage of PE development occurs in patients with a violation of the CM without performed on prehospital stage of antihyperglycemic therapy, namely in patients with NDDM - 21.7%. This can explain the high percentage of PE in patients with IGT -15.6%,when only diet is recommended. Patients with type 2 diabetes have long-term experience diseases and the presence of diabetic complications compared with NDDM, and their glycemic level in 63.5% of cases exceeded 11.1 ml mol / l compared to patients with IGT. Moreover, PE occurred in patients with overt type 2 diabetes in 16.5% of cases.

**Nechytailo O.Y.**

**DIAGNOSTIC SIGNIFICANCE OF INFRARED THERMOMETRY IN PREVENTING THE DEVELOPMENT OF PURULENT-NECROTIC COMPLICATIONS OF DIABETIC FOOT SYNDROME**

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Measurement of body temperature in various diseases is one of the most common diagnostic measures, due to its low cost, speed and ease of execution, as well as non-invasiveness for patients. Pathogenetically, a decrease in local temperature can be associated with microcirculation disorders, metabolic and degenerative changes in tissues. Inflammation processes accompanied by vasodilation and acceleration of metabolic processes, malignant neoplasms, endocrine and neuroregulatory disorders contribute to the increase in skin temperature. Changes in temperature precede other clinical symptoms of the disease, which allows for early diagnosis and timely treatment. In diabetes mellitus, changes in local temperature have not been sufficiently studied, although a number of studies indicate the diagnostic value of the relationship between total and local temperature in the plantar area of the diabetic foot in limb ulcers.

The aim of our study was to establish the significance of changes in local body temperature in the early diagnosis of purulent-necrotic complications of diabetic foot syndrome in patients with type 2 diabetes.

We examined 87 patients with type 2 diabetes who were treated for diabetic foot syndrome. Patients were divided into two groups: the first group - 47 patients with surgical pathology with diabetes without purulent-necrotic complications and 40 patients with purulent-necrotic

complications. Infrared thermometry was performed in all patients after 15 minutes of acclimatization to room temperature ( $23 \pm 1.0^{\circ}\text{C}$ ), in standard clothing, at rest. Absolute local indicators were translated into relative by dividing by the indicator of the total body temperature and compared with each other in the dynamics of treatment. The temperature difference in different areas was calculated -  $^{\circ}$ .

When comparing the temperature gradients of the lower extremities, there was a significant increase in the gradient in patients of the second group, with the maximum increase in the temperature difference on the plantar surface of the foot ( $p < 0.05$ ). In patients of the first group, the temperature difference in the lower extremities was greater than between the upper extremities, but not so significant ( $p > 0.05$ ). The skin temperature of the plantar surface of the foot was probably lower in the second group of patients with diabetes mellitus ( $30.9 \pm 0.49^{\circ}\text{C}$ ) compared to the first group ( $33.0 \pm 0.46^{\circ}\text{C}$ ) ( $p < 0.05$ ). Significant changes in limb skin temperature were often correlated with the presence of diabetic retinopathy ( $r = 0.36$ ,  $p < 0.05$ ) and the severity of diabetic nephropathy ( $r = 0.76$ ,  $p < 0.05$ ). To a lesser extent, the temperature gradient correlated with a healthy lifestyle ( $r = -0.54$ ,  $p < 0.05$ ), adherence to dietary norms ( $r = -0.56$ ,  $p < 0.05$ ), sufficient physical activity ( $r = -0.59$ ,  $p < 0.05$ ). The occurrence of angiopathies of the extremities led to a decrease in the intensity of blood flow, a decrease in metabolic activity of tissues and, accordingly, to a lower temperature of the distal parts of the legs. The body responded by raising blood pressure.

Thus, infrared thermometry is an affordable and sensitive method for early diagnosis of circulatory disorders of the lower extremities and detection of the risk of severe diabetic foot. The criterion for such a risk can be considered a temperature gradient of more than 10%. According to the results of infrared thermometry, it was found that the skin temperature of the plantar surface of the foot in patients with purulent - necrotic complications was significantly lower ( $30.9 \pm 0.49^{\circ}\text{C}$ ) compared with patients with diabetic foot syndrome, which currently did not require surgical treatment ( $33.0 \pm 0.46^{\circ}\text{C}$ ).

**Petrynych V.V.**

### **THE INFLUENCE OF THE RATE OF ACETYLTATION ON THE STATE OF THE BEHAVIORAL RESPONSES OF RATS IN CONDITIONS OF LEAD INTOXICATION**

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There is speculation that the marker predisposition to action of the unfavorable factors of the environment, including the salts of heavy metals, is the type of acetylation. However, the role of individual genetic predisposition as the reasons for the sensitivity of the organism to the effects of toxic chemicals, including heavy metals, today was studied not enough.

Objective: to study the changes of behavioral reactions in rats with different types of acetylation in the conditions of acute intoxication of lead acetate.

Experimental studies were conducted on white conventional outbred sexually mature male rats, which were divided into two groups: with «quick» and «slow» type of acetylation by the test with amidopyrin. Subacute intoxication was modeled by means of intraperitoneal injection of lead acetate to experimental animals at doses of 2,5 mg/kg (1/100 DL50) and 15,5 mg/kg (1/16 DL50) for 28 days. Isotonic solution of sodium chloride (intraperitoneally) was injected to control groups of animals instead of lead acetate. In the dynamics of intoxication were studied behavioral reactions in rats: horizontal and vertical motor activity, mink reflex, emotional reactivity and integrated behavioral activity.

It is established that the introduction of rats lead acetate in the dose of 2,5 mg/kg (1/100 DL 50) accompanied by inhibition of indicators of behavioral reactions with 14 days of the experiment, the «slow» and «quick» acetylation to achieve maximum to the end of the experiment. Increasing the dose of the toxicant to 1/16 DL 50 causes early behavioral changes: with 7 days of the experiment, the «fast» acetylation. More expressive changes in indicators of behavioral reactions of the toxicity of lead acetate in doses 1/100 DL 50 and 1/16 DL 50 to the end of the experiment observed in the «quick» acetylation.

The «quick» type of acetylation is a susceptibility marker to lead acetate toxic action under conditions of subacute experiment on mature rats.

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**Bambuliak A.V.**

**CLINICAL EFFICIENCY OF BONE AUGMENTATION MATERIALS AND THEIR COMBINATIONS WITH MULTIPOTENT MESENCHYMAL STROMAL CELLS FROM THE PATIENT AFTER REMOVAL OF THIRD MOLARS**

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Despite the active ability to repair, often the independent potential of bone tissue is insufficient, which is a serious problem in reconstructive maxillofacial surgery, orthopedics, and traumatology. The use of stem cells and tissue engineering provides an innovative approach to identifying material that can be used not only to replace lost tissue but also to improve bone regeneration.

The aim of the study was to identify the clinical efficiency of bone augmentation materials and to determine the feasibility of using tissue equivalents of bone tissue based on multipotent mesenchymal stromal cells of adipose tissue to heal bone defects in patients after removal of retinal third molars. The study was conducted at the Department of Surgical Dentistry and Maxillofacial Surgery of Bukovinian State Medical University, Chernivtsi, Ukraine. The operation impacted third molars removal was performed on 72 patients. At the same time, 31.94% of the subjects underwent bone augmentation procedure after surgery using osteoplastic material "Colapan-L" (group A); 41.67% of patients - with a combination of multipotent mesenchymal stromal cells of adipose tissue + "Colapan-L" + platelet-rich plasma (group B) and in 26.39% of patients wound healing occurred under a blood clot (group B). Postoperative pain was assessed using the Numerical Rating Scale (NRS) based on patients' subjective pain. Visual assessment of the severity of collateral edema and hyperemia of the oral mucosa after surgery was also performed. A scoring system was used to determine the severity of collateral edema. To assess the course of the postoperative period in patients of all study groups, a protocol was completed daily during the hospital stay, which reflected the most important data of an objective and subjective nature. During the morning dressings, patients' complaints, general and local status were clarified: presence of appetite, quality of sleep, wound pain, postoperative edema, hematoma, hyperemia of the oral mucosa, presence of secretions from the wound, fever, type of wound healing.

It was found that at the final stage of postoperative observation in patients in whom the bone defect was filled with a combination of the drug "Colapan-L" with multipotent mesenchymal stromal cells of adipose tissue and platelet-rich plasma, the absence of pain was noted in 89.31%,

which is 2 times  $p1 < 0.05$  and 1.3 times  $p2 < 0.05$  higher than in patients of groups A and B. Collateral edema was absent in 98.47% of operated group B, which exceeded 1.2 times,  $p1 < 0.05$  number of such persons of group A, where the bone defect was augmented by the drug "Colapan-L" and 1.4 times higher,  $p1 < 0.01$ ,  $p1 > 0.05$  indicators of group B, where the healing of the bone defect occurred without the use of bone augmentation materials. The absence of hyperemia of the oral mucosa was determined in 92.37% of patients in groups B, which was 1.3 and 1.4 times higher than the values obtained in groups A and B,  $p1 < 0.05$ ,  $p2 < 0.01$ .

A comparative analysis of the clinical efficiency of bone augmentation materials in the operation of impacted third molars extraction convincingly proved the advantage of using bone augmentation material "Colapan-L" and its combination with multipotent mesenchymal stromal cells and platelet-rich plasma before spontaneous augmentation, as evidenced by subjective and objective symptoms in patients during the postoperative period.

**Batig V.M.**

## **THE DEVELOPMENT OF EXPERIMENTAL PERIODONTITIS MODEL UNDER ANTICHOLINERGIC DRUGS**

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The microbiome of the oral cavity plays an essential role in the development of periodontal disease. It also has a significant pathogenic effect on the innervation of the oral cavity organs. Pathogenic bacteria reach through toxins, and lipopolysaccharide is the most active among them. A number of enzymes are among toxic microbial factors, and according to their catalytic properties, they can lead to toxic effects, directing on the destruction of structural biopolymers of macroorganisms.

The aim of the paper was to develop an experimental periodontitis model under anticholinergic drugs. The development of the experimental model of periodontitis was carried out by injecting the pathogenic factors into the rats' gums: lipopolysaccharide, hyaluronidase and trypsin. The preparations were in the form of solutions of 0.9% lipopolysaccharide NaCl (1 mg / ml), hyaluronidase (2 mg / ml) and trypsin (5 mg / ml), which were injected into the gums in the molar area in an amount of 0.2 ml per rat. The study was performed on white Wistar rats (45 rats in total). The aim of the study was to investigate the effect of anticholinergic drugs (pilocarpine and atropine) on the development of an experimental model of periodontitis after administration of a solution of hyaluronidase (2 mg / ml) into the rats' gums.

The results were next: activity of the proteolytic enzyme elastase was chosen as an indicator of inflammation. The effect of three pathogenic factors (lipopolysaccharide, hyaluronidase and trypsin) on the activity of elastase in various tissues (gums, pulp, serum and gastric mucosa) was studied. According to the data obtained, hyaluronidase has the most significant pro-inflammatory effect. After recalculating the magnitude of the increase in elastase activity per 1 mg of the pathogen, it was found that hyaluronidase is more effective when acting on the gums, tooth pulp and serum.

The results of this series of experiments became the basis for the use of hyaluronidase for the experimental model of periodontitis. The effect of autonomic nervous system modulators (pilocarpine and atropine) on the development of acute experimental periodontitis after administration of hyaluronidase solution (2 mg / ml) in the gums of rats was studied in the following series of experiments (15 rats)). To do this, rats were pre-administered orally with gels with pilocarpine (2 mg / ml) or atropine (0.2 mg / ml) for two days. Rats were sacrificed 3 hours after hyaluronidase injection, gum and dental pulp were isolated, and serum was obtained.

The presence of an inflammatory process in the periodontium is evidenced by a significant increase in elastase activity (by 22.5%). The use of pilocarpine or atropine gels slightly reduces the activity of elastase, but it remains much higher compared to intact rats. Both anticholinergic drugs (pilocarpine and atropine) significantly increase the content of malonic dialdehyde compared to its level in rats with an experimental model of periodontitis.

The use of pilocarpine gel significantly reduced catalase activity and API index. Gel applications with the proposed drugs did not reduce catalase activity. However, they have lowered the API index to some extent. As a result of the first series of experimental studies, we can make a conclusion that an experimental model of periodontitis was developed using one of the pathogenic effectors of bacteria, namely hyaluronidase, which can significantly increase the permeability of bacteria and their toxins in periodontal tissues.

**Batih I.V.**

**DENTAL PROTECTOR AND HEPATOPROTECTOR ACTION OF PHYTOGEL  
"Dubovyi" ON RATS WITH HEPATO-ORAL SYNDROME**

Department of Surgical Dentistry and Maxillofacial Surgery  
Bukovinian State Medical University

Hepato-oral syndrome is manifested by dental complications on the background of hepatobiliary pathology. First of all, pathogenesis of the hepato-oral syndrome is based on the violation of the antimicrobial function of the liver, which often occurs as a result of the activation of free radical processes under the action of hepatotoxicants. It is proposed to use antioxidant drugs to prevent the activation of free radical processes and violation of the antimicrobial function of the liver.

The purpose of the study is to determine the possibility of using oral applications of phytogel "Dubovyi" for the prevention and treatment of the hepato-oral syndrome.

Hepato-oral syndrome was reproduced in rats by intra-abdominal administration of the hepatotoxicant hydrazine sulfate. It was used phytogel "Dubovyi", which contains phenolic compounds extracted from oak wood. The condition of the liver was assessed by the level of elastase and malonic dialdehyde (MDA) in the liver and in the serum by the level of bilirubin, alanine aminotransferase, and alkaline phosphatase. The condition of the mucous membrane of the cheeks and gums was assessed by the level of elastase, MDA, urease, lysozyme. The degree of dysbiosis was calculated by the ratio of the relative activities of urease and lysozyme.

Administration of hydrazine sulfate to rats increases the level of inflammatory markers in the liver (elastase and MDA), and the level of liver markers (bilirubin, alanine aminotransferase and alkaline phosphatase) in the serum. In the mucous membrane of the cheek and gum, the activity of elastase, urease, and the degree of dysbiosis increases, but the activity of lysozyme decreases. Rats, which were treated with hydrazine sulfate, on the background of oral applications of phytogel "Dubovyi", in the liver normalizes the level of markers of inflammation in the serum, significantly reduces the activity of alanine aminotransferase and alkaline phosphatase, in the buccal mucosa and gums decreases the activity of elabiase, elastase increases lysozyme activity.

The introduction of hepatotoxicant hydrazine sulfate into the body of rats causes the development of hepatitis and the development of inflammatory-dystrophic processes in the tissues of the oral cavity (hepato-oral syndrome). Oral applications of the phytogel "Dubovyi", which contains phenolic compounds extracted from oak wood, have hepatoprotective, anti-inflammatory, and anti-dysbiotic effects on the tissues of the oral cavity.

**Bernik N.V.**

**COMPLICATIONS OF INFECTIOUS-INFLAMMATORY NATURE IN THE ORAL  
CAVITY IN THE PRACTICE OF A DENTIST**

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The disorders of quantitative and qualitative microscopic flora content, that is, microbe biotic community of the oral cavity and colonization with pathogenic microorganisms, cause inhibition of the body immune reactivity, promote the occurrence of infectious-inflammatory complications, and become one of the important reasons for their development.

The objective of the work is to study the mechanisms of development of infectious-inflammatory complications in the oral cavity after oral surgery in order to improve their treatment and prevention. 81 patients, aged from 20 to 65, were examined. They were prepared for out-patient

surgery in the oral cavity and distributed into three groups according to the types of surgery performed: the 1<sup>st</sup> group included 27 patients waiting for dental implants, the 2<sup>nd</sup> group — 28 patients with retention and dystopia of the third lower molar, the 3<sup>rd</sup> group — 26 patients with radicular cystogranuloma. Before surgery all the patients underwent examination of their immune status in the oral cavity by means of flow cytometry with monoclonal antibodies on the laser cytometer cs XL-MCL (Coulter, France), microscopic flora of the mucous membrane in the area to insert dental implant and other surgeries in the oral cavity. Isolated cultures of bacteria were identified in order to examine their quantitative and qualitative content.

The results of the investigations demonstrated that alternations of microbial background were found in all three groups of patients prepared for out-patient surgery in the oral cavity. The following stabilizing and periodontal pathogenic flora was found: *Prevotella intermedia* (2,0+0,19; 5,7+0,21; 3,7+0,20), *Fusobacterium* spp (2,7+0,20; 5,6+0,19; B 4,6+0,20) respectively. Moreover, *Candida* spp. (3,7+0,21) were found in patients from the 2<sup>nd</sup> group with retention and dystopia of the third lower molar.

Examination of microbe biotic community in the oral cavity demonstrates periodontal pathogenic flora available, which determined the necessity to initiate pre-surgical antibiotic preventive therapy of possible infectious-inflammatory complications in case of out-patient dental surgery. Investigation of the immune status in the groups of the study found decreased immune reactivity of the body in 58,1% of patients and normal immune reactivity — in 40,9% of patients.

Examination of the absolute and relative amount of T-lymphocytes, T<sub>H</sub>-helpers, T<sub>H</sub>-suppressors and immune regulating index (IRI) in patients prepared for oral surgery found a statistically reliable difference of parameters in the groups with decreased immune reactivity of the body and normal immune reactivity. The content of CD3 was 57,6+3,5 and 69,4+1,8; CD4 — 29,2+1,4 and 41,9+1,2; CD8 — 31,9+2,3 and 30,2+2,9; CD4/CD8 — 1,1+0,1 and 1,52+0, respectively. The levels of immunoglobulins IgA, IgM, G did not differ.

The results of the study performed are indicative of the fact that patients with decreased immune reactivity of the body prepared for oral surgery in addition to antibiotics in order to prevent infectious-inflammatory complications before surgery should take immunotropic medications as well. Periodontal pathogenic flora and decreased immune reactivity are determining factors promoting the development of infectious-inflammatory complications in the oral cavity in patients prepared for out-patient dental surgery. In addition to antibiotic prevention of infectious-inflammatory complications before surgery in the oral cavity the drugs with immunotropic effect should be prescribed for patients prepared for out-patient dental surgery.

**Gerasyim L.M.**

## **THE INFLUENCE OF USING A GENERAL ANESTHESIA IN SURGICAL DENTISTRY ON THE PSYCHO-EMOTIONAL STATE OF PATIENTS**

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*Bukovinian State Medical University*

For many people, including children, visiting the dentist is a difficult task. Fortunately, the equipment now is completely different from that which there used to be in public clinics. The importance of the child's first visit to the dentist is clear to doctors as well - in some dental clinics, children receive small gifts and diplomas for courage. Medical staff tries to set up at least some positive relationship with the child, and if it fails - no one makes the little patients open their mouths.

If a medical intervention is necessary or the medical situation is complicated, then there is an extreme measure – the child's dental treatment under general anesthesia. These are, of course, special cases or when there are very serious diagnoses and the above mentioned anesthesia cannot be performed in an ordinary private dental room. Though some countries have great experience in performing such procedures, it is a completely new project for our dentists. But it allows us to solve the problems of children's teeth in one visit with the duration of treatment no longer than 2-3 hours. But who are the candidates for dental treatment under general anesthesia?

First of all, they are children with special needs. Children who suffer from specific diseases (different types of syndromes, neurological disorders, autism, etc.) require special dental care, which, in most cases, cannot be provided without general anesthesia, classic intervention in the dental room can damage the health of the child or may be impossible without the cooperation with the patient.

The patients are very small kids who need a large amount of dental treatment. The onset of dental diseases can occur in early childhood, and then the child requires complex intervention, rehabilitation of a large number of teeth from the age of 2-3 years. At this age, children tend to have a very low degree of contact or cooperation with the doctor, and therefore there is a high risk of being injured during classical dental surgery. In this situation, after a complete dental assessment (clinical and radiological) of the patient, the practitioner may recommend dental treatment under general anesthesia, surgery, which includes resolution of all dental problems of the child in one visit (treatment), the length of which does not exceed 3 hours.

At the end of dental treatment under general anesthesia, the patient is fully rehabilitated, but in terms of dental results - they are absolutely incredible. This procedure includes a number of classic therapies performed in the dental room, and the child's stress is minimized.

The benefits of dental treatment under general anesthesia can only be discussed in the context in which it is carried out under conditions of maximum safety for children patients. We should keep in mind that the intervention must be carried out in the hospital, equipped with all the necessary equipment in operating rooms, which is able to manage this kind of treatment in all phases of anesthesia.

Therefore, the dental treatment of children under general anesthesia in the dental room/dental clinic is completely inappropriate, this kind of intervention can only be performed safely in all respects in a hospital. It is where the dental treatment under general anesthesia is conducted and supervised by a team of anesthesiologists who specialize in treating children, and, if necessary, there are pediatricians of related sciences, who, together with dentists, provide the prerequisites and conditions for dental treatment in order to obtain good results which are unattainable with traditional methods of treatment.

**Glushchenko T. A.**

## **PERIODONTAL DISEASE IN PATIENTS WITH METABOLIC SYNDROME**

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Metabolic syndrome includes abdominal obesity, dyslipidemia, hypertension, and carbohydrate metabolism disorders, and its pathogenetic nature is the phenomenon of insulin resistance. In recent years, the study of the relationship between metabolic syndrome and periodontal disease has attracted the attention of many dental scientists.

The aim of the study was to investigate the condition of periodontal tissues in individuals with metabolic syndrome. We examined 190 people with metabolic syndrome and they formed the main group. The comparison group included 90 people without metabolic disorders. The age of respondents ranged from 25 to 55 years. To determine the metabolic syndrome, endocrinologists used the criteria proposed by the World Health Organization (WHO) in 1998. According to this criterion, the metabolic syndrome includes impaired glucose tolerance or type 2 diabetes mellitus and / or insulin resistance in combination with two or more of the following criteria: increase in blood pressure to 160/90 mm Hg; increased plasma triglycerides (greater than 1.7 mmol / l) and / or low levels of high-density lipoprotein cholesterol (less than 0.9 mmol / l in men and less than 1.0 mmol / l in women).

According to the data, the results were next: 155 out of 190 patients with metabolic syndrome had periodontal disease, which was  $81.58 \pm 2.82\%$ . In 90 patients without endocrinological pathology, the prevalence of periodontal disease was 1.2 times lower ( $65.56 \pm 5.04\%$ ).



Generalized periodontitis predominated in the structure of periodontal diseases in patients with metabolic syndrome.

Thus, in the comparison group, gingivitis was detected in  $27.12 \pm 5.84\%$  of patients, which is 1.4 times more than in the main group. Localized periodontitis was detected in  $23.73 \pm 5.59\%$  of patients in the comparison group. The number of cases of the initial stage of generalized periodontitis in the comparison group was 1.06 times higher than in the main group ( $p < 0.01$ ). However, the number of cases of generalized periodontitis stage II in patients without metabolic disorders was  $18.65 \pm 5.11\%$  and was 1.4 times less than in patients with metabolic syndrome. The lowest percentage in the structure of periodontal diseases in the comparison group ( $8.47 \pm 3.66\%$ ) was in stage III of generalized periodontitis. In contrast, in the main group, the percentage of stage III GPs was 2.6 times higher ( $21.94 \pm 3.33\%$ ).

In the 25-34 age range, periodontal disease was detected in  $64.15 \pm 5.63\%$  of patients with metabolic syndrome, which is 1.3 times more than in patients without metabolic disorders ( $47.62 \pm 11.12\%$ ,  $p < 0.01$ ). In the 35-44 age range, the number of people with periodontal disease in the main group increased to  $83.08 \pm 3.12\%$ .

In the comparison group, there was an increase in the percentage of patients with periodontal pathology. However, the number of patients was 1.3 times less than in the main group ( $p < 0.01$ ). With increasing age to 44-55 years in patients with metabolic syndrome  $93.05 \pm 3.12\%$  of cases of periodontal disease were observed, which are 1.4 times more than in persons without metabolic disorders ( $77.78 \pm 6.40\%$ ,  $p < 0.01$ ). Intact periodontium was detected only in  $18.42 \pm 2.82\%$  of patients with metabolic syndrome.

Therefore, we can make a conclusion that patients with metabolic syndrome had a higher prevalence and intensity of periodontal disease than patients without metabolic disorders. Regarding the structure of periodontal disease, patients with metabolic syndrome were dominated by severe stages of periodontal disease. The progression of periodontal lesions was faster compared with patients without metabolic disorders.

#### **Halahdina .A.**

### **USING A SET OF EXERCISES OF REHABILITATION IN THE TREATMENT OF PATIENTS WITH INFLAMMATORY PROCESSES OF THE MAXILLOFACIAL AREA**

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In spite of considerable success in diagnostics and treatment of inflammatory diseases of the maxillofacial area (MFA), till nowadays they have not lost their scientific-practical value. Still they are one of the most urgent issues of modern dentistry. Considering all the importance of the situation, the treatment of inflammatory diseases of the maxillofacial area should be comprehensive. Physical rehabilitation plays a considerable role in a comprehensive treatment of maxillofacial diseases.

Objective: to learn the efficacy of physical rehabilitation in a comprehensive treatment of inflammatory processes of the maxillofacial area during the early postoperative period. In order to provide the outflow, an inflammatory exudate physical rehabilitation is carried out in the form of therapeutic exercises. Intensity and period of exercises are determined depending on the functional state of the patients' bodies. Special exercises for mimic and masticatory muscles are indicated in association with head movements repeated 5-6 times during 10-20 minutes. Slow developing exercises for the muscles of the upper and lower limbs, back and anterior abdominal wall in the initial lying and sitting positions in combination with long-phase expiration respiratory exercises are indicated. The results of the study showed that physical exercises provide improvement of the blood and lymph circulation in the injured place; activate reparative processes; accelerate resolution of inflammatory exudate and improve its outflow from the wound; restore the functions of the mimic, masticatory and lingual muscles; prevent rough scar changes on the skin and mucous membrane. Physical rehabilitation prevents destructive-atrophic processes in the peri-articular tissues and thus

prevents contracture and ankylosis in the temporal-mandibular joint, respiratory and thromboembolism complications, normalizes emotional state, possibilities at home and at work.

Thus, the methods of physical rehabilitation used in a comprehensive treatment of inflammatory processes of the maxillofacial area during the early postoperative period produce a positive effect on resolution of an inflammatory exudate, prevent development of marked scars, increase general nonspecific response of the body and provide restoration of the functions lost.

**Hodovanets O.I.**

**CLINICAL ASPECTS OF DENTAL DISEASES  
IN CHILDREN WITH ENOCRINE PATHOLOGY**

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In recent years, the problem of the prevalence of thyroid pathology, its impact on health and intellectual development of the population has become extremely relevant.

The aim of our study was to investigate the clinical features of dental diseases in children with thyropathology. For this purpose, a dental examination was performed among children aged from 12 to 15 years who had thyropathology (diffuse non-toxic goiter, autoimmune thyroiditis, hypothyroidism). The control group consisted of somatically healthy children of the same age.

The highest prevalence of dental caries has been reported in children with hypothyroidism and diffuse nontoxic goiter. The rate was over 90% and was probably higher than in the control group ( $p < 0.05$ ). There was a high level of caries intensity in both somatically healthy and children with concomitant pathology of the thyroid gland. However, in children of the control group, the CPV index and its individual components were probably lower ( $p < 0.05$ ). This figure in hypothyroidism was characterized as very high. Complications of dental caries in children with thyropathology were recorded 2 times more often than in the control group ( $p < 0.05$ ),

Non-carious dental lesions occurred in 27.85% of children with thyroid disease, which was much more common than in somatically healthy children ( $p < 0.05$ ). The main form of hard tissue damage was systemic hypoplasia, which occurred in more than 70% of cases.

Periodontal tissue diseases were diagnosed in the vast majority of examined children. Their prevalence in diffuse nontoxic goiter, autoimmune thyroiditis and hypothyroidism significantly outweighed the control group ( $p < 0.05$ ). The structure of periodontal diseases was dominated by chronic catarrhal gingivitis, which accounted 83-89% of cases.

The study revealed a high prevalence of dental anomalies and deformities in children with endocrine pathology (72.87%). In the group of comparison, this figure was 51.67%. The highest rate was registered in hypothyroidism (80.00%). Analysis of the frequency of detection of various anomalies and deformations of the dental area showed that the highest level of morphological disorders was observed in diffuse nontoxic goiter and hypothyroidism. Among orthodontic problems, anomalies of teething came forward, which were found in 57.14% of examined children with hypothyroidism and in 45.92% with diffuse non-toxic goiter.

Thus, the prevalence of dental disease in children with thyroid pathology is high and it demands the development of treatment and prevention programs.

**Honcharenko V.A.**

**FREE RADICAL OXIDATION PECULIARITIES AND ANTIOXIDANT PROTECTION  
PARAMETERS OF THE ORAL FLUID IN CHILDREN WITH CHRONIC CATARRHAL  
GINGIVITIS WITH UNDERLYING DIABETES MELLITUS**

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The research objective was to study free radical oxidation peculiarities and antioxidant protection parameters of the oral fluid in children with chronic catarrhal gingivitis with underlying diabetes mellitus.

In order to solve this task, dental and laboratory examination of 105 children aged 12 was carried out. 65 children suffering from diabetes mellitus treated at the Pediatric Endocrinology Department of the Municipal Institution "Regional Pediatric Clinical Hospital" were examined including 35 patients with diabetes lasting up to 5 years (group 3), and 30 patients with diabetes mellitus lasting longer than 5 years (group 4). The groups of comparison consisted of children without underlying pathology with healthy periodontium (group 1 contained 22 patients) and with chronic catarrhal gingivitis (group 2 contained 18 patients).

Children's oral fluid from the observation groups was the material for additional examination. The following parameters were determined: the level of diene conjugates, Malone dialdehyde by N.D. Stalna's method [1977]; catalase activity with the use of ammonia molybdate [ . . Koroliuk,1988]; SOD activity by S.Chevari's method [1985]; POM [E.E.Dubynina, S. . Burmistrov,1995] in modification [ .F. Meshchyshen,1998]; whole protein; ceruloplasmin; S-group.

The parameters of lipid peroxide oxidation of the oral fluid of children from the observed groups possessed a reliable difference depending on the general health state and periodontal tissue condition. The best parameters were observed among somatically healthy children and intact periodontium. The worst parameters were found among children with chronic catarrhal gingivitis and diabetes mellitus lasting longer than 5 years.

Protein oxidative modification degree in children from group 1 is 1,28 times lower than in children from group 2. The parameter increases among children suffering from diabetes mellitus lasting up to 5 years (1,15 times) and those with the duration more than 5 years (1,22 times). The concentration of diene conjugates was the highest among patients with chronic catarrhal gingivitis and duration of diabetes mellitus more than 5 years. In comparison with somatically and stomatologically healthy children this parameter increased 3,73 times ( $5,18 \pm 1,45$  mcM/ml in group 1 against  $19,31 \pm 0,81$  mcM/ml in group 4). A similar tendency was found concerning Malone dialdehyde. The numerical values deteriorate among children with chronic catarrhal gingivitis, and it becomes of a maximum value among patients with inflammatory processes in the periodontal tissue and diabetes mellitus lasting more than 5 years.

The whole protein parameter is of a special attention, since it increases 5,3 times among the patients from group 4 in comparison with group 1, and the parameter of catalase activity decreases 3,8 times ( $6,69 \pm 1,15$  nmol/min\*mg of protein in group 1 against  $1,75 \pm 0,02$  in group 4). Our research found its decrease among the patients from groups 2, 3 and 4 in comparison with healthy children (group 1). The worst parameter was found among children from group 4. A probable difference of superoxide dismutase enzyme activity among children with different duration of diabetes mellitus was not found, but the parameters were worse among patients suffering from diabetes mellitus more than 5 years ( $5,03 \pm 0,13$  UN/min\* mg of protein in group 3 against  $4,42 \pm 0,05$  in group 4).

The parameters of activity of S-groups and ceruloplasmin decrease in case of inflammatory processes in the periodontal tissue, especially among children suffering from diabetes mellitus longer than 5 years.

Thus, the results obtained force us to regulate the processes of antioxidant protection among children with chronic catarrhal gingivitis especially with diabetes mellitus by means of development of therapeutic complexes which is a subject of the further research.

**Kasiyanchuk .V.**

**NEUROLOGICAL MANIFESTATIONS IN THE CLINIC OF DENTISTRY: FEATURES OF COMPUTER SUPPORT IN PRECLINICAL AND CLINICAL RESEARCHES**

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Surgical trauma is known to provoke loss of the osseous tissue at the first and second stage of implantation which is evidenced by many literary reviews. We believe that one of the ways to

prevent it is to use interactive techniques. And the development of telecommunications technology encourages us to improve medical technology.

The aim of this study was to evaluate the manifestation of soliton in bone tissue, relevance in a preclinical study using ANDROID technology in the use of endoscopy and medical navigation during surgery to maximize the preservation of bone tissue.

An experimental surgery on dental implantation was performed in the laboratory on the bone specimen of a dead animal (piglet under 6 months) with further registration of the influence of physical factors on the periosteum in the implant area. Phantom implants (real analogue: D = 3.5mm; L = 6.0 mm) were used for this purpose. While planning the laboratory experiment, it was assumed that uncontrolled pressure (traumatic stimulus) on the periosteum occurs during surgery, which becomes a pathogenic destructive factor.

To control the movement and positioning of the implant, we used our own method using a navigation module (Ukrainian patent 68641), which was integrated with a mobile phone on the platform "ANDROID" via a micro-USB port (2x7) type B ("Navigator UK-A"). The receiver of the device is fixed rigidly relative to the bone specimen. The positioner is integrated with the tip of the device, the movement is fixed at the conditional point of the implant. The smartphone, on the screen of which the operation is monitored, is conveniently fixed in the holder (clamp to the car panel). We compared the results of the experiment with the results obtained in the experiment with navigation systems integrated with a desktop computer running the "WINDOWS" OS via a USB port (Navigator UK-A).

With deviations from 25 to 5 angular minutes, the accuracy (positioning) is not less than 10%, with smaller deviations it falls to 18%. The gap of up to 0.1-0.5 mm between the periosteum and the implant platform is boundary. At the same rotational force in the area of the implant platform, the pressure on the bone tissue increases disproportionately, and at some value is destructive. Uneven deformation of adjacent bone structures was found. Comparing experiments, the results are comparable, the difference in data rate is not subjectively determined.

For visual examination, an endoscope installed on the platform "ANDROID" was used. In 22% of cases, manifestations of the process of deformation of the bone layer, the manifestation of soliton in bone tissue, not visualized by conventional observation were found. The efficiency of endoscopy by the suggested method was 92%. The use of the ANDROID platform in medical navigation and endoscopy systems is relevant in connection with the development of telecommunication technologies.

Statistical analysis of the data confirmed the effectiveness of our original method during the sinus lifting procedure, namely, confirmed the dependence of a successful completion of the operation and a positive dynamics in the postoperative period from the selected method. The use of an advanced method of radiovisiography and a modified sensor allowed to detail the bone architecture of the adjacent soft tissues from 44.8% to 100%  $\pm$  1.5% and differentiate adjacent soft tissues, including atrial ones -  $67.1 \pm 6\%$ ; reduce the exposure by one order of magnitude -  $0.08s \pm 8\%$ , according to X-ray image of the device.

**Killmukhametova Yu.H.**

**VISUAL OBSERVATION OF THE EFFECTIVENESS OF THE COMPOSITE MIXTURE  
OF DRUGS WITH ANTIOXIDANT AND ANTIMICROBIAL ACTION ON  
NECROTIZING ULCERATIVE GINGIVITIS**

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The study was aimed to determine the effectiveness of the developed treatment regimen, which included applications of a mixture of ointments of thiotriazoline, zinc oxide, and 0.05% solution of chlorhexidine bigluconate, on the healing process of ulcerative lesions of the maxillar process mucosa in experimental animals. We used the data of visual observation to assess the course of the pathological process as a criterion of evaluation.

The study was conducted on 18 rabbits. The model of necrotizing ulcerous gingivitis was obtained in animals by chemical burns. Experimental preparations were applied to the damaged gum area 2 times a day in 2 hours after feeding the animals at an approximate dose of 200 mg. The nature of the course of experimental ulcerous - necrotic gingivitis was investigated on the 3rd, 5th, 7th and 10th days of the healing process.

Observations of the simulated ulcer of the maxillar mucosa were daily performed, the wound was photographed in time according to the scheme of the experiment. The criteria for evaluating the effectiveness of local treatment were the timing of elimination of perifocal inflammation, hyperemia, infiltration of the edges of the lesion, cleaning the surface of necrotic tissue, the beginning of the marginal epithelialization, and the time of its completion.

The first phase proved to be the most effective for application - the phase of acute inflammation, in which there was a significant and the greatest reduction in the course and a faster beginning of the next stage of the pathological process. In the next two phases (purification and the beginning of epithelialization) the difference was almost the same and significantly smaller compared to the control group, but their size was inferior to the indicators of the first phase. The least effective was the use of the developed complex in the phase of active anabolic phenomena, where this percentage difference is noticeable, 1.85 times inferior to its greatest results during the entire observation time, indicating a slight inhibition of synthetic processes with regular application to the damaged area.

Analyzing the obtained data on the effectiveness of the developed complex of drugs, it can be noted that in all periods of ulcerative necrotic gingivitis there was a positive difference between the experimental and control groups: the completion of each phase of the disease in treated animals came faster comparing to the untreated animals.

**Kotelban A.V.**

## **ORAL MICROFLORA AS A MAIN RISK FACTOR IN THE DEVELOPMENT OF DENTAL CARIES IN CHILDREN**

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Dental caries has been the undisputed leader among all dental diseases since ancient times. The key to its development, regardless of age, is the microflora of the oral cavity. Most epidemiological studies have shown that high level of cariogenic microorganisms in the oral cavity was associated with a high prevalence of dental caries.

The aim of the research is to assess the microbial risk factor for caries of temporary teeth by determining the titer in the oral cavity of the main cariogenic microorganisms.

We examined 73 children aged 6 living in Bukovina. To determine the level of intensity of dental caries, the RIC index was used (Leus PA, 2009). The titer of cariogenic microflora was determined by the CRT bacteria kit (Ivoclar Vivadent, Liechtenstein) according to the manufacturer's instructions. The degree of probability of the obtained results was statistically assessed.

As a result of our research, it was found that the intensity of caries of temporary teeth was  $3.78 \pm 0.32$  points, which corresponded to the average level. When determining the concentrations of *Streptococcus mutans* and *Lactobacillus salivarius*, we found a probable increase in the titer of colonies among children with different levels of caries intensity compared to dentistically healthy children. At a low level of caries intensity of the vast majority (55.55%) of children established (<104) CFU of streptococci. For the average level of caries intensity, the most characteristic is the number of colonies of microorganisms with a concentration (105-106) of CFU in 57.14% of the examined children. In the case of a high level of caries intensity, (> 106) CFUs of streptococci were sown in 46.67% of children and (105 - 106) CFUs of streptococci in 33.33% of children. Regarding lactobacilli, the low level of intensity of dental caries is characterized by the concentration (<104) of CFU in 44.44% of the examined children. Under the conditions of medium level, a half of the

children was diagnosed with (<104) CFU lactobacilli, high level - of the vast majority of children (53.33%) (104 - 105) CFU lactobacilli.

Thus, we found a high concentration of major cariogenic microorganisms among children with caries of temporary teeth compared to dental healthy children. As the level of caries intensity increases, there is a probable increase in the titer of streptococci and lactobacilli.

**Mandziuk T.B.**

## **FORMING OF ORAL HYGIENE SKILLS AMONG SCHOOL-AGE CHILDREN DURING QUARANTINE**

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The health of the child's body is extremely important. For the proper functioning and development of the child, prevention and timely treatment of pathological changes in the body are important. Prevention of dental diseases remains an urgent problem.

Carrying out sanitary and educational work with schoolchildren, because of the rapid development of dentistry and the search for new effective methods and means of treatment of oral diseases, their prevalence remains high.

One of such methods of prevention is sanitary - educational work among the population. Children of middle school age need special attention, as at this age the forming of permanent occlusion and the dental-maxillary system as a whole take place.

In recent years, it has become common to conduct preventive examinations and thematic "Health Lessons" by students of the Dentistry Faculty under the guidance of teachers in preschools, schools and boarding schools. The essence of these lessons is to demonstrate to students the rules of brushing teeth and oral care clearly.

The current situation in Ukraine and around the world, caused by the prevalence of COVID-19, has made its adjustments in all areas of human activity, in particular in the process of higher medical education. That is why, for the period of quarantine restrictions, it was decided to carry out such preventive measures online.

First of all, a survey was conducted to determine what items and tools children used in the daily care of the oral cavity, or visited the dentist for preventive purposes.

An important step was to acquaint children with the means and objects of oral hygiene, the relevance and correctness of their intended use. Students demonstrated a variety of videos, mobile applications with which you can not only learn how to properly perform oral hygiene, but also competently select items and personal hygiene products.

Children were also shown how to brush their teeth properly using dental phantoms. We have developed illustrated recommendations for proper brushing and nutrition. Don't forget that food is an important factor in the self-cleaning of the oral cavity, the natural cleansing of soft plaque.

As a result, 60-80% of school-age children have an unsatisfactory state of oral hygiene, which indicates that they do not follow the hygienic rules of oral care, despite the high awareness and capabilities of modern society. This is due not only to non-regular care, but also to the lack of skills in proper brushing and the choice of hygiene products.

Experience shows that the necessary level of hygiene skills and systematic and proper care of the oral cavity among children can be ensured only with the proper cooperation of dentists, teachers, parents and children themselves.

Thus, prevention of dental diseases is extremely important and usually includes two components: daily oral hygiene and regular dental examinations. Each component of the prevention of dental diseases has its own characteristics.

**Mytchenok O.V.**  
**METHOD OF DETERMINATION OF THE CENTRAL OCCLUSION HEIGHT IN  
PATIENTS WITH DENTAL WEAR PATHOLOGY**

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Pathological abrasion of teeth is one of the common diseases of the dental system. According to researches, pathological abrasion of teeth reaches 19% of the total number of examined patients. The most common form of pathological abrasion of the teeth is horizontal. Patients' attention is increasingly growing not only to the restoration of function but also to the aesthetic qualities of the obtained structures of dental restorations. Denture designs should completely restore the color of teeth, their shape, be invisible to others, and be easy to use. Most patients usually insist on permanent prosthetics. It was found that the pathological abrasion of teeth was mostly caused by a combination of various factors, including abnormal occlusion, the prevalence of which reaches from 20 to 80%, incorrect prosthetics, poor oral hygiene, lack of prophylaxis, the financial inability of people to receive appropriate treatment. Thus, with such a large number of methods of prevention and treatment of dental pathology in the current level of dental care, pathological abrasion of the teeth is a very important problem today. Patients need the proper quality of prevention and treatment of pathological tooth abrasion.

Difficulties in orthopedic treatment of patients with pathological abrasion of hard tooth tissues are determined not only by the type and degree of abrasion but also by concomitant deformations of the dentition, changes in the nature of the bite and its height, changes in reflex connections in the masticatory apparatus.

The most common type of dental prosthesis is a fixed prosthesis. Fixed prosthetics are widely used because they have a number of advantages over removable structures, namely: restore masticatory efficiency up to 100%, have a small size; practically do not interfere with taste and tactile sensitivity. These features allow in a short period of time to rehabilitate the functions of the maxillofacial area, aesthetic norms.

To determine the amount of abrasion of teeth and abrasion resistance of restorative structures, most authors use only visual guidelines, which is not an accurate method of measurement and does not provide sufficient information about the quality of prosthetics. To more accurately determine the reduction in bite height, we proposed our own measurement technique.

To determine the amount of abrasion of the teeth, we made X-ray contrast marks with filling material within the blind fossa of the first permanent molars of the maxilla and mandibula. In the panoramic image, the distance between the lower limit of the mark on the mandible and the upper limit of the mark on the maxilla was measured immediately after fixing the pad, and after 6 months. The difference between these values was the amount of abrasion. A panoramic x-ray was performed with closed teeth in the position of central occlusion.

The distance between the blind fossa and the apex of the medial and distal buccal mounds was also measured immediately after fixation of the lining, and after 6 months, to determine which of the antagonists was erased more.

Thus, the proposed technique allows you to most accurately measure the amount of reduction in the height of the bite in persons who have restored the masticatory surface of the teeth with tabs.

**Mytchenok M.P.**  
**PREMORBID CONDITION OF CHILDREN WITH ACUTE PURULENT  
LYMPHADENITIS AND ODONTOGENIC OSTEOMYELITIS**

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In the pathogenesis of acute inflammatory processes of the maxillofacial area, children have a history of chronic foci of inflammation and acute bacterial infections. The presence of secondary immune deficiency among some patients and immunosuppressive effects of saprophytic microflora

of the oral cavity under conditions of increased antigenic load on its tissues create appropriate conditions for the development of acute purulent diseases of soft tissues and facial bones due to odontogenic, hematogenous, lymphogenic, stomatogenic, dermatogenic ways of infection.

The aim of our research was to study the premorbid background of 35 patients with acute purulent lymphadenitis and of 23 patients with odontogenic osteomyelitis. The anamnesis of life and disease was collected mainly from parents and children of older age groups in a generally accepted volume.

The analysis of the obtained data allowed to establish concomitant chronic diseases among 27 patients (77.1%) with lymphadenitis and among 18 patients (78.3%) with osteomyelitis. They were the most often observed among children of preschool and primary school age and concerned in most cases the ENT organs, the respiratory tract, the gastrointestinal tract.

After studying the premorbid period, it was found that acute purulent lymphadenitis occurred after SARS among 10 patients (28.6%), in 7 cases (20%) inflammation was combined with acute pathology of the ENT organs, in 5 cases (14.3%) with acute inflammation of the broncho-pulmonary system, in 5 cases (14.3%) with acute periodontitis and exacerbation of chronic periodontitis from temporary permanent molars on the lower jaw, in 3 cases (8.5%) with pustular, skin diseases were observed. Among 5 patients (14.3%) a provoking factor that could contribute to purulent inflammation of the lymph nodes was not detected.

Occurrence of odontogenic osteomyelitis of the jaw bones was preceded by SARS in 7 children (30.4%), general hypothermia - in 5 children (21.7%), acute inflammation of the ENT organs - in 4 children (17.4%), exacerbation chronic diseases of the broncho-pulmonary system - in 3 patients (13.1%) and among 4 (17.4%) provoking factors were not detected.

The development of acute osteomyelitis began in 9 patients (39.1%) with the occurrence of acute periodontitis in temporary teeth, in 7 patients (30.4%) - in permanent premolars and molars. In 4 children (17.4%) and 3 children (13.1%) the cause was exacerbation of chronic periodontitis from deciduous and permanent teeth, respectively.

Thus, the presence of chronic somatic pathology in children and the action of provoking factors create the basis for the realization of the aggressive properties of the infectious agent and lead to acute inflammation in the lymph nodes and jaw bones. The most common causative factors are colds, temporary and permanent molars with complicated forms of carious process.

**Ostafiichuk M.O.**

**THE EFFECT OF LYSOZYME-CONTAINING DRUGS ON THE TREATMENT OF DISEASES OF ORAL MUCOSA IN PATIENTS WITH GASTROINTESTINAL PATHOLOGY**

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The initial anatomical and physiological structure of the gastrointestinal tract is the oral cavity. Therefore, all the processes occurring in the gastrointestinal tract are primarily manifested in the oral cavity. According to statistics, from 10 to 20% of all dental patients have diseases of oral mucosa. The most common diseases of oral mucosa are inflammatory-dystrophic or stomatitis.

The aim of the study was a clinical and experimental justification for the use of a fortified lysozyme-containing agent for the prevention and treatment of stomatitis in patients with diseases of the gastrointestinal tract.

The study was performed on 60 patients with concomitant pathology of the gastrointestinal tract. These patients were treated in the gastrosurgical department of Chernivtsi Regional Clinical Hospital.

In accordance with the existing recommendations, a dental examination of patients was performed, taking into account the complaints of patients, medical history, and examination of the oral cavity. Hygienic indices were also conducted. All patients had unstimulated saliva collected on an empty stomach. The level of biochemical markers of inflammation was determined in saliva: the activity of the proteolytic enzyme elastase, the content of the lipid peroxidation product of malonic



dialdehyde, the activity of the microbial enzyme urease and the activity of the antimicrobial enzyme lysozyme. The control group consisted of 20 patients who were also treated in the gastrosurgical department of the Chernivtsi Regional Clinical Hospital.

From the first day of treatment, all patients in the experimental group were prescribed standard treatment (according to the protocol) and additional "Lysozyme-forte" (2 tablets 30 minutes before meals per person 3 times a day for 10 days). Patients of the second group (comparison group) received only standard treatment (according to the protocol). After 10 days, all patients were re-determined hygienic indices, collected oral fluid and performed biochemical studies.

The study obtained the following results: in patients with gastrointestinal pathology significantly increases the rate of salivation (55.5%), which after treatment is reduced by 21.4% and does not differ significantly from normal. The Silness-Loe index also triples, indicating the presence of an inflammatory process. The use of "Lysozyme-forte" increases this figure by more than 50%. From the data of determining the Schiller-Pisarev index, it is seen that in patients with gastrointestinal pathology this index significantly increases, and the use of "Lysozyme-forte" almost completely normalizes this indicator. The PMA index increases more than 3 times. The introduction of "Lysozyme-forte" significantly reduces this figure.

The level of elastase in saliva increases almost twice in patients, which indicates the presence of inflammation in oral mucosa. "Lysozyme-forte" significantly reduces the activity of elastase. The second marker of MDA inflammation does not respond to the condition of patients and changes little after treatment with "Lysozyme-forte". The results of determining the activity of the bacterial enzyme urease show that in patients with gastrointestinal pathology, urease activity increases 5 times, which indicates a significant increase in microbial contamination of oral mucosa. "Lysozyme-forte" reduces urease levels by 2 times, i.e. it effectively reduces microbial contamination. The activity of lysozyme, which is one of the factors of nonspecific immunity, in patients with gastrointestinal pathology in the saliva is significantly reduced, which indicates the suppression of nonspecific immunity. The introduction of "Lysozyme-forte" significantly increases the level of lysozyme, although it does not increase to normal.

Thus, the conducted clinical studies confirmed the positive results of the therapeutic and prophylactic action of "Lysozyme-forte", obtained in the experiment.

**Palis S.Yu.**

## **MORPHOGENESIS OF THE MANDIBLE IN THE PRENATAL PERIOD OF HUMAN ONTOGENESIS**

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The study of features and critical periods of prenatal development of the human dental and maxillofacial system is an important area of morphological research, which helps to solve an important medical and social problem - improving methods of prevention, early diagnosis and effective correction of birth defects and treatment of acquired mandibular diseases. Clarification of the features of development and topographic and anatomical changes of the mandible can be a morphological basis that will develop new and improve existing prevention measures, methods of early diagnosis and surgical correction of congenital malformations of the mandible.

The aim of the study was to determine the features of morphogenesis, the structure of the mandible in the dynamics of the prenatal period of human development. A set of methods of morphological examination was used (anthropometry; micro-macroscopy; production of histological sections; morphometry; three-dimensional computer reconstruction; statistical analysis. Morphometric study measured the following parameters: 1. The length of the mandibular bone - the distance between the proximal and distal points of ossification of the jaw; 2. Length of the mandible - the distance from the middle of the line connecting the distal points of both halves of the mandible to the middle of the line connecting the proximal points of both halves of the mandible; 3. Width of the mandible - the distance between the distal points of both halves of the mandible; 4. The distance

between the mental holes; 5. The average value of the angle of the lower jaw. Statistical analysis of morphological research materials was performed using computer technology with software in the form of a mathematical apparatus of spreadsheets "StatPlus 2005 Professional 3.5.3" (Analyst Soft). For the analysis of the obtained data the generally accepted methods of descriptive statistics and correlation analysis were used.

Identification of patterns of dynamics of morphometric parameters in the period of organogenesis is an important area of morphological research. Based on our obtained digital indicators ( $M \pm m$ ) of the main morphometric parameters of the human mandible in the dynamics of the prenatal period of fetal development, we found out the critical periods of its morphogenesis and derived mathematical functions that describe the normal course of mandibular organogenesis. It can be used to improve the diagnostic algorithms of the norm during prenatal diagnosis and monitoring of the fetus. Critical periods of morphogenesis of the human mandible are the 6th week (the beginning of the formation of the mandible from the ventral processes of the mandibular arch), 9-10th weeks (period of intensive growth of the organ), which may initiate the formation of structural variants in these periods and can be the time of congenital malformations of the maxillofacial area.

**Romaniuk D.G.**

## **INNOVATIVE APPROACHES TO THE PREVENTION OF DENTAL CARIES IN CHILDREN AND PREGNANT WOMEN**

*Department of Pediatric Dentistry  
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Early dental caries is an important social and medical problem among all countries of the world, and it is one of the most common diseases among children. The results of previous epidemiological studies in Ukraine showed a high prevalence of caries of deciduous teeth, which reached 62.0% among children aged two years, and up to 70.3% among children aged three years. The antenatal period is important both for general and dental health of the child. Negative impact on the forming of good dental health of the unborn child has not only a multicomponent malnutrition of the mother, characterized by a deficiency of vitamins, macro- and micronutrients, but also a high prevalence of dental diseases of pregnant women. During the physiological course of pregnancy, periodontal tissue disease occurs in 96% of pregnant women, and the prevalence of caries is more than 90%.

Therefore, the aim of our study was to substantiate the scheme of prevention of dental caries in children and pregnant women. To achieve the given objective, we conducted a survey of 60 pregnant women in Bukovina, aged from 20 to 45 years. We formed two groups (main and control groups) each of which consisted of 30 children. In order to prevent caries in pregnant women, both groups carried out generally accepted local prevention measures, rehabilitated the oral cavity, provided recommendations of home hygiene, as well as kept to a balanced diet. In addition, the main group was orally administered vitamin-mineral and iodine-containing drug (1 tablet per day) throughout pregnancy, as well as probiotic chewable pills, which include  $10^8$  viable bacteria *Lactobacillus reuteri* DSM17938 and PTA5289 for a dose of 1 pill for 20 days. Among children born with these parameters, the index of oral hygiene, the prevalence and intensity of dental caries were determined.

As a result of dental rehabilitation and the first course of preventive measures, significant changes in the condition of the hard tissues of the teeth, naturally, did not occur. However, we have noticed certain trends. There was a slight increase in the intensity of caries from 5.0 (the second trimester) to 6.0 (the third trimester) and from 5.0 to 7.0 (after childbearing), which occurred due to the appearance of single initial forms of the disease. Our prevention scheme showed high efficiency, because in the control group of examined children there were more than 15% disorders of enamel mineralization than among children of the main group.

Therefore, the obtained data indicate the high effectiveness of our preventive measures during pregnancy. This helps to stabilize the intensity of dental caries among pregnant women, to

improve dental health and to prevent the development of possible diseases of the dental system of the mother, as well as of her child as a whole.

**Roshchuk O.I.**

**A COMPREHENSIVE TREATMENT OF CHRONIC GENERALIZED PERIODONTITIS  
IN PATIENTS WITH FIXED DENTURES  
AND COMORBID GASTRIC AND DUODENAL ULCERS**

*Department of Prosthetic Dentistry  
Bukovinian State Medical University*

A comorbid course of chronic generalized periodontitis and gastric and duodenal ulcer disease, especially in the presence of fixed dentures, requires careful selection of a comprehensive treatment with correction of oxidant-antioxidant balance and restoration of metabolic processes of components of extracellular matrix in periodontium.

The aim of the study: to establish the effectiveness of usage of L-glutathione and connective tissue stabilizer (nemoliks C3) in the comprehensive therapy of chronic generalized periodontitis in the presence of fixed dentures at concomitant gastric and duodenal ulcer disease. Material and methods of research: 60 patients with chronic generalized periodontitis and concomitant gastric and duodenal ulcer disease in the cicatrization stage with fixed dentures were examined. Two groups of patients were formed: group 1 (25 people) who received L-glutathione in addition to traditional therapy and group 2 (35 people) who also received nemoliks C3. Clinical examination of the periodontal tissues and laboratory examination of patients were performed. The obtained results were statistically processed.

In the dynamics of treatment, a unidirectional and almost identical in strength decrease of the intensity of lipid peroxidation in patients of the 1st and 2nd groups ( $p>0.05$ ) was found. A more intensive effect of L-glutathione and nemoliks C3 on the natural system of antioxidant protection has been established. In patients of both groups after the course of treatment there was a significant increase in the content of reduced glutathione in erythrocytes (in 1.7 times,  $p<0.05$ ) with normalization of the value ( $p>0.05$ ). Analysis of the results of the study of cytokines in blood in the dynamics of treatment showed their reliable decrease in the 2nd group of patients: TNF- $\alpha$ , IL-1 – respectively in 2.2 and 2.9 times ( $p<0.05$ ) and increase of TGF- $\beta$  1 content – in 2.1 times ( $p<0.05$ ), while in patients of the 1st group changes were not reliable after treatment with the presence of intergroup difference ( $p<0.05$ ). According to the data obtained, the content of protein-bound hydroxyproline in the dynamics of treatment of patients of the 1st group remained unchanged ( $p>0.05$ ), but in patients of the 2nd group it increased in 1.7 times ( $p<0.05$ ) with normalization of the indicator. At the same time, the rate of free hydroxyproline in the blood of patients of the 1st group after treatment decreased by 11.5 %, and in patients of the 2nd group – by 28.6 % ( $p<0.05$ ) with normalization of the indicator ( $p>0,05$ ) and the presence of a difference with the indicator after treatment in the 1st group ( $p<0,05$ ).

Thus, the comprehensive therapy of patients with chronic generalized periodontitis and gastric and duodenal ulcer disease in the cicatrization stage with fixed metal-containing dentures with the inclusion of L-glutathione and nemoliks C3 helps to reduce lipid peroxidation, to reduce the level of proinflammatory cytokines, to restore the metabolic processes of components of extracellular matrix of periodontium.

**Shostenko A.A.**

**STUDY OF LOCAL IMMUNITY IN PATIENTS WITH CHRONIC GENERALIZED  
CATARRAL GINGIVITIS BEFORE AND AFTER COMPLEX THERAPY**

*Department of Pediatric Dentistry  
Bukovinian State Medical University*

Significant prevalence, especially among young people, the number of increasing of cases of long-term course with frequent exacerbations on the background of insufficiently effective treatment, make the problem of generalized catarrhal gingivitis one of the most relevant and

unresolved in modern dentistry. The great importance in the pathogenesis of generalized catarrhal gingivitis belongs to the state of local immunity, which provides biocidal activity of the oral mucosa. Nowadays, the immune mechanisms that form clinical variants of generalized catarrhal gingivitis have not been studied sufficiently.

The aim of our research is to analyze the results of the study of local immunity before and after combination therapy in patients with chronic generalized catarrhal gingivitis. The research included 33 patients with chronic generalized catarrhal gingivitis aged from 18 to 30 years. The concentration of IL-1, TNF- $\alpha$  and IL-4 was determined in oral fluid using reagent kits "Protein Contour", "Cytokine" (RF) by solid-phase enzyme-linked immunosorbent assay according to standard methods and to the manufacturer's instructions. Concentrations in unstimulated saliva of the main classes of immunoglobulins SIgA, IgG and IgM were established by radial immunodiffusion in a gel using monospecific antisera (Manchini G., 1965).

Gingivitis being at the stage of the chronic course of the inflammatory process, there was a deficiency of SIgA production in the tissues of the gums. At the same time, there was an increase in the synthesis of IgM and IgG, which indicated the activation of this link of humoral protection.

Analysis of the results of the content of cytokines in the oral fluid revealed statistically significant deviations in the levels of IL-1, TNF- $\alpha$  and IL-4 from the values of the accepted norm. However, the identified abnormalities did not indicate an imbalance in the functioning of the cytokine system, as their production in the oral fluid increased or decreased insignificantly and did not go beyond the range of generally accepted reference values.

We have developed and implemented a comprehensive therapy, which involved the use of professional hygienic measures, antibacterial and immune-corrective agents with a certain sequence. At the first stage of treatment of patients, we carried out professional hygienic measures. At the second stage of the treatment, patients received basic treatment: standard antibacterial therapy with chlorhexidine-containing drugs. Additionally, a probiotic ("Bifidobacterin" 5 doses 2 times a day during 10 days) and an immune-corrector ("Cycloferon" orally, 300 mg per day during 10 days) were prescribed.

The obtained data on the dynamics of local secretory immunity allow, on the one hand, to state the normalization of SIgA, IgM, IgG levels under the influence of complex therapy, and on the other hand to indicate an adequate effect on immunological processes in chronic disease.

Thus, the complex treatment of generalized catarrhal gingivitis eliminates the deficit of local humoral immunity, cytokine system imbalance, leads to the elimination of inflammation in the gums after 6-7 visits in 93.3% of patients with chronic disease.

**Tokar O.M.**

## **IMPROVING THE LOCAL TREATMENT OF GENERALIZED PERIODONTITIS WITH A COMBINATION OF MEDICINES**

*Department of Therapeutic Dentistry  
Bukovinian State Medical University*

Long-term use in medical practice of broad-spectrum antibiotics is accompanied by the formation and spreading of microorganisms with pronounced multiple antibiotic resistance. The arsenal of antibacterial agents used for the prevention, rehabilitation and treatment of inflammatory diseases of the maxillofacial area is quite large but does not contain highly effective ones against microorganisms, which are polyresistant to antibiotics. On the other hand, the prevention and treatment of inflammatory diseases of the maxillofacial area are currently complicated by the great variety of microorganisms with different degrees of sensitivity to antibiotics, located on the anatomical formations of the oral cavity. That is why it is extremely important to choose a solution that has both antiseptic and antiinflammatory properties. Due to the high prevalence of the periodontal disease among workers in the woodworking industry and the lack of effectiveness of existing preventive and curative means, we propose antiseptic composite solution DEPS for the treatment of inflammatory diseases of periodontal tissues in workers in the woodworking industry.

The purpose of our study was to improve the standard scheme of treatment of inflammatory diseases of periodontal tissues in workers in the woodworking industry.

For the study, we selected 28 employees of the primary woodworking industry aged 25 to 35 years with approximately the same work experience of 5 - 10 years with a previously diagnosed generalized periodontitis. All patients underwent a comprehensive examination of periodontal tissues and the treatment of generalized periodontitis which was the same in all subgroups according to the degree of development and the nature of the course of generalized periodontitis. They were divided into two subgroups: the main (14 patients) and the comparison group (14 patients). The distribution of patients by subgroups was almost the same according to the degree of disease, age and sex. All periodontal tissue irritants (dental plaque, tartar, etc.) were completely eliminated in both groups. Subsequently, complete removal of the subgingival dental plaque was performed with the treatment of tooth root surfaces (SRP - scaling and root planning). For maintenance therapy, patients of the main group were additionally prescribed mouthwash composite solution – DEPS, which includes: decamethoxine, etonia, propolis and ethanol. The solution restores the integrity of the epithelium of the oral mucosa, increases its resistance to local factors, especially biological (bacteria and fungi). Biologically active components that are part of the DEPS solution block the reproduction of microorganisms, inhibit their growth, which is very important for the treatment and prevention of complications and exacerbation of inflammation in periodontal tissues during its stabilization. To evaluate the condition of periodontal tissues before the treatment, we used the PSR-test and PMA index. To determine the effectiveness of the proposed composite solution DEPS, the same indicators were determined one month after treatment.

Before the treatment, the PSR test did not differ statistically significantly in both study groups and was  $1,64 \pm 0,17$  and  $1,57 \pm 0,13$ . After the treatment, the value of the PSR test was  $0,43 \pm 0,14$  in the main group and  $0,71 \pm 0,12$  in the comparison group. It can be noted that the indicators in the main group are better than in the comparison group, but the difference in the value of the PSR test was not statistically significant. Indicators of the PMA index before treatment were  $0,38 \pm 0,04$  in the main and  $0,39 \pm 0,03$  in the comparison group. After the treatment, indicators of the PMA index were  $0,18 \pm 0,03$  in the main group and  $0,27 \pm 0,02$  in the comparison group. The difference in the indicators of the PMA index after the treatment was statistically significantly better in the main group where the complex of maintenance therapy was used composite solution DEPS.

On the basis of the received data, it is possible to state that the composite solution DEPS is effective and can be used in complex therapy of periodontal diseases in workers of the woodworking industry.

**Vitkovskyi O.O.**

## **COMPLEX TREATMENT OF ODONTOGENIC JAW PERIOSTITIS IN CHILDREN AGAINST THE BACKGROUND OF THYROID PATHOLOGY**

*Department of Pediatric Dentistry  
Bukovinian State Medical University*

The problem of odontogenic purulent-inflammatory diseases of the maxillo-facial area (MFA) among children remains relevant. The dissemination of patients with inflammatory diseases of the MFA is from 30 to 56% and tends to increase. The increase in the number of such patients is due to a high prevalence and intensity of dental caries; the prevalence of caries among children of Ukraine in different age groups ranges from 81.4 to 99.5%; late term of dental treatment of patients; untimely and unconventional surgical care during the initial treatment of patients.

Odontogenic periostitis is an inflammation of the periosteum that occurs as a result of the spread of microorganisms and their toxins from the chronic odontogenic focus of infection. In the clinical course there are acute (serous and purulent) and chronic odontogenic periostitis.

The purpose of the research is to improve the method of treatment of odontogenic inflammatory processes among children by adding to the generally accepted therapeutic and prophylactic measures probiotic chewable pills BioGay Prodentis and oral immunomodulator “Imupret”, against the background of correction of the microelement metabolism of the body with vitamin and mineral preparation “Calcemin advance”.

50 children aged from 9 to 15 years were examined and treated. The main group consisted of 24 children. The comparison group was made up of 26 children who were treated with standard methods. All children were treated in the Children's Dental Clinic in Chernivtsi.

Local oral immunity was evaluated by determining the contents of sIgA, IgA, IgG in the oral fluid. Mixed saliva was collected immediately before performing local surgical manipulations, by spitting into tubes of the volume of 5 ml.

Paraclinic examination of children with odontogenic periostitis, alveolite showed a decrease in the level of basic mineralizing components of oral fluid, insufficiency of trace elements, in particular zinc, copper, manganese, which pathogenetically affects the processes of trophic, regeneration and protective mechanisms of oral tissues.

An immunological survey of the main group of children showed an increase in the content of sIgA, IgA, decreased IgG levels, and imbalances in the cytokin system, reflecting the strain of local humoral immunity of the oral cavity.

The obtained data indicate the elimination of the inflammatory process in the tissues of the maxial region, an increase in the mineralizing potential and protective mechanisms of the oral fluid of children.

Thus, the proposed method allows treating odontogenic inflammatory diseases among children effectively, taking into account the etiopathogenetic mechanisms of the pathological process forming and preventing the development of possible complications of the dental system and of the child's body as a whole.

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**Chuprovskaya Yu.Ya.**

**SOME FEATURES OF BREAST CANCER PROGRESSION**

*Department of Oncology and Radiology*

*Bukovinian State Medical University*

Despite the rapid development of oncology, the prognosis of breast cancer metastasis remains an extremely important and unexplored issue.

A retrospective study of the features of the progression of breast cancer will provide a deeper understanding of the problem, which will be the basis for further research aimed at identifying objective criteria for predicting the progression of breast cancer.

The aim of the study was to study the clinical and statistical features of the course of breast cancer with the verified progression of the tumor process, depending on the stage of the disease and the molecular subtype of the tumor. A retrospective analysis of 242 outpatient charts of breast cancer patients was performed. Patients, depending on the progression of breast cancer after treatment, were divided into two groups - 179 people "without breast cancer progression" and 63 (26.0%) people "with the verified progression of breast cancer." The mean age of patients was  $57.3 \pm 0.69$  years.



The results of the study indicate a clear relationship between the increase in the percentage of people with breast cancer progression and the stage of the disease. There is no significant difference between the two study groups when studying the average age of a woman, the frequency of lesions of the right or left breast, the number of metastases of regional lymph nodes, except for the average tumor size, where patients with the verified continuation of breast cancer are more likely. The longest period to verify the progression of breast cancer is characteristic of stage II B of the disease, with Luminal - A subtype of the tumor.

Thus, the age of the woman, the location of the tumor in the right or left breast, the numbers of metastases of regional lymph nodes do not affect the progression of breast cancer. With the progression of breast cancer, there is larger average tumor size, especially in the luminal subtype - A tumor. The longest period to verify the progression of breast cancer is characteristic of stage II B of the disease, with Luminal - A subtype of the tumor.

**Hovornyan S. L.**

## **ORAL CANCER: WHAT DO WE KNOW ABOUT THE RISK FACTORS?**

*Department of Oncology and Radiology  
Bukovinian State Medical University*

Oncological illnesses are the second leading cause of death worldwide, claiming the lives of nearly 10 million people each year. At the same time, every third of these cases could be avoided with early detection and treatment. Oral cancer is included in the list of 10 leading types of cancer deaths in Ukrainian men, and in 38,8% of these cases, patients did not survive 1 year after they detected cancer. It is important to study the risk factors for this type of cancer to prevent and predict this illness.

**Aim:** to process and analyze the existing data on risk factors of oral cancer. We provided an analysis of different sources of scientific information according to the aim of our research.

Oral cancer rates were 27.7 times higher in male smokers than in non-smokers, and nearly 6 times higher in female smokers. Estimates of the percentage of oral cancers caused by cigarette smoking have been very stable, ranging between 75 and 90 percent. We also discovered that after 3 to 5 years of smoking cessation, the risk of oral cancer fell by roughly 50%. There was a 50-fold increase in cancer risk for long-term users of smokeless tobacco. These malignancies were 14 times more likely among women who had used smokeless tobacco for less than 25 years. In addition, the majority of oropharyngeal cancer patients consume alcohol. According to one study, men have a rate of 94 percent and women have a rate of 82 percent. Oral cancer has been linked to all three types of alcohol (beer, hard liquor, and wine), while hard liquor and beer have a larger risk. Another study found that if the average daily use of alcohol exceeded 120 grams, there was a considerable increase. According to some research, the risk of oral cancer caused by tobacco is larger (72%) than that caused by alcohol (29%). It is clear that when alcohol and tobacco are combined, they have a synergistic impact that significantly raises the risk of oral cancer. Lung, laryngeal, gastric, ovarian, breast, cervical, and oral cancers have all been linked to low beta-carotene consumption. Poor consumption of fruits and vegetables, which are the principal sources of beta-carotene, has been linked to elevated cancer risk and mortality in several studies. Vitamin C deficiency has been linked to an increased risk of stomach, esophageal, oral cavity, laryngeal, and cervical malignancies. There is scant evidence that oral cancer is caused by poor oral hygiene, ill-fitting dental prostheses, inadequate dental restorations, or misaligned or pointed teeth. Candida fungal infections, Chlamydia, and HPV are all known to cause cancer. Oral cancer does not appear to be a typical side effect of systemic immunosuppression, although HIV-associated oral cancers have been observed in HIV-positive immunocompromised patients.

Thus, alcohol intake, smoking, smokeless tobacco, some dietary habits, and infections such as Candida, Chlamydia HPV, as well as the HIV are the risk factors of oral cancer.

**Ivashchuk O.I.**

## **ORAL CANCER SCREENING. MODERN APPROACHES AND PROSPECTS**

*Department of Oncology and Radiology  
Bukovinian State Medical University*

Topicality. It is well known that cancer is the second most common cause of death in the world, claiming about 10 million lives each year. However, every third of these cases could be prevented by early diagnosis and timely treatment. Oral cancer (OC) is among the 10 most common causes of cancer deaths in Ukraine, and in 38.8% of cases, patients die within 1 year of diagnosis. This is due to the fact that this type of sociopathology is usually detected in the late stages, after the appearance of metastases in lymph nodes and other tissues and organs. At this stage of cancer, isotropic treatment is ineffective and even impossible. The situation can be corrected by an effective method of early diagnosis and timely suspicion of OC. That is why it is important to find effective methods of OC screening, as this issue is still insufficiently studied.

The aim of the study: to analyze the existing methods of OC screening, their specificity, and sensitivity, the current state of their implementation in global screening programs, as well as to study the prospects of new approaches to OC screening. An analysis of scientific literature sources that correspond to the topic and purpose of the study.

A review of the literature has shown that no successful attempts at organized or opportunistic screening programs have been made, and none of them have been accepted at any level of the health care system in the world. The main method of screening remains a physical examination of the oral cavity with various auxiliary approaches, although none of them was specific or sensitive enough for an organized screening program. On the other hand, physical examination of the oral cavity using various light adjuvant systems remains promising for opportunistic screening. According to research trends, spectroscopy and polarimetry of tissues and fluids of the oral cavity can be an effective tool for early diagnosis. The main disadvantage of this method is the difficulty of interpreting the results. Convolutional neural networks and other artificial intelligence technologies, in our opinion, can overcome this problem. Attempts to create an OC screening model based on artificial intelligence already exist, showing promising results.

Thus, none of the currently available screening technologies are sufficiently relevant, practical, effective, sensitive, and cost-effective. The need to develop an improved tool for screening oral cancer with elements of artificial intelligence based on in-depth learning technologies has been identified and emphasized.

**Morar I.K.**

## **SOME FEATURES OF THE POSTOPERATIVE EVENTRATION DEVELOPMENT ON THE BACKGROUND OF THE ONCOLOGICAL PROCESS**

*Department of Oncology and Radiology  
Bukovinian State Medical University*

One of the dangerous postoperative complications in abdominal surgery is eventration. This postoperative complication mostly occurs after emergency surgery on the abdominal cavity, in debilitated elderly and senile patients with low immunobiological condition. The phenomena of secondary immunodeficiency, cachexia, anemia, etc. occur in patients with oncological diseases of the abdominal cavity, which causes a high risk of postoperative eventration. The study of some features of the occurrence of eventration on the background of the oncological process will provide a better understanding of the role of the latter in the development of this postoperative complication.

The aim of the study was to experimentally investigate the effect of malignant neoplasms on the mechanical strength of the postoperative scar of a laparotomy wound, as well as to clinically study the frequency of postoperative eventration in patients with malignant neoplasms of the abdominal cavity. Experimental studies were performed with the participation of 102 laboratory rats, which underwent a laparotomy with a length of 3.0 cm. The main group of animals, two weeks before the laparotomy, was vaccinated with Guerin's tumor under the skin of the outer thigh. The mechanical strength of the postoperative scar of the laparotomy wound was determined on the 1st,

3rd and 5th day after surgery, by measuring the level of intra-abdominal pressure at the time of rupture of the latter. 140 patients who underwent median laparotomy for surgical treatment of abdominal diseases were studied. The main group consisted of 98 patients with malignant neoplasms of the abdominal cavity, which, depending on the stages of the cancer process, were divided into two subgroups. The first subgroup of the main group consisted of 46 people in stages I-II, and the second subgroup of the main group consisted of 52 patients in stages III-IV. The comparison group consisted of 42 patients with acute surgical non-oncological pathology of the abdominal cavity. The frequency of postoperative complications ("systemic" and "local"), including eventration during the early postoperative period, was studied.

The results of the experimental study indicate that the presence of a malignant process in the body leads to a decrease in the strength of the postoperative scar, starting from the 3rd day after surgery. Clinical studies prove a probable excess of the frequency of "local" postoperative complications, namely eventration and suppuration of the postoperative wound, in the presence of a cancerous process in the later stages of the disease.

Thus, the presence of a cancerous process in the later stages of the disease reduces the strength of the postoperative scar of the laparotomy wound and leads to an increase in the frequency of eventration and suppuration of the postoperative wound.

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### **Boiko I.I.**

## **HIV-ASSOCIATED NEUROLOGICAL DISORDERS TAKING INTO ACCOUNT THE LOAD OF HIV IN THE CSF**

*Department of Infectious Diseases and Epidemiology  
Bucovinian State Medical University*

The issues of replication and concentration of HIV in various tissues and body fluids remain insufficiently studied. The solution to this problem is hampered by the lack of simple, cheap and affordable methods for quantifying HIV in various tissue samples.

Despite the general pattern - lower concentration of HIV compared to blood and reduced virus content in body fluids on the background of successful antiretroviral therapy (ART), there is evidence of discordant results in the determination of viral load in the blood and other biological samples of the same the same patient.

Aim of the study: establish a relationship between the presence of HIV-associated central nervous system damage, the number of CD4 + lymphocytes in the blood, the level of HIV load in the blood plasma and cerebrospinal fluid.

The amount of HIV in the blood of patients (viral load) was determined in the laboratory of the Ivano-Frankivsk Regional Municipal Center for AIDS Prevention and Control using test systems on equipment manufactured by Hoffman La Roche. The Amplicor HIV-1 MONITOR Test used polymerase chain reaction (PCR) technology to detect very little genetic material (RNA) contained in human immunodeficiency viruses.

SMR studies were performed by the same method as for plasma, because the chemical composition and rheological properties of SMP allow the use of this technique without further modification. The sensitivity of the method for blood plasma was 40 copies of RNA / ml, the linear measurement range from 40 copies of RNA / ml (1.6 lg copies of RNA / ml) to 10 million copies of RNA / ml (7 lg copies of RNA / ml).

It was found that the patient's clinical signs of CNS damage were significantly correlated with the level of HIV load in the cerebrospinal fluid and was not related to the content of CD4 + lymphocytes or the level of HIV load in the blood.

Thus, the method of determining the level of HIV load in cerebrospinal fluid samples can be used to optimize the algorithm for diagnosing HIV-associated CNS lesions, differential diagnosis with neurocognitive disorders of non-infectious etiology. In the absence of therapy in patients with clinical signs of HIV-associated CNS damage, the load of HIV in the cerebrospinal fluid is on average 1.5 lg copies of RNA / ml higher than in patients without CNS dysfunction, and the difference between HIV and cerebrospinal fluid is only 0,8 lg copies of RNA / ml. A high level of HIV load in the cerebrospinal fluid, exceeding 4.00 lg copies of RNA / ml, in the presence of signs of CNS damage can be considered as an additional indication for the administering of ART.

**Denysenko . .**

## **A COMPREHENSIVE TREATMENT OF PATIENTS WITH ALLERGIC DERMATOSIS USING ANGIOPROTECTIVE MEANS**

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Bukovinian State Medical University*

A topical issue of clinical dermatology is to increase effect of treatment of patients suffering from allergic dermatosis. Allergic dermatosis (allergic skin diseases) constitute from 20 to 40% in the structure of dermatologic pathology in Ukraine. According to clinical observations, today allergic dermatosis have a tendency to more severe clinical course with acute inflammatory signs, generalized skin lesions, frequent relapses, which become a cause of temporal disability for patients and loss of social activity for a long time. According to current investigations allergic dermatosis possesses a complicated multi-factor pathogenesis. Changes of the neuroendocrine and immune regulation, imbalance of the oxidative-antioxidative homeostasis, changes in the microcirculation play an important role in the development and course of allergic dermatosis, which should be considered in prescribing a comprehensive treatment for such patients.

Objective of the research was to increase the effect of treatment of patients suffering from allergic dermatosis and acute inflammatory skin signs by means of addition of a current combined angioprotector containing diosmin and hesperedin to a comprehensive therapy. 39 patients suffering from allergic dermatitis were observed (21 men, 18 women) aged from 19 to 76 years, including 28 individuals with diagnosed true or microbial (infectious) form of eczema, and 11 – with atopic dermatitis. Pathological process on the skin of all the patients was of acute inflammatory and diffuse character, often with localization on the lower limbs. In the process of treatment the patients were distributed into two groups: the group of comparison (20 patients including 15 with eczema and 5 with atopic dermatitis) receiving a standard treatment, and the main group (19 patients including 14 with eczema and 5 with atopic dermatitis), who in addition to a comprehensive treatment received a combined angioprotector containing diosmin and hesperidin (1 tablet twice a day during 7 days followed by 2 tablets once a day during 14 days). According to clinical observations patients suffering from eczema and atopic dermatitis from the main group who received angioprotector containing diosmin and hesperedin in addition to the comprehensive treatment, presented much earlier decrease of hyperemia and swelling, and patients with eczema – the foci of skin lesions became dry quicker (on an average 5-6 days earlier than in patients from the group of comparison). The period of treatment became shorter as well (on an average 5-7 days shorter). When the treatment was over, the state of clinical recovery among patients with allergic dermatosis in the group of comparison was registered in 9 (45,0%) patients, considerable improvement – in 11 (55,0%) individuals. Among the patients from the main group – in 15 (78,9%) and 4 (21,1%) patients respectively, which according to Freidman test of nonparametric dispersing analysis possesses a reliable difference ( $\chi^2 = 4,74$  with a critical value of this index – 3,84).

Thus, addition of a current combined angioprotector containing diosmin and hesperedin to a comprehensive therapy of patients suffering from allergic dermatosis and acute inflammatory skin signs promotes a reliable increase of clinical effect of treatment for such patients.

**Hajevska M.Yu.**

**PROBIOTICS AND HEPATOPROTECTORS USAGE IN THE COMPREHENSIVE TREATMENT OF PSORIASIS**

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Psoriasis is a chronic, systemic immune-mediated disease characterized by the development of erythematous, indurated, scaly, pruritic and often painful skin plaques. Nowadays Psoriasis characterizes whith higher behavior that proves an importance of treatment of psoriatic patients.

The aim is to research the effect of probiotics and hepatoprotectors in a complex psoriasis treatment. 169 patients with psoriasis 89 of them were men and 80 women aged 20-58 years with duration of dermatosis from 10 till 19 years, were observed. To include patients to investigation they should have clinical manifestations of psoriasis, patients age should be 19 years and over dermatosis duration of more than 10 years. To evaluate the clinic manifestations of Psoriasis and to analyze the effectiveness of dermatoses treatment we identify skin affect index and Psoriasis Area Severity Index (PASI) analysis with a help of standard technique. In all patient's pathological process on the skin had a prevailing character, aggravate stage of psoriasis was diagnosed in the majority (118) of patients, 51 patients had stationary stage of the disease. In order to optimize the treatment of patients with Psoriasis we use probiotic Enterozhermina and hepatoprotector in the complex therapy. Hepatoprotector Chophytol can be used both in the acute stage of the disease case (as a detoxicant and donator of nitric oxide) and during the reconvalescence (as a hepatoprotector). An antagonism towards apportunistic and pathogenic organisms, and activation of lactobacilli breeding and compensation of B vitamins deficiency due to their synthesis, provide probiotic and immunomodulatory Enterozhermina function. In the process of treatment, the patients with psoriasis were divided into 2 groups: 63 patients (comparative group ) received fundamental therapy of dermatosis, 106 patients (basic group), taking into consideration the available disease case of hepatobiliary zone, were administered hepatoprotective and probiotic means: - Enterozhermina probiotics (During progressive phase - 3 capsules per day or 1 bottle of suspension 2 times day for 12 days) and Chophytol (0.5g thrice a day during 15 days) stage-by-stage in a complex treatment of dermatosis. The drug usage requires maximum drinking water to normalize the water-electrolyte balance. We have established that the complex therapy of such patients provokes positive dynamics of psoriasis clinical manifestation on the 8-12 day of treatment. The patients showed an improvement in a general condition, their sleep became better, the intensity hyperemia of papules reduced, desquamation decreased. During the final stages of treatment, patients with psoriasis of both groups showed a decrease of index of PASI. However, more significant decrease ,72% of it, was determined in patients of the basic group; in patients of the comparative group-63,2 %. Simultaneously 84 from 106 patients of the basic group showed prolongation (on average to 7-8 months) of the state duration of the clinical remission of dermatosis (in the group of comparison) in 28 out of 63 patients) that allows us to recommend Hepatoprotector Chophytol and Enterozhermina Probiotics use in complex therapy of Psoriasis.

As a result, using hepatoprotector Chophytol as a part of multimodal treatment of psoriasis brings forth the improvement of the results of the patients' therapy and prolongs the duration of clinical remission of the disease. Additionally, Enterozhermina drug proves to be an effective and important component of a complex therapy of adult psoriasis patients of different ages with stable clinical manifestations.

**Hulei L.O.**

**THE INTESTINAL BIOCENOSIS DISORDERS AS KEY FACTOR IN ALLERGODERMATOSES**

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Contact dermatitis (CD) is a common inflammatory cutaneous disease caused by an exposure of contact allergens and irritants on the skin. 4-7% of all dermatology consultations deal with

allergic contact dermatitis. The point prevalence of contact sensitivity is 15.2% in teenagers whereas in adults it can reach 18.6%. Urticaria (U) (“hives”) may affect up to a quarter of people at some time in their lives. Due to the fact that 100% of patients with allergodermatoses have various disorders of the gastrointestinal tract and changes in the microbiocenosis of the intestine, which in turn leads to sensitization and deterioration skin diseases. Thus, we decided to indicate peculiarities of clinical course of allergic diseases (AD) (urticaria and irritant/allergic contact dermatitis) in patients with the intestinal biocenosis disorders.

The aim of this study was to evaluate the features of the clinical manifestation in patients with various clinical forms of allergodermatoses on the underlying changes of intestinal microbiota profiles. In our specialized dermatological unit 25 patients were diagnosed with allergic dermatoses, such as, urticaria and irritant/allergic contact dermatitis from February 2020 to October 2021. Chronic urticaria (CU) was defined by the presence of hives and itch for 6 weeks or longer, acute urticaria (AU) – less than 6 weeks. U activity was evaluated by using a simple unified validated system, the UAS7 score. All patients included in the study group were consulted by related specialists, in accordance with the current Protocol providing medical care to patients with AD. The main issues to be studied were the features of the intestinal biocenosis of patients with AD. We performed a prospective study on patients who underwent routine clinical examination and special laboratory (immunological, bacteriological) and statistical research methods were applied as well. According to the results of received data, among 25 aged between 45 and 67 patients diagnosed with AD cases of female obesity were more frequent than cases of male obesity (52% versus 48% correspondingly). 17 (68%) of the surveyed persons lived in the city and 8 (32%) patients – in rural areas. The majority of patients had (84%) the pathological process spread over the large area of skin and in 4 patient (16%) the spread was limited; in 22 (88%) patients the dermatosis had a chronic course from 6 months to 20 years, and in 3 (12%) - was diagnosed for the first time. During follow-up research, only 3 patients out of 15 suffered from AU and 12 cases had U, such as chronic spontaneous urticarias (CSU) in 8 patients and in 4 cases - chronic inducible urticarias (CIU) (1 patient - cholinergic urticaria, 3 patients reported concomitant physical triggers). Throughout the course of disease in 3 cases familial cold urticaria developed. Due to microbiological method, used to study the composition of the gut microbiota in patients with AD, dysbiotic disorders were characterized by a decrease in the quantitative content of aerobic and anaerobic bacteria, predominantly, with moderate and severe clinical course and widespread skin lesions. The number of Bifidumbacteria was most frequently reduced in patients with AD - 8 cases, there was a decrease in seeding of Lactobacilli in 5 patients. In 7 patients with allergodermatosis there was observed an increase in the number of Clostridia, Bacteroids and some strains of Escherichia coli as well. The increase in the number of pathogenic microorganisms was detected in 16 patients (*H. alvei*, *K. pneumoniae*, *Proteus spp.*, *E. aerogenes*) and also frequent detection of fungi of the genus *Candida* (21 patients) and *Staphylococcus aureus* (6 cases - mainly with moderate clinical course and extended rash). In the most of patients (92%) digestive impairment with concomitant, often combined, have been detected as well as diseases of the hepatobiliary system or intestinal tract (6 – chronic latent hepatitis of mixed etiology, 7 - chronic cholecystitis, 4 - chronic pancreatitis, 8 - chronic gastroduodenitis, 25 - dysbiosis I-III grade). Intestinal parasitosis was found in 8 cases (*Helicobacter pylori* – 4 patients, Lambliosis – 6 cases).

In conclusion, allergodermatoses (urticaria, irritant/allergic dermatitis) impaired with the gut microbiota might lead to the chronicity and severer course of AD in patients.

**Kolotylo T.R.**

## **PECULIARITIES OF IMMUNOLOGICAL INDICES IN HIV INFECTION IN THE TUBERCULOSIS ASSOCIATION**

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The relationship between tuberculosis and HIV at the cellular level is very complex and poorly understood. Reducing the number of CD4 + T lymphocytes in HIV infection significantly



increases susceptibility to tuberculosis infection or reactivation of initially latent tuberculosis infection. Foreign authors point to the great role of cytokines in the pathogenesis of HIV infection. There are very few such studies in the combined pathology of HIV/TB in the domestic literature.

The aim of the work: is to perform comparative analysis of individual laboratory parameters of groups of patients with HIV combined with tuberculosis (TB) and TB monoinfection. A comprehensive immunological examination of 231 patients was performed, including 155 HIV-infected with active tuberculosis and 76 tuberculosis alone. The HIV/TB group was divided into 3 subgroups, depending on the time when the TB was joined to the HIV infection. CD4 + T-lymphocyte, CD8 + T-lymphocyte, CD4 +/CD8 + index, interleukin-4 (IL-4), interferon- (IFN- ) and tumor necrosis factor- (TNF- ) were compared with combined HIV/TB infection and patients with TB monoinfection. We established a significant difference between the CD4 + T lymphocyte indices, the CD4 +/CD8 + ratio in the associated HIV/TB infection, as well as in the 1st and 3rd subgroups of HIV/TB compared to the TB monoinfection patients, which was significantly higher. CD4 + T lymphocytes and higher CD4 +/CD8 + index in patients with TB monoinfection.

In the HIV/TB group, there was an average feedback force between the CD4 + T lymphocyte count and serum IFN- concentration (correlation coefficient  $r = -0.36$ , confidence level  $P < 0.05$ ); weak feedback between CD4 + T lymphocyte count and serum TNF- concentration ( $r = -0.29$ ,  $P < 0.05$ ); a weak direct relationship between viral load level and serum IFN- concentration ( $r = 0.25$ ,  $P < 0.05$ ); the mean direct link between the viral load level and serum TNF- concentration ( $r = 0.38$ ,  $P < 0.05$ ); the mean strength was the inverse relationship between the number of CD4 + T lymphocytes and the level of viral load ( $r = -0.44$ ,  $P < 0.01$ ). In the group with TB monoinfection, no correlation was found between CD4 + T lymphocyte counts and cytokine parameters.

Thus, in the case of associated HIV/TB infection, CD4 + T lymphocyte indices, CD4 +/CD8 + ratios were significantly lower compared to patients with TB monoinfection. As HIV infection progresses (decrease in CD4 + T lymphocyte count and increase in HIV load), there is an increase in serum IFN- and TNF- content, which probably indicates a decrease in the number of anti-inflammatory T-regulatory cells, or a decrease in their suppressor cells. activity. The signs of progression of combined HIV/TB infection should be considered a rapid decrease in CD4 + T lymphocyte count, CD4 +/CD8 + ratio, an increase in HIV load, an increase in serum TNF- and IFN- content.

**Perepichka .P.**

## **A COMPREHENSIVE TREATMENT OF PATIENTS WITH ROSACEA CONSIDERING FUNCTIONAL CHANGES OF THE HEPATOBILIARY SYSTEM ORGANS**

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Improvement of the results of treatment of patients suffering from rosacea is a topical issue of modern dermatology. Rosacea is a common chronic dermatosis registered in different regions of Ukraine among 3-5% of the population. Clinical manifestation of rosacea is localized on the open skin areas – for example, the face. It possesses long chronic course, often resistant to standard therapy. All these factors are a cause of reduced ability-to-work and social activity of patients which stipulates the importance to increase the effect of treatment of such patients. Rosacea is known to be a poly-factor dermatosis. An important role in its pathogenesis belongs to disorders of the neuroendocrine regulation, vegetative dysfunctions, microcirculation changes, and functional disorders of the digestive organs, which should be taken into account in the treatment of such patients. Objective of the research was to increase the effect of treatment of patients with rosacea considering changes of the functional state of the hepatobiliary system organs. 37 patients aged from 28 to 69 years suffering from rosacea were examined including 26 women and 11 men. According to clinical signs on the skin 17 patients were diagnosed to have erythematous-teleangiectatic form of rosacea, and other 20 individuals – papulopustular form of dermatosis. Dermatitis lasted from 2 to 6 months in 11 patients, and the rest 26 patients – from 7 months to 1

year. The following methods of examination were used to determine functional state of the hepatobiliary system organs: instrumental (ultrasound examination of the abdominal organs), laboratory (biochemical, immune-enzymatic) and statistical. A comprehensive examination found that the majority of patients (26 – 70,3%) suffering from rosacea had changes in the hepatobiliary system organs (chronic cholecystitis and hepatitis), which were manifested by changes detected by the ultrasound examination of the liver and gallbladder, and changes in the content of cholesterol in the blood serum, lipid spectrum, activity of transaminase and alkali phosphatase. Considering the changes detected in the functional state of the hepatobiliary system organs and in order to improve the effect of rosacea treatment, a comprehensive therapy of 18 patients (the main group) was supplied with hepatoprotector containing silymarin. The rest 19 patients (the group of comparison) received standard therapy for dermatosis. According to clinical observations patients with rosacea from the main group who received a hepatoprotector containing silymarin in addition to the comprehensive treatment presented much earlier decrease of hyperemia and swelling (on an average 6-9 days earlier) and infiltration signs of dermatosis disappeared on an average 10-14 days earlier than in the patients from comparison group. When the treatment was over, the state of clinical recovery was registered among 13 (72.2%) patients with rosacea in the main group, considerable improvement – in 5 (27.8%) patients; and in the group of comparison among 10 (52,6%) and 9 (47,4%) individuals respectively. Thus, addition of a hepatoprotector containing silymarin to a comprehensive treatment of patients with rosacea and functional changes of the hepatobiliary system organs available promotes effect of treatment for such patients.

#### **Semianiv I.O.**

### **MANAGEMENT OF DIABETES MELLITUS-TUBERCULOSIS**

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The association between diabetes mellitus (DM) and tuberculosis (TB) has been known for many years but studies in the last 10-15 years have highlighted that DM (both type 1 and type 2) increases the risk of active TB and that patients with dual disease have worse TB treatment outcomes compared with those who have just TB alone. The rapidly growing epidemic of DM in low and middle income countries therefore threatens TB control efforts and might derail progress made towards achieving the Sustainable Development Goal of ending TB by 2030. Likewise TB may provoke hyperglycaemia and result in overt DM in susceptible persons.

Our study is based on the analysis of treatment of 30 patients with comorbid TB / diabetes pathology who were hospitalized during 2020-2021.

The management of DM during TB treatment is aimed at improving TB treatment outcomes and reducing DM-related morbidity and mortality. The key activities are optimizing glycaemic control (through dietary instructions and medication) and implementing measures to reduce the risk of cardiovascular disease. Metformin is the first choice oral glucose-lowering drug for TB patients. Sulphonylurea derivatives can be used as add-ons or in patients who cannot use metformin although drug-drug interactions with rifampicin limit their use. Insulin is effective in patients with severe hyperglycaemia but has several disadvantages limiting its use in TB patients in programmatic settings. Cardiovascular risk assessment should be considered in TB-DM patients through counselling and prescription of anti-hypertensive, lipid-lowering and anti-platelet treatment with the aim of lowering early and long-term cardiovascular morbidity and mortality. Aspirin and statins should be considered early on in patients who have a previous history of cardiovascular disease.

Monitoring of glucose control during TB treatment is best done by measurement of FBG. HbA1c can be used but is generally not repeated within 2-3 months after starting DM treatment. The frequency of monitoring depends on DM severity. In mild cases (for example, HbA1c < 8% at baseline), blood glucose or HbA1c measurement can be repeated after 3 months. In more severe cases (for example, HbA1c > 10%), FBG measurements should be done more frequently, for example every one – two weeks until reasonable control is achieved. If FBG cannot be done because patients have come to the clinic in a non-fasting state, then post-prandial blood glucose

measurements can be done with the aim of reaching glucose levels < 11.1 mmol/l (< 200 mg/dl). Use of insulin ideally requires self-monitoring of blood glucose.

The documented experience of treating DM in TB patients is mostly limited to three types of drugs: metformin; sulphonylurea derivatives (SUs) and insulin. These three types of drugs are also the most widely available. Newer drugs for treating DM, such as incretin-based therapies (glucagon-like peptide 1 receptor agonists and dipeptidyl peptidase 4 inhibitors) and sodium glucose transporter 2 inhibitors, are generally not available in resource-limited countries.

The standard treatment regimens recommended for drug-susceptible and drug-resistant tuberculosis (TB) remain unchanged with or without diabetes mellitus (DM) as there is no strong evidence currently to support an alternative approach. Dosages should be given daily throughout both the initial and continuation phases. When the person with DM is diagnosed with TB, either through bidirectional screening in the TB clinic or through bidirectional screening in the DM clinic, the treatment should always be administered, supervised and monitored in a TB clinic where the drugs are available and where health care workers are trained in the management of the disease and patient-centred care.

Since DM is associated with an increased risk of drug-resistant TB and worse TB treatment outcomes, patients need to be carefully assessed for drug resistance at the beginning of treatment and carefully monitored for failure during treatment and for relapse after treatment has been completed.

**Sorokhan V.D.**

### **THE USAGE OF AUSAK AND REO-WATER SOLUTION IN THE COMPLEX TREATMENT OF PATIENTS WITH ACUTE SHIGELLOSIS**

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Bukovinian state medical university, Chernivtsi*

Clinical and laboratory studies were performed in 5 patients with shigellosis. All patients had gastroenterocolitis syndrome (acute onset, fever, nausea, vomiting, abdominal pain, mainly in the left lower quadrant, frequent scanty stools with mucus. The course of the disease was moderate.

The effectiveness of AUSAK (containing a live culture of *Saccharomyces boulardii* (5 billion CFU), as well as vitamin B2) was studied in 5 patients. A one sachet of AUSAK was administered PO QD for 5 days. To restore the signs of dehydration supplemented solution (ReO-water) was given orally in addition to the basic treatment: detoxification and rehydration with parenteral ("Trisil", reosorbilact) administration of saline solutions, nifuroxazide, enterosorbents, enzyme preparations.

As a result of clinical monitoring, it was found that in patients treated with AUSAK in combination with a solution of ReO-water, the disappearance of symptoms of intoxication and normalization of bowel movements occurred earlier (on average 1.5 days) compared with the control group.

**Sydorchuk A.S.**

### **IVERMECTIN FOR PREVENTION AND TREATMENT OF COVID-19: PROS & CONS (BRIEF REVIEW)**

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Bukovinian state medical university, Chernivtsi*

For a discovering of ivermectin and artemisin in 2015 Nobel Prize in physiology and medicine was awarded. C<sub>47</sub>H<sub>72</sub>O<sub>14</sub>(H<sub>2</sub>B<sub>1</sub>b) is chemical formula of this prospective drug, which since 1997 was approved for a treatment of onchocerciasis and strongyloidiasis mainly. This substance can be used in human only per os and can connect on 93% with serum proteins and metabolize in the liver. Ivermectin is active because can amplify a formation of neuro mediators which inhibit gamma amino butyric acid that led to the blockage of neuromuscular transmission, paralysis and death of parasite.

Ivermectin was screened in 2020 for activity against COVID-19. The research purpose was to analyze efficacy of the ivermectin based upon international scientific papers with meta-analysis data and systemic reviews. Free access journals in the COVID-19 field, Cochrane library publications, PubMed data were analyzed.

In March 2021 WHO advises that ivermectin only be used to treat COVID-19 within clinical trials. 24 randomized controlled trials with total number of 3,406 participants were conducted. The antiparasitic ivermectin, with antiviral and anti-inflammatory properties, has now been tested in numerous clinical trials. Ivermectin application for scabies gives a direct cost of around three dollars for a hundred of 12-mg tablets.

Most trials were registered, self-funded, and undertaken by clinicians. It had been assessed efficacy of ivermectin treatment in reducing mortality from COVID-19, as well as for prevention and reducing of clinical signs and severity.

Conclusions suggest that ivermectin reduced risk of death compared with no ivermectin. Meta-analysis of 15 trials (n=2,438) revealed average risk ratio 0.38 and suggest moderate-certainty evidence by GRADE score.

There are still insufficient data to recommend either for or against the use of ivermectin for the treatment of COVID-19. The sample size of most of the trials was small. Various doses and schedules of ivermectin were used. Some of the randomized controlled trials were open-label. Patients received various concomitant (confounding) medications (e.g., doxycycline, hydroxychloroquine, azithromycin, zinc, corticosteroids). The severity of COVID-19 in the study participants was not always well described. The study outcome measures were not always clearly defined.

Thus, moderate-certainty evidence finds that large reductions in COVID-19 deaths are possible using ivermectin. Using ivermectin early in the clinical course may reduce numbers progressing to severe disease. The apparent safety and low cost suggest that ivermectin is likely to have a significant impact on the SARS-CoV-2 pandemic globally. Studying of efficacy of ivermectin should be continued.

### **Yeremenchuk I.V.**

#### **ASSESSMENT OF THE PREVALENCE OF ADVERSE REACTIONS TO ANTIMYCOBACTERIAL DRUGS IN PULMONARY TUBERCULOSIS**

*Department of Phthisiology and Pulmonology*

*Bukovinian State Medical University*

The problem of effective and safe pharmacotherapy is relevant worldwide. Treatment of a patient with tuberculosis (TB) is one of the main issues. The development of common, destructive, resistant forms of TB and the occurrence of severe adverse reactions (AR) in the treatment process are the main problems in the fight against this disease.

230 patients with confirmed pulmonary TB were examined. The daily doses of drugs included in the standard chemotherapy regimen were calculated according to the concept of chemotherapy. An average follow-up was 59 days (95% CI (95% CI) 16-133 days).

Allergic ARs were found in 15% of patients. The manifestations of AR in the form of eosinophilia were found in 25% of patients, including urticaria - in 41.7% of patients.

AR of a toxic nature was determined in 66.7% of cases. Medical-induced liver damage was registered in 57.9% of patients, of which it was confirmed only by an increase in the level of transaminases in the blood - in 86.4% of patients. In 13.6% of patients, the cytolysis syndrome was accompanied by clinical manifestations (increased direct bilirubin fractions, jaundice, nausea, vomiting). From the side of the nervous system, AR of a toxic nature was recorded in 26.3% of patients in the form of headaches, in 18.4% of individuals in the form of a sleep disorder. From the side of the cardiovascular system, the following changes were noted: an increase in blood pressure was noted in 27.6% of the patient, pain in the heart - in 10.5% of people, metabolic changes on the ECG - in 9.2% of patients. The manifestations of AR considering the gastrointestinal tract were noted in 63.2% of cases in the form of nausea and in 55.3% of vomiting.



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( $\chi^2 = 4,04$  - 3,84).

**COVID-19**

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Sars-Cov-2  
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30 % COV D-19,  
(Journal of Allergy  
and Clinical Immunology).

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NCT04355637 [ ]; NCT04193878 [ ]; NCT04331470 [ ]; NCT04377711 [ ];  
NCT04330586 [ ]).

**Basaraba R.Yu.**

**INVESTIGATION OF THE HEPATOPROTECTIVE EFFECT OF THE COMMON  
CAT'S FOOT HERB DRY EXTRACT**

*Department of Pharmacy*

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Throughout many years plants using not only as a source of food but also in treating diseases. One of the directions of modern pharmaceutical science for herbal medicinal products production is the use of plant raw materials. Plant metabolites are close to metabolites of the human body, and the main effect of the use of plant remedies is to regulate impaired metabolic processes. The use of medicinal plants (MP) in folk and scientific medicine has a centuries-old tradition. The searching for plants with a long history of usage, minor side effects and high tolerability, regardless of the age of patients are the objects of interest in our society. Herbal remedies have a milder effect, a fairly wide range of pharmacological activity, practically do not cause addictions compared to synthetic drugs, and also go well with food and synthetic medicines. Due to the presence in plants of many groups of biologically active substances (BAS) with various pharmacological actions, plant remedies can be used for the treatment of many diseases.

The object of the study was to select the common cat's foot herb (*Antennaria dioica* (L.) Gaertner), which was harvested during the flowering period in the Vyzhnytsia district, Chernivtsi

region. The raw material was dried in a shade under tents; laid out in a thin layer (2-3 cm) on paper and periodically flipped. The herb was dried using a conventional method and stored in paper bags in a dry, protected from direct sunlight place.

Preparation of extract. About 500 g of dried raw material was powdered. It was taken in the extractor and extracted using 50 % ethanol as a solvent. The extract was concentrated under vacuum and dried by rotator evaporator under reduced pressure.

The 45 white nonlinear male rats weighing 200-250 g were used as the experimental animals. The animals were kept in a room under the temperature of  $22 \pm 2$  ° C, and relative humidity of 44-55 % under 12/12 hour light and dark cycle with a standard laboratory diet and water were given ad libitum.

The study of hepatoprotective activity of the common cat's foot herb dry extract was performed on the model of acute toxic hepatitis caused by alcohol – CCl<sub>4</sub> in comparison with the known hepatoprotective agent, which is widely used in the clinic, Silibor (produced by “Zdorovia” Ltd., pharmaceutical company, Kharkiv, Ukraine).

The experiments were conducted on 45 white nonlinear male rats weighing 200-250 g. Animals were divided into 5 groups of 9 animals in each: group 1 – intact control; group 2 – control pathology, animals that were injected intragastrically with a 50 % oil solution of alcohol – CCl<sub>4</sub> at a dose of 0.7 ml/100 g mass; groups 3, 4 and 5 are animals that received the common cat's foot herb dry extract 1, 2 hours prior to the administration of alcohol – CCl<sub>4</sub>, respectively, in doses of 25 mg/kg and 50 mg/kg, and Silibor comparator drug 100 mg/kg. Tested remedies were administered in animals prophylactically for 7 days. Control pathology animals were treated with an equivalent volume of drinking water (1 ml/100 g mass). Hepatotoxin was administered daily for 2 days (day 8 and day 9 of the experiment). 24 hours after the last injection of alcohol – CCl<sub>4</sub>, the animals were removed from the experiment, the liver was excluded, which was weighed and its weight factor was calculated, and blood was collected for biochemical study.

The conducted researches allow us to state, that the common cat's foot herb dry extract at a dose of 50 mg/kg has a hepatoprotective effect, which is realized due to the membrane-stabilizing and antioxidant properties of the extract's biologically active substances. The obtained results can be used in a further preclinical study of the studied raw material's dry extract to create new hepatoprotective agents on its basis.

**Batranovska S.O.**

### **USE OF SULFUR ION DONORS AS A NOVEL STRATEGY FOR ORGAN PROTECTIVE THERAPY**

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The rapid growth of pollution of air, soil and water bodies with salts of heavy metals and other toxins is facilitated by the uncontrolled use of pesticides in agriculture, the increasing frequency of industrial accidents and toxic emissions, oil refining and exhaust gases from cars, the widespread use of toxic paints and chemicals in production and in everyday life. Subsequently, all this accumulates in plants and ends up in finished products.

The aim of our research was the increasing use of products with a long shelf life, as well as polypragmasia and self-medication due to the availability of most drugs without a prescription and the abundance of advertising in the media, in turn, also accelerate the growth of toxic and allergic reactions among the population. Taking into account the increase in allergization and various poisoning in the world and in Ukraine, in particular, and, accordingly, taking into account the socio-economic factors and the far disappointing forecasts of a further increase in the incidence, the question arises about the availability of effective and affordable treatment. Sodium thiosulfate (STS) [antichlorine, sodium hyposulfite, sodium sulfate Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>] is an inorganic salt widely used in various industries, since the end of the 16th century it has been used for poisoning. The drug has a low cost, is produced by domestic pharmaceutical companies in the form of a 30% solution for injection, has an antitoxic, desensitizing, antioxidant, anti-inflammatory and neuroprotective effect.

This complexing agent, a donor of sulfur ions, easily reacting with various chemical compounds and oxidizing, acts as a strong reducing agent, forms low-toxic and non-toxic compounds with cyanides, heavy metal salts, and halogens.

The drug has antidote properties in relation to hydrocyanic acid and cyanides, phenols, benzene, aniline, compounds of mercury, lead, arsenic, copper, chlorine, iodine, bromine, which makes it possible to use it in the complex treatment of poisoning, allergic diseases, as well as burns, arthritis, neuralgia, diabetic neuropathy. STS has also been shown to be effective in the treatment of calciphylaxis, a formidable complication in patients with severe renal failure on hemodialysis, resulting from calcium deposition in the intima of arterioles and characterized by nodular subcutaneous calcification and painful tissue necrosis, often leading to skin ulceration, secondary infection and high one-year mortality from sepsis (45%-80%). STS displaces calcium ions from sediments to form calcium thiosulfate, which is excreted by the kidneys or is dialyzed. Diabetes mellitus, obesity, the use of calcium-containing agents and dietary supplements, active vitamin D, warfarin, corticosteroids, iron preparations, and trauma associated with subcutaneous administration of heparin or insulin increase the risk of developing calciphylaxis. STS, a reversible oxidation product of hydrogen sulfide, has vasodilation and anti-oxidative properties, making it an attractive agent to alleviate damaging effects of hypertension. Combining thiosulfate of sodium with angiotensin converting enzyme inhibitors further lowered renal vascular resistance and prevented glomerulosclerosis.

Thus, these data suggest that thiosulfate has therapeutic potential in hypertensive renal disease and might be of value when added to standard antihypertensive therapies. In addition, STS attenuates glial-mediated neuroinflammation in degenerative neurological diseases by increasing the expression of sulfhydryl groups and glutathione in cultures of microglia and astrocytes. Since neuroinflammation has been found to occur in degenerative neurological diseases such as Alzheimer's and Parkinson's, STS is a potential therapeutic agent for these and other neurodegenerative diseases and deserves attention for further study.

**Drachuk V.M.**

**ANTIOXIDANT POTENTIAL OF GLUTATHIONE IN THE CONDITIONS OF DEVELOPMENT OF ACETAMINOPHEN-INDUCED ACUTE RENAL INJURY**

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Despite significant advances in drug therapy and improvements in renal replacement therapy, mortality rate of acute kidney injury (AKI) continuously increases and is about 25-70%. On the other hand, Acetaminophen is frequently used for analgesia and is considered safer than nonsteroidal anti-inflammatory drugs (NSAIDs) for the kidneys. However, there is little epidemiological evidence of the association between Acetaminophen and development of AKI. Renal insufficiency occurs in approximately 7-15% of patients with acetaminophen overdose. For this reason, potent cytoprotector and antioxidant – glutathione has drawn our attention as remedies for the pathogenetic correction of Acetaminophen-induced AKI.

Aim of research – to study antioxidant potential of glutathione in conditions of Acetaminophen-induced AKI in rats. Research was conducted on 21 mature non-linear white rats weighting 130-180 g, randomly divided into 3 groups (n = 7): I group – intact control, II group – Acetaminophen-induced AKI (Acetaminophen-induced AKI was caused by a single intraperitoneal administration of acetaminophen (paracetamol, Health, Ukraine) at a dose of 750 mg/kg), rats of III group were daily administered with glutathione (TAD 600, Biomedica Foscama, Italy) at a dose of 30 mg/kg, 1 h after paracetamol injection. Animals were withdrawn from the experiment 24 h after the last injection, while blood, urine were sampled for biochemical assessments. Peroxidation processes in kidneys were evaluated by the malone dialdehyde and oxidative modification of proteins levels, antioxidant defense – by catalase and glutathione peroxidase activity, and SH-groups content.

In the course of experimental studies on the model of Acetaminophen-induced AKI, the expressive antioxidant activity of glutathione was proved, which was confirmed by the decrease in lipid and protein peroxidation processes in blood plasma and renal tissue, as well as an enhancement of enzymatic activity (increase in activity of endogenous glutathione peroxidase in blood plasma by 24,6%, in kidney tissue by 34,9%), and on the non-enzymatic level of the antioxidant defence (increase in the SH groups level by 25,1%, decrease of ceruloplasmin – by 22,2%) compared to the model pathology group.

The antioxidant potential of glutathione is confirmed by an increase in the antioxidant-prooxidant index in kidney tissue and a significant decrease in the index of oxidative stress in the blood of treated animals. The cytoprotective effect of glutathione was confirmed by a reduction in gamma-glutamyltranspeptidase activity in urine by 2,4 times ( $p < 0.01$ ) compared to untreated animals. Maintenance of the cellular energy balance is an important mechanism of the nephroprotective effect. Co-treatment with glutathione contributed to an increase in the activity of succinate dehydrogenase by 1.5 times compared with Acetaminophen-induced AKI. Under the conditions of renal damage, glutathione promotes the compensatory activation of the aerobic glycolysis and activates the energy-synthesizing function of nephrocytes.

The results of the experimental studies show the nephroprotective activity of glutathione in conditions of Acetaminophen-induced AKI. Nephroprotective effect manifests restoration of the prooxidant-antioxidant and energy balance in kidneys of animals with Acetaminophen-induced AKI. The obtained results substantiate the relevance of further research to broaden the spectrum of glutathione use and optimize the pharmacotherapy of renal pathology.

**Ezhned M.A.**

**MARKETING ANALYSIS OF PHYTODRUGS BASED ON MARSHMALLOW  
(*ALTHAEA OFFICINALIS L.*)**

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The use of plants as drugs has a long history. The first mention of medicinal plants and their properties are found in the earliest written records of human culture and morphological descriptions of plants and their use date back to the 7<sup>th</sup> century B.C. One of such widely used plants was marshmallow (*Althaea officinalis L.*), which is used since the IV century. B.C. The tradition of marshmallow usage has survived to our time. Therefore, a deeper study of this plant and drugs based on it is still relevant.

Therefore, the aim of the study was to conduct a marketing analysis of the phytodrugs range based on *Althaea officinalis*, which are presented on the pharmaceutical market of Ukraine.

Marshmallow drugs are used to treat the acute and chronic inflammatory diseases of the respiratory system, gastrointestinal tract, ulcers and wounds and have expectorant, enveloping and anti-inflammatory effects; they are also used as an external remedy for joint and muscle pain as well as relaxing and helping emollient.

The first stage of the study was to establish the range of phytodrugs which include marshmallow. The pharmaceutical market of Ukraine is found to represent 28 names of drugs based on marshmallow.

The next stage was to study phytodrugs based on *Althaea officinalis* in accordance with the presented dosage forms. The largest share is made up of syrups - 36%, tablets – 21%, herbal compositions - 14% and chewable tablets - 11%. Other dosage forms (tinctures, oral drops, sprays, lollipops, powders for internal use) account for a total of 18%.

The final stage was the pharmaceutical market analysis according to the country of manufacture. The largest number of presented phytodrugs were domestic producers (23 items) and 5 items of foreign production, which is 82% and 18% respectively.

The data analysis of the State Registration of Medicinal Products established that the leading positions in the pharmaceutical market are occupied by domestic manufacturers, which over time

may lead to depletion of raw materials in Ukraine. Therefore, the greater cultivation and development of new phytodrugs of *Althaea officinalis* L. is valid and up-to-date nowadays.

**Fedotova M.S.**

## **STUDY OF THE EPIDEMIOLOGY OF DEMENTIA AND ALZHEIMER'S DISEASE IN UKRAINE AND IN THE WORLD**

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The aim of the work was to conduct a study of the epidemiology of dementia and Alzheimer's disease (AD) in Ukraine and around the world. The research used general theoretical methods and methods of epidemiological research.

The results showed that according to statistics, in 2019, about 50 million people in the world suffered from dementia, and almost 10 million new cases are detected each year, and this figure should triple by 2050.

With the improvement of the quality of medical care and pharmaceutical provision of the population in most countries with high socio-economic development, the level of dementia, as a threatening neurodegenerative disease among the population, began to increase gradually. For example, in the countries of the European Union in 2001, the prevalence of dementia was 7.7 million people, and according to forecasts in 2040 the number of patients with dementia is expected to increase to 16 million.

The total number of people with this type of disease in Europe is 9780678 people or 1.57% of the total population.

The incidence of Alzheimer's disease is also gender-dependent. Thus, in European countries, this diagnosis is more common in women than in men. The number of diseases among European women in 2019 was 6,650,228 people, and men - 3,130,449 people, which is twice less than among women.

In Ukraine, since 2018, the incidence of all mental disorders has increased, including symptomatic manifestations of cognitive impairment (2.0%), all forms of dementia (6.0%), vascular dementia and Alzheimer's disease (9.0% each). The structure of dementias is dominated by the vascular form of dementia (62.59%), and AD has been characterized since 2015 by a systematic increase in the proportion (%) from 7.0% to 12.0%. The average prevalence of dementia in Ukraine was 99.72, and Alzheimer's disease - 5.34 people per 100 thousand population. Significant fluctuations in the prevalence of dementia and Alzheimer's disease in different regions of the country. Thus, in the regions of the country these indicators differed 6 or more times. The highest prevalence of dementia was observed in 7 regions (Vinnytsia, Donetsk, Zaporizhia, Zhytomyr, Kharkiv, Cherkasy and Chernihiv) and Kyiv, and AD in 3 regions (Zaporizhia, Kherson, Chernihiv) and Kyiv.

Systematizing the results of research on different groups of epidemiological indicators for all forms of dementia, including AD in Ukraine in the dynamics of the years, we can make a conclusion. Of concern is the increase in the incidence of all forms of dementia and AD since 2018. In addition, it is proved that since 2015, against the background of the unconditional dominance of the vascular form of dementia, the proportion (%) of AD is gradually increasing. It should be noted that there is a significant discrepancy between the epidemiological indicators of Ukraine and world statistics. This indicates the need to implement an effective system for recording and monitoring cases of all forms of dementia, including Alzheimer's disease in Ukraine.

**Filipets N.D.**

**PROTECTIVE ROLE OF THE ACTIVATOR OF ATP-SENSITIVE K<sup>+</sup> CHANNELS OF FLOCALINE ON MODELS OF EXPERIMENTAL NEPHROPATHIES**

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Potassium (K<sup>+</sup>) channels in kidneys have various functions starting from ion balance support and volume regulation to the regulation of renin synthesis and finally angiotensin II generation. The results of renal ATP-sensitive K<sup>+</sup> channels (KATP channels) activators studies are ambiguous that gives evidence of the complexity of this research. The reason may be that modern representatives of potassium flow activators are not selective regarding renal KATP channels and have adverse effects. Unlike the reference drugs (the other potassium flow activators) the new KATP channels activators including Flocalin contain the fluorine atom in their molecule that determines higher selectivity and significantly lower toxicity.

The aim of our study was to study the effect of Flocalin KATP channels activator on the dynamics of proteinuria in rats with different models of experimental nephropathy.

The experiments were made on 84 laboratory non-linear white rats 0,15-0,17 kg. The model of sublimate nephropathy was made by a single subcutaneous injection of mercuric dichloride. Hypoxic histohemic nephropathy (HHN) was modeled with the patented method of sequential administration of sodium nitrite and 2,4-dinitrophenol. The rats with experimental nephropathies were divided into two series for the analysis of acute and chronic kidney damage induced by sublimate and of hypoxic origin. In each series the rats from Group I were left without correction and the rats from Group II received intraventricular probe administration of Flocalin in the dose 5 mg/kg during 7 days. To the rats with acute nephropathy we administered Flocalin from the first day of pathology modeling, whereas the rats with chronic nephropathy received Flocalin from the 30<sup>th</sup> day after nephrotoxins administration. After the last dose of Flocalin all the rats went through water load in the amount of 5 % of body weight and were placed into exchange cages for two hours for urine collection. Euthanasia of rats was done under light ether anesthesia. For glomerular filtration rate (GFR) assessment we measured creatinine level in the urine by the method of Folin. Plasma creatinine was assessed by the method of Popper in Merson modification. Protein concentration in the urine was determined by sulfosalicylic method. For the possible interrelation between the dynamics of proteinuria and biochemical state of the nephrocytes at all stages of experiment after the course administration of Flocalin we studied particular indexes of energy metabolism – alkaline phosphatase (AP) in renal cortex and succinate dehydrogenase (SDH) in renal cortex and medulla. Statistical processing was performed with «Statgrafics». The significance of differences of the results was assessed with parametric Student's t-test.

Flocalin use causes a decrease in standardized by glomerular filtration rate proteinuria: by 4,5 times and 1,2 times in rats with both acute and chronic sublimate nephropathy; and by 1,6 and 2,1 times, simultaneously, under the conditions of hypoxic injury of nephrocytes. Antiproteinuric effect of Flocalin during both acute and chronic periods of nephropathy was accompanied by an increase in enzymatic activity of alkaline phosphatase (by 18,1 % and 49,9 % – in rats with sublimate nephropathy; by 18,1 % and 4,0 % – in rats with HHN) and succinate dehydrogenase (by 36,3 % and 56,7% in rats with sublimate nephropathy; reaches control level in rats with acute HHN and increases by 71,2 % in rats with chronic HHN) in kidney cortex.

Thus, Flocalin induced KATP channels activation has led to the decrease of proteinuria in the rats with acute and chronic kidney damage caused by the nephrotoxic effect of sublimate and combined histohemic hypoxia. The elevation of protein excretion standardized by GFR has pointed at the predominant tubular origin of proteinuria due to primary damage of the proximal part of nephron regardless of the etiology of nephropathy. The use of Flocalin was followed by the increase of AP and SDH activity in renal cortex of rats in acute period of sublimate nephropathy and HHN, as well as in chronization of these pathological processes. Combination of the antiproteinuric effect and the improvement of energy supply of the functional state of the nephrocytes in renal cortex

points at the nephroprotective effect of KATP channels activation with Flocalin predominantly in the proximal part of the nephron.

**Horoshko O.M.**

### **CHRONORHYTHMOLOGIC FEATURES OF LIPIN ON ANTIOXIDANT PROTECTION INDICATORS IN RATS WITH MODEL PATHOLOGIES**

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Any biological system of the organism is subjected to the natural functioning organization. Renal function has a conspicuous circadian periodicity. Thus, circadian rhythms of biochemical parameters in organs and tissues are indicators of the body state, including kidneys. Many pathological processes are accompanied by a violation of the temporal organization of physiological functions, which is also characteristic of the pathogenesis of the acute renal failure development.

The aim of the given study was to establish chronorhythmic indicator changes of antioxidant protection of renal tissues under the conditions of model pathology with a single injection of lipin.

The experiments were conducted on 21 adult outbred white rats, weighing 120-160 g. Acute renal failure was caused by intramuscular administration of 50% glycerol solution at a dose of 10 mg/kg. Lipin was administered at a dose of 500 mg/kg once intraperitoneally in 40 min after administration of glycerol. To perform biochemical studies, kidney tissue was collected after decapitation of rats for the 12th hour of the experiment with a 6-hour interval: 4 times a day - at 8 am, 2 pm, 8 pm and 2 am.

Antioxidant effects were evaluated by the content of lipid peroxidation products (malondialdehyde (MDA)) and proteins (protein oxidation products (POP)).

The obtained data on MDA content in the animal kidney tissues with model pathology reached a minimum value at 8 pm and a maximum one at 2 am, which was 1.6 times higher than control group and remained high at 8 am. Lipin reduced the MDA content on the background of acute renal failure by 1.3 times during the period of its maximum value by 2 hours, and at 8 am the effect of the drug reduced the MDA content by 1.2 times. The POP content reached its peak in the affected animals at 8 pm (1.3 times) compared with the control group. Lipin with a single injection had the greatest effect (in 1.4 times) on the intensity of the POP formation at 8 pm.

Thus, in animals with model pathology there were changes in the structure and nature of circadian rhythms that characterized antioxidant protection. The correction of model pathology by lipin should be noted to enhance since 8 pm till the end of the experiment.

Therefore, the treatment of acute renal failure should be prescribed taking into account the rhythm of antioxidant protection processes and the use of antioxidant drugs is recommended mainly in the afternoon.

**Kopchuk T.G.**

### **HISTOLOGICAL CHANGES IN THE KIDNEY STRUCTURE IN THE DYNAMICS OF FEVER DEVELOPMENT**

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Fever is a typical pathological process characterized by a shift of the thermoregulatory reference point to a higher level of body temperature regulation due to the influence of pyrogenic substances. Fever development includes three stages: rising of temperature, maintenance of high temperature and decrease in body temperature.

The aim of our experiment was to study the histological changes the kidney structure in the dynamics of fever development and detect the mechanisms of damage to nephrocytes of the kidney cortex, medulla and papilla in conditions of the fever development.

Research was conducted on 60 non-linear white male rats weighing 130-180 g, maintained under the standard vivarium conditions with a constant temperature and humidity. Aseptic fever was induced according to recommendations by a single subcutaneous injection of pyrogenal at a



dose of 25 µg/kg. During development of the fever, rectal temperature was measured every 30 min. Animals were withdrawn from the experiment 24 h later, while blood, urine and kidneys were sampled for biochemical and histopathological assessments. Statistical processing of the obtained data was performed using the SPSS Statistics 17.0 software.

According to obtained results, in the first stage of fever, heat production predominates over heat transfer, which in pathogenesis is actually the effect of low temperature and is accompanied by the activation of the sympathetic and renin-angiotensin systems, respectively. This explains the decrease in GFR. The increase in protein excretion in the urine in the first stage of fever is due to the ischemic effect of angiotensin 2 on the cortical region of the kidneys, where localized proximal tubules responsible for protein reabsorption. Fibrin filaments were deposited at the site of destroyed nephrocytes, which was detected during Slinchenko staining as a small-focal character of changes in the properties of proteins with a shift in color to red. In the second stage of fever, the body temperature reaches the level of a new reference point, heat production is balanced with heat transfer, and fever performs its biological role. This normalizes the activity of the renin-angiotensin system, which was increased in the first stage of fever, resulting in increased GFR and there is an expansion of the capsule Shumlyansky-Bowman. Inhibition of distal reabsorption of sodium ions with dystrophic changes in the epithelium of the tubules of this nephron is due to energy deficiency of the kidneys, because the energy of ATP in the second stage of fever is used to ensure its biological role. Inhibition of proximal reabsorption of sodium ions and insignificant dystrophic changes of the epithelium of the proximal tubules in the third stage of fever decrease in temperature with predominance of heat transfer over heat production due to hypoxia of the kidneys due to blood clotting due to intense sweating.

With the development of aseptic fever on white nonlinear male rats with hyponatremic diet found: in the first stage (temperature rise) vacuolar dystrophy of the epithelium of the proximal tubules and small-focal nature of changes in the properties of proteins with a shift in color to red (standing) high level) expansion of the lumen of the Shumlyansky-Bowman capsule and dystrophic changes in the epithelium of the distal tubules, in the third stage (decrease in temperature) moderate expansion of the lumen of the Shumlyansky-Bowman capsule and insignificant dystrophic changes in the epithelium of the proximal tubules. Morphological disorders in the dynamics of the development of fever reflect the nature of changes in renal function.

**Korovenkova O.M.**

## **THE EFFECT OF THIO CETAM ON THE EXCRETORY FUNCTION OF THE KIDNEYS UNDER THE CONDITIONS OF BLOCKADE OF PROSTAGLANDIN SYNTHESIS**

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It is known that prostaglandins (PG), namely, eicosanoids, that synthesized in kidney cells as natriuretic (PG E) and sodium delays (GHG F2a), take a direct part in the regulation of renal circulation and kidney function.

The purpose of the paper was to conduct a series of experiments against the background of inhibition of prostaglandin.

We studied 18 male rats, which were divided into 3 groups: with and without thiocetam 250 mg/kg (control group) and with indometacyn 100mg/kg. An experimental and case-control design was used. Biochemical methods were used in the study of blood and urine. Renal sodium transport was calculated after 2 hours, taking into account body weight. Kidney function was estimated at 5% including by weight of water.

According to our results, the inhibition of prostaglandins by indomethacin in rats reduces diuresis by 30%, inhibition of prostaglandins by indomethacin in rats reduces glomerular filtration rate by 1.7 times, the concentration of sodium ions in blood plasma was decreased by 30%, plasma creatinine concentration was also decreased (from 71.3±2.83 µmol/l to 61.8±1.25 µmol/l, P<0,01), as well as decreased renal excretion (from 2.4±0.09 µmol/2h in control up to 1.2±0.04 µmol/2h in the experiment, P<0,01).

Therefore, inhibition synthesis of prostaglandins by indomethacin in animals significantly reduced diuretic and saluretic effects of thiocetam, indicating the possible involvement in eicosanoids to the renal effects of thiocetam.

**Kostyshyn L.V.**

## **THE ACUTE TOXICITY STUDY OF TAGETES LUCIDA CAV. DRY EXTRACT**

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An important characteristic of the substances of medicinal plants that are studied in order to create new drugs, in addition to high pharmacological activity should be their safety. In order to obtain information on the safety of new substances their acute toxicity is determined. This type of research allows one to obtain the necessary information to establish the toxicity level of the test substance, to determine the relationship between dose and adverse effects of the tested substance and to determine the species and gender sensitivity of laboratory animals to its action. A pharmacognostic analysis of species of *Tagetes* L. cultivated in Ukraine, golden marigolds was performed and the presence of phenolic compounds (flavonoids, hydroxycinnamic acids, tannins), essential oils, carbohydrates, fatty and amino acids was evident in their raw material (herb) as well as the dry extract from the studied raw materials was obtained.

Marigold (*Tagetes* L.) – a kind of annual or perennial herbaceous plants, which has about 50 species and about 600 varieties. Only 7 species have been introduced into the culture. In Ukraine, only the National Botanical Garden named after M.M. Hryshko of the National Academy of Sciences of Ukraine and the Donetsk Botanical Garden of the National Academy of Sciences of Ukraine cultivate golden marigolds (*Tagetes lucida* Cav.). Marigolds or Mexican tarragon (*Tagetes lucida* Cav.) Is a perennial herb with a strong pleasant aniseed scent that grows wild in the mountains of Mexico. This species is used in traditional medicine as an antihypertensive, antipyretic, diuretic, carminative and tonic medication.

The aim of the given research was to study the acute toxicity of the dry extract of golden marigold grass using the V.B. Prozorovsky method.

The study was performed on 30 white nonlinear male and female mice weighing 20-22 g which were divided into groups of 6 animals (3 males and 3 females) in each. Animals were intragastrically administered dry extracts of golden marigold herb in the dose range of 2000, 3000, 4000 and 5000 mg/kg. The control group of mice received equivolume amounts of purified water. To calculate the average lethal dose (LD50) after 14 days, the percentage of mortality in each group was determined according to the method of probit analysis of mortality-response curves according to V.B. Prozorovsky. After 14 days, the animals were removed from the experiment by dislocation of the cervical vertebrae, an autopsy was performed as well as the macroscopic examination of the internal organs (heart, lungs, kidneys, liver, spleen), in the end they were weighed and the mass coefficients were determined. The obtained data were statistically processed by the method of variation statistics using the statistical program Statistica 6.0.

The results showed that even after a single intragastric administration of dry extract of the golden marigold herb to mice of both sexes during the entire observation period, no deaths of experimental animals were registered. No abnormalities in the appearance of the animals were also observed. All animals were active, had smooth fur and clean skin, normal appetite, responded to sound and light stimuli, normal urination and defecation was preserved.

The administration of dry extract of golden marigold herb in doses from 2000 to 5000 mg/kg in no way affected the dynamics of body weight of mice of both sexes in comparison with the control group. Experimental and control animals gained weight in accordance with physiological norms. In the study of the absolute mass of the heart, liver, spleen, lungs and kidneys, calculating the relative mass of internal organs of animals (g) per 100 g of body weight, it was found that the mass of internal organs and relative mass of internal organs in mice of experimental groups did not change in relation to the mass of the internal organs of the control group. The administration of dry extract of golden marigold herb did not cause animal death in all applied doses during the entire

observation period (14 days). According to the K.K. Sidorov's classification, which is recommended by the State Pharmacological Center of the Ministry of Health of Ukraine, the studied extract of golden marigold herb can be classified as class V, i.e. almost non-toxic substances (LD50 > 5000 mg/kg).

**Matushchak M.R.**

**THE ANALYSIS RESULTS OF MEDICAL PRESCRIPTIONS AND DRUG CONSUMPTION IN PATIENTS WITH LYMPHOGRANULOMATOSIS IN UKRAINE**

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The effective treatment organization of patients with Hodgkin's lymphoma requires significant costs, which in most countries are reimbursed by public funds or social health insurance programs. This is due to the high cost of chemotherapy regimens that have been used for a long time. Given the global trends in the medical care cost and drug expenses used in the treatment of cancer patients lead to the arising issues concerning development and introduction of rational models of pharmaceutical support for patients with Hodgkin's lymphoma.

Ukraine is no exception, where in the 2000s the main elements of control strategy for rational use of limited resources was the use of health technology assessment. One of the tools is clinical and economic analysis, namely frequency and structural analysis of drug consumption by different patient groups. The analysis results are the basis for effective management decisions in rational usage of health resources.

The aim of the study was to analyze medical prescriptions and the structure of drug consumption in patients with lymphogranulomatosis in Ukraine. The patients' medical records (455) with lymphogranulomatosis were studied. The historical, analytical, comparative, systemic, logical, hypothetical, deductive, graphical methods of scientific research, as well as clinical and economic analyses were used.

The study results were the following: on average, the patients were found to be in the hospital for 32 sick-days and they received 16,835 medical prescriptions. There were 37 prescriptions per patient. The first place in the prescriptions occupied drugs from groups L – Antineoplastic and immunomodulating agents, B – drugs affecting the blood system and hematopoiesis, and A – drugs affecting the digestive system and metabolism. These groups of drugs accounted for more than half of medical prescriptions (9247 or 54.93%). The prescription structure was dominated by drugs in the form of solutions or powders (62.78% of all prescriptions or 10569). In accordance with the II level of the ATC classification, the first three positions in prescriptions were occupied by drugs used in the chemotherapy and elimination of exacerbation symptoms of chronic pathologies. These drugs were from the following groups: L01 – antineoplastic and immunomodulating agents (12.80% or 2154 prescriptions), B05 – blood substitutes and perfusion solutions (11.95 % or 2012, respectively), C01 – drugs for the heart diseases treatment (9.99 % or 1681, respectively). Antineoplastic prescriptions ranged from 31 (L01C D01 – Paclitaxel) to 289 (L01DB01 – Doxorubicin) ones. The most prescribed drugs were L01DB01 – doxorubicin, AA01 – cyclophosphamide, and L01CB01 – etoposide. It was proven that patients with lymphogranulomatosis received an average of 8.3 prescriptions of antitumor drugs. The general indicator of the drug consumption was 23440.30 thousand UAH or 822.58 thousand US dollars, which, in terms of one patient, amounted to 51517.14 UAH or 1807.86 US dollars. It was found that 38797.60 UAH or 1361.50 USD were spent on the effective chemotherapy and maintenance of the patient's body, which was 8.21 and 17.1 times more than the minimum wage and living wage according to the data presented in the state budget for 2020 in Ukraine.

Thus, medical prescriptions and drug consumption by patients with lymphogranulomatosis have been found to reflect the nature of the therapy, namely the need for intensive chemotherapy courses, polymorbidity of patients as well as the severity of the pathological process. Considering the high treatment cost, the solution to the increase its availability level requires a systemic solution in various directions.

**Melnychuk S.P.**  
**CHANGES IN THE EXCRETORY KIDNEY FUNCTION IN THE DYNAMICS OF  
CHRONIC HYPOXIA DEVELOPMENT**

*Department of Pharmacology  
Bukovinian State Medical University*

The consequences of exposure to hypoxia develop in two ways: hypoxia causes pathological changes at the tissue, cellular and molecular levels, while metabolic disorders are observed during the long-term post-hypoxic period. The kidney is an organ with an extremely high rate of oxidative metabolism, which determines its increased sensitivity to changes in oxygen supply as well as its critical role in the development of compensatory reactions during hypoxia. The current research aimed to study the changes in the excretory kidney function in the dynamics of chronic hypoxia development.

The experiments were carried out on 36 white laboratory nonlinear male rats weighing 140-180 g, kept on a standard balanced diet with free access to water. The animals were divided into 5 groups (n=7): the first group - intact animals, the second, third and fourth groups - modeling of chronic hypobaric hypoxia in a modified flow-through pressure chamber imitating the ascent of rats to an altitude of 4000 m above sea level at a speed of 24 km/h. The animals were kept in the chamber for 2 hours daily during 1, 2, 3, or 4 weeks. Animals were withdrawn from the experiment, while blood, urine and kidneys were sampled for biochemical and histopathological assessments. Excretory kidney function was evaluated by diuresis, plasma creatinine level, glomerular filtration rate (GFR), urine protein excretion.

It was found that in animals exposed to chronic hypoxia during one week, diuresis was significantly reduced compared with control (by 1.26 times); after two weeks of the experiment there was a tendency to decrease, but it did not reach significant values, while after three weeks of chronic hypoxia diuresis decreased significantly by 1.27 times. However, the most significant reduction of diuresis was observed after four weeks of exposure to hypoxia (by 1.6 times compared with control). Significant changes in the excretory function of the kidneys during the fourth week of the experiment indicated a possible damaging effect of the chronic hypoxia on both the renal filter and renal tubular apparatus. It was found, that during first and second weeks of the hypoxia influence GFR decreased slightly, but this trend was not significant. While at the end of the third week of the experiment this figure decreased by 1.3 times, and after four weeks of the chronic hypoxia - by 1.9 times, indicating exhaustion of the functional reserve of the kidney at the third week of the experiment. Under the influence of chronic hypoxia, the level and excretion of protein with urine increased gradually and reached the highest levels at the fourth week of experiment (by 10.5 and 6.9 times higher than the control), indicating a combination of damage to the glomerular filter and impaired proximal reabsorption. Along with the significant proteinuria the level of creatinine in urine also gradually increased with prolongation of hypoxia influence: after the first week of experiment - by 1.16 times, after the second and third week of the influence of hypoxia - by 1.3 times and 1.48 times, respectively, and remained significantly high after the fourth week (by 1.28 times compared with control). The plasma creatinine level increased significantly starting from the second week of exposure to hypoxia (by 1.2 times), and during the third and fourth weeks of the experiment reached maximum values (by 1.5 and 1.46 times, respectively, compared with control). A retention azotemia also was most pronounced on the third and fourth weeks of the chronic hypoxia, correlating with the decrease in GFR.

Result of the experimental studies show a significant impairment of the excretory kidney function under the influence of chronic hypobaric hypoxia manifested in the decrease in GFR (corresponding to reduction of diuresis), marked proteinuria and retention azotemia, which reached the highest levels on the fourth week of the experiment.

**Muzyka N.Y.**

**EXPERIMENTAL STUDY OF PHARMACOLOGICAL PROPERTIES OF A NEW  
HERBAL PREPARATION OF ALTABOR SUPPOSITORIES**

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Nowadays, prostate diseases, in particular, chronic prostatitis is considered to be one of the acute medical and social problems. It prevails among urological diseases and causes infertility, impotence. According to recent studies, approximately 30-45% of men suffer from chronic prostatitis. In other words, almost every third middle-aged man in Ukraine is diagnosed with inflammation of the prostate. This problem is extremely serious as there is the tendency of the number of patients with chronic prostatitis to increase, which, in turn, takes place due to the decrease in the immunoresistance of a body and increased exposure to adverse environmental conditions.

Pharmacocorrection is etiopathogenetic in nature and involves the use of drugs of different pharmacological groups (antibacterial, muscle relaxants, antispasmodics, 5- $\alpha$ -reductase inhibitors,  $\alpha$ -blockers, herbal drugs, etc.) The leading mechanisms of prostate pathology are not precisely established. That is why the effectiveness of many drugs has not been confirmed in terms of evidence-based medicine. Prostate protectors are especially highlighted in the list of drugs used to treat prostatopathy. These drugs have a cytoprotective effect, inhibit the process of excessive peroxidation, improve microcirculation in prostate tissues, provide high resistance to the development of inflammatory reactions, hyper- and neoplasia in the prostate etc.

The choice of domestic prostate protectors is rather limited in Ukraine. That is why people use imported drugs for the treatment of prostatitis. Unfortunately, this type of treatment remains unaffordable for many people. As a consequence, the development and implementation of effective and safe domestic drugs are absolutely essential for the treatment and prevention of prostatitis.

**Novychenko S.D.**

**CHARACTERISTICS OF HYPERTENSION IN PATIENTS WITH DIABETIC  
NEPHROPATHY**

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*Bukovinian State Medical University*

Hemodynamic disturbances, occurring early or late as response to any pathological processes in the kidneys, are of great significance nowadays in the development of progressiveness of chronic kidneys disease (CKD). Dystrophic and scleral pathological processes that have more or less pronounced diffuse character, considered to acquire steady progression just due to stable hemodynamic changes. Kidney Doppler ultrasonography as relatively new ultrasound method of investigation of the organ bloodcirculation, occupied deserving place in cardiology, obstetrics and gynecology, vascular surgery and transplantology.

The aim of this abstract was to make better diagnostics and dynamic control of the quality of treatment of patients suffering from chronic kidney disease with arterial hypertension presence by means of color duplex Doppler ultrasonography investigation of the renal organ blood flow. The study involved 55 men (41.98%) and 76 women (58.02%) aged 29-65 years (mean age  $46.50 \pm 2.25$  years) with the 5-10 year history of CKD and hypertension. All patients underwent Doppler ultrasound renal scanning to evaluate morphological changes of kidney structure and patterns of the renal vascularization. Investigation was carried out in the triplex regimen (B-mode ultrasound, colour duplex scanning, mapping, and spectral analysis of Doppler shift frequency) with measurement of the peak systolic velocity ( $V_s$ ), end-diastolic velocity ( $V_d$ ), time-averaged maximum blood flow rate (TAMX) in *interlobaris*, and calculation of the volume velocity ( $V_{vol}$ ) and renal resistive index ( $RRI = (V_s - V_d) / V_s$ ). All values were calculated automatically.

Some patients (from 69) with AH during this period of time received lisinopril at a dose of 10 mg and amlodipine at a dose of 5 mg (39 patients) with the object to normalize AP and the

remaining 35 patients received monotherapy with lisinopril 10 mg 1- 2 times a day (individually selected doses) and, if necessary, diuretics .During one-year follow-up, the stage of CKD changed to CKD stage III in 11 patients from the group under observation.The treatment of nephrological pathology carried out in accordance with the existing principles of therapy of the detected nephrological diseases. he indices of the renal blood flow against a background of 6-month treatment with the use of antihypertensive pathogenetic therapy combination of lisinopril and amlodipine, veritably decreased in many cases at the level of a. segmentalis. In patients with CP, all indices did not differ from normal values of almost healthy individuals ( $p < 0.05$ ), except index Vd. In patients with CKD, Vd ( $p < 0.05$ ) and IR ( $p < 0.05$ ) values probably decreased but did not differ from the normal values. And in DN group of patients with hypertension, the indices were torpedoed and did not respond to 6-month therapy of the combined use of lisinopril at a dose of 10 mg and amlodipine at a dose of 5 mg once a day. Patients, who were taking lisinopril as monotherapy for renal hypertension, did not show significant changes in the renal blood flow during the 6-month treatment period ( $p > 0.05$ ).

Thouse, it has been determined that the combined use of lisinopril at a dose of 10 mg and amlodipine at a dose of 5 mg per day in the complex therapy of CKD stage I-II patients with AH stage II during a year contributes to the probable improvement of the renal blood flow indices (Vs, Vd, Vvol, TAMX, IR) ( $p < 0.05$ ) of the small renal vessels (at the level of a.interlobaris).

**Pazyniuk A.Yu.**

## **FEATURES OF PHARMACEUTICAL EDUCATION ABROAD**

*Department of Pharmacy*

*Bukovinian State Medical University*

Over the past two decades, the pharmaceutical market has grown significantly, and revenues from drugs worldwide in 2020 amounted to 1.27 trillion US dollars. The United States has become the world's leading pharmaceutical market. European countries (Germany, France, Great Britain) are not the last in their contribution to the pharmaceutical industry. The results of the pharmaceutical organization largely depend on the qualifications and educational level of staff. After all, only high-quality education contributes to personal and professional development, as well as social, cultural, economic, political and environmental development of the country as a whole.

The purpose of the study was the analysis of educational programs for students of leading foreign universities in the field of pharmacy.

The results of the analysis were obtained after exploring the educational programs of the following universities: University of Bonn (Federal Republic of Germany), University of Nantes (France), University of Birmingham (United Kingdom), University of Florida (United States of America), Niigata University of Pharmacy and Applied Life Sciences (Japan).

Curricula of European universities (Federal Republic of Germany, France, Great Britain) have minimal differences from the education of pharmaceutical students in Ukraine.

Upon graduation from French universities, students, in addition to a diploma of higher education, receive a certificate confirming the level of English language proficiency.

The 4-year education in the UK is the shortest of the European pharmaceutical degrees. The internship at the University of Great Britain begins at the end of the first year of study. After graduation, a year-long internship outside the university on public and industrial pharmacy is mandatory, after which there is an exam in the Royal Pharmaceutical Society to confirm professional qualifications. An interesting fact is the lack of refresher courses for pharmaceutical workers in the UK because every pharmacist must adhere to the Standards of Continuing Professional Development made by the General Pharmaceutical Council. Perhaps this helps to increase the self-awareness of pharmaceutical workers in terms of self-education.

There aren't any possible ways to enter one of the higher educational complexes in the USA immediately after graduation from school. Firstly, a student must complete a 2-3 year pre-pharmacy or pre-professional preparatory course, which serves as a preparatory cycle of education. You can attend them in any regional accredited technical (Technical), municipal (Community Colleges) or

junior college (Junior Colleges). When entering a pharmaceutical university, it is mandatory to pass the Pharmacy College Admission Test, which is divided into 6 sections: verbal abilities, knowledge in chemistry and biology, computational skills, reading comprehension and two written sections.

Japanese pharmaceutical education devotes a significant part of educational time to subjects related to the methodology of drug development, such as bioanalytical chemistry, mechanism of action of drugs, pharmacokinetics, pharmaceutical chemistry, toxicology, development of new drugs, targeted synthesis. Minimal attention is paid to the humanities.

Therefore, we can make a conclusion that obtaining such information will help to borrow the experience of world universities, as well as to create own methods of education that will promote faster development of the pharmaceutical industry through the education of highly qualified pharmacists in Ukraine.

**Shchudrova T.S.**

## **THERAPEUTIC POTENTIAL AND PERSPECTIVE ON MELATONIN USE FOR DRUG-INDUCED NEPHROPATHY**

*Department of Pharmacology*

*Bukovinian State Medical University*

The research aimed to review the effects and mechanisms of action of the pineal hormone melatonin, to study the nephroprotective effect of exogenous melatonin in conditions of drug-induced nephropathy, and to assess the prospects of its use for prevention and treatment of kidney diseases based on the literature data and results of own studies. According to literature and results of our previous research, the nephroprotective effect of melatonin has been shown in various experimental models of acute renal injury (AKI). Numerous studies established the antioxidant, anti-inflammatory, anti-apoptotic, immunomodulatory, and cytoprotective effects of melatonin, and showed its ability to restore the function and structure of the kidneys.

The objective of the current study was to evaluate the effects of melatonin (5 mg/kg) on the animal model of acetaminophen-induced AKI. The experiments were conducted on nonlinear mature white rats weighing 150-200 g, and randomly distributed into three groups (n=7). Group I – control; group II – acetaminophen-induced AKI (administration of paracetamol (Health, Ukraine) at a dose of 750 mg/kg); group III – administration of melatonin (Sigma-Aldrich, USA) at a dose of 5 mg/kg against the background of AKI development. Animals were withdrawn from the experiment 24 h later, while blood, urine and kidneys were sampled for biochemical and histopathological assessments. Statistical processing of the obtained data was performed using the SPSS Statistics 17.0 software.

In our experiment, a single administration of the toxic acetaminophen dose to rats (group II) resulted in drug excessive accumulation and damage to the proximal tubular cells. It is known, that cellular toxicity of acetaminophen is associated with translocation and dysfunction of Na<sup>+</sup>-K<sup>+</sup>-ATPase, which ensures effective sodium reabsorption. In rats with acetaminophen-induced AKI a decrease in sodium reabsorption and, accordingly, an increase in fractional sodium excretion was found. An increase in the sodium concentration in the tubular fluid led to the activation of tubuloglomerular feedback with a 2-fold decrease in glomerular filtration rate (GFR), reduced urine output, and development of retention azotemia. Significant proteinuria compared to the control confirms the severe toxic damage to renal tubular cells. In animals that received melatonin, treatment (group III) renal dysfunction was less pronounced. Melatonin counteracted the nephrotoxic effect of acetaminophen, as evidenced by the prevention of significant sodium loss due to maintenance of the reabsorption capacity of tubular cells, restoration of urine output due to maintenance of GFR, and prevention of retention azotemia and significant proteinuria. Acetaminophen overdose induced the oxidative stress from the intensification of ROS production, lipid and protein peroxidation processes and the simultaneous decline of the enzymatic antioxidant capacity. In animals from group II, a significant increase in the level of lipid peroxidation end-product malondialdehyde (MDA) and protein oxidative modification products (OMP) was found in kidney tissue (p<0.05 compared to the control group). Acetaminophen also compromised local

antioxidant system, manifested in a decrease in glutathione peroxidase (GPx) and catalase (CAT) activity ( $p < 0.05$  compared to the control group). Melatonin showed a significant antioxidant effect manifested in attenuation of both lipid and protein peroxidation in the kidney tissue, along with an increase in the GPx and CAT activity compared to untreated animals ( $p < 0.05$ ).

The obtained results show the ability of melatonin to reduce the severity of damage and prevent kidney dysfunction associated with acetaminophen over dose. Treatment with melatonin was suppressed the progression of oxidative stress in kidney tissue through the limitation of lipid and protein peroxidation and activation of the key antioxidant enzymes. Results of research complement to existing data on the nephroprotective activity of melatonin and substantiate the high therapeutic potential and prospects of melatonin use as adjunctive therapy of drug-induced nephropathy.

**Shliusar O.E.**

**VOLTAMPEROMETRIC DETERMINATION OF THIORIDAZINE  
AS ITS S, S'-DIOXIDE, OBTAINED BY CARO ACID**

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*Bukovynian State Medical University*

Known synthetic drug thioridazine (syn. thioridazine hydrochloride, ridazine, sonapax, melleryl, tioryl) belongs to the original piperidine fentanyl and is widely used as a neuroleptic, sedative, thymoleptic and sedative drug in medical practice. It detects a mild antidepressant effect. The most effective disorders are accompanied by fear, stress, and excitement. The dose is 50-100 mg per day. Medicine is produced in tablets of 10, 25 and 100 mg for children - 0.2% suspension and syrup. For determination of basic substance content in the substance acidimetric method in the medium of glacial acetic acid and acetic anhydride (potentiometric titration) is recommended, in tablets and pills – direct UV spectrophotometry method.

The aim of our study was to develop a simple, selective and fast enough, and cost-effective way to assay thioridazine at 10 mg tablet sonapax, produced at pharmaceutical plant AT (Jelenia Góra, Poland), based on previous drug oxidation in an acidic medium using potassium hydrogenperoxomonosulfate to the corresponding S, S'-dioxide with the subsequent voltammetric determination of its recovery after wave of mercury drops at -0,41 B (SCE). Formation in the studied reactions S,S'-dioxide is due to electrophilic attack -oxygen atom of peroxyacid peroxide group on sulfur atoms of during minute. In the process of electrochemical reduction polarograms S,S'-dioxide thioridazine experienced two waves of  $E_n$ : at - 0.41 V (restoration to the S-oxide) and slightly less at - 0.72 V (SCE), height is proportionally increased depending on the concentration of the analyte. As we have chosen the analytical wave with peak potential at - 0.41 V (SCE). It was experimentally found that the dependence of peak current strength of the recovery potentials S,S'-dioxide thioridazine in - 0.41 V ( $I$ , mA) on the concentration ( $C$ , mol / l) in the concentration range from  $2.0 \cdot 10^{-5}$  to  $1,6 \cdot 10^{-4}$  mol / l by the equation:  $I = (0,18 \pm 0,03) \cdot 10^5 \cdot c$  (correlation coefficient  $r = 0,98$ ). The content of thioridazine by a method of the standard was determined. The reproduction of the signal (peak height of the current restoration of thioridazine potential - 0.41 V (SCE) in the test solution Rcc thioridazine hydrochloride  $7,37 \cdot 10^{-5}$  mol / l (10.00 ml of the drug taken for analysis) characterized by the RSD = 3,27 for  $n = 5$ ;  $P = 0,95$ ).

Therefore, the method for quantitative determination of thioridazine tablets of 0.01 g by variable-current voltammetry method as S, S'-dioxide thioridazine ( $E_n = - 0.41$  V (SCE) obtained by using Caro acid is developed. RSD = 3,27% ( $n = 5$ ,  $P = 0,95$ ). The results were in good agreement with those of hP ( = -1,01%).



**Zamorskii I. I.**  
**PERSPECTIVES OF THE CLINICAL USE OF MELATONIN**

*Department of Pharmacology*  
*Bukovinian State Medical University*

Melatonin is a hormone of the pineal gland (pineal gland of the brain), was discovered in 1959. Since the 1990s, it began to be produced as a medicinal product and used in clinical practice under various trade names - Vita-melatonin (Ukraine); Melaxen, Melatonex (USA), Circadin (Switzerland, FRG) and others. However, despite the various pharmacological effects of melatonin, its use is still limited.

The main indication for the clinical use of melatonin is sleep disturbance, in particular, in desynchronization and mental illness. Since 2003, it has been recommended by the authoritative Cochrane Database Library of Evidence-based Medicine for use in sleep disorders associated with the rapid transmeridional time zones change in air travel (jet-lag syndrome). Melatonin does not change the physiological structure of sleep and synchronizes the rhythms of the organism, it is no less effective than other hypnotics, in particular Zopiclone.

In addition, melatonin has a powerful antioxidant, pronounced adaptogenic, neuroprotective, and antihypoxant actions, limits the development of stress, slows the progression of Alzheimer's disease, has a sedative effect. Therefore, some researchers recommend prescribing melatonin in complex anti-shock therapy as a geroprotective agent in the treatment of migraine, Alzheimer's disease. It is predicted to be effective in the treatment of stroke and parkinsonism.

Even earlier, many clinical studies proved the positive effect of melatonin on the course of cancer diseases, as well as in the treatment of AIDS patients. It was found that melatonin exhibits a cytostatic, anti-inflammatory, photo- and radioprotective effect, stimulates hematopoiesis and the immune system (enhances the production of cytokines), and against the background of immune hyperactivity, on the contrary, provides an immunosuppressive effect. At the same time, the experience of prescribing this hormone for neurological, oncological, autoimmune, dermatological, and infectious diseases remains limited.

Melatonin has antihypertensive, hypolipidemic, and cardioprotective properties, enhances the therapeutic effect of antihypertensive and antiulcer drugs, improves microcirculation in the stomach wall, inhibits the proliferation of cells in the digestive tract, and also prevents the development of postmenopausal osteoporosis. This allows us to propose the use of the hormone for hypertension, hyperacid gastritis, peptic ulcer disease, tumors of the digestive tract, cardiological and arthrological practice.

The available data indicate the promise of widespread introduction of melatonin into clinical practice for various diseases.

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**Bartosh I.A.**

**CASE TECHNOLOGY AS AN EFFECTIVE TECHNOLOGY IN TEACHING  
PROFESSIONALLY ORIENTED ORAL COMMUNICATION IN ENGLISH**

*Department of Foreign Languages  
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Taking into account the new challenges of the present-day information society, as well as the requirements for professionally oriented communication, which any specialist should meet, we may conclude that the issue of teaching English in a non-language institution of higher education is not sufficiently investigated, although much research has been done in this area. Among the factors that prevent achieving the required results in the learning process in higher education institutions, where the language is not a specialty, particular emphasis is laid on the low level of class intensity and rather passive participation of students. The latter problem might be partially solved by increasing students' motivation and introducing new educational materials that would be of great interest for them.

The issue of searching for relevant technologies and adequate exercises is of primary significance in the process of forming the future doctors' skills in professionally oriented oral communication in English. This is the reason why we have proposed a case technology and developed a scientifically based subsystem of exercises for teaching professionally oriented English-language communication to medical students.

The object of research is the process of training future doctors in professionally oriented oral communication. The subject of research is the method of training future doctors of professionally oriented oral communication. The purpose of the study is a theoretical justification of the method of training future doctors of professionally oriented oral communication with the use of case technology.

The work of a medical specialist is based on various models of work with the client, among which the leading one is a problem-oriented model, and requires a specialist to have communication skills, argumentation, counterargumentation, ability to critically analyze and make quick decisions. The main idea of the doctor's activity is to solve the client's problems. Therefore, in the process of learning it is important for us that students will be able to apply the skills acquired in the classes of their main specialty.

Based on the analysis of sources on the study of the peculiarities of the introduction of case technology in the educational process, we offer independent case studies by students. These cases are regarded as scientific-research tools and defined as a description of an actual problem situation, which suggests that the participants of the learning process should prepare the cases independently in order to be able to analyze them, identify the problem and find the possible ways of its solution. To do this, we offer certain requirements for compiling cases in particular: authenticity of sources

and situations, unambiguous problem setting, novelty and relevance, reputable sources, informational content.

Summing up all the above, we think that this method of using cases in foreign language classes will combine theory and practice, promote analytical and critical thinking, initiative of students, develop their ability to make non-standard and original decisions, students will learn to take responsibility for selected decisions, analyze a wide range of information, systematically solve current problems of future professional activity.

**Bebykh V.V.**

## **METHODOLOGY FOR ANALYSIS OF THE TERMINOLOGICAL SUBSYSTEM "INFECTOLOGY"**

*Department of Foreign Languages  
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Active processes in the development of the medical sphere stimulate the need to study the English terminology in its various areas. The rapid growth of the number of terms in the terminological subsystem "Infectology" requires its study and systematization. An integrated approach to the study of the problem is characterized by multifaceted analysis. The need to unify the terminology of the sublanguage "Infectology" directs the research focus to the subject-conceptual field of the terminology, lexical-semantic and word-formation mechanisms, structural and grammatical features of phrases in the English vocabulary in the sphere of infectious diseases, nominative processes in special vocabulary.

The purpose of the study is the methodology for analysis of the terminological subsystem "Infectology" in terms of identifying the basic structural and semantic characteristics of terminological units.

Achieving this goal involves solving the following tasks: defining criteria and principles for selecting the terminological minimum of lexical units; study of the stratification structure of English professional terminology in the field of "Infectology"; definition and analysis of semantic processes occurring in this subsystem.

The analysis is based on the criterion of professional and practical value of terms. The criterion of professional and practical value follows from the interpretation of a number of outlined principles: *the principle of stylistic limitations*, which ensures the inclusion to a minimum of general terms used in the system under study, as well as narrowly specific terms; *the principle of semantic value*, which provides an objective analysis of the most commonly used important terms that reflect the basic concepts of the chosen sphere. According to the principle of *word-forming value*, the lexical minimum includes the primary bases, the knowledge of which creates the preconditions for independent semantization of a large number of unknown complex and derivative terms, as well as stable terminological combinations.

*The stratification structure* of the terminology reflects the distribution of thematic groups by levels of hierarchy. Such levels for the terminological field of any branch are the core and the periphery. In this case, we consider the terminological field as a kind of space existence of the term, within which it has all the features that characterize it. After the necessary systematization and analysis, we form a working version of the terminology core. According to its structure, we divide the terminological core into one-word terms, two-word phrases.

*Semantic fields* are intersecting classes, there is no single division of the vocabulary into semantic fields: from any semantic field through a more or less long chain of indirect links you can get into any other field. If we are talking about the delimitation of terminologies, then the focus should be on the semantic relationship between terminologies. Recent research proves that the terminology of one branch can have broad and branched semantic connections with related terminologies. A number of terms are borderline in both terminology. The interaction of different terminologies takes place through boundary terms. The semantic environment of a certain terminology consists of terminologies for which it acts either as a recipient or as a donor. Statistical analysis of this phenomenon is the subject of our further research.

**Kaizer I.Yu.**

**POLISH ALLUSIONS IN THE LYRICAL-EPIC WORKS OF IVAN FRANKO FROM THE POINT OF VIEW OF MAHDALYNA LASLO-KUTSIUK**

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Polish literature of the Renaissance gave European fiction literature an unsurpassed example of elegy-crying – “Treny” by Jan Kokhanowski (“Treny Yana Kchanowskiego” (1580) – a kind of philosophical and poetic work, which testified to the generics of the genre. In particular, the concept of man propagated by humanists was dealt a devastating blow, because this paradigm argued that it is possible to maintain mental harmony if the eternal problem of life and death, the loss of loved ones is not considered in terms of fate, but the continuation of the human race.

Under the influence of the theme of betrayal revealed by A. Mickiewicz, Franco creates a poem “Funeral”, in which he tries to correct what, in his opinion, was a miscalculation of almost all the works of the Polish author, namely the moral justification of betrayal by higher considerations. M. Laslo-Kutsiuk confidently notes that this poem also did not do without literary models, without intertext. Thus, the moment was borrowed in Franko’s poem when the hero saw himself in a coffin, his repentance and the character of a priest, from the story of Prosper Merimee “Souls of Purgatory”.

M. Laslo-Kutsiuk points out that Franko’s poem is A. Mickiewicz’s “Conrad Valenrod” inside out. Myron fights in the ranks of the plebeians and moves to the side patricians, giving his act a hypocritical explanation, that it is better for the people to be defeated: it will give birth to martyrs, and therefore raise the heroic spirit, while victory would develop only the negative traits of the rebels – rudeness and arrogance.

There are many studies about Kokhanovsky’s “Treny”, which confirm their significance, define innovation and originality. Researchers believe that they had a significant impact on the development of European elegy, creating a whole school of imitators. Ivan Franko became one of the imitators, creating elegies “On the XXIII anniversary of Taras Shevchenko’s death”, “On the twenty-fifth anniversary of Taras Shevchenko’s death”, written in a sublime-patriotic spirit and devoid of intimate tone, sensuality, even the sadness that pervades poetry can be defined as patriotic. The lyrical hero appears in the role of an expression of the feelings and thoughts of the people:

Poklin tobi, narodnykh nuzhd spivache,  
Vid milioniv, dlya kotrykh ty zhyv,  
Vid Ukrayiny, shcho shche y nyny plache,  
V tim samim hori, yak ty yiyi lyshyv!

Franko’s elegies “On the XXIII anniversary of Taras Shevchenko’s death” and “On the twenty-fifth anniversary of Taras Shevchenko’s death” violated one of the most acute aesthetic problems: the place of the poet and the role of poetry in society. Their leading mood was criticism and denial of the existing system and an uncompromising protest against the enslavement of Ukraine.

**Karatintseva K.P.**

**BASIC METHODS OF TERMS INDICATING DENTAL INFECTIONS CREATION**

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The study of terminology and fields of terminology is a topical issue in linguistics. Special attention should be devoted to medical terminology, which branches into different areas, is heterogeneous in its composition and has specific properties and patterns of each area.

The objective of the paper is to study the ways of the terms, which by their etymological properties are referred to both dental and infectious branches, creation. The structural aspect of the term formation helped outline both the general patterns and specific characteristics of the term, and thus identify the main mechanisms of their genesis. The main task of the paper was to analyze the

terms describing infectious diseases transmitted by bacteria, viruses and fungi and have manifestations in the oral cavity, and therefore are often used in dental practice. After using the method of structural analysis, it was found that morphological, syntactic and semantic methods of term formation are the most common for lexical units to denote infections of the oral cavity. The analysis was conducted on the basis of the book "Textbook of Human Disease in Dentistry" by M. Greenwood, R. Seymour, J. Meechan (2013).

It was figured out that the main morphological methods in the noun word formation are affixal, word- and basic formation, and abbreviation. The creation of the terms is carried out according to the same word-forming models and word-forming affixes, which form the words of general literary language. Among the morphological methods, affixation, especially in terms that by their structure include components of Greek or Latin origin, word formation and abbreviation are distinguished. The most common prefixes denoting infectious diseases are: peri- (around), para- (near), mono- (one); suffixes: -itis (denoting inflammation), -osis (denoting a chronic process), -oid (denoting similarity). The next method of term formation is syntactic. It includes the formation of phrases of two, three or more components. A compound term is a semantically complex noun that connects to one whole two or more full words. It has its own scheme of structure or structure represented by two, three-, four-component terms. The main reason for using such complex terms is narrowing the meaning to a precise one, describing the disease, location, processes happening, etc.

Metaphorization and metonymization are processes characteristic of the semantic method of genesis of terms of the Dentistry sublanguage. These are the least used due to the fact that the scientific style (the terms are referred to this particular style) rarely includes the lexical units that might have different meanings, because it conveys the direct and precise one.

Given the analysis, we can make a conclusion that morphological, syntactic and semantic ways are productive for the creation of terms to denote infectious diseases oral cavity.

**Lapa G. M.**

## **COGNITIVE AND DISCOURSIVE ASPECTS OF TERMINOLOGICAL STRUCTURES IN THE ENGLISH PROFESSIONAL LANGUAGE "INFECTOLOGY"**

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Cognitive term formation as a direction in modern linguistics, the basic concept of which is terminological competence, is defined as the ability to express, understand and create knowledge with the help of terms. Therefore, it is not only a tool that registers language phenomena, but also a means of why these phenomena are realized exactly this way.

The cognitive approach to discourse includes the fact that language activity is one of the types of people's mental and cognitive activity, and the language phenomena can be properly understood only in the context of other cognitive processes, such as knowledge presentation, memory, attention, intelligence.

The linguocognitive research of the English professional language "Infectology" directs our attention to the tendencies of nominative terminological structures, system of their functioning and methods of consolidation of new complex specialized information through the use of different language paradigms, which is explained by the rapid development of terminology systems in medicine. We can observe the following tendencies in terminology of the discourse under study: name and introduction of new specialized information and economy of the language means, and simplification of the form of presentation for more comfortable memorizing and correct use of them just in this discourse.

Examples of the first tendency are terms characterized by a high degree of motivation and semantic transparency - *virus, infection, vaccine, pneumonia, Post-Covid-Syndrome*, the meaning of which is easily conveyed by means of their standard meanings.

Another trend can be seen in the following examples - *C -virus, Rhinovirus, Coronavirus, Retrovirus < Covid-19, Delta-Strain, Cov-infection, Corona-Vac; Pfiser-vaccine, SARS*, where an increase in the level of treatment is observed. It should be noted that in the process of the formation

and borrowing of this vocabulary into other languages, including the Ukrainian language, the given terminological units of different structures are not always fully assimilated, so their translation is possible by the description of conceptions, replacement of certain components by synonyms: *SARS-atypical pneumonia, post-Covid Period, retrovirus - virus* of low action and other transliterations - open *Covidclinics - clinics*, which operate during the pandemic in online mode, indicate universality of the cognitive scheme of communication and information storage and use in the corresponding discourse, which contains a new scientific content, closely interacting with other discourses, interdiscoursiveness, which should be considered as a cognitive phenomenon.

Therefore, the noticeable interest concerning the problem of interaction of the scientific discourses is associated with changes in the scientific views as to the understanding of the processes of categorization and conceptualization, interpretation of knowledge as a society product. Their terminological arsenal is supplemented by a whole chain of terms, in the meanings of which, this or that aspect of the complex notion of interdiscoursiveness - polydiscoursiveness, mixing of discourses, discourse-donor, discourse-recipient, is reflected, signs of which can be formulated only from the general context of the modern science, discourses of which should be subjected to linguistic analysis equally in the cognitive and communicative aspects, since they are a tool for creating new knowledge of the language, they open new possibilities for studying cognitive and social aspects as well as the discourse of the English professional language "Infectology".

**Maksymyuk M.V.**

## **INTERACTIVE TECHNOLOGIES USE IN HIGHER EDUCATIONAL INSTITUTIONS**

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In the XXI century. there is a tendency to introduce interactive technologies that have more advantages over the usual multimedia presentations in the form of a slide show in the educational process of higher school. In particular, the use of projection and sound capabilities of the multimedia board in the process of learning foreign languages allows to demonstrate authentic video reference materials of the countries whose language is being studied; to involve materials of electronic manuals and textbooks during training exercises and analysis of grammatical phenomena; produce and modify software that is characterized by interactive clarity that provides "the effect of immersion in the learning software environment and interaction with it." Thus there is also the implementation of didactic principles of clarity, accessibility and systematicity. In addition, user participation in the virtual foreign language learning environment promotes the activation of the main channels of perception of new information (visual, auditory, motor) and allows to intensify the process of learning a foreign language and improve its results through speech-thinking operations. The presented new information by means of multimedia technologies attracts selective attention, which is the main basis for effective training of students, is subject to productive processing, penetrates deep into memory and is easily reproduced. According to the educational programs of future philologists, the following types of software are used in higher education institutions of Ukraine in accordance with their content and functions: 1) information and reference sources (almanacs, reference books, encyclopedias, dictionaries, magazines, newspapers); 2) electronic sources; 3) YouTube videos; 4) electronic libraries and repositories; 5) methodical materials in electronic form (plans of seminars and practical classes, lecture notes, methodical instructions and methodical recommendations for practical and seminar classes, tests and other materials for knowledge control); 6) Internet resources; 7) electronic teaching aids (computer training programs, electronic textbooks and manuals, computer games for the development of foreign language skills); 8) educational and methodical software products for visualization of the taught material (schemes, tables, drawings, presentations for seminars and practical classes, etc.), created by scientific and pedagogical staff in the process of learning a foreign language.

**Manchul B. V.**

## **THE ASYMMETRY OF INTERDISCIPLINARY SCIENTIFIC RESEARCH**

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The study of the relationship between disciplinary and interdisciplinary research is still frequently debated. In particular, there is a lack of infrastructure for such research, the need to formulate a regulatory framework for interdisciplinary work, and the development of communication tools.

The investigation is aimed at studying the asymmetry of interdisciplinary research in different fields of science. The hegemony of natural sciences is represented in the majority of interdisciplinary projects. They receive financial support more often compared to social sciences and the humanities. In addition, there is a widespread tendency for representatives of natural or engineering disciplines to refuse the help of colleagues from the socio-humanitarian block, appealing to the fact that they can do the layer of work that is usually assigned to the latter. This approach is manifested in the fact that, first, the social sciences (often one sociologist), as a rule, are involved after the project is formed.

Firstly, the asymmetry of interdisciplinary scientific research is present in all aspects of integration - from the distribution of functions to the number of staff, funding, knowledge production, and, ultimately, independence, but remains hidden in everyday interactions that dictate what is considered important socio-scientific activity and who should determine it. And, secondly, the spheres of social sciences and the humanities in such cases help to formulate clear definitions of the problem and appropriate strategies for its solution, as well as to convey the results of research to society in an understandable way and to involve it in scientific debates.

The example of the social sciences, which experienced a boom in the 1940 - the 1970s, is illustrative because there were high hopes for solving social problems such as mental health, alcoholism, crime, etc. However, neither Freudianism nor behaviorism, which became the foundation for solving these problems, could provide adequate solutions. Thus, on the one hand, some scientists chose the positivist path and quickly found interdisciplinary communication with other sciences, especially biology, fully accepting its methodology and scientific language. On the other hand, others remained in the bosom of social sciences, but could not develop a powerful methodology to address these social challenges. Therefore, the role of communication among academic disciplines in general and scientists, in particular, has become crucial for effective interdisciplinary research.

**Marchuk I.V.**

## **THEORETICAL AND METHODOLOGICAL ANALYSIS OF APPROACHES TO THE STUDY OF NURSES' PALLIATIVE COMPETENCE**

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The current stage of society development requires reforms in processes of education. In the conditions of modernization of all life spheres of the country the problem of higher education system development is especially topical. The implementation of modern approaches in education is capable of providing quality training for future professionals. This problem is especially important in the context of preparing nurses for palliative and hospice care. The strategic challenges facing health care include ensuring high quality nursing care. An important direction of successful development strategy of palliative care is to improve the quality of medical workers' professional training in the field of palliative care. The professional competence of a nurse is in demand and necessary in solving the problems of their own and patients' health-preserving competencies. Thus, the problem of forming nurses' palliative competence in today's challenges is extremely relevant.

The aim of the study is to analyze the problems of palliative and hospice care, to theorize the study approaches to nurses' professional readiness in the palliative field.

The materials for the study were the results of the analysis of domestic and foreign experience in studying the problem of nurses' palliative competence of. We used theoretical methods (analysis, comparison, synthesis, systematization, classification, generalization) for elaboration of modern psychological, pedagogical and medical literature to compare different views on the research problem, for analytical and bibliographic consideration of theoretical issues to determine the conceptual and categorical apparatus of research. Theoretical and methodological research is designed to promote the highest quality disclosure of the research topic and can become a basis for creating further research in this field.

Nurses' palliative competence is characterized as an integrative quality of highly motivated personality, determined by a set of professional knowledge, skills and abilities, professional and personal qualities that provide internal readiness to carry out palliative care in accordance with qualification requirements and deontological norms of behavior, with desire for selfless care and with the improving the experience of palliative care.

In the study of nurses' palliative competence the concept of psychological support and spiritual care of a palliative patient is encountered in the works of such Korean scientists as Kyung-Ah Kang, Youngsim Choi, Shin-Jeong Kim. Scientists include such nurses' palliative competence components as assessment and level of spiritual care knowledge, the concept of professionalization and improvement of the spiritual care quality, personal support, the nurses' ability to advise, implementation of the interdisciplinary approach and cooperation with other health professionals in the field of palliative care. The importance of the personal level of spirituality, nurses' communicative competence is emphasized. Personal factors that are important for providing spiritual care are a measure of the patient's spirituality. Thus, the personal spiritual health of nurses can affect patients' attitudes and health.

**Matiichuk K.D.**

**INFECTIOUS DISEASES WITH MULTIPLE TRANSMISSION MECHANISMS:  
MORPHOLOGICAL-SYNTACTIC AND SEMANTIC-COGNITIVE ANALYSIS**

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All infectious diseases can be divided into four classical groups, according to the mechanism of infection transmission, and the place of primary localization of the pathogen in the macroorganism. These include intestinal, blood, respiratory infections, and infections of outer coverings. Each group of diseases has its own way of infection transmission. However, some diseases can be transmitted by equally different mechanisms of infection transmission. The localization of the pathogen in the body can be multiple. Several mechanisms of transmission are characteristic of zoonotic infections, but it appears to be difficult to determine the main one. Mathematical and computational models can be useful tools to provide important information on key aspects of the epidemiology of infectious diseases. In recent years, efforts have been made to improve the use of disease modeling terminology by creating specific glossaries on the topics.

The author aimed to analyze a developed "dictionary of terms," which describes the standard use and definition of terms for modeling of infectious diseases with multiple transmission mechanisms.

Specific terms used in peer-reviewed published articles in a large number of English journals were considered. The search engines "PubMed", "Google Scholar", "Web of Science" and "Scopus" were taken into account to search for terms used in both mathematical epidemiology and health care with ambiguous and contradictory definitions.

The main terms that are often used in epidemiological models of infectious diseases were considered according to two main criteria: 1) the term was defined differently in different articles or 2) two different terms were used interchangeably, with a threshold corresponding to one of the criteria in at least two peer-reviewed articles. The terms and definitions selected in the review of the relevant studies were classified as "topics of discussion" based on their definitions and uses.



Models of the dynamics of infectious diseases are designed to reflect: 1) the biology of the pathogen and 2) the physiological processes and signs of the disease at both individual and population levels. They are determined by: a) the temporal course of the stages of disease progression through the infectious process, from the moment of infection (exposure) to recovery or death (which is the field of clinical medicine) and b) the temporal course of potential transfer from the moment of infection (exposure) to post-infectious condition (which is the field of health and epidemiology). The biology of infectious agents and pathophysiological processes include the disease status of individuals, which determine the susceptibility of individuals to infection or the transmissibility of the disease. The change in status described in the models is often related to the prevalence of the disease, which is characterized by population-related morbidity or prevalence, as well as parameters that affect these phenomena, such as generation interval and serial interval.

In most dynamic models of diseases, a compartment structure has been developed that divides the population into several classes of individuals according to their epidemiological status. These include: susceptible (S-susceptible), exposed (E-exposed), infectious (I-infectious) and recovered (R-recovered), and their relationship describes the main dynamic model of disease transmission, which is called the classical model (SEIR model).

We have summarized the analysis of the terminology of the infectious diseases according to the models. This review has not been intended to be comprehensive. It has been done to demonstrate some characteristic features of medical terminology.

**Namestiuk S.V.**

**MORPHO-SYNTACTIC AND SEMANTIC-COGNITIVE RESEARCH OF ENGLISH  
PROFESSIONAL DISCOURSE: HEMO-CONTACT INFECTIONS**

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An increased interest in human cognitive reception and ways of perceiving the world and the linguistic picture of the world has contributed to the development of anthropological linguistics, which involves the study of language in close connection with human, his consciousness, thinking, spiritual practice. The set of language means in a certain paralinguistic context - the context of medical discourse, the subjective representations of which are organized into a complex discourse are made possible in language precisely through language means. One of the ways to study the peculiarities of the translation of professional, in our case medical, related to the sublanguage of infectology - metaphors that structure them. Metaphorical constructions are considered to be one of the main means of objectifying the basic cognitive models of this phenomenon of the impact of medical tests on recipients. The aim of the topic is due to its connection with the relationship between objective reality, language and thinking, as well as the general direction of modern linguistics to study linguistic phenomena, including the translation of metaphorical constructions from the standpoint of cognitive linguistics in medical and infectious discourse. Metaphorical transfer is a «projection of one conceptual area to another», a kind of expansion of the concepts of the source domain (source domain), which results in the capture and development of a new area - the target domain (target domain), and «transferred» is not an isolated name. I (with a direct nominative meaning), and the whole conceptual structure (scheme, frame, model, script), which is activated in the mind verbally due to the conventional connection of the word with the conceptual structure. For example, take hemo-contact AIDS. Every disease is mystified, this mystification occurs against the background of new expectations. From ancient times, any disease that inspires horror is metaphorized in the discourse in the process of cognitive processes of individuals. Figurative medical terms are also used in everyday life. Consider some of them on the example of English and Ukrainian. The transfer of the physical phenomena of blood to the metaphorical plane is quite common, so blood is seen as a symbol of life and personified. For example, «bad blood» in English will sound like «dirty blood» – «dirty blood», while, literally, «bad blood» means "quarrel, misunderstanding". The adjective «dirty» in relation to blood is used to replace medical facts about the disease, and quite often the expression is used to describe heme-contact infectious diseases.

Conceptual analysis, like any other analysis, must have its own, clearly defined research methodology, its own set of techniques and approaches necessary to achieve this goal, because it is associated with the study of mental entities that are fully or partially reflected by the language system, and since these mental entities - concepts - are ordered in a hierarchical system, we can agree with the statement that conceptual analysis is the analysis of some concepts with the help of others. Thus, a conceptual metaphor is a form of conceptualization, a cognitive process that reflects and generates new concepts and without which it is impossible to gain new experience. A conceptual metaphor corresponds to a person's ability to perceive and create similarities between different individuals and classes of objects. For the most part, metaphor is not about isolated, isolated objects, but about complex mental spaces. Metaphor helps to overcome the communication deficit. Cognitive metaphor, compared with other types of metaphors, mostly approaches the concept, so its analysis is more appropriate in the logical-semantic aspect, which allows to distinguish the types of cognitive metaphors used in English medical discourse, based on the structure of the lexical concept. Thus, the theory of conceptual metaphor is the object of keen interest in cognitive research. Conceptual medical metaphor is defined as the main mental operation in translation studies and medical terminology, as a way of reception, categorization, conceptualization, evaluation and explanation of a language act.

Nykyforuk . . .

## **VERSIFICATION OF WORKS BY S. VOROBKEVYCH**

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The material of the study was the poetry of S. Vorobkevych, found in the most complete modern three-volume edition of O. Makovey. Published and unpublished works, allocated by the specific genre, metalogical, syntactical, background, and versification features were studied.

Research methods are predetermined by the purpose and tasks of the work, the object of research is complex. The hermeneutic method and the method of slow reading (the method of receptive poetics) were practiced, aimed to reveal S. Vorobkevych artistic means and interpret his works. Formal method based on the use of statistics, quantitative processing of the material, aimed to analyze the aspects of versification, has been applied. Particular attention should be paid to the "frequency coefficient" principle (FC), which is the ratio of the poetic element to the number of lines and was practiced in the works of V. Pivtorak, O. Romanytsya and R. Pazyuk. This approach made it possible to obtain objective conclusions regarding the various components of poetry of the writer. Comparative and comparative historical methods are used to reveal the influence of other authors on the poetics of the Bukovynian writer. Biographical method makes it possible to find out the dependence of S. Vorobkevych's views on poetics on the life basis.

The study of publications related to the topic of the study showed that the most valuable of them are the materials of O. Makovey, V. Lesyn and O. Romanets, P. Nykonenko, M. Bondar, P. Nykonenko and M. Yuriychuk. The generic and versification as the components of S. Vorobkevych poetics are considered as relatively better revealed. However, even they have not been studied very thoroughly. This fact made the emergence of a complex, diachronic investigation of poetics of poetry works of Bukovynian artist relevant, based on objective quantitative indicators.

The following periodization of S. Vorobkevych's poetic creativity was proposed: 1863 – 1867; 1868 – 1875; 1876 – 1903 (we distinguish two subperiods within the last period: 1876 – 1891 and 1892 – 1903). S. Vorobkevych's arguments about the form of the literary work were important. The writer determined two components of the external form: languages and versions, which are clearer than other ones. The specifics of certain poetry's poetic judgments (the examination of folkloric and book syllabic forms under the rules of "stop" silabotonic versification) led to excessive choreatization of his own silabagic poetry.

There are syllabic (I period – 90 % of all works, II – 56 %, III – 31 %), silabo-tonic works (I period – 8 %, II – 41 %, III – 63 %) and polymetric designs (I period – 3 %, II – 1 work, III – 10 %) in S. Vorobkevych works. The development of poetry versification from syllabic to syllabic-tonic

forms is traced. All poems are strophic. Monostrophic forms prevail (I period – 93 %, – 90 %, – 89 %).

Strophic verses are represented by the following stanzas: dystych, katren, 5 verses, 6 verses, 7 verses, 8 verses, 9 verses, 11 verses, 12 verses. A tendency towards a gradual reduction of the proportion of katren stanzas is traced. Instead, the number of 8 verses is increasing. This phenomenon is due to S. Vorobkevych tendency to create lyrics. Vorobkevych's versatile designs are most widely represented in the lyric of the last period (11 %), in the second and first periods their number is 10 % and 7 % respectively. The poet uses predominantly accurate rhyme (85,6 %). The percentage of approximate rhymes is 10,4 %. Inaccurate rhymes – 17,6 %. The poetry rhyme is predominantly monotone grammatical 74,6 %, with the prevalence of verbose – 40,7 %.

The results obtained are an important material for expressing our knowledge of the poetics of S. Vorobkevych's poetic works; they are the material for comparison with the similar material on the artistic nature of Y. Fedkovych's poetic works. On the basis of revealing common features, taking into account the data of other Ukrainian poets of the region of this period it becomes possible to get a general picture of the poetics of domestic poetry works in Bukovyna in the second half of the nineteenth century.

**Osypenko V. A.**

## **THE USE OF PSYCHOTHERAPY PRACTICE IN THE MENTAL HEALTH CARE OF STUDENT'S YOUTH**

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The problem of mental health is becoming increasingly important in today's world. Scientists discuss the norms and disorders of mental health, various of psychotherapeutic and psychological-pedagogical practices.

Psychological science and practice pay attention to the study of mental and psychological health of student youth. In particular, the socio-psychological adaptation of students and the need of self-determination in the future professional environment are in focus.

Aspects of mental health were considered in the scientific literature by the following representatives: O.V. Alekseev, M.Y. Boryshevsky, S. Bratus, L.F. Burlachuk, I.V. Dubrovina, G.V. Lozhkin, M. I. Mushkevych, O.V. Naskova, I.V. Tolkunova, S.D. Maksymenko, O. V. Khukhlaeva and others.

Mental health refers to cognitive, behavioral, and emotional well-being. It is all about how people think, feel, and behave. People sometimes use the term "mental health" to mean the absence of a mental disorder. Looking after mental health can preserve a person's ability to enjoy life. Doing this involves reaching a balance between life activities, responsibilities, and efforts to achieve psychological resilience. Conditions such as stress, depression, and anxiety can all affect mental health and disrupt a person's routine. Therefore priority attention is needed the complex realization of measures to the effective prevention of diseases and risk factors for their development among students, creation of pre-conditions for forming in students the principles of healthy way of life and health-protecting behavior, improvement of medical care and implementation of monitoring the health status of students.

When stress is prolonged, it can lead to psychosomatics. Psychosomatics occurs when "speaking the body" becomes the main way to express emotions. The ability to express their main emotions through words is blocked for some deep reason. A person starts to "feel" and "think" with the body instead of words.

Psychodrama - is a therapeutic method that can translate body language into the language of human feelings. Psychodrama emerged as a method of group psychotherapy in which one of the main elements is play. The founder of psychodrama - Jacob Levi Moreno, said: "If you change the inner reality of man, it will change his real life." The main components of psychodrama are: roles, play, spontaneity, "tele", catharsis and insight.

Characteristics of using role-playing as a tool to work with the symptom: has its own well-developed psychodramatic theory; - has a methodological basis for practical use; allows you to "pass" the protective mechanisms of the individual's psyche; is both an analytical and an effective method. During the role-playing game, internal images appear on the "stage" that fill our consciousness. Having the idea of the symptom as a symbolic image, a metaphor, we can work with both situational pain and severe chronic diseases. The main goals of role play are the ability to visualize the problem and choose the most appropriate behaviors in the problem situation for students which have psychosomatic problems.

Role-playing involves the change of stereotypes about one's own body. Role-playing has predominant features in comparison with other types of practice. It basically contains real situations from the life and activity of the student. Practical technological processes of RP doesn't take place in thinking, but in action, which allows the active use of intelligence, perception, memory, as well as emotional, sensory and physical components of human behavior. It combines lightness and depth. RP gives the opportunity to feel, understand and comprehend the psychological state in the technique of "exchange of roles". It allows to search the process of intrapersonal conflicts and promotes disclosure of personal resources: increases the spontaneity and creative potential of the person.

**Rak O.M**

## **LEXICAL AND SEMANTIC COMPARATIVE CHARACTERISTIC OF THE VERB FACERE IN LATIN AND FRENCH**

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Semantic structure of the verb *facere* is extremely rich and diverse both in Latin and French, it is not chaotic, has its own system and its development tendency. Using linguistic, statistic and comparative research methods, it was possible to identify the frequency of use of the given verb in different functions on the examined material.

Number of semantic diversity that the verb under study acquires and its lexical meaning depend on the functions and those semantic and syntactic relations between *facere* and other words and their meanings inside Latin and French lexical systems.

Independent use of this verb contributes to the implementation of terminative semantics, which involves reaching the limit of action, its result ("to do something that will exist", "to made", "to create", "to act", "to commit" that is to perform a certain action, thing).

An indicator of the broad semantics of the most generalized meaning is the use of *fasere* as a substitute verb. In this role the given verb expresses any specific action, condition, excitement: "to present, to pay, to sell, to adjust, to cry, to talk, to make" etc.

Coherent use of the verb under study is characterized by general coloring as: "to force someone to accept or to have this or other condition or view" (to make happy, to make one's own etc.)

The presence of homogenous descriptions of functional and semantic structure of Latin verb *facere* and French verb *faire*, acquired with the help of using the same methodology, allowed to determine the most general and obvious similarity and difference features in the structure of the verbs mentioned above.

Latin verb has at its disposal the same functions as French verb *faire* = they can be considered as universal verbs. The original function of *faire* and *facere* is their role as independent verb, which includes direct-transitive and non-objective use, and *faire* and *facere* are words of high frequency. Distinctly, Latin verb *facere* succumbs in use to verb *esse*, at the same time as *faire* in French dictionaries is on the third place after *tre* and *avoir*.

However, it should be mentioned, that degree of abstraction of French verb in connection with certain nouns is higher in comparison with Latin verb. In the French language *faire* is capable to converge semantically with the verb "to be". Sometimes it can be substituted by the verb *tre* without violating the meaning of the phrase, for example: "Je n'ai rien de ce qu'il faut pour faire



In next context, the symptoms of tuberculosis are described although the name of the disease is missing: , , - , ! (novella “Behind Gotar”).

Thus, in the Olga Kobyljanska’s artistic discourse, the tokens with its derivatives and the adjective are used to denote tuberculosis. The writer uses different descriptive constructions to denote the state of the disease.

**Shalajeva A.V.**

## **THEORETICAL PROBLEMS OF THE NORMALIZATION OF SPECIAL VOCABULARY IN THE FIELD OF INFECTIOUS DISEASES**

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Terminology is a science, the main objects of which are special lexical units, primarily terms and their aggregates used in a certain area of terminology. Terminology as a scientific discipline has its own structure, the elements of which are associated with the main areas of theoretical and practical activities in this area. The theoretical tasks of terminological activity include: establishment and description of the main types of special lexical units; development of common methods for describing and analyzing terminologies; determination of the general properties of terms and the peculiarities of their implementation in certain areas of special vocabulary; the study of the basic types of concepts called terms and the relationships between them, semantic features and problems of terms; the study of the structural and derivational composition of terms in the field of infectious diseases; ways, models and features of their formation; types of term elements and types of motivation of terms; study of the peculiarities of education and the development of terminology in various fields of knowledge; analysis of the features of the functioning of terms and terminologies in special speech and modern automated systems; defining the role of terms in the training and communication of specialists; improvement of the theoretical foundations for the creation of various types of dictionaries for special vocabulary.

Practical terminological activity is aimed at solving the following tasks: development of a methodology for the normalization and creation of terminologies in this area of medicine; establishment of criteria and principles for the selection and processing of special vocabulary when creating a dictionary; development of methods, techniques and recommendations for the translation of terms.

Thus, practical terminological activity has two interrelated aspects: optimization and normative. The result of optimization and normative terminological activities is the unification of terms. When a precise and unambiguous use of a term is required, the form is adopted, enshrined in the standards for terms. The appearance of the product of practical terminological activity, which reflects its result, is preceded by practical work to streamline special vocabulary.

The task of the initial, preliminary stage of work on the ordering of terminology is the selection of terms, their lexicographic processing and description. Terminological activity at this stage involves: defining the boundaries of the study area, choosing terminological sources and compiling a selection of terms.

The ordering of terminology is the main component of the practical work on the unification of terminology associated with bringing terms to uniformity, a single form or system, therefore the main task in the process of creating an ordered terminology is the formation of a system of concepts. Linguistic unification of terminology presupposes bringing various and many types and means of creating terms to the required minimum of models that would meet the necessary requirement to serve as a means of monosemous expression of a special concept. In practice, the unambiguity of the term is achieved due to the restrictions imposed on it by the conditions of each terminological field.

**Shutak L.B.**

## **METAPHORICAL PROCESSES IN THE CREATION OF MEDICAL TERMS**

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The lexical organization of any language is characterized not only by the correlation of the lexical-semantic units in the language, but also by the possibility of their reinterpretation for naming all that is necessary for the speaker at the moment. Therefore, the secondary names, that is, the formation of the second, even the third name for objects of extralinguistic reality, which have already been denoted as the means of language, often appear in the speech. Such lexical units are often created by means of metaphorization.

In terms of cognitive terminology, the medical discourse is of particular interest. The peculiarity of medicine as a specialty lies in the fact that it combines both traditional ways of cognition, with centuries-old history, and the most modern and accurate methods of research. Medicine is one of the oldest scientific fields, which explores the same object (ill person) during its development, and determines the cumulative nature of human activity, because it preserves all stages formed during the development of science. All the above determines the constant change, updating of medical terminology and is a prerequisite for studying the processes of the linguistic sign development in the medical discourse.

The study of specific processes of terminology in medical discourse is necessary for constructing an integrative model of a metaphor and, consequently, an integrative model for the development of a linguistic sign in a discourse. Studying the process of metaphorization, it is advisable to refer to the methodology of polyparadigmatic discourse analysis. Its methodological basis is the system approach, in which the object is considered to be a complex system consisting of subordinate systems and elements; the functioning of this system ensures the interaction of subsystems of the same level, as well as the connection of different levels in the hierarchical structure of the system.

Discourse as a verbally mediated activity in a special field is, by definition, a complex functional system that includes a hierarchy of levels – stages of sign activity, in particular, the stage of a conceptual metaphor and metaphorization in the process of text production. The use of polyparadigmatic analysis allows to study the phenomenon of terminologisation in the medical discourse, as well as to obtain new information about metaphorization as a general mechanism of a linguistic sign development.

There is a number of metaphor typologies in linguistic science, such as the typology according to the morphological expression of the principal part; according to the structural features; the functional purpose; the belonging to the language and speech system, etc. In the medical discourse, metaphorization is primarily used as an action, which can be implemented through a variety of strategies (operations, instructions, methods, skills, etc.). They are aimed at solving cognitive and communicative tasks, where the external (non-verbal) side of metaphorization has a communicative phase, and the internal one has conceptual and pragmatic phases.

Since the medical discourse is a complicated speech phenomenon, associated with the everyday communication of doctors in different situations, the choice of simple linguistic means often helps to avoid communicative barriers, such as psychological (when the patient is dissatisfied with the doctor); semantically-phonetic (when an adequate perception of the situation is complicated due to excessive medical terminology); stylistic (speech discrepancy for its stylistic purpose); socio-cultural and others.

**Skakun I. O.**

## **ANTHROPOCENTRISM IN MODERN NATURAL SCIENCE**

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Anthropocentrism is one of the leading philosophical concepts of our time. Anthropocentrism along with pragmatism form an effective worldview model of modern science.

The picture of the world forms the fundamental elements that ensure its effectiveness. These parts put forward human ideas, theories, concepts and facts. The world picture completely covers the potential of our civilization, analyzing the past, regulating today and predicting the future for the effective management of existing paradigms of science.

Mankind has constantly cared about its place in nature and relationships with the living world of the planet. As the result, two major theories emerged: anthropocentrism, which claims that nothing in the environment has its own value, unless it benefits to human, and biocentrism, which claims that nature has its own value. Anthropocentrism is a human centered view of the world, while biocentrism is life centered. These two views turned into confronting paradigms.

The aim of the study: anthropocentrism is a basic paradigm of civilizational development. The concept asserts itself of anthropocentrism and biocentrism and forms a balanced system of the culture. There is a logical connection with the natural sciences, humanitarian aimed ideas. The results of the philosophical dichotomy "man-world", transformed into a practical confrontation of anthropogenic and biocentricism and became apparent in the cultural and civilizational manifestations. The only question we are facing is whether this problem is up to date. Since the time of scientific and technological progress and the establishment of rational system of thinking (and later its crises), anthropocentrism and ecocentricism have gained recognition and popularity. We used theoretical methods: analysis, comparison, synthesis, systematization, classification, generalization. In our study, a synergistic method was successfully implemented.

The concept of humanity is virtualized in the idea of a post-man (according to the pattern of post-science), whose biological essence is full of advances in nanotechnology. It is about abandoning the biological component of anthropocentric worldview. The basis of transhumanism is the technological evolution of man, his body, consciousness and sensuality. Transhumanism doubts the biological value of human existence, destroying anthropocentrism, guided by the impossibility of being an artificial consciousness. Anthropocentrism provides the sacred content of human biology as the only form of matter capable of containing human consciousness and generating the highest values.

More important is the coverage of the level of human interaction with the noosphere processes, as this is one of the fundamental issues of self-knowledge, which requires adequate theoretical and methodological guidance. Having received a philosophical substantiation in the scientific picture of the world, interdisciplinary ideas and principles acquire the status of methodological and predetermine changes in the outlook. Modern philosophy of science is intended to provide worldview constants for the continuation of man's evolutionary development.

Thus confrontation between scientism and humanism, the technical and human minds are reflected in the understanding of ecology. Anthropological theme provides potential efficiency in anthropological research paradigms. Anthropocentrism has been the dominant ideology since antiquity. During the historical development of human civilization, this idea has become even more established. The key concept in the historical and civilizational context is the concept of "humanity". Man is a defining element of socio-cultural life.

**Skrytska N.V.**

## **TESTING AS THE NECESSITY OF THE EDUCATIONAL PROCESS**

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The 21st century is first and foremost an era of new technologies, information, and globalization. The main purpose of studying social courses in educational institutions for foreign and Ukrainian students is to develop new non-traditional approaches to thinking in various fields.

One of the features is the conclusion of test tasks taking into account the specifics of assimilation and perception of information by foreign students, in particular in the subject "History of Ukraine and Ukrainian culture", in order to achieve maximum results.

We share the opinion that the empirical form of taking test tasks for foreign students is more effective, because the teacher, analyzing the knowledge and skills of students of a certain group, can



make a certain algorithm for working with this group to achieve maximum results. The priori form is a more general and schematic form focused on the general process of teaching a certain subject, but without an individual approach to students of a certain group.

It is quite effective in an individual approach to students when concluding test tasks is to create tests individually for each group, taking into account the specifics of perception and assimilation of material. Some groups can master the material at a fairly high level, and therefore need to create test tasks with a certain level of difficulty, which would allow students to give more complex answers to questions. For such students, the multiplicity of facts, different theories, concepts, etc. should be used. This will actualize their perception and imagination. However, there are groups with a rather slow perception and assimilation of material, and therefore the teacher in his work should focus on concluding fairly simple test tasks that do not require additional knowledge and are focused solely on current facts on a given topic. It will be difficult for such students to focus on causation and to match the facts, events, or consequences that follow.

The discipline "History of Ukraine and Ukrainian culture" includes facts, events, causation, historical and cultural stages and features of the Ukrainian people in a particular historical period. Therefore, test tasks from the above training course have a wide range of selective tests. The teacher, focusing on the perception and assimilation of the discipline by students, can provide more factual material (dates, events), or focus on the causal links between certain facts in the development of Ukrainian history and culture. Undoubtedly, the second task will promote the actualization of additional knowledge and skills of students and deepen their interest in studying the socio-humanitarian course.

**Teslenko M.O.**

## **TERMFORMING MODELS OF THE ENGLISH PROFESSIONAL LANGUAGE IN THE FIELD OF INFECTOLOGY**

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Linguistic features of medical terminology remain in the center of attention of modern researchers given the need for in-depth study of the nomination mechanisms of concepts and phenomena represented in modern medical terminology, identification of compositional and semantic characteristics which will certainly contribute to standardization and unification of medical terminology in general and its individual terminological subsystems. The process of formation and functioning of scientific phrases has been particularly common in modern English medical terminology. More than 70% of terms in different terminologies are phrases.

The basic terminology of English medical terminology consists of one-word terms, for example: malaria, measles, pertussis, poliomyelitis - polio, rubella, tuberculosis - TB, smallpox, tetanus, cholera.

A conducted study convincingly shows that in English medical terminology, many of the compound terms are models of two-component phrases formed on the basis of substantive-substantive and substantive-adjectival connections. Substantive-substantive medical terms are formed according to the scheme: [noun (Nom.) + noun (Gen.)], for example: tuberculosis cutis - tuberculosis of the skin, Vincent's angina - Vincent's sore throat, etc.

A larger group consists of noun-adjective formations, expressed by nouns in Nominative case and the agreed relative adjective (rarely - verb) for example: scarlatina anginosa - anginal scarlet fever, erythema infectioum - infectious erythema, exanhema subitum - sudden exanthema, etc.

There are terms with a different order of its components, for example, model (adjective + noun): black measles, streptococcal pharyngitis, pneumonic plague, epidemic pleurodynia, epidemic jaundice.

Usually, compound terminological structures are formed according to different word-forming schemes, the most common are three-component: adjective + adjective + noun: (acute

anterior poliomyelitis); noun + adjective + adjective (tuberculosis miliaris disseminata - miliary disseminated tuberculosis); noun + noun + noun (Marburg virus disease), etc.

Abbreviated terms are also considered: IH - infectious hepatitis - infectious hepatitis; ILT - infectious laryngotracheitis, EI - erythema infectiosum - infectious erythema, etc.

In the course of the study it was found that different parts of speech and syntactic constructions are used to denote the same concept. This refers to a pathological erythema that can be seen on the palms (liver disease, rheumatoid arthritis, even during pregnancy) or on the palms and soles (a hereditary disease associated with abnormal arterial and venous anastomoses).

Summarizing up the data, it should be noted that:

1. The vast majority of TU in the field 'Infectology' consists of the binary terminological units formed in the pattern 'Subst. nom. sing. + Adject. nom. sing.';

2. Model of TU formation according to the pattern 'Subst. nom. sing. + Subst. gen. sing./gen. plur.' is unproductive;

3. TU using the prepositions belong to the unproductive model of term formation.

4. The attributive component, regardless of the model of TU formation, in each case provides a classification detail of the denoted phenomenon and thus contributes to the specification of clinical forms of erythema and allows to avoid misunderstandings between dermatologists and infectious disease specialists. Widespread use of composites in the field of "Infectology" is due to more accurately and fully name new diseases, their symptoms, diagnostic methods, treatments and more.

**Tomashevska A.Yu.**

## **LINGUISTIC FEATURES OF THE ENGLISH SUBLANGUAGE OF PHARMACY**

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The study of system-structural, semantic, and functional features of the English language of the specialty "Pharmacy", lexical-semantic analysis of lexical units of different levels, nominative classes of proprial vocabulary is an insufficiently studied layer of the lexical composition of this sublanguage.

The scientific novelty of the research consists in theoretical substantiation and compiling a vocabulary of pharmaceutical terminology (with Latin and Ukrainian equivalents).

The objective of the study is to define key peculiarities of the English language of Pharmacy.

We consider the sublanguage of pharmacy divided into two aspects - as a hierarchical system of professional scientific texts, which are the environment and tool, as well as a system of special medical field terminology, characterized by its own structural organization. The linguistic study of the English language of pharmacy based on selected genres, within which the language of pharmacy is actually realized, typical roles and functions inherent in pharmacists as representatives of the linguoactive profession, allowed us to conclude that: 1) most of all pharmaceutical terms are Greek-Latin names, which are characterized by a considerably low amount of normative grammar due to the requirements regarding the contextual unambiguousness of the graphic-semantic data on the names of medicines; 2) prevalence of special medical field terms, compound terminological names, interdisciplinary and proprial lexis within the pharmaceutical vocabulary; 3) prevalence of initial abbreviations and morphological derivation among the productive means of terminologization.

Note that among the active language structures there are propriatives components of modern pharmaceutical terminology. Their structural and semantic construction is aimed at the adequate perception of a particular object or phenomenon and specific action. The pragmatic value of such units is that they have a certain impact on a person and his way of perception.

**Tsurkan M.V.**

**PROCESSES OF HUMANIZATION AND HUMANITARIZATION OF HIGHER  
MEDICAL EDUCATION**

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The current direction of Ukrainian medical institutions of higher education is the professional training of foreign students who are the representatives of different nationalities, ethnicities, religions, etc., so the problems of humanization and humanitarization obtain one of the leading places in the educational process. Humanized education finally reveals to a person the truth that there is a certain universal solidarity, and that people of different nationalities can not only know the same truth and acknowledge the same justice, but also combine their efforts to carry out benefit in life that is equally understood». As we can see, teaching students in interethnic groups, in addition to well-known difficulties (religious or national intolerance, physiological features of pronunciation of Ukrainian sounds), has positive aspects, after all, it is in the process of daily communication that representatives of different nationalities and races have the best opportunity to get to know another's culture, features of a different mentality and religion, and to understand the content of the basic principles of life.

The problem of humanization is especially relevant in the process of training medical workers, including foreigners who came to Ukraine to become doctors. Humanization of the educational process, the participants of which are domestic and foreign students representing different ethnic groups, nations, cultures, religions, is one of the priority prerequisites for achieving and realizing the educational goal of each medical institution of higher education. The basis of the humanities includes universal spiritual and moral values, which are associated not only with the external needs of the individual, but also based on a deep understanding of the meaning of human existence, understanding the relationship of past, present and future life, desire for self-realization, self-affirmation, and striving to be useful for society in general and each person in particular.

We observe a particularly important function of the word in the communicative act “doctor – patient” in a situation where foreign doctors undergo medical practice in Ukrainian medical institutions, because, in addition to special knowledge, they must learn the linguistic, cultural, mental, religious postulates of other peoples and skillfully, appropriately, correctly, humanely build a relationship with the patient. The difficulty of the above communication is that the representatives (“doctor – patient”) of different ethnic groups perceive each other with a certain fear, because they are pre-adjusted to the possible misunderstanding due to the inability to overcome language and psychological barriers.

Humane attitude of the doctor to the patient is the dominant of professional activity of the doctor, which must be developed by humanizing and democratizing the educational process in general and special, humanitarian and social disciplines in particular, because the main task of modern education, including medical, is to form a humanistic worldview of people and their professional skills. We believe that the priority of humanization, humanization and democratization of medical education should be the formation of a motivated attitude of the doctor to the patient as the highest value and awareness of the doctor that maintaining health and life is the most important professional duty of all health workers.

Thus, humanized education is the main means of global humanization of society, the purpose of which is the development of a person capable of creative thinking, who strives for self-improvement, determines the strategy of professional activity, is able to adapt to living conditions, has a formed worldview, aware of universal moral and ethical values. As we can see, the concepts of “humanization of education” and “humanitarization of education” are interconnected and interdependent, as they are aimed at achieving a single goal – the formation of the personality of the specialist: humanization determines theoretical and methodological ways of training of a specialist, humanitarization ensures the implementation of the outlined ideas of this process.

**Tymofiieva M.P.**

**THEORETICAL AND METHODOLOGICAL ANALYSIS OF PROBLEM OF DOCTOR-  
PSYCHOLOGIST'S HEALTH-PRESERVING COMPETENCY**

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There is a need to form young people's conscious attitude to their health as the highest social value, conscious attitude to forming of hygienic skills and principles of a healthy lifestyle, conscious attitude to maintaining and strengthening physical and mental health. Young people who are the future generation of the state have a special status in the field of health preservation. Therefore, ensuring their physical, social and spiritual health should be a priority for society. It is important to conduct research on the study of the students' lifestyle, future psychologists and on the study of the impact of health-preserving environment on the state of their body and the formation of healthy lifestyle values.

Studying the lifestyle of students and its impact on the functional state of the body will help to improve the development of measures to optimize learning conditions and increase the efficiency of students.

The aim of the study is to justify theoretically health-preserving competence as the basis for the professional training of future psychologists.

The task of the study is to analyze and theoretically substantiate modern health-preserving technologies that contribute to the activation of personal health-preserving opportunities of students.

To date, many cases of functional disorders have been recorded among students. The number of chronic diseases grows, the proportion of diseases of the nervous, cardiovascular and digestive systems, musculoskeletal system increases. This trend is associated with an increase in workload, the amount of information to be learned, the ever-increasing requirements for training students and the lack of physical activity (Caputi, V. & Garrido).

Fatigue, emotional and physical overload lead to a decrease in professional development interest. Therefore, there is a need for such appropriate measures as forming teachers' competencies related to responsible and informed attitudes to health.

The essence of "health-saving competence" concept, according to N. V. Tamarska, is manifested in the implementation of preventive measures and the use of health-preserving technologies by people who know the patterns of the health-preserving process.

Health-preserving competence is associated with the willingness to lead a healthy lifestyle in the physical, social, mental and spiritual spheres. D. E. Voronin believes that health-preserving competence involves not only medical and wellness awareness, but also the use of acquired knowledge in practice, possession of methods of strengthening health and preventing diseases. The formation of thinking focus on preserving and strengthening health is an integral component of the health-preserving competence of future psychologists.

Consequently, many aspects of health-preserving environment in educational institutions are still debatable. The main issues are practical modeling and diagnostics of health quality during the educational process, its measurable parameters and methods of formation. Unfortunately, most scientific papers do not take into account the issue of creating a health-preserving environment in educational institutions, while students studying in this field have specific features that require a special approach. The formation of psychologist's health-preserving competence is one of the important requirements for the formation of specialist's professional competencies. In contrast to the external health impact, health competence acts as an internal regulator of behavior, remaining a significant factor in the constructive life of a person. That is why the process of its formation requires compliance in the educational process with a systematic approach, the optimal manifestation of which is the introduction of appropriate educational technologies.

Voytkevich N.I.

## MORPHOLOGIC-SYNTACTIC STUDY OF ENGLISH PROFESSIONAL DISCOURSE IN INFECTIOLOGY

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Modern English infectiology is a part of clinical terminology formed during many epochs. It is one of the most complicated subsystems of medical terminology including the names of diseases, pathological conditions, methods of examination, treatment, transmission of infectious diseases etc.

Objective of our research was to study morphologic-syntactic aspects of medical terminology, and infectiology in particular, including the names of vertically transmitted infectious diseases. Materials and methods: The terms were isolated on the basis of modern classifications of vertically transmitted infectious diseases – 70 terms total. The following methods of research were applied: analytical method involving comparative, semantic, conceptual, historical-etymologic, transformation analysis, structural-functional method and the method of grammatical analogy.

Major morphologic-syntactic methods in English are: substantivation– transformation of adjectives and adverbs into nouns; adjectivization – transformation of nouns, verbs and pronouns into adjectives; pronominalization – process of using pronouns instead of nouns or substantivized group; adverbialization – transformation of adjectives and nouns into adverbs; verbing – transformation of nouns and adjectives into verbs.

All the above methods deal with transformation of one part of speech into another associated with changing of appropriate paradigm characteristics, that is, conversion (from Lat. *conversio* – transformation, change). Conversion is a specific feature of the English word-building system. It is also called zero suffixation or non-affixation derivation. Many classical scientists in English Philology worked on the issues of morphological-syntactic aspects in the English language. The most famous classical works on morphological-syntactic methods are: Henry Sweet «New English Grammar, Logical and Historical», Clarendon Press, Oxford, 1891; Hans Marchand, *The categories and types of present-day English word-formation*. München: Verlag C. H. Beck. Second edition, 1969; Otto Jespersen, “Language: Its Nature, Development and Origin” (1922), “Modern English Grammar on Historical Principles” (1909–1949), “Growth and Structure of the English Language” (1905), “Analytic Syntax” (1937), “The Philosophy of Grammar” (1924) etc.

The majority of the terms studied– 46 out of 70 (65.8%) are two- and multiple word names of diseases (noun + adjective(s), noun+ noun(s)) like *human simplex virus* (HSV-1 and HSV-2), *varicella/herpes zoster virus* (VZV), *human herpes virus* (HHV), *Varicella zoster*, aseptic meningitis etc. Several eponyms were found: Epstein-Barr virus (EBV) (after the author’s name), Zika virus (after locality they were identified), Coxsackie virus after locality they were identified, Heck’s disease (after the author’s name), Lyme disease after locality they were identified.

The main ways of word-building are identified: derivatives and one-word clinical terms – 7 terms respectively (10% in every group); derivatives built by means of the suffixes *-itis*, *-iasis* (*hepatitis*, *encephalitis*, *chlamydiasis*); simple one-word terms like *herpes*, *varicella*, *rubella*, *syphilis*, *impetigo*, *measles* etc. (10 terms– 14.3%).

Prospects of further studies: our future research will include investigation of semantic-cognitive aspects of the English professional discourse.

Thus, the study of English medical discourse lasts over a century, but it does not lose its topicality in modern linguistics. Medical discourse is considered to be one of the oldest vitally important spheres of human activity. Its continuous growth and development due to new discoveries, appearance of new nominations is an everlasting source for the study of professional terminology.

Vykliuk A. O.

## LEXICAL-SEMANTIC FIELD “INFECTIOUS DISEASES OF CUTANEOUS COVERING” IN FILM-DISCOURSE

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Investigations based on modern cinematograph are perfectly suitable to reveal the general awareness of people about medicine and to compare the medical communicative situations people find interesting to observe with the actual state of medicine.

The aim of the investigation was to delineate lexical units comprising the topic of infectious diseases of cutaneous covering, which are found in the products of modern cinematograph, such as medical TV-shows, medical documentaries and non-documentary films about physicians and diseases. It will be necessary for future comparative analysis, which will reveal the most popular topics applied in modern film discourse. The tasks of the research are the following: to gather, to systematize and to analyze on the morphological level the lexical units concerning the topic “infectious diseases of the skin”.

The procedure of the research contained the following steps: to single out lexical units of morphological and phrasal levels by means of complete sample method, to subdivide them into lexical-semantic groups, to count the morphological types of lexical units and to contrast them using comparative-quantitative analysis.

Lexical-semantic field can be understood as the scope of lexical units of different levels, which are related to each other in terms of their meaning. These units are linked paradigmatically, in other words by means of subcategorization, inclusion, derivation, contrast, similarity, etc. They all share one and the same constant, embedded in one word or a phrase, which can be used to characterize all the lexical units lexical-semantic field may contain. For instance, lexical-semantic field “sickness” might contain nouns, such as diabetes, the measles, adjectives such as sick or weak, verb or noun phrases such as suffer pain or cardiac dilation, etc. Lexical-semantic field (LSF) must not be confused with lexical-semantic group (LSG) which is a narrower notion than the one of LSF. The latter usually contains several lexical-semantic groups, which are linked not only semantically, but also morphologically. Thus, lexical-semantic group “hernias” might contain the following noun phrases: external hernia, internal hernia, inguinal hernia etc.

The research was conducted on the basis of famous modern TV-shows: “House M.D.”, “The Good Doctor”, “The Clinic”. The scripts of 177 episodes of “House M.D.”, 79 episodes of “The Good Doctor” and 66 episodes of “The Clinic” were processed and 87 lexical units of lexical-semantic field “infectious diseases of cutaneous covering” were singled out. The following lexical-semantic groups were created in the process of the analysis of the revealed samples: “the condition of the patients”, “the symptoms of infectious diseases of cutaneous covering” and “the names of the infectious diseases of cutaneous covering”. These groups are placed in the previous sentence according to the number of lexical units, they contain. Thus, the first mentioned lexical-semantic group contains the largest share of lexical units (39), the scope of the symptoms of the diseases under the investigation is a bit smaller (24) and it was singled out only 16 lexical units in the last lexical-semantic group. These groups contained all the parts of speech.

To draw a conclusion, infectious diseases of cutaneous covering appeared to be not really popular topic in medical TV-shows. However, the variety of the applied lexical units is rather vast, for it contains different lexical-semantic groups and all the parts of speech on the morphological level. The collected findings may and will be used in the further research of lexical-semantic fields, based on medical issues in order to identify the most popular and discussed ones.







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 : ποτάμιος — + ὄνομα — → . febris Ebola, . Ebola fever.

, . Ebolavirus,  
 — Zaire ebolavirus;

2) \_\_\_\_\_.  
 , ., febris maculosa Montium Saxosarum, . Rocky Mountains spotted fever —

3) \_\_\_\_\_ ← ἄστυ - + ὄνομα —  
 ; ( οἶκος — + ὄνομα — ),

\_\_\_\_\_ ( ὠμη — , + ὄνομα — ) —

: . febris Lassa, . Lassa fever ( -  
 ), febris Marburg, . Marburg hemorrhagic fever ( , ), febris  
 Bunyawera, . Bunyawera fever ( ), morbus Ockelbo, . Ockelbo disease  
 ( ) ;

4) \_\_\_\_\_ ← ὄρος — , , +  
 ὄνομα — , ., febris marseillensis, . Marseilles fever — :  
 hemorrhagic fever — ; febris haemorrhagica Taurica, . Crimea  
 ; febris Volhynia, . Volhynia fever —

febris morbus,





PPE (*person protective equipment*), PUI (*person under investigation*), CFR (*case fatality rate*), CQO (*electronic quarantine order*), VTL (*vaccinated travel lane*), WFH (*working from home*), SARS (*severe acute respiratory syndrome*), MERS (*Middle East respiratory syndrome*), MEURI (*monitored emergency use of unregistered interventions framework*), FET (*fast and easy testing*), ARDS (*acute respiratory distress syndrome*), COVID (*coronavirus disease*).

COVID, covidiot (*covid+idiot*), ovexit (*covid+exit*), covideoparty (*covid+video+party*), ovidivorce (*covid+divorce*).

450  
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**Bezruk V.V.**

**THE RESULTS AND EFFECTIVENESS OF THE IMPLEMENTATION OF LOCAL PROTOCOLS AND CLINICAL TRIALS OF PATIENTS WITH NEPHROLOGICAL DISEASES IN MEDICAL INSTITUTIONS OF CHERNIVTSI REGION**

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First identify the incidence of kidney disease and urinary tract, and, accordingly, the disability are important indicators of the health status of the child population in Ukraine.

The objective: analysis of the effectiveness of the implementation of local protocols and clinical trials of patients with nephrological diseases in medical institutions of Chernivtsi region. Materials and methods: The material for this study is reporting documentation about the condition of the nephrological service care for children's population of the Chernivtsi region in 2013-2019 and the data of The Center of medical statistics of Ministry of Health of Ukraine.

Analyzes the main indicators of child nephrology service in Chernivtsi region. The introduction of local protocols and clinical trials of patients with nephrological diseases in medical institutions of Chernivtsi region had a positive impact on reducing prevalence and first identified in the incidence of diseases of the urinary system in children's Chernivtsi region and allowed to reduce the duration of the patient's stay in the nephrology bed by 11.40% and the average duration of treatment of patients with infectious and inflammatory diseases of the urinary system by 2.93% for 2016-2019.

So, the introduction of local protocols and clinical trails pediatric patients Nephrology pathology in medical institutions of Chernivtsi region have improved the quality of care at all stages, respecting the standards for the provision of specialized medical care.

**Biduchak A.S.**

**HEALTHY LIFESTYLE OF STUDENTS DURING COVID-19 PANDEMIC**

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In modern conditions of lack of live communication and constant being in a static position during distance learning, the issue of improving the physical culture of youth is extremely

important. Strengthening of physical health is actual in modern conditions of biological danger of Covid-19.

Of course, among young students, methods of physical and social distancing are becoming commonplace to stop the spread of the virus. The closure of gyms, sports facilities and stadiums, swimming pools, dance studios and playgrounds means that many of us cannot take an active part in individual or group sport or physical activities. But that doesn't mean we should stop being physically active. We should not lose touch with our coaches, teammates, instructors and fans who help us stay in good physical condition and be socially active.

The aim of the study is to determine students' physical activity during Covid-19 pandemic. The task of the study is to analyze the frequency of physical activity of students during Covid-19 pandemic. Research methods: epidemiological - to study the sources of statistical information; medical and statistical - for the collection, processing and analysis of the information obtained during the study.

As a part of our study, we assessed the types of physical activity of students during the COVID-19 pandemic using a survey. It has been found that more than half of the surveyed students on self-isolation perform simple physical exercises for less than 30 minutes a day. Only a third of students perform physical activity for more than 60 minutes a day. Only 34% of respondents spend more than an hour outdoors. Among the applied by students types of physical activity, the largest percentage (57%) is a general course of exercises to improve health. And as for the frequency of physical activity during the week, 46% of respondents exercise less than 2 times a week. During quarantine and distance learning, 36% of surveyed students have gained weight, 22% haven't gained weight, 24% have lost weight. Only 7% of respondents spend less than 5 hours on a computer, and more than 90% spend more than 9 hours before a computer screen.

So, physical activity of students today is very important and necessary for them to maintain their own health. Students need to be actively involved in various sports marathons, provided recommendations for certain exercises, motivated and encouraged to follow a healthy lifestyle. Distance physical education classes help to form a more voluminous theoretical knowledge, contribute to the preservation of health, motivate for a healthy lifestyle under the condition of conscious self-organization of a student.

**Chornenka Zh.A.**

## **MORBIDITY AND MORTALITY FROM TUBERCULOSIS AMONG THE POPULATION**

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Every year there are 7-10 million people in the world with tuberculosis. The total number of TB patients in the world reaches 50-60 million. In 2019, there were 10.4 million new TB cases and 1.7 million deaths related to the disease worldwide. The state of the environment, geographical and environmental factors also play an important role in the prevalence of tuberculosis. Overcrowding and time of contact with patients are key factors in tuberculosis infection. The situation with tuberculosis in Ukraine is quite complicated. Tuberculosis is not just a medical problem. This is a social problem that reflects the socio-economic condition of the country, the cultural and educational level and well-being of the population, the degree of development of health care, including tuberculosis.

The aim of the study was to compare morbidity and mortality from tuberculosis among the population of Ukraine and Europe. The study was conducted on the basis of personalized information from the database of the report on Global Tuberculosis 2012-2020 analytical and statistical guide "Tuberculosis in Ukraine" 2013-2019 and on the basis of anti-tuberculosis dispensaries of Chernivtsi region.

The national incidence of TB ranges from less than 5 to more than 500 new case and recurrences per 100,000 population per year. In 2019, 54 countries had a low incidence of TB (<10 cases per 100,000 population per year), mainly in the United States and the WHO European Region.

Worldwide, the incidence of tuberculosis is declining, but not fast enough to reach the limit of 2020 - a decrease of 20% between 2015 and 2020. The overall incidence reduction from 2015 to 2019 was 9% (from 142 to 130 new cases per 100,000 population), including a decrease of 2.3% between 2018 and 2019. The WHO European Region achieved the most positive results, reducing the incidence of TB by 19% between 2015 and 2019. Globally, the incidence of tuberculosis is declining by about 2% per year. In order to achieve the targets set by the TB Elimination Strategy, these rates of decline need to be accelerated to 4-5% per year. In Ukraine, the incidence of tuberculosis is significantly declining. According to WHO estimates, the incidence of TB in 2018 was 80 new cases and relapses per 100,000 population. The average annual reduction in the estimated incidence of TB over the last five years was about 4.0%, which is lower than the observed average annual reduction in the incidence of TB in 5.6 priority countries in the WHO European Region over the same period.

Worldwide, the leading cause of death among infectious diseases is TB, which is also one of 10 most common causes of death in general. In 2019, TB caused 1.4 million deaths, including 208,000 among HIV-positive people. The annual number of TB deaths is declining worldwide, but not fast enough to reach the first phase of the End TB Strategy; i.e. a reduction of 35% between 2015 and 2020. The cumulative reduction between 2015 and 2019 was only 14%, which is less than half the way to reach this limit. From 2015 to 2019, the WHO European Region achieved significant results towards reaching this limit, reducing TB mortality by 31%. According to WHO estimates, in 2000 the TB mortality rate (excluding TB / HIV deaths) was estimated at 23 cases per 100,000 population. Over the past five years, Ukraine has maintained a steady trend towards a gradual reduction in TB mortality by an average of 8% per year, from 10.8 per 100,000 population in 2015 to 8.8 per 100,000 population in 2019. To implement the TB strategy by 2035, the mortality rate must be reduced by 95% compared to 2015 (from 10.8 to 0.5 per 100,000 population).

Thus, the high level of morbidity and mortality on TB at the present stage is associated with the socio-economic crisis both in Ukraine and in the world as a whole, shortcomings in the health care system, increasing proportion of multidrug-resistant strains of the *M. tuberculosis* complex, the HIV epidemic, and low effectiveness of TB control measures among vulnerable groups.

**Domanchuk . . .**

## **INCIDENCE AND MORTALITY FROM GASTRIC CANCER AMONG MEN AND WOMEN IN UKRAINE**

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Gastric cancer is an important contributor to the global burden of cancer, and less than a century ago it was the most common type of cancer in the world. Ukraine is one of the countries with a high level of cancer and is among the top ten countries in the world in this regard. Moreover, according to scientists, by 2020 the number of people in Ukraine who got cancer for the first time exceeded 200 thousand people. Ukraine ranks 8-9 in the list of 49 countries with registered cancer (incidence of men - 39.5 per 100 thousand population, women - 22.4), annually the country registers 16-17 thousand new cases.

The aim is to study the ten-year trends in morbidity and mortality due to malignant neoplasms of the stomach in Europe and Ukraine. Analyzed the database of the National Cancer Registry of Ukraine for 2010-2019 and Global cancer statistics 2018, used methods: epidemiological, medical and statistical.

There are significant regional differences in current GC incidence and mortality. The highest rates are observed in East Asia, Eastern and Central Europe and South and Central America. Gastric cancer rates are also significantly lower in more economically developed regions of the world than in less developed ones (age-standardized incidence rate [ASIR] per 100,000: men = 15.6 vs. 18.1; ASIR women = 6.7 vs. 7.8 Age-standardized mortality rate [ASMR] per 100,000: men = 9.2 vs. 14.4; ASMR women 4.2 vs. 6.5) [9]. More developed countries, as defined by the UN, include all regions of Europe plus North America, Australia / New Zealand and Japan; less developed

countries include all regions of Africa, Asia (except Japan), Latin America and the Caribbean, Melanesia, Micronesia and Polynesia (Fig.1). More than 70% of GC occurs in less developed countries.

According to the results of cancer records in 2018, 133133 cases of GC were recorded among all European countries for both sexes. The highest incidence of GC 64482 cases (48.4%) was associated with Central / Eastern Europe, and the lowest - 11244 cases (8.4%) - with Northern Europe. The incidence of GC in Ukraine (7492 new cases) as well as in European countries shows a tendency to decrease over the last decade from 25.5 per 100 thousand population in 2010 to 19.5 similar cases in 2019, which corresponds to intermediate level. Also in our study, for comparison, we evaluated the incidence and mortality of GC in the least region of Ukraine, namely Chernivtsi. Thus, in the Chernivtsi region, the incidence of GC decreased from 20.6 in 2010 to 16.0 in 2019 per 100 thousand population, respectively.

The total number of deaths from gastric cancer in 2018 among all European countries was 102167 cases, indicating the second place of death due to GC, after lung cancer. The highest mortality rate, as well as morbidity, was observed in Central / Eastern Europe - 54268 cases (53.1%), and the lowest mortality rate was in Northern Europe and 8014 cases (7.8%) were counted. Mortality from GC in Ukraine also decreased slightly from 19.2 to 14.0 per 100 thousand population during 2010-2019 (which is - 27% in terms of visibility). Similar to the incidence rates, gastric mortality rates in Chernivtsi region are also not significantly lower than similar rates for GC in Ukraine and showed approximately the same trends as in the primary incidence over the past ten years, fluctuated with varying intensity in the range of 18.3-13.2 cases per 100 thousand population, which is 27.9% showing a generally stable trend and equalization of indicators over the past five years to national values.

The epidemiological situation with gastric cancer remains threatening and is characterized by an increase in the primary incidence of the population of Ukraine, in half of the cases due to neglected stages. This leads to low survival (over 40% die within a year) and increased mortality, mainly male.

**rytsiuk M.I.**

### **THE INFLUENCE OF CORONAVIRUS DISEASE 2019 ON CARDIOVASCULAR DISEASES**

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The first cases of coronavirus disease 2019 (COVID-19) were registered in Wuhan in December 2019. At the end of October 2021 2.78 million cases of infection had already been registered in Ukraine, and more than 65,000 people had died. After a year and a half of life in the new realities a fairly large array of data on the manifestations and most common complications of this infection was accumulated. Acute respiratory disease COVID-19 caused by the coronavirus SARS-CoV-2 has been shown to have an adverse effect on the cardiovascular system.

The aim of the study is to analyze the cardiac complications after coronavirus disease 2019. The task of the study: to analyze the impact of coronavirus disease 2019 on cardiovascular disease. Research methods: epidemiological - to study the sources of statistical information; medical and statistical - for the collection, processing and analysis of information obtained during the study.

At the present stage of knowledge it is necessary to allocate at least three directions of researches in the context of defeat of cardiovascular system at COVID-19: acute cardiac manifestations of SARS-CoV-2 infection (acute coronary syndromes, exacerbation of heart failure, arrhythmias, etc.); post-covid lesions, characterized by the appearance of cardiac symptoms only a few weeks after recovery (most often: arrhythmias, signs of myocarditis, vasculitis); chronic organ damage as part of the so-called "prolonged COVID-19 syndrome", which is the least known and which is defined as complications that exist within a few months after the disease and equate to cardiac, pulmonary or neurological complications.

Cardiac complications were observed among both patients who have already been diagnosed with cardiovascular disease, and persons without a burdensome medical history, previously healthy people. There are reports of myocardial damage, even a few weeks after infection, of considerable concern: for example, magnetic resonance imaging performed 2-3 months after the disease revealed myocardial inflammation in 60% of patients and 76% of patients with elevated levels. troponins as a result of myocardial damage.

Severe complications after COVID-19 include de novo thromboembolic events, pulmonary fibrosis, heart failure, chronic kidney disease, and stroke, as well as worsening of the aforementioned diseases. SARS-CoV-2 infection significantly increases the risk of thromboembolic complications, development of chronic inflammatory processes, etc.

Thus, the treatment of patients infected with SARS-CoV-2 is a significant challenge for health systems around the world. Patients with circulatory diseases have a more severe course of COVID-19 and higher mortality, and data on the frequency and types of long-term cardiovascular complications after COVID-19, clinical consequences and long-term risks, clear algorithms for the treatment of postpartum lesions, unfortunately, is still missing.

**Lytvyniuk N.Ya.**

## **RISK FACTORS AND MEASURES FOR THE PREVENTION OF GESTATIONAL DIABETES**

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Gestational diabetes is one of the most common complications of pregnancy, the frequency of which is 6–25% of cases among pregnant women (depending on diagnostic criteria) and is associated with an increased risk of stillbirth and neonatal death, as well as many other complications from the mother and fetus. In most cases, the disease is latent and is detected only by blood sugar testing. Women diagnosed with gestational diabetes mellitus (GDM) during pregnancy and childbirth are in danger of developing high blood pressure. They have an increased risk of developing type 2 diabetes later in life.

Risk factors for gestational diabetes include overweight and obesity, overweight in the third trimester of pregnancy, hypodynamics, burdened heredity for type 2 diabetes, stress, smoking. Important factors in increasing the risk of GD are polycystic ovaries, hypertension, glucocorticosteroids.

The aim of our study was to develop measures aimed at preventing the development of gestational diabetes by studying the risk factors for gestational diabetes and identifying women who are at risk at different stages of pregnancy. The study solved the following tasks: analyzed the risk factors for GDM as well as the dynamics of blood sugar in different trimesters of pregnancy and developed recommendations for the prevention of gestational diabetes. The following materials and methods were used in the study: research materials were 100 individual cards of pregnant women (f.111 / o) aged from 19 to 45 years who were registered in the women's clinic in different trimesters of pregnancy. The following methods were used: epidemiological - to study the sources of statistical information; sociological - to determine the most common risk factors for gestational diabetes; medical and statistical - for the collection, processing and analysis of information obtained during the study.

According to the results of this study, the following was obtained: it was found that out of 100 risk factors for the development of gestational diabetes mellitus were observed in 20% of the subjects - overweight or obesity, a woman's age over 40 years, diabetes mellitus in close relatives, a large fetus in a previous pregnancy. All women who were at risk, overweight or obese were more likely to develop gestational diabetes mellitus during their pregnancy. Out of the 20 women at risk, 34% of women developed gestational diabetes mellitus, and 66% of them were diagnosed with the disease in the second trimester of pregnancy.

In the late stages of pregnancy there was an increased amount of women with hyperglycemia, which required preventive measures in all trimesters of pregnancy. In most cases,

dietary therapy and dispensary observation were recommended as preventive measures, and very little attention was paid to physical activity. Despite the preventive measures taken by pregnant women, who were classified as at risk, the development of gestational diabetes mellitus was observed, which may be explained by non-compliance with the recommendations or lack of prescribed preventive measures.

Thus, our observations have shown that the presence of any one, two or all the risk factors for GD is found in the vast majority of pregnant women with GD. The combination of two or all of these factors significantly increases the risk of developing the disease. The risk of developing gestational diabetes can be reduced through diet, exercise and lifestyle modifications.

**Mandryk-Melnychuk M.V.**

## **HISTORY OF DISCOVERING OF «MEDICAL» PAPYRUSES**

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The most reliable sources from the history of medicine of Ancient Egypt were papyrus scrolls. Papyruses were written in Armenian, Syrian, Coptic and Arabic languages. Sometimes a late hieratic script (system of writing by black inks with red marks) was used. First texts on papyrus scrolls began to be studied in 1822 by French scientist G.F. Champollion. The most interesting among them is The Ebbers Papyrus composed between 3730 and 3710 BC, «surgical» «The Smith Papyrus» dated back to the beginning of 3000 DC, medical texts educed during excavations of city Al-Kahun, which had got the title «The Kahun Medical Papyrus or Gynaecological Papyrus», conditionally divided into medical and veterinary papyruses. Fragments of «Hearst Papyrus» and «The Beatty Medical Papyrus» were devoted to the separate diseases and the methodology of their treatment.

The majority of the information about internal illnesses and methods of treatment is contained in «The Ebbers Papyrus», found out in 1874 in Luxor and named after the German scientist-egyptologist Georg Ebbers. «Book of preparation of medications for all parts of body» was published for the first time and got the full title in 1875. This historical source contains the information about 900 scrolls related to the treatment of organs of digestive system, ear, throat and nose, burns and bleeding, eye illnesses, skin, parasitic diseases.

«The Smith Papyrus» is the oldest Egyptian text about structure of human body and surgery, which was composed approximatively in XVI century BC. Edwin Smith was an American merchant and collector of the Egyptian artefacts, manuscripts, he bought this papyrus in 1862 in Luxor. However, he was not able to carry out complete translation of papyrus and Smith did not succeed due to the shortage of knowledge of late hieratic script. After Edwin Smith's death his daughter passed a papyrus to New York historical society in 1906.

The American Egyptologist, head of the first in the USA department of Egyptology and Eastern History, James Henry Breasted translated the contents of papyrus, published this text, its transliteration and translation in English. More than 48 cases of traumatic damages of bones, brain, backbone, collar bones, forearm, thorax and rachis, methods of examination of patient, diagnoses and self-treatment are described in this papyrus.

Not less important are «gynaecological» and «veterinary» papyruses that comprise the only source «The Kahun Medical Papyrus» that was discovered by William Mathew Petrie during excavations of settlement of Medinet-Kahun. Thus, this papyrus is considered to be the oldest medical papyrus of Egyptian civilization. In 1898 The Kahun Papyrus was translated by F.L. Griffit and published for the first time. The source is dated 2000 BC. In this text we can find the description of 17 diseases, methods of their diagnosing, symptomatology of pregnancy, methods of determination of sex of baby. Part of papyrus contains texts from veterinary science. Beatty Medical Papyrus dated 1200 BC was named after the famous American collector and papyrolog Alfred Chester Beatty and sanctified to use of invocations against a headache and anorectal illnesses. Hearst Papyrus is dated back to the period of rule of pharaoh Thutmose III (XV century BC) and named after Randolph Hearst – American publisher and newspaper publisher who provided funds



on an archaeological expedition. A papyrus was found in 1901 during excavations near the settlement of Del Bullas on territory of Overhead Egypt, where the administrative center of ruling XVII dynasty of pharaohs was situated. It was published in 1905. Papyrus contains 18 foils with medical recipes.

**Vlasyk L.Y.**

**PREVALENCE OF MAJOR NONCOMMUNICABLE DISEASES AMONG  
THE ECONOMICALLY ACTIVE POPULATION OF CHERNIVTSI REGION AND ITS  
AFFECTIVE FACTORS**

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Major noncommunicable diseases (NCDs) have been described as an unacceptable blind spot on the collective path to sustainable development, as they cause far more deaths and disabilities than any other group. The issue of NCDs has been included in the Global Sustainable Development Goals since 2015, in particular, Goal 3 provides for ensuring a healthy lifestyle and promoting well-being for everyone of all ages, and Goal 3.4 – reducing premature mortality from NCDs by a third.

In order to study the prevalence of NCDs among the economically active population (EAP) and the factors that were associated with it, we set the task to analyze the differences in indices by gender and place of employment. The materials were the results of a step-by-step cross-sectional sociological study of self-assessment of EAP concerning their health (N=1252), half of which were employed in the market (n=633). Sociological and statistical methods (PIVOT, -Square for comparing relative values) were used.

It was found that the prevalence of the main NCDs according to respondents' self-assessment was 35.5% and was lower among those employed in the market (33%) than among the other categories (41%), ( $p < 0.05$ ). The lowest index was in the "market" group among men, 27% who were less likely to visit a doctor during the year than men in the "other categories" group – 32% vs. 51% ( $p < 0.001$ ) correspondently; economically active people were less likely to visit a doctor "more than a year ago" in comparison with the respondents of the other category – 24% vs. 32%, ( $p < 0.05$ ); more often did not go at all – 44% vs. 17%, ( $p < 0.001$ ). The combination of major NCDs with each other was more characteristic among women than among men – 28% vs. 18% by the structure of diseases, or 11% vs. 5% by prevalence ( $p < 0.01$ ). The presence of the main NCDs significantly affected the reason for going to the doctor. Respondents who had cardiovascular diseases, diabetes mellitus, and chronic respiratory diseases were more likely to be treated by a primary care physician (38%) than those who did not report the presence of the disease (29%) ( $p < 0.05$ ). Among individuals without NCDs, there were 2 times more who did not visit a doctor at all (31%) than among the individuals with the above-mentioned NCDs (16%) ( $p < 0.001$ ). Respondents who had NCDs were more likely to visit a doctor with acute or exacerbation of chronic illness (45%) than those without NCDs (25%) ( $p < 0.001$ ) and were more likely to be admitted to monitor the disease – 21% vs. 12% ( $p < 0.01$ ). At the same time, respondents without NCDs were more likely to apply for preventive examination (38%) than the ones with NCDs (30%), ( $p < 0.05$ ) and for obtaining a certificate – 12% against 2%, respectively ( $p < 0.001$ ). These patterns were the same regardless of gender and level of education. We see the quality of their implementation as a significant factor in the timely detection of diseases during preventive examinations.

The study showed that stress and overwork were common background conditions among a third of EAP (34%). It was found that the employment of business entities in the field of trade (market) associated with unpredictable risks did not increase their frequency (30%). In contrast, the "other categories" group, which included civil servants, were significantly more likely to be stressed (42%) ( $p < 0.001$ ), as well as women in general (43%) compared to men (25%) ( $p < 0.001$ ). Depression was noted by 12% of respondents: women – 15%, men – 8%, the least of all civil servants – 3%, which characterizes their work as stable with high responsibility. Social insecurity,

instability, and high responsibility in the workplace should be considered additional factors of impact on health, which should be taken into account in the multi-factor prevention of NCDs.

Thus, regardless of the place of employment, women were more likely than men to report NCDs and comorbidities, which was associated with stress and with more frequent visits to doctors. Improving the quality of preventive examinations is an important reserve for the early diagnosis of NCDs in EAP. Employment features should be taken into account in the prevention and timely diagnosis of NCDs.

**Yasynska E.Ts.**

**THE RISK OF CARDIOVASCULAR DISEASES IN PATIENTS  
WITH ARTERIAL HYPERTENSION**

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Researchers ascribe the reduction in circulatory mortality among the population of the most economically developed countries to the reduction in the number and level of major risk factors: smoking, total cholesterol and blood pressure, as well as to the widespread introduction of modern diagnostic and treatment methods.

The purpose of our study was to determine the level of risk factors for cardiovascular disease in patients with hypertension (AH). During the study, the following task was solved: cardiovascular risk factors in patients with initial forms of arterial hypertension were analyzed. The study was conducted on the basis of the Regional Cardiology Dispensary of Chernivtsi. The study subjects included 85 patients: 45 were men (52.9%) and 40 were women (47%). The average age of patients was 50 +8.6 years. 70 people among them are of working age (82.4%). Cardiovascular risk assessment was performed among people who were diagnosed with the initial forms of hypertension according to the criteria of national recommendations for the diagnosis and treatment of hypertension (AH). All patients were at the stage of outpatient dispensary observation by a family doctor or cardiologist.

According to the results of the study, the following data were obtained: hypercholesterolemia (53.3%) is the most common risk factor (CRF) among patients with newly diagnosed hypertension. Obesity occurs in half of patients, the average body mass index (BMI) was  $32.1 + 7 \text{ kg} / \text{m}^2$ . 34.1% patients had a burdensome heredity. Risk factors such as smoking were found among 32.2% (25% among men and 7.2% among women). 14.6% had elevated blood glucose levels. It should be noted that almost all risk factors were more common among men, but there are no gender differences in the prevalence of unmodified risk factor (URF) - aggravating heredity.

A combination of 2 or more risk factors (RF) was found in most patients. Moreover, the absence of additional cardiovascular risk factors among patients with newly diagnosed hypertension occurred only among women (25%). The presence of two risk factors among men and women is approximately the same (41.9% and 43.8%, respectively). The combination of three and four risk factors was almost 2 times more common among men than women (40.2% and 20.1%). The respondents among patients with arterial hypertension (AH) who did not receive treatment before had a medium or high risk (41.7% and 50.1%, respectively) factors.

According to the results of the study, the following conclusions were made: the high prevalence of risk factors in the study population indicates an unfavorable epidemiological situation regarding the occurrence of cardiovascular disease in patients with hypertension. Coping with risk factors should be aimed at treating high blood pressure, detecting dyslipidemia, obesity, combating smoking and increasing the motivation of the population to follow the principles of a healthy lifestyle - nutrition, optimal exercise and avoidance of bad habits.









**Fediv V.I.**  
**QUANTUM DOT AS FLUORESCENCE/MAGNETIC  
 RESONANCE DUAL-MODAL IMAGING AGENT**

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Dual-modal imaging by combining magnetic resonance (MR) and near-infrared (NIR) fluorescence can integrate the advantages of high-resolution anatomical imaging with high sensitivity in vivo fluorescent imaging, which is expected to play a significant role in biomedical researches. Therefore, it is highly desirable to develop a dual-modal imaging probe for both cell fluorescence imaging and *in vivo* MRI with high sensitivity and deep penetration.

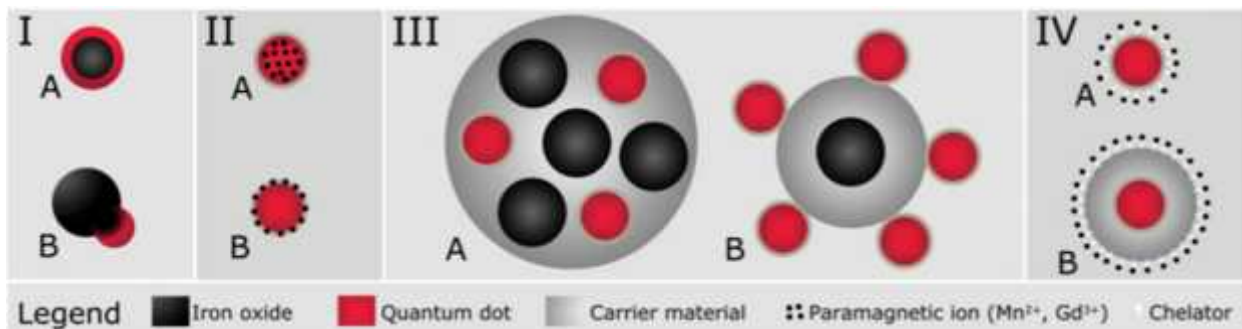


Figure. Schematic representation of the four types of magnetic quantum dots.

(I. Core-shell and heterostructures of magnetic and semiconductor materials; II. Semiconductor nanoparticles doped with paramagnetic ions; III. Composite particles combining magnetic and semiconductor nanoparticles; IV. Semiconductor nanoparticles with a paramagnetic coating of Gd-chelates.)

Quantum dots (QDs) have attracted attention as fluorescent nano-probes in biomedical imaging because of their unique optical properties of broad absorption, narrow emission, tunable emissive wavelength and excellent resistance to light bleaching. Magnetic resonance imaging (MRI) contrast agents are widely used to increase the contrast difference between normal and abnormal tissues. The majority of MRI contrast agents are either paramagnetic (usually made from dysprosium ( $\text{Dy}^{3+}$ ), the lanthanide metal gadolinium ( $\text{Gd}^{3+}$ ), or the transition metal manganese ( $\text{Mn}^{2+}$ )) or superparamagnetic (iron oxide) magnetite particles.

One of many dual-modal imaging agent are magnetic QDs. As is well-known four different architectures of magnetic QDs that have been reported to date (Fig.) Each of which synthesized using a wet chemical procedure, in which the magnetic core is synthesized prior to the attachment of the semiconductor material. Moreover, types of combination both materials give us possibilities a number of ways for changing different properties of magnetic QD.

**Galushko K.S.**

### **POYNTING VECTOR COMPONENTS OF QUASIMONOCROMATIC FIELD**

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The study of the angular momentum, energy currents, which create it in the polychromatic waves, are on the first stage. At the same time, such an investigation has quite good perspectives, first of all, in fundamental aspects. One of them is related with the statement, that the value of angular momentum must be connected with the coherence characteristics of a polychromatic wave. The existence of such relationship is obvious. As it is known the angular momentum may be separated into orbital and spin part. At least, this statement follows from the fact, that the spin angular momentum is defined by the determinate circulation of the field vector. Naturally, the “level of such determinancy” must be connected with coherency.

Let us consider the quasimonochromatic wave, which is additionally obeyed the paraxial approximation.

Correspondingly, under this assumption, the instantaneous Poynting vector may be derived similarly to one of strongly coherent case:  $A_i, \Phi_i$  are interpreted according to Eq. (1),  $A_i^l, \Phi_i^l$  – partial derivatives of  $A_i(t)$  and  $\Phi_i(t)$ ,  $i, l = x, y$ .

It can be rather easily illustrated, that under our assumptions the following expressions as the “base” of averaging procedure take place

Thus it can be stated that the notation of averaged Poynting components of quasichromatic wave is the same for strongly monochromatic wave with corresponding determinate parameters.

The terms in the square brackets of the 1-st and 2-nd equations can be called as structure or orbital transversal part of field energy density. Just these terms, in coherent case, are responsible for appearance of orbital momentum in the area of vortex (scalar field) or C-point, point of circular polarization, in inhomogeneously polarized field.

The last terms in the expressions of transversal components causes of spin energy currents, which define the spin angular momentum of the field.

Correspondingly, if one takes into account, that angular momentum density is defined as follows: one can state that for polychromatic beam (similarly to coherent case), at least, for the wave with narrow spectrum and when paraxial approximation is satisfied, the total angular momentum may be divided on the orbital and spin parts.

**Gutsul O.V.**

### **INFLUENCE OF INFRASONIC OSCILLATIONS ON LIQUID FLOW IN CAPILLARIES**

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To study the effect of infrasonic oscillations on the flow rate of liquids with different electrical conductivity, we designed a hydromechanical generator of infrasonic periodic oscillations with the ability to smoothly adjust the amplitude and period of oscillations in the range of 0,5–50 sec. The process of fluid flow in the capillary was studied by the electrode method on a computerized installation described in.

During the experiment, the dependence of  $I(t)$  at  $U=const$  was measured using digital voltammeters B7-21, which were connected to the computer via interface adapters, and the compiled program allowed to observe the graphical time dependences of the experimental  $I = f_1(t)$  and computational  $I/I = f_2(t)$  functions at  $U = const$ .



The results of studies of the influence of infrasound on the process of fluid boundary flow in the capillary are shown in Fig.

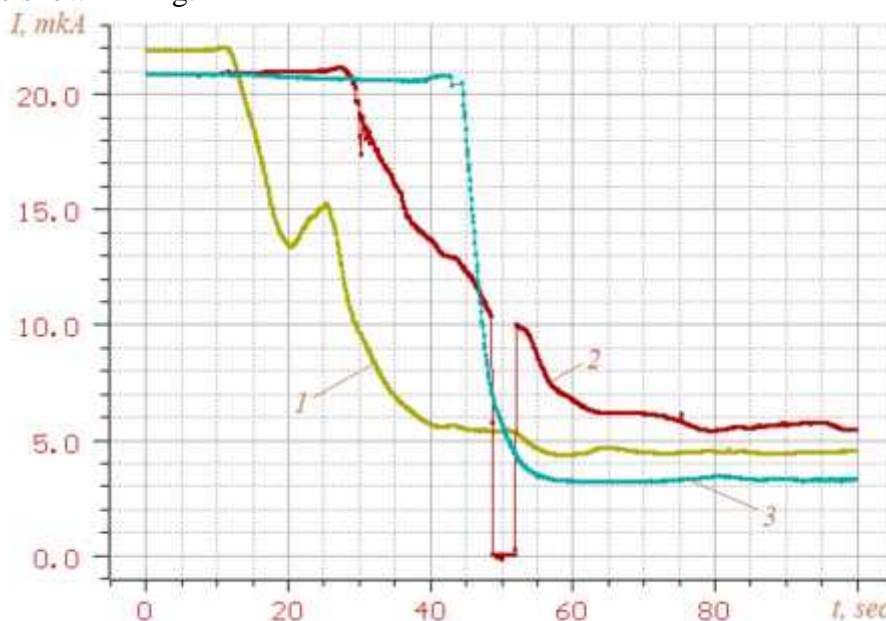


Fig. Time dependences of the electric current  $I(t)$  through the liquid in the capillary during the flow of the boundary of liquids with different given concentrations of ions: 1 - in the presence of resonance of infrasonic oscillations with the capillary; 2 - in the absence of resonance; 3 - in the absence of infrasonic oscillations.

Infrasonic oscillations lead to a decrease in the velocity of fluid in the capillaries. When approaching the resonance of infrasonic oscillations with the capillary, there is a short-term rupture of the fluid boundary or even a change in the direction of fluid flow in the capillary.

**Ivanchuk M.A.**

### **STATISTICAL ANALYSIS OF MEDICAL-PSYCHOLOGICAL RESEARCH**

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One of the features of psychological research is the process of measuring the results of the experiment. Unlike medical research, which typically uses physical units of measurement, most variables in psychological research are not unambiguous or easy to measure. To describe the procedures of psychological measurement in psychological research four types of measurement scales are used: nominative, ordinal, interval, and scale of equal relations. Statistical analysis of the results of medical and psychological research depends on the type of scale in which the studied trait was measured.

The nominative scale is a scale that classifies by name. Conjugacy tables are used to describe and analyze nominative scales. An ordinal scale is a scale that classifies on the principle of "more or less". Statistical analysis of ordinal scales is performed using non-parametric criteria. The interval scale is a scale according to which each of the possible values of the feature is at the same distance from the other value. The scale of equal relations has all the properties of nominative, ordinal, and interval scales. To analyze the results of the study, which were measured in interval scales or in scales of equal relations, one uses parametric or nonparametric criteria depending on the distribution of a random variable.

Correct application of statistical analysis is the key to obtaining reliable results of medical and psychological research.

**Kulchynskiy V.V.**

**POLYMER FIBERS FABRICATED BY ELECTROSPINNING TECHNIQUE:  
APPLICATIONS AND PROBLEMS**

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Electrospinning is a simple, cheap and versatile technique to form fibers from solutions or melts. Force of electric field draws out polymer fibers up to some hundred nanometers in diameter during process of electrospinning from polymer solutions or melts. Moreover, those nanofibers can be made of solutions (melts) of metals, ceramics or composite solutions as well. The electrospinning process is particularly suitable for the production of fibers using large and complex molecules, because it does not require the use of chemical or thermal pre-treatment to obtain solid threads from solution.

The formation of continuous fibers of a broad range of insulating, conducting and semiconducting polymers, or even multi-component compounds, with diameters ranging from a few hundreds nanometers to several hundreds micrometers and length up to kilometres is possible by means of electrospinning. Depending on the electrospinning system and solution formulation used, the resultant fibers can be porous, hollow, aligned, core-shell, and in multilayer coaxial structures. Moreover, various (bio) active molecules can be incorporated into the matrix of electrospun nanofibers. The addition of nanoparticles can further improve the characteristics of electrospun fibers.

Fibers made by electrospinning method are widely applicable due to their adjustable properties. Among fields of their applications, one can find food-packaging, sensors, electronics, energy storage devices, biological tissue engineering and other medical applications. It should be mentioned that list of applications is still updating. However, although this technique possesses its pros, it has limits in each application field as well.

Conducting fibers are mostly applied in sensors due to their clear advantage – an extended surface area. PANI is by far the most employed polymer to develop conducting fibers. Improved quality and morphology of fibers can be obtained by using polymer blends in the electrospinning process. However, the extent of polymers intermixing and degree of the continuity of the two phases may affect the fibers electrical conductivity due to presence of an insulating matrix.

A key factor in the electrospinning process are the viscoelastic properties of the polymer solution, since a critical amount of chain entanglements is needed for fiber formation. Critical value differs for each system composition. Below this value, the voltage applied cause electrospaying or the formation of beaded fibers due to a capillary wave breakup. On the one hand, the more viscous the system, the less defective the fibers. On the other hand, too high viscosity turns into high cohesiveness of the solution and may cause flow instability. The final quality of the deposited fiber mat can be described by such characteristics as the uniformity of the fibers, the absence of defects, the average diameter and their distribution width. Many processing parameter can be classified as setup parameters, solution parameters and environmental conditions. Setup parameters are volume feed rate, needle inner diameter, collector type, tip-to-collector distance, applied voltage. Solution parameters are polymer concentration and molecular weight, solvent electrical conductivity and boiling point, solution viscosity, surface tension. Environmental conditions are temperature, pressure and relative humidity. The actual fibers formation and their morphology depend on all these usually highly interrelated parameters. However, solution parameters have a “primary effect” with respect to others that are classified as “secondary parameters”.

Fabrication of considerably complex nanofiber-based 3D scaffolds/tissue constructs with appropriate chemical, mechanical, and biological properties in a spatially controlled manner can be possible in combination of 3D printing and traditional electrospinning techniques.

**MakhrovaYe.G.**

## **BONE PLATE FOR OSTEOSYNTHESIS IN SCREW FRACTURES**

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According to the WHO, injuries rank 3-4th in the world in the incidence of the population. As a result of road accidents in the world about 250 000 people die every year, about 10 million victims remain crippled, and most of the victims are characterized by fractures of limbs of varying severity. For reliable and stable osteosynthesis - fixation of bone fragments with the subsequent creation of factors for their reliable fusion, it is necessary to comply with several mandatory conditions, the main of which are sufficient reposition and reliable, rigid fixation. Therefore, surgical treatment of fractures is becoming more common, providing a fairly fast, high-quality, without complications of fracture fusion and restoration of function of injured limbs. Analysis of modern medical and technical literature of domestic and foreign authors in the field of traumatology, sports medicine, military medicine, surgical treatment of bone fractures showed that bone osteosynthesis methods are effective and accessible to a wide range of victims, because bone osteosynthesis operations do not require expensive composition and operating equipment. Retainers for bone osteosynthesis are quite cheap and available compared to intramedullary and transosseous structures. Because there are a large number of types of fractures, one particular type of bone plates for osteosynthesis cannot meet all requirements and needs. It is desirable to use different in shape, size and design bone plates. Accordingly, bone plates other than rectangular shapes should be used to fix helical fractures, which would allow the bone fragments to be securely fixed in several planes.

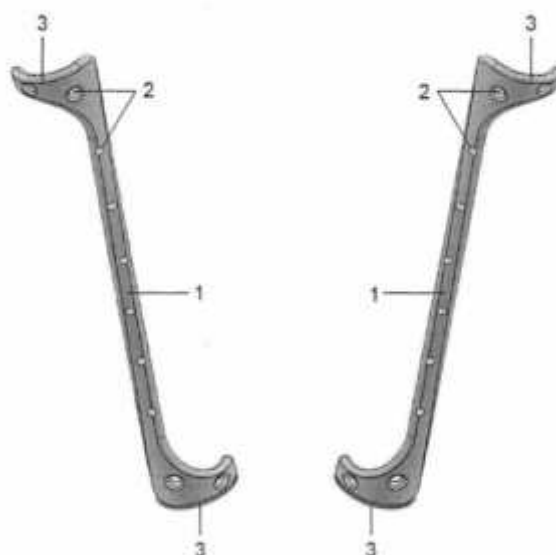


Fig. Bone plate for osteosynthesis in screw fractures

In Fig. the design of the bone plate for osteosynthesis in screw fractures (clockwise and counterclockwise) is presented. The bone plate (1) made of titanium or alloy 18H12N10T contains the required number of holes (2) of a special shape with one-sided slopes of their side walls for bicortical fixation of screws, which serve to "tighten" with a certain tension of the cortical surface of the bone to the bone fixator. "unilateral fixation and promotes uniform pressing of bone fragments to each other around the perimeter of the fracture surface. The bone plate has an S-shape with rounded ends (3) to cover at least half the diameter of the distal and proximal bone fragments.

Therefore, the proposed device allows efficient and reliable fixation of helical fractures of long bones due to its S-shaped shape with rounded ends to cover at least half the diameter of the distal and proximal bone fragments.

**Nahirniak V.M.**

## **THE USE OF CURVE-FITTING IN MATLAB FOR FINDING THE MAIN PARAMETERS OF THE COMPARTMENT MODEL OF EPIDEMICS**

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Compartmental models are used to predict a worldwide spread of infection and declaration of a pandemic. For such cases, researchers use the SIR model. It was used when the outbreak of Ebola virus had happened. It started in Guinea and then spread across land borders to Sierra Leone and Liberia. The epidemiology data were analyzed, and processed using the SIR model.

The SIR compartmental model is based on three linear differential equations with two main parameters  $\beta$  (t) and  $\gamma$  (t) for three chambers or categories of people:

$$\frac{dS}{dt} = -\beta I S, \quad \frac{dI}{dt} = \beta I S - \gamma I, \quad \frac{dR}{dt} = \gamma I,$$

where S (t) - susceptible to infection people, I (t) – infected ones, R (t) – recovered ones.

Modeling the dynamics of infectious diseases requires to determine whether the spread of the disease can reach epidemic levels or can be gradually eradicated. According to the SIR model, the slowdown in epidemics occurred after the number of infected people reaches its peak. The theoretical model of SIR allows predicting the results of epidemics and the factors that determine its severity.

The physical meaning of  $\beta$  (t) is the number of contacts during which the infection gets transmitted per person per unit time. By reducing the coefficient  $\beta$  by various anti-epidemiological measures, we can reduce the rate of spread of infection

The physical meaning of  $\gamma$  (t) is the share of infected people who have recovered per unit time. It demonstrates how effective the treatment of the infected is.

The development and course of the epidemic depends on these two factors. From the equations it is seen that in the case when  $S(t) < S_c$ , then  $dI/dt < 0$  and the epidemic dies off on its own. If  $S(t) > S_c$ , then  $dI/dt > 0$  and the number of the infected people increases dramatically. This leads to a rapid spread of the epidemic. Thus, the way to limit the epidemic may include immunization, which leads to a decrease in the number of susceptible to infection S (t), or a decrease in the coefficient  $\beta$  (t), i.e. the rate of transmission from one person to another. The latter can be achieved through quarantine, lockdown, promotion of disinfection culture.

The values of the parameters  $\beta$  (t) and  $\gamma$  (t) can be determined on the basis of statistical data obtained for three categories of people. The collected data are stochastic in nature and are characterized by strong variability. To more accurately determine the parameters of the chamber model, we used the utility Curve Fitting software environment MATLAB (Mathworks, MA, USA) to determine the analytical function that describes this data set. Having determined the analytical function that most accurately describes the statistics, it is possible to estimate the values of parameters  $\beta$  (t) and  $\gamma$  (t) during a certain period of the epidemic. For example at the beginning of quarantine and accordingly at the end of it. This analysis allows us assessing the effectiveness of anti-epidemiological measures.

**Olar O.I.**

## **NANOTECHNOLOGIES - HEALTH HAZARDS**

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Identification and unification of the properties of most nanomaterials (NMs) clearly outlined the area of their application. Exceptional properties of nanoparticles (NPs) have become the driving force of their widespread use in the biomedical field. High photostability, significant quantum yield and absorption coefficient in a wide spectral range allowed to obtain molecular imaging (e.g., NP can be used as probes in vivo by their attach to molecules of proteins, antibodies and nucleic acids; NP can be used as an instrument of evaluation of molecular reactions in the body, etc.).

The issues of targeted delivery and improved bioavailability of drugs are also promising. An interesting potential use of NP for cancer treatment is the study of tumor-specific thermal scalpels for heating and burning tumors (e.g., gold of nanocoating with polyethylene covering which absorb near-infrared radiation can be used to inhibit tumor growth). Cosmetic products also merit special attention. For example, gold and silver NP have significant antifungal, antibacterial and anti-inflammatory properties and are used in compound of anti-aging creams, deodorants, medicines for burns treatment etc.

Nowadays, the potential impact of NPs and raw NMs on humans will increase as a result of development and commercialization of nanotechnology programs. One of the most serious problems is the workplace (research laboratories, places where NMs are synthesized, processed, used, disposed or recycled). In order to determine whether the unique chemical and physical properties of new NPs lead to specific toxicological properties, the nanotechnology community needs new ways of hazards and risk factors estimation.

Toxicity of NP depends on their surface properties, coating, structure, size and aggregation ability. Poor NPs solubility may cause a risk of cancer. This is due to the fact that in this case the NPs have a larger ratio of surface area to volume, which increases the chemical and biological reactivity.

NPs can penetrate into the body in different ways: transdermal, by inhalation, injection or implantation. Transdermal exposure is especially common in cases of using skin care products, hair care products or lip balms, including sunscreens and anti-aging creams. The danger consists in the fact that cosmetic products do not require clinical trials, but contain the maximum amount of components with NP that can cause erythema (Cobalt and Chromium NPs, for example, cross the skin barrier and damage fibroblasts).

Nowadays, many mechanisms have been proposed to explain the negative effects of NPs, which can lead to cardiopulmonary disease. NPs sometimes affect reactive oxygen species and can also stimulate neurons in the lungs, affecting the CNS and cardiovascular autonomic function. Having the possibility of circulation in the body, NPs can cause an acute inflammatory reaction, as they are recognized and identified by the immune system as foreign.

WHO has already identified a number of health effects to NP exposure, but risk levels and regulations and policies have not yet been articulated. A new type of environmental pollution has appeared – it is nano-pollution. Norms of nanoproducts use (cosmetics, drugs, implants, food packaging, etc.) have not yet been introduced. Therefore, protection during working with nanomaterials and rules for the disposal of these materials after the completion of experiments is an important component in the prevention of nanocontamination, and therefore risks to human health.

**Tkachuk I.G.**

**THE FORMATIONS AND CHARACTERISTICS OF NANOCOMPOSITE MATERIALS  
BASED ON NANOPARTICLES OF 2D LAYERED CRYSTAL INSE AND GASE AND  
SOLID ME(NO<sub>3</sub>) ION SALTS (ME K, NA, RB, CS)**

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For manufacturing of nanocomposites based on ionic MeNO<sub>3</sub> salts (Me= K, Na, Rb, Cs) and 2D nanoparticles of InSe and GaSe used the results of studies of ionic self-organization of nanostructures on van der Waals surfaces of layers of oxides of In and Ga in the implementation of the melts of the ionic salts in the space between the layers of these crystals. Taking into account: different wetting by molten ionic salt crystal surfaces with molecular linkages and surfaces of oxides, which is due to different values of the surface energy of the interphase boundaries; thermal decomposition of ionic molten salts according to the chemical reaction  $2 \text{MeNO}_3 = 2 \text{MeNO}_2 + \text{O}_2 \uparrow$  and burn is accompanied by release of molecular oxygen, which creates excessive pressure on the layers of crystal and oxidizes their surface; the processes self-wetting ion salts in the wetting of nanoscale oxides; the formation nano composites type “oxide-ion salt” with high ionic conductivity at the boundaries of 2D nanoparticles. The structure, composition and morphology of



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$(E, F)$        $S + T$        $S, T : E \rightarrow X$   
 $L_1[0, 1]$       ,       $L_p[0, 1]$        $1 < p < \infty$   
**1.**       $E \rightarrow$   
 $(\Omega, \Sigma, \mu)$ .       $\mathbf{1} = \mathbf{1}$  ,       $T_1 + T_2$        $T_1, T_2 \in L(E)$ ,  
**1.**       $E \rightarrow$        $X \rightarrow F$       **1.**  
 $S, T : E \rightarrow X$        $e \in E$        $\varepsilon > 0$   
 $e = e' \lfloor e''$  ,       $\|Se' - Se''\| < \varepsilon$        $\|Te' - Te''\| < \varepsilon$ .  
 $\vdots$   
 $S, T : E \rightarrow X$       ( ? )  
**2.**       $E \rightarrow$        $X_1, X_2$  ,       $X$ .  
 $Y = X_1 \oplus X_2$   
 $S, T : E \rightarrow X$   
**3.**       $E \rightarrow$        $X_1, X_2$  ,       $X$   
 $Y = X_1 \oplus X_2$   
 $\tau_i : X \rightarrow X_i, i = 1, 2.$   
 $S, T : E \rightarrow X$   
**4.**       $E \rightarrow$        $Y$   
 $F \rightarrow$        $X_1, X_2$  ,       $X$ ,  
 $Y = X_1 \oplus X_2$        $X_{3-i}$        $S, T : E \rightarrow X$   
 $Y \rightarrow X_i$

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**Abramova N.O.**

**CORRELATION BETWEEN 25-HYDROXYVITAMIN D STAUTS AND BODY COMPOSITION, PHYSICAL ACTIVITY AND INSULIN RESISTANCE**

*Department of Clinical Immunology, Allergology and Endocrinology  
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Vitamin D is known to reduce insulin resistance trough its effect on calcium and phosphorus metabolism and through regulation of the insulin receptor gene. Besides, vitamin D is a fat-soluble substance and people who have high body fat need higher doses of vitamin D for the optimal body in need. Previous analysis conducted in 58 obese adolescents demonstrated that a 1% increase in fat weight was associated with a  $1.15 \pm 0.55$  nmol/L reduction in serum calcifediol. Thus, there is a need in studying dependence of 25-hydroxyvitamin D (25 (OH) D) on patients' fitness, physical activity and insulin resistance in order to understand the necessity of cholecalciferol prescription for the correction of these metabolic disorders.

The aim of the study was to examine the relationship between vitamin 25 (OH) D content in serum and body composition, physical activity and insulin resistance. 35patients (15 females, 20 males) aged  $28.1 \pm 6.3$  years were enrolled into the study between February-March 2021 and provided written consent to use their data. Protocol of examination included the following data:

Body Composition - Height, weight, Body Mass Index (BMI), percentage of total and visceral fat using bioimpedance meter weighing scale (OMRON BF 511) were estimated. To assess the insulin resistance degree a small model of homeostasis (Homeostasis model assessment – HOMA) was used, calculated by means of the HOMA Calculator Version 2.2 Diabetes Trials Unit at the University of Oxford (UK). All individuals underwent a single serum 25 (OH) D. An electrical and chemiluminescent method was used to determine the level of 25 (OH) D in the blood serum. The study was performed using the Elecsys 2010 device (Roche Diagnostics, Germany) using cobas test systems.

Behavioral Outcomes, minutes per week of moderate and vigorous physical activity were used in analyses, dichotomized as less than/greater than 90 minutes/week, based on the median reported time. Patients were asked to report number of hours/days spent sitting or reclining on a typical weekday to examine sedentary behavior. Basic descriptive statistics described the sample. Pearson correlations examined the relationships between the vitamin D content and the fitness, insulin resistance and physical activity. Significance levels were set at  $p < 0.05$ . The average BMI of the subjects was  $34.4 \pm 5.4$  kg / m<sup>2</sup>, visceral fat  $10.4 \pm 5.2\%$ , the total fat content in the body was  $29 \pm 5.3\%$ . Vitamin D insufficiency was found in 91.6% of patients, and vitamin D deficiency in 4.5%. Physical activity more than 90 minutes/week was reported by 8% of patients enrolled into the study. The level of vitamin 25 (OH) D in serum correlated negatively with BMI ( $r = -0.414$ ,  $p < 0.05$ ), the content of visceral fat ( $r = -0.626$ ,  $p < 0.05$ ), total fat ( $r = -0.398$ ,  $p < 0.05$ ) and HOMA-IR ( $r = -0.487$ ,  $p < 0.05$ ).

The following conclusions can be drafted: Sedentary lifestyle, higher content of visceral and total fat contributed to vitamin D deficiency. 25 (OH) D deficiency and insulin resistance are interrelated. It is necessary to prescribe cholecalciferol in order to prevent and correct its deficiency in obese individuals and improve insulin sensitivity.

**Marchuk Yu.F.**

## **OBESITY AND HYPERANDROGENISM IN WOMEN – MECHANISMS OF MUTUAL DEVELOPMENT AND PECULARITIES OF METABOLIC DISORDERS**

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Bukovinian State Medical University*

Obesity is a non-infectious epidemic of our century. All over the world, people of different ages tend to suffer from it. If current trends continue, by 2025 2.7 billion people will be overweight, more than 1 billion people will be obese, and approximately 177 million people will be severely affected by obesity. As a matter of fact, every 4th adult Ukrainian is obese. Obesity is associated with many comorbid metabolic diseases and complications. Among those are diabetes mellitus (DM) type 2, cardiovascular diseases, non-plastic processes, osteoporosis, polycystic ovary syndrome and hyperandrogenism.

In case of obesity, the formation of active androgens in peripheral tissues increases. Obesity causes a decrease in the concentration of sex-binding globulins, which leads to an increase in the fraction of free androgens in the blood. Obese women are almost three times more likely to develop polycystic ovary syndrome, whereas 50-80% of women with polycystic ovary syndrome are overweight or obese. In adipocytes of visceral adipose tissue, there is a decrease in the number of insulin receptors. As a result, relative hyperinsulinemia and compensatory insulin resistance develop which leads to impaired glucose tolerance and the development of hyperglycemia, DM type 2. Hyperinsulinemia affects both the ovaries and adrenal glands, increasing the production of androgens. Due to the disorders of the formation and secretion of gonadotropins, the same changes are observed with gonadotropic hormones. The secretion and level of luteinizing hormone increases, consequently, follicle stimulating hormone decreases. In response to these changes, under the influence of luteinizing hormone, the production of androgens in the theca cells of the follicle increases. The maturation of follicles is deteriorated and their atresia occurs. In atresia follicles, the formation of estradiol decreases and androgen production increases. In adipocytes of visceral adipose tissue, the content of androgen receptors and aromatase increases, resulting in the

autonomous formation of androgens and the development of relative hyperandrogenism. In addition, obesity is accompanied with an increase in the level of 5-alpha-reductase. Thus, apart from the ovaries and adrenal glands, adipose tissue is the source of androgen production in obese persons. Women with obesity and polycystic ovary syndrome have more severe insulin resistance and hyperandrogenism, a more unfavorable lipid profile and a reduced quality of life. Thus, the reduction of the body weight causes impairment of clinical hyperandrogenism manifestations, which is an important component of treatment for such a comorbid pathology.

**Olenovych O.A.**

**TUBULOINTERSTITIAL SYNDROME DEVELOPMENT IN THE DYNAMICS OF ALLOXAN-INDUCED EXPERIMENTAL DIABETES MELLITUS**

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The aim of the presented study was to explore the peculiarities of tubulointerstitial syndrome development in the dynamics of alloxan-induced experimental diabetes mellitus.

The experiments were carried out on 60 white non-linear mature male rats, 30 with experimental diabetes mellitus (EDM) induced by intraperitoneal administration of alloxan at a dose of 160 mg/kg of body weight, 30 intact rats served as the control group. After 10, 25 and 45 days of the experiment the animals with EDM of corresponding duration and 10 animals of the control group were withdrawn from the experiment. The kidneys, removed after decapitation of rats, were dissected to 3 parts – renal cortex, medulla and papilla, sodium and potassium content was determined in water-extract of the corresponding part of the renal parenchyma, and papillary-cortical, papillary-medullary and medullary-cortical concentration ion gradients were calculated.

Calculation of the concentration gradients of sodium ions revealed a two-fold decrease in the papillary-medullary gradient and a two-fold increase in the medullary-cortical gradient with practically unchanged papillary-cortical gradient when comparing the results of animals with 11-day EDM with control indices. At the same time, there was a significant increase in papillary-cortical and medullary-cortical potassium gradients (1,6 times and 2,6 times, respectively) with a 1,5-fold decrease in papillary-cortical potassium gradient in animals of this experimental series.

Significant suppression of papillary-medullary and papillary-cortical concentration sodium gradients, as well as a slight limitation of its medullary-cortical gradient were established in case of 26-day long EDM. The concentration potassium gradients were significantly reduced.

The papillary-cortical and medullary-cortical concentration sodium gradients were found to be significantly increased, while the papillary-medullary sodium gradient was reliably decreased in 46-day long EDM. Similar changes concerned the concentration potassium renal gradients.

Thus, the results of the study of tubulointerstitial disorders in the dynamics of alloxan-induced EDM suggest that changes in the concentration gradients of sodium and potassium are already observed at the early stages of pathology and indicate the initiation of tubular dysfunction accompanied by intensification of natriuresis and kaliuresis. It is disorders of tubular sodium and potassium transport, redistribution of their content between the vascular, tubular and interstitial compartments of the kidneys that lead to changes in local hemodynamics in the kidneys, hydrophilicity and osmolarity of the interstitium, limitation of regulatory influence of the renal countercurrent multiplication system, disturbance of urine concentrating mechanisms and water-osmotic balance regulating system. Further development of glomerular-tubular and tubular-tubular imbalance, suppression of aldosterone- and vasopressin-dependent mechanisms of interstitial osmolarity regulation will contribute to secondary damage of tubules and interstitium of kidneys as well as the progression of renopathy.

**Pashkovska N.V.**  
**PECULIARITIES OF AMYLINEMIA DEPENDING ON THE TYPE  
OF DIABETES MELLITUS**

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-cell dysfunction in combination with insulin resistance are key causes for type 2 diabetes mellitus (T2DM). However, in addition to insulin, pancreatic islet cells produce another hormone, amylin, the physiological role of which is widely discussed by scientists.

The aim of the study was to determine the level of amylinemia in different types of diabetes. 145 patients with diabetes mellitus (DM) and chronic kidney disease who were treated at the Chernivtsi Regional Endocrinology Center were examined (average age of patients -  $45.5 \pm 1.3$  years; men - 71, women - 74; diabetic history -  $11.7 \pm 5.5$  years). Patients were divided into groups depending on the type of diabetes: the first group consisted of 40 patients with classical type 1 diabetes mellitus (T1DM), the second - 70 people with latent autoimmune diabetes in adults (LADA), the third - 35 patients with classical type 2 diabetes mellitus (T2DM). Diagnosis of diabetes was established in accordance with the recommendations of the American Diabetes Association (ADA, 2021), the diagnosis of LADA, in accordance with the recommendations of the Immunology of Diabetes Society (2005). All patients underwent general clinical studies, determination of the main indicators of carbohydrate metabolism (glucose onset, C-peptide, insulin, HOMA-IR index). The amylin content was determined by enzyme-linked immunosorbent assay using Elabscience kits (normal values 4.0-25.0 pmol/l).

In classical T1DM amylin levels did not exceed normal values and did not undergo statistically significant changes with the control group, while in patients with classical T2DM it was 10.8 times higher than in control ( $p < 0.01$ ) and 8.3 times higher than the group of patients with classical T1DM respectively ( $p < 0.01$ ). In the LADA group, the content of amylin in the blood serum was 9 times higher ( $p < 0.01$ ) compared to the control group and 6.8 times higher than in the case of classical T1DM respectively ( $p < 0.01$ ), at the same time was lower by 17.3% than in the T2DM group ( $p < 0.05$ ). In patients with DM a direct probable correlation was observed between amylin and C-peptide, HOMA-IR index ( $p < 0.05$ ), which confirms the relationship between increased amylin and insulin synthesis in this category of patients. In patients with LADA, there was an interrelationship between the content of amylin and insulin, C-peptide, HOMA-IR index ( $p < 0.05$ ), which indicates the role of insulin resistance as well as the hyperamylinemia caused by it in the development and progression of this diabetes subtype. On the other hand, in classical T1DM no probable correlation between the indicators was found.

The level of amylin in classical type 2 DM and latent autoimmune diabetes in adults differs sharply from that in classical type 1 DM and is associated with the degree of insulin resistance, which indicates its role in the development of metabolic disorders in this category of patients.

**Pavlovych L.B.**  
**NERVOUS CONDUCTIVITY INDICATORS IN PATIENTS WITH DIABETIC  
POLYNEUROPATHY DEPENDING ON THE DURATION OF DIABETES MELLITUS**

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Bukovinian State Medical University*

The most informative method of diagnosing lesions of the peripheral nervous system in patients with diabetic polyneuropathy (DPN) is electroneuromyography examination, i.e. registration of fluctuations in electrical potentials in skeletal muscle, which allows you to objectively examine the state of damage to the peripheral neuromotor system. Thus, using this method, the frequency of lesion detection of peripheral nerve function increases up to 70-90%.

48 patients with diabetes mellitus (DM) were examined (32 women – 66.7% and 16 men - 33.3%) at the age of 45-60 years (average age – 52.5 years). Stimulation electroneuromyography (ENMG) was performed on a Neuro-MVP device. ENMG was used to assess the maximum amplitude parameters of the motor M-response peculiar to the extremities muscles, the reduction of

which is a diagnostic criterion for axon damage, and to determine the rate of excitation by motor fibers of the extremities' distal nerves. Slow rate of excitation is observed in the demyelination of nerve fibers. The amplitude of the M-response was determined and the excitation rate with the motor fibers n. medianus; n. ulnaris; n. tibialis, n. peroneus was measured in patients with DPN. Patients with a duration of DM up to 1 year showed a decrease in the rate of excitation on the motor fibers n. medianus by 13.8% compared with the control, which indicates a decrease in nerve conduction due to the predominant lesion of the myelin sheath. The excitation rate of the motor fibers of a median nerve progressively decreases, depending on duration of the DM. Thus, in patients with duration of DM up to 10 years, the rate of excitation decreased by 20%, and in patients with duration of DM more than 10 years, there was a decrease in the rate of excitation on motor fibers n. medianus by 33.2% compared to control. Analysis on the indicators obtained in the study of the tibial nerve, revealed a probable decrease in the excitation rate of the motor fibers n. tibialis by 19.9% in patients with duration of DM up to 1 year compared with control. In patients with duration of DM up to 10 years the rate of excitation of the motor fibers n. tibialis decreased by 25.8%, and in patients with duration of DM more than 10 years - by 31.1% ( $p < 0.05$ ).

Decrease in the excitation rate by motor fibers of a tibial nerve is already revealed in patients with DPN and duration of DM less than 1 year. Progression of DPN is followed by further decrease in the excitation rate. Furthermore, DPN affects more nerves of the lower extremities compared to the upper.

**Piddubna . .**

## **THE LIPID PROFILE FEATURES IN PATIENTS WITH METABOLIC SYNDROME IN COMBINATION WITH HYPOTHYROIDISM**

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Metabolic syndrome (MS) is one of the priority problems in medicine and leads to negative social and medical consequences. Subclinical thyroid dysfunction can lead to the formation of MS components. Thyroid stimulating hormone (TSH) is definitely among the new contenders for the role of the component of MS.

The purpose of the study was to identify the lipid profile features in patients with MS in combination with hypothyroidism. 21 patients with MS with hypothyroidism (9 men and 12 women), aged 45 to 60 years were examined. The duration of the disease is  $5.68 \pm 5.23$  years. All patients received basic therapy, the control group consisted of 20 healthy donors. All the main components of MS are closely related to the functional state of the thyroid gland. In addition to the active effect on energy balance, lipid and carbohydrate metabolism, body weight, thyroid hormones also affect the state of the cardiovascular system, including blood pressure (BP). According to many epidemiological studies (Whickham Survey, National Health and Nutrition Examination Survey (NHANES-111) thyroid dysfunction is quite common in the population. Diseases of the hepatobiliary system occupy about 40% of the pathology of the digestive system. Such patients make up about 20% and occupy one of the leading places in the structure of disability. Dyslipidemia is a risk factor for cardiovascular pathology in general, and hypothyroidism pathogenetically contributes to its development. Therefore, it is important for doctors to make every effort to detect the first manifestations of MS in time and take measures to correct it. Patients underwent general clinical and biochemical studies to determine the main indicators of carbohydrate, lipid, protein and mineral metabolism, determined the levels of thyroid hormones. Ultrasound of the thyroid gland, liver, gallbladder, pancreas was performed. MS was diagnosed according to the recommendations of the International Diabetes Federation (2005). To assess the lipid spectrum of the blood, the content of total cholesterol (CTC) and triglycerides (TG) was determined using standard test systems from OlvexDiagnosticum by the enzymatic method on an autoanalyzer. Statistical analysis of the study results was performed on a personal computer using the program "Statistics for Windows".

Manifestations of dyslipidemia were noted in all patients with MS. The patients' features with MS and hypothyroidism were found to be the most proatherogenic changes in the lipid profile, namely the increase in levels of total cholesterol and LDL cholesterol ( $p < 0.05$ ), which is not a typical manifestation of dyslipidemia for patients with MS, which is usually characterized by elevated triglycerides (TG) and lowering high-density lipoprotein cholesterol (HDL cholesterol). The majority of patients (93%) were found to have higher than normal values of total cholesterol and LDL cholesterol, while hypertriglyceridemia and decreased levels of HDL cholesterol were observed in less than half of patients ( $p < 0.05$ ), indicating adverse atherogenic potential. People with MS and hypothyroidism. That is, hypothyroidism through the formation of atherogenic dyslipidemia significantly contributes to the progression of atherosclerosis and is one of the most significant risk factors for cardiovascular disease.

The lipid profile in patients with MS and hypothyroidism is characterized by the largest atherogenic changes, namely elevated levels of total cholesterol and low-density lipoprotein cholesterol, which are found in 93% of patients, respectively, while the classic manifestations of dyslipidemia in MS, hypertriglycerol, were diagnosed in less than half of patients (46%).

**Tsaryk I.O.**

### **RELATIONSHIP BETWEEN AMYLINEMIA LEVEL AND KIDNEY FUNCTION IN PATIENTS WITH DIABETES MELLITUS AND CHRONIC KIDNEY DISEASE**

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Together with insulin,  $\beta$ -cells of the islets of Langerhans produce another hormone - amylin or islet amyloid polypeptide. In numerous studies, amylin deposits have been found in kidneys of patients with type 2 diabetes mellitus (T2DM), as well as in brain tissue with the development of dementia disorders.

The aim of the study was to determine the correlation between amylinemia and renal function in patients with diabetes mellitus (DM) and chronic kidney disease (CKD). 145 patients with DM and CKD who were treated at the Chernivtsi Regional Endocrinology Center were examined (average age of patients -  $45.5 \pm 1.3$  years; men - 71, women - 74; diabetic history -  $11.7 \pm 5.5$  years). Patients were divided into groups depending on the glomerular filtration rate (GFR): G1-G4, as well as by category of albuminuria - A1-A3. Diagnosis of diabetes was established according to the recommendations of the American Diabetes Association, the diagnosis of latent autoimmune diabetes in adults (LADA) - according to the recommendations of the Immunology of Diabetes Society, GFR was determined by the formula CKD-EPI according to the recommendations of KDIGO. The amylin content was determined by enzyme-linked immunosorbent assay using Elabscience kits (normal values 4.0-25.0 pmol/l). The category of albuminuria was determined by the indicators of microalbuminuria (MAU) and the albumin-creatinine ratio (ACR) in the urine using sets of OO NPL "Granum" (Ukraine).

The amylinemia rate in patients with CKD and diabetes in G3a group was 7.7 times higher than in the control ( $p < 0.05$ ) and 3.7 times higher than in the G1 group ( $p < 0.05$ ), but was lower than in the G4 group 3.4 times ( $p < 0.01$ ). Analyzing the G3b group, we found that compared to the control, the above indicator was 14.7 times higher ( $p < 0.01$ ), it also increased 7.2 times relative to the G2 group ( $p < 0.01$ ) and 1.9 times relative to G3a ( $p < 0.01$ ). Serum amylin in the G4 group was significantly 26 times higher than in the control ( $p < 0.01$ ), 12.7 times higher compared to G1 ( $p < 0.01$ ), 6.1 times relative to G2 ( $p < 0.01$ ), 3.4 times - relative to G3a ( $p < 0.01$ ). In groups G1 and G2 no significant difference between amylin levels was found compared to the control. Regarding the dependence of amylin levels on the degree of albuminuria, the following trends were found: the lowest rate was recorded in patients of category A1 - it was higher than that in group A3 2.9 times ( $p < 0.05$ ); in patients with albuminuria A2 category amylin increased 9 times compared with the control group ( $p < 0.01$ ) and in A3 - 19 times compared with the control ( $p < 0.01$ ). In other cases, no significant difference was found between the indicators. In patients with CKD and diabetes, there are probable positive correlations of medium strength between the content of amylin and insulin, C-

peptide, HOMA-IR index, and a weak one between the level of serum amylin and serum creatinine (p<0.05).

Amylin levels vary inversely with glomerular filtration rate and in direct proportion to albuminuria categories, indicating a role for hyperamylinemia in renal impairment in patients with diabetes.

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2

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COVID-19



6

COVID-19

SARS Cov-2

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(50 )

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2-  
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29

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, 66,4 %

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6

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(P<0,05).

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( >0,05),

6,5 ± 0,2

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( >0,05),

6,3 ± 0,3 10(9)/

190,3 ± 4.2

204,7 ± 3,6 10(9)/

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 / ( >0,05), 81,6 ± 1,4 / 78,9 ± 1,3 / ( >0,05),  
 - 74,6 ± 0,9 77,8 ± 1,2 / .1,73 <sup>2</sup>( >0,05), 36,4 ± 0,9  
 / <sup>2</sup> 34,6 ± 0,6 / <sup>2</sup>.

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25( )D

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<0,05).

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D

<b>Antoniuk O.P.</b> Formation of physiological atresia in embryogenesis of bile ducts.	<b>3</b>
<b>Garazdiuk M.S.</b> Temporal dynamics of maps of the module of complex degree of mutual polarization of microscopic images of brain histological sections for establishment of time of hemorrhages formation.	<b>4</b>
<b>Garvasiuk .V.</b> Immunohistochemical study of trophoblasts proliferative processes in basal deciduitis combined with iron-deficiency anemia in gravidas.	<b>4</b>
<b>Honchar T.V.</b> Development and establishment of pelvic joints in the prenatal period of human ontogenesis.	<b>5</b>
<b>Ilika V.V.</b> Immunohistochemical study of trophoblasts proliferative processes in chorioamnionitis combined with iron-deficiency anemia in gravidas.	<b>6</b>
<b>Ivaskevich I.B.</b> Differential diagnosis of alcohol and carbon monoxide poisoning by the method of statistical analysis of diffusive tomographs of fluctuations of optical activity of histological samples of the adrenal glands.	<b>7</b>
<b>Karatieieva S.Yu.</b> Search for results of application of the morphometric parameters at the field of sports.	<b>8</b>
<b>Kashperuk-Karpiuk I.S.</b> Fetuses anatomy of the buccal region.	<b>9</b>
<b>Kavun M.P.</b> Morphogenesis of liver vessels in human prefetus.	<b>9</b>
<b>Kryvetsky I.V.</b> Anatomy of the spinal column in the fetuses.	<b>10</b>
<b>Kyshkan P.Ya.</b> Identification of piercing-cutting objects of injury with specific parameters by means of 3D reconstruction of the wound channel.	<b>11</b>
<b>Lavriv I.P.</b> The anatomical features of the parotid gland structure.	<b>12</b>
<b>Lazaruk O.V.</b> The risk of breast cancer metastasis in women depending on age.	<b>13</b>
<b>Leka M.Yu.</b> Fetal topography of anterolateral abdominal wall nerves' muscles.	<b>14</b>
<b>Marchuk F.D.</b> The peculiarities of morphogenesis of the maxillary sinuses during the second childhood.	<b>15</b>
<b>Oliinyk I.Yu.</b> Morphological peculiarities of the bone tissue of the human lower jaw in case of its disuse atrophy.	<b>16</b>
<b>Proniaiev D.V.</b> Fetal uterus anatomy.	<b>16</b>
<b>Reshetilova N.B.</b> Morphology of the third ventricle in the 16-20 <sup>th</sup> weeks of prenatal period of human ontogenesis.	<b>17</b>
<b>Rusnak V.F.</b> Topography of pharynx in the fetuses in the 11-12 <sup>th</sup> weeks of human ontogenesis.	<b>18</b>
<b>Sarkisova Yu.V.</b> Analysis of the dynamics of change in the structure of the vitreous body matrix in the post mortem period according to spectral-selective autofluorescent microscopy.	<b>19</b>
<b>Stelmakh G.Ya.</b> Anatomical variability of the visceral branches of the thoracic aorta in the fetal period.	<b>19</b>
<b>Zabrodska O.S.</b> Anatomical aspects of the umbilic vein study.	<b>20</b>
• • 270,0-375,0	<b>21</b>
• •	<b>22</b>

• •	23
• •	24
• •	25
• •	25
• •	26
• •	27
• •	28
• •	29
• •	30
• •	31
• •	32
• •	33
2	

<b>Andrushchak L.A.</b> Peculiarities of rudiment sources and morphogenesis of the pyelocaliceal system of the kidney.	33
<b>Chernikova G.M.</b> Development of the lungs in the embryonic period of human ontogenesis.	34
<b>Khodorovska A.A.</b> Developmental peculiarities of lungs in humans.	35
<b>Komar T.V.</b> Topographic and anatomical features of the peroneal artery in 4-month-old human fetuses.	36
<b>Malyk Yu.Yu.</b> Morphological structure of the left ventricle papillary muscles of the human's heart.	37
<b>Oshurko A. P.</b> Influence of quantitative morphology on topographic features of the left mandibular canal in case of bone atrophy.	38
<b>Popova I.S.</b> Developmental features of the anterior neck triangle in human fetuses during prenatal period of human ontogenesis.	39
<b>Proniaev V.V.</b> Morphogenetic and topographic peculiarities of the male perineum during the prenatal period of ontogenesis.	40
<b>Semeniuk T.A.</b> Endothelium of the heart ventricles in human: its morphological characteristics and methods of its investigation.	40
<b>Stoliar D.B.</b> Morphometric characteristics of the temporomandibular joint in humans during the 4th month of intrauterine development.	41
<b>Yaremchuk N.I.</b> The importance of computed tomography in the study of human lower jaw bone tissue.	42

. . C	43
. .	44
. . C	44
. .	45
. . E	46
. .	47
3	

<b>Dudka Y.A</b> Influence of the pineal hormone on the functional state of the kidney.	48
<b>Ksylytsia S.O.</b> Conservative methods of treatment of acute rhinosinusitis.	49
<b>Povar M.A</b> Features of the reaction of systemic indicators of prooxidative-antioxidant homeostasis to cerebral ischemia-reperfusion in rats with diabetes mellitus.	49
<b>Semenenko S.B.</b> Pathophysiological mechanisms of the epiphysis effect on the ion-regulatory function of the kidney under constant darkness.	50
<b>Tymofiychuk I.R.</b> Cognitive disability in estrogen-ectomized and old rats with development of diabetes mellitus.	51
<b>Yasinska O.V.</b> Features of the protein metabolism in the adrenal tissues of immature rats with hypobaric hypoxia depending on sex and the functional activity of the pineal gland.	51
. .	52
. .	53
. .	54
. .	55
. . B	56
4	

<b>Bulyk R.Ye.</b> Changes of morphofunctional state of medial small-cell subnucleus of paraventricular hypothalamic nucleus on the background of different illumination periods.	57
<b>Kushniryk O.V.</b> Current issues in the study of prion infections.	57
<b>Lomakina Yu.V.</b> New approaches in diagnosis of cystic fibrosis.	58
<b>Obradovych A.S.</b> Using of melatonin as a potential covid-19 prophylaxis method.	59
<b>Vlasova K.V.</b> Supraoptic nuclei receptors denseness at night period under light exposure.	60

<b>Yosypenko V.R.</b> Submicroscopic changes of the lateral preoptic nucleus of the hypothalamus under light stimulation.	60
. . . . .	61
. . . . .	62
. . . . .	63
. . . . .	64

5

<b>Barus M.M.</b> new approach to the preparation of 4-difluoromethyl-1 -pyrazole-3-carboxylic acids.	65
<b>Bratenko M.K.</b> Benzoazepinopyrazoles – a new heterocyclic system.	66
<b>Chernyukh O.G.</b> Qualitative detection of IG G antibodies to SARS-COV-2 coronavirus nucleocapsid antigen in the blood serum of patients who had viral respiratory infection, caused by SARS-COV-2.	67
<b>Chornous V.O.</b> Light-controllable chiral dopant based on azo-fragment: synthesis and characterization.	68
<b>Davydova N.V.</b> The total antioxidant activity of blood plasma in case of alcohol intoxication, its combination with modified photoperiod and melatonin administration.	68
<b>Dikal M.V.</b> Morphological changes in the cortex of the kidneys under the development of aseptic fever.	69
<b>Ferenchuk Ye.O.</b> Effect of glutathione on oxidative-antioxidant system in the liver of rats in experimental nephropathy.	70
<b>Kropelnyska Yu.V.</b> New photocatalytical systems based on TiO <sub>2</sub> and the symmetric cationic polymethine dye.	71
<b>Krupko O.V.</b> Statistica (statsoft) program in experiment planning and visualization of the content-property dependency in the system Cd <sup>2+</sup> -L-cysteine-S <sup>2-</sup> .	71
<b>Kushnir .Yu.</b> Effect of melatonin on age-related changes of glycated hemoglobin content in the blood of alloxan diabetic rats.	73
<b>Lenha E.L.</b> Chronorhythms of total antioxidant activity of rat serum under different functional activity of epiphysis cerebri.	73
<b>Lukan Yu.R.</b> Influence of the phenomenon of polymorphism on the properties of drugs.	74
<b>Okrepka G.M.</b> Mechanism of nanoparticle incorporation into the salt crystal.	75
<b>Panasenko N.V.</b> Synthesis and fluorescence spectrum of 9-(4-pyrazolyl)decahydroacridindiones-1,8.	76
<b>Tkachuk M.M.</b> Research of the non-equilibrium of the diffuse layer for the description of the electrochemical kinetics near the rotating disk electrode by numerical solutions of the strict boundary problem.	77
<b>Winkler I.A.</b> Viscosity of aqueous solutions of the dietary mono- and polysaccharides.	78
. . . . .	79
. . . B . . . . .	79
. . . . .	80

. . 5-	-4-	-1 -	-3-		81
. .				2S-	82
. .					83
. .					84
<i>absinthium L.</i>				<i>rtensis</i>	85
. .					86
. .		4{(2-	-2-	-4-	-1-(4-
	-	-2-	] -1-	-3-	
					87
6					
<b>Al Salama Muhammad Wathek</b>	Peculiarities of pathogenetic changes in stable angina in the analysis of heart attack.				88
<b>Bachuk-Ponych N.V.</b>	Adjuvant therapy of meteosenivity patients with ischemic heart disease.				89
<b>Dogolich O.I.</b>	ardiovascular risk as a comorbidity phenomenon in patients with gout.				90
<b>Gingulyak O.M.</b>	Changes in vascular endothelium on the background of coronary heart disease and atherosclerosis.				91
<b>Glubochenko O.V.</b>	Spinal gout: clinical aspects.				91
<b>Halytska V.O.</b>	Bronchial asthma in combination with diabetes mellitus type 2 – the current state of the problem.				92
<b>Horevych S.S.</b>	Effects of combined therapy with rosuvastatin and polyunsaturated omega-3 fatty acids on lipoprotein-associated phospholipase a2.				93
<b>Hrechko S.I.</b>	The level of kinesiphobia in patients with heart failure.				94
<b>Hulaga O.I.</b>	Eplerenone use in acute myocardial infarction.				95
<b>Husarchuk A.G.</b>	Parameters of endothelial dysfunction and immune response in patients with rheumatoid arthritis with and without ischemic heart disease.				96
<b>Ivanchuk P.R.</b>	“Digitalization” in cardiology: changes in ECG markers during COVID-19.				97
<b>Ivashchuk S.I.</b>	Association of red blood cell distribution width with the acute pancreatitis and chronic pancreatitis exacerbation from the position of the prognosis.				97
<b>Kolodnitska T.L.</b>	Current views on the pm2.5 exposure effect on coagulation, inflammation and endothelial function.				98
<b>Lukashevych I.V.</b>	Dynamics of indicators antioxidant protection in patients with chronic hepatitis during the comprehensive treatment with inclusion “Heptral” belongs to disease with chronic hepatitis.				99
<b>Nesterovska R.A.</b>	Colchicine efficacy and safety for the treatment with ischemic heart disease: a systematic review and meta-analysis of randomized trials.				99



<b>Peryzhniak A.I.</b> The state of the system of free radical oxidation and the antioxidant defense system of the body in newborns with impaired functional state of the cardiovascular system.	<b>100</b>
<b>Petrynych O.A.</b> Dependence of lipid peroxide oxidation and antioxidant protection in patients with hypertension from the fasting insulin level.	<b>101</b>
<b>Prysyazhnyuk V.P.</b> complex treatment with quercetin inclusion in chronic nonviral hepatitis patients.	<b>102</b>
<b>Repchuk Yu.V.</b> The association of hormonal and metabolic parameters and the agt gene polymorphism (rs699) in patients with essential hypertension.	<b>103</b>
<b>Riabyi S.I.</b> Impact of tissue proteolytic and fibrinolytic activities on the mechanisms of intestinal anastomotic leakage.	<b>104</b>
<b>Rusnak I.T.</b> Cardiovascular risk factors. Physical activity.	<b>105</b>
<b>Sem aniv M.M.</b> Hormonal and metabolic risk factors of essential arterial hypertension depending on polymorphic variants of the AGTR1 (rs5186) and VDR (rs2228570) genes.	<b>105</b>
<b>Slyvka N.O.</b> Impact of chronic pyelonephritis on the survival of patients with hepatorenal syndrome.	<b>106</b>
<b>Sydorchuk L.P.</b> Aldosterone synthase CYP11B2 (-344C/T) gene polymorphism influence risk of chronic kidney disease in patients with arterial hypertension.	<b>107</b>
<b>Voroniuk K.O.</b> Dependence of lipid metabolism on polymorphic variants of the GNB3 gene in patients with primary arterial hypertension.	<b>108</b>
<b>Yurkiv . .</b> Experience of probiotics use in newborn with perinatal pathology in dysbiotic intestinal disorders.	<b>108</b>
. .	<b>109</b>
. .	<b>110</b>
. .	<b>111</b>
. .	<b>112</b>
. .	<b>113</b>
. .	<b>113</b>
. .	<b>114</b>
. .	<b>115</b>
. .	<b>116</b>
. .	<b>117</b>
. .	<b>118</b>
. .	<b>119</b>
COVID-19.	<b>119</b>

COVID-19.	120
..	121
..	122
.. « » – COVID-19	123
..	124
..	124
.. SIRT1	125

7

<b>Antofiichuk T.M.</b> Intensity of liver parenchym fibrosis in patients with alcoholic steatohepatitis depending on the presence of dysmetabolic iron overload syndrome.	126
<b>Antoniv A.A.</b> The mutual influence of the state of the lipid spectrum of blood and content of adipokines on the clinical course of non-alcoholic fatty liver disease in the presence of comorbid chronic kidney disease.	127
<b>Biriuk .G.</b> eculiarities of development of the colon topography at the end of the fetal period of human ontogenesis.	128
<b>Chernetska N.V.</b> Indicators of carbohydrate and lipid metabolism in patients with chronic obstructive pulmonary disease with concomitant type 2 diabetes mellitus.	129
<b>Dudka I.V.</b> Carbohydrate metabolism disorders in patients with chronic pancreatitis due to comorbidity with chronic obstructive pulmonary disease.	130
<b>Dudka T.V.</b> Analysis of changes in computer spirometry indicators in patients with bronchial asthma and associated chronic cholecystitis.	131
<b>Honcharuk L.M.</b> The role of helicobacter infection in gastroduodenopathy induced by nonsteroidal anti-inflammatory drugs in patients with osteoarthritis.	132
<b>Hontsariuk D.O.</b> hronic pancreatitis - how often it is combined with other internal organs diseases.	132
<b>Hryniuk O.Ye.</b> Treatment optimization of non-alcoholic steatohepatitis in obese patients according to comorbidity with COPD.	133
<b>Kaushanska O.V.</b> Therapy of patients with anxiety disorders with metabolic syndrome X.	134
<b>Khukhlina O.S.</b> Clinical efficacy of antral in the treatment of non-alcoholic steatohepatitis against the background of obesity.	135
<b>Kotsubiyhuck Z.Ya.</b> Changes in biochemical markers of liver damage in patients with non-alcoholic steatohepatitis, diabetic kidney disease against diabetes, effectiveness of medical correction.	136
<b>Kulachek V.T.</b> The morphofunctional erythrocyte status in patients with chronic kidney disease and rheumatoid arthritis.	137
<b>Kulish N.M.</b> Emotional intelligence s a psychological resource of sportmen.	137
<b>Kvasnytska O. B.</b> Modern approaches in the prevention of colon cancer.	138



II		159
		160
		161
	-1	162
	:	162
		163
		164
	2.	164
		165
		166
	?	167
8		

<b>Grynychuk A.F.</b> Differentiated approach to the treatment of acute peritonitis.	168
<b>Grynychuk F.V.</b> The predictors of the gastroduodenal ulcerous rebleeding.	168
<b>Hyrla Ya.V.</b> Ultrasonography as a method of diagnosis of vocal mobility disorders in patients operated with different forms of goiter.	169
<b>Karliychuk M.A.</b> New method of postoperative vitreous hemorrhage prevention after vitrectomy with fibrovascular membranes removal in patients with proliferativediabetic retinopathy.	170
<b>Kozariychuk N.Ya.</b> Dry eye syndrome in patients with glaucoma.	171
<b>Kuchuk O.P.</b> Treatment and prophylaxis of parasitic blepharonconjunctivitis.	172
<b>Maksymyuk V.V.</b> Polymorphism N34S of the SPINK1 gene in patients with acute pancreatitis.	173
<b>Moroz P.V.</b> Current issues of treatment of acute peritonitis.	174
<b>Penishkevich Ya.I.</b> Laboratory testing of retinal pigment epithelium dysfunction in diabetic retinopathy.	175
<b>Sheremet M.I.</b> Differential diagnosis of nodular goiter on the background autoimmune thyroiditis and differentiated thyroid cancers.	176
<b>Shurma A.I.</b> Changes in the properties of the optical density of venous blood plasma in patients with inflammatory-destructive intraabdominal pathology.	177
<b>Tarabanchuk V.V.</b> Luminescence changes of venous blood plasma in patients with acute pancreatitis.	178
	178

• •	179
• •	180
• •	181
• •	COVID-19. 182
• •	« » 183
•	183
9	,
<b>Dudko O.G.</b> Lower extremity functional state after plate osteosynthesis of long bone fractures.	184
<b>Knut R.P.</b> Groin hernia: anatomically determined risk factors for the recurrence.	185
<b>Kozlovska I.</b> The role of preoperative preparation in the anal fissure treatment.	185
<b>Kulachek Ya.V.</b> The role of providing proper medical care in “golden hour” for victims with dominant abdominal trauma.	186
<b>Kurikeru M.A.</b> Epidemiology and quality assurance of medical care for patients with acute traumatic brain injury in Chernivtsi region.	187
<b>Kvasniuk D.I.</b> Using optio-polarizational methods and arthroscopy in early diagnostics and treatment of septic arthritis.	188
<b>Marchuk O.F.</b> The peculiarities of differential diagnostics of transient synovites in children.	189
<b>Moskaliuk O.P.</b> The reproductive function changes in men with inguinal hernia.	190
<b>Raylyanu S.I.</b> Morphological changes of tissues in patients with chronic inguinal hernias.	190
<b>Rotar O.V.</b> Changes of intestinal microbiota at acute pancreatitis.	191
<b>Shutka V.Ya.</b> Modern methods of treatment of brain tumors.	191
<b>Solovai M.M.</b> Phase tomography of the polycrystalline of blood films.	192
<b>Sydorchuk R.I.</b> Early postoperative changes of primary haemostasis under abdominal sepsis.	193
<b>Tulyulyuk S.V.</b> Experience of blocking metallopolymeric intramedullary osteosynthesis treatment of fractures of long bones.	194
<b>Vizniuk V.V.</b> Aspects of nephroprotection therapy of patients suffering from benign prostate hyperplasia.	194
<b>Vladychenko K.A.</b> Analysis of spermiological research indicators and Mar-test.	195
<b>Zaitsev V.I.</b> Influence of chronic urinary infection on the muscles activities of bladder and perineum in the patients with urinary incontinence.	196
• •	196
• •	197
• •	198
• •	199
• •	200

• •	200
• •	201
• •	202
• •	203
• •	204
• •	205
• •	206
• •	207
• •	208
• •	208

## 10

<b>Andriychuk N.J.</b> Peculiarities of accumulation of silver nanoparticles in the internal organs of rats.	210
<b>Atamaniuk Y.A.</b> daptation process, level of cellular reactivity and nonspecific reactivity of patients with acute bronchitis.	210
<b>Blinder O.O.</b> Prevalence of methicillin-resistant <i>Staphylococcus aureus</i> among ambulant patients with purulent skin diseases.	211
<b>Dzhuryak V.S.</b> Prognosis of chronic kidney disease development in hypertensive patients depending on the cyp 11b2 gene allelic state.	212
<b>Gavryliuk O.I.</b> Heterocyclic compounds as the basis of medical drugs.	212
<b>Iftoda O.M.</b> Gender aspects of connexin 26 (gjb2) gene polymorphism in children with hearing loss.	213
<b>Kushnir O.V.</b> Prospects for application of omega-3 polyunsaturated fatty acids in immunonutritional prevention of respiratory diseases.	214
<b>Masikevych A.Yu.</b> Ways to minimize an environmental hazard to the river system of the Pokutsko-Bukovynian Carpathians.	215
<b>Popovich V.B.</b> Microbiome of the colon cavity of the adult population in bukovyna region.	216
<b>Rotar D.V.</b> Sensitivity of <i>P. freudenreichii</i> to substances for the sorting of fabrics in the textile industry.	216

<b>Sydorchuk I.Y.</b> Taxonomic composition and microbiological indicators of microbiota of infectious-inflammatory processes of soft tissues.	217
<b>Sydorchuk L.I.</b> Destabilization of colonic luminal microbiome in chronic obstructive bronchitis.	218
<b>Yavorenko K.</b> Impact of <i>Ambrosia artemisiifolia</i> L. on the health of Chernivtsi region residents. Comprehensive program of <i>Ambrosia artemisiifolia</i> L. elimination in Chernivtsi region.	219
. . . . . i . . . . .	220
. . . . . – . . . . .	221
. . . . .	221
. . . . . 5-	222
. . . . .	223
. . . . . ( )	224
. . . . . O	225
. . . . . 6- [2,1-b][1,3]	226
<b>11</b>	
<b>Babiy N.V.</b> The importance of diagnosing of preeclampsia and the development of heart failure.	227
<b>Bakun O.V.</b> Role of genital endometriosis and associated diseases on infertility according to retrospective analysis of case history.	227
<b>Berbets A.M.</b> Changes of levels of melatonin, cytokines and placental growth factor in the umbilical blood taken from women with fetal growth restriction.	228
<b>Byrchak I.V.</b> Search for new approaches to the treatment of primary placental dysfunction in pregnant women with a history of habitual miscarriage.	229
<b>Hresko M.D.</b> Differentiated approach to a comprehensive examination and management of patients with climacteric syndrome.	229
<b>Kalinovska I.V.</b> Ultrasound aspects of fetal development and extraembryo structures in pregnant women with recurrent miscarriage.	230
<b>Lisova K.M.</b> New gestosis prevention methods in pregnant women with miscarriage.	231
<b>Marynychyna I.M.</b> Placental morphometric indices in woman with placental dysfunction.	232
<b>Nitsovyeh I.R.</b> Intrauterine infection of the fetus at different stages of pregnancy.	233
<b>Pecheriaha S.V.</b> Results of prevention of placental dysfunction with low placentation.	233
<b>Semenyak A.V.</b> Peculiarities of pregnancy in the presence of opportunistic microflora.	234
<b>Solovei V.</b> . . . . . The structure of somatic pathology in women with miscarriage threat at early terms of gestation.	235
<b>Tsysar Yu.V.</b> Menstrual irregularities in the background of some endocrine pathology.	236
<b>Voloshynovych N.S.</b> Assessment of the obstetric complications' risk as a result of surgical treatment of ovaries in anamnesis.	237
<b>Yuzko V.O.</b> Comparative characteristics of patients with infertility when applying melatonin in complex preparation for assisted reproductive programs.	238

..	-	239
..	Candida	240
..	-	240
..	.	241
..	?	242
..	,	243
..	.	244
..	.	245
..	.	246
..	.	247
..	3D/4D -	248
..	.	249
..	-	250
..	:	251
,	-	252
..	-	253

12

<b>Filipets O.O.</b> The trends of stroke incidence in chernivtsi: analysis of epidemiological data for a ten-year period and assessment of statistical accounting.	254
<b>Grinko N.V.</b> Community-based participatory research methods.	255
<b>Herasymiuk I.G.</b> Comorbidity of recurrent depressive disorder and chronic somatic pathology.	255
<b>Ivanova N.M.</b> Correlation of anxiety-depressive disorders and cognitive impairment due to stroke. features of early diagnosis and treatment.	256
<b>Nika O.</b> Anxiety and depression symptoms in patients with migraine.	257
<b>Savka S.D.</b> Quality of life in patients affected by schizophrenia and comorbid cardiovascular disorders.	258
<b>Vasylieva N.V.</b> Psychogenic movement disorders: comprehensive review of the literature.	258
<b>Yaremchuk O.B.</b> Parkinson disease in the chernivtsi region of Ukraine: clinical and epidemiological study.	259
<b>Yurtsenyuk O.S.</b> The frequency of new cases of non-psychothotic mental disorders among students of higher educational institutions.	260
<b>Zorii I.A.</b> Clinical-electroneuromyographic peculiarities of spastic syndrome in children with infantile cerebral palsy.	261



• •	261
• •	262
• •	263
• •	264
• •	264
• •	265
• •	266
• •	267

### 13

<b>Andriychuk D.R.</b> Clinical course of ulcer disease in children depending on the duration of the disease.	268
<b>Bilyk G.A.</b> Evaluation of treatment tactics in children with bronchitis depending on its clinical features.	269
<b>Bodnar G.B.</b> Specifics of elemental status in children with chronic constipation.	270
<b>Bogutska N.K.</b> The association between pediatric type 1 diabetes mellitus and COVID-19.	271
<b>Buryniuk-Hloviak H.P.</b> Peculiarities of bronchial asthma course depending on the function of the parathyroid glands in patients with various amount of basic therapy by means of inhalation glucocorticosteroids.	272
<b>Haras M.N.</b> Neonatal COVID-19 as new experience in pandemic era.	273
<b>Horbatiuk I.B.</b> Clinical and paraclinical of inflammatory activity in acute tonsillopharyngitis in children.	273
<b>Khlunovska L.Yu.</b> Clinical case of spinal muscular atrophy.	274
<b>Korotun O.P.</b> Diagnostic value of some clinical indicators in identifying the risk of bronchial remodeling in children with bronchial asthma.	275
<b>Lastivka I.V.</b> Clinical case of tuberous sclerosis.	276
<b>Lozyuk I.Ya.</b> Frequency of Helicobacter pylori infection in children with inflammatory diseases of the gastrointestinal tract.	276
<b>Marusyk U.I.</b> Markers of atopic reactivity in the pupils, with severe bronchial asthma.	277
<b>Myslytska H.O.</b> Selected anamnestic and immunological risk markers in schoolchildren for atopic bronchial asthma.	278
<b>Ortemenka Ye.P.</b> Effect of long-term usage of inhaled corticosteroids on physical development of children with bronchial asthma.	279
<b>Ryznychuk M.O.</b> The state of the cardiovascular system in adolescents with hypothalamic obesity.	280
<b>Sazhyn S.I.</b> Spirometric indices to predict the severity of virus-induced asthma exacerbation.	281
• •	282
• •	283

. . A	283
COVID-19.	284
. . COVID-19	285
. . (	286
. . )	287
. . O	288
. .	289
. .	289
. . COVID-19	290
. .	291
. .	292
. .	293
. .	294
. .	295
. .	295
14	

<b>Babintseva A.G.</b> Oxidative Stress and Neonatal Acute Kidney Injury.	296
<b>Bodnar B.M.</b> Online diagnostics and management of hemangiomas in children.	297
<b>Bodnar O.B.</b> Local immunity status after surgical treatment of Payre's disease in children.	298
<b>Bohdanova L.</b> . Treatment of cardiovascular diseases in children in accordance with the peculiarities of circadian rhythms.	299
<b>Dronik T.A.</b> Clinical markers of gastrointestinal disorders in newborns who have undergone perinatal pathology.	300
<b>Frunza A.V.</b> The role of urinary $\beta_2$ -microglobulin in predicting tubular damage in premature infants of different gestational ages.	300
<b>Godovanets O.S.</b> euliarities of the biochemical spectrum of blood in premature newborn in conditions of perinatal pathology.	301
<b>Kalutskyi I.V.</b> Level of dysbiotic changes in patients with chronic purulent superchain sinusitis.	302
<b>Khaschuk V.S.</b> Adhesive bowel obstruction simulation at different surgeries in experimental trials on rats.	303

<b>Khodzinska Yu.Yu.</b> Life quality indicators of schoolchildren before and during the implementation of health programs.	<b>304</b>
<b>K vtyuk N. .</b> Features of quality of life in children depending on the nosology.	<b>305</b>
<b>Levytska S. .</b> Hereditary determined level of production of IL-1Beta and IL-4 as the risk factors of chronic sinusitis in children.	<b>305</b>
<b>Mabrouk Ben Othmen</b> The features of clinical manifestations in children with acute obstructive bronchitis and their assessment.	<b>306</b>
<b>Mazur O.O.</b> The role of microbial associations in chronic purulent rhinosinusitis in patients for type 1 diabetes mellitus.	<b>307</b>
<b>Popeliuk N.O.</b> Features of diagnosis and treatment of atypical respiratory diseases in children.	<b>308</b>
<b>Prokopchuk O.V.</b> Criteria for digestive system dysfunction in newborns with perinatal pathology.	<b>309</b>
<b>Randiuk R.Y.</b> Pain and wound healing duration according to different methods of surgery concerning pilonidal sinus treatment in children.	<b>309</b>
<b>Sapunkov O.D.</b> Maxillary sinusitis and diabetes mellitus.	<b>310</b>
<b>Yakovets K.I.</b> Characteristics of microflora of the upper jaw in chronic sinusitis in patients with type 1 diabetes mellitus.	<b>311</b>
..	<b>312</b>
..	<b>313</b>
..	<b>314</b>
..	<b>315</b>
..	<b>316</b>
..	<b>317</b>
..	<b>318</b>
..	<b>319</b>
1-	<b>320</b>
.. i i i .	<b>321</b>

<b>Andrushchak A.V.</b> Formation of volume and osmoregulatory function of the kidneys in patients with compensated sepsis-induced hypotension.	<b>321</b>
<b>Apakitsa V.V.</b> Features of cerebral stroke course in patients with diabetes mellitus.	<b>322</b>

<b>Dobriansky V.V.</b> Risk factors for recurrent hypoglycemia in patients with type II diabetes mellitus in the prehospital stage.	323
<b>Malaiko S.S.</b> Frequency of pulmonary edema development in patients with acute coronary syndrome and diabetes type 2.	323
<b>Nechytailo O.Y.</b> Diagnostic significance of infrared thermometry in preventing the development of purulent-necrotic complications of diabetic foot syndrome.	324
<b>Petrynych V.V.</b> The influence of the rate of acetylation on the state of the behavioral responses of rats in conditions of lead intoxication.	325
. . . . .	326
. . . . .	327
. . . . . COVID-19.	327
. . . . . -L-	328
. . . . . -2.	329
. . . . .	330

**16**

<b>Bambuliak .V.</b> Clinical efficiency of bone augmentation materials and their combinations with multipotent mesenchymal stromal cells from the patient after removal of third molars.	331
<b>Batig V. .</b> The development of experimental periodontitis model under anticholinergic drugs.	332
<b>Batih I.V.</b> Dental protector and hepatoprotector action of phytoigel "Dubovyi" on rats with hepato-oral syndrome.	333
<b>Bernik N.V.</b> omplications of infectious-inflammatory nature in the oral cavity in the practice of a dentist.	333
<b>Gerasym L.M.</b> The influence of using a general anesthesia in surgical dentistry on the psycho-emotional state of patients.	334
<b>Glushenko T.A.</b> Periodontal diseases in people with metabolic syndrome.	335
<b>Halahdina .A.</b> Using a set of exercises of rehabilitation in the treatment of patients with inflammatory processes of the maxillofacial area.	336
<b>Hodovanets O.I.</b> Clinical aspects of dental diseases in children with endocrine pathology.	337
<b>H ncharenko V.A.</b> Free radical oxidation peculiarities and antioxidant protection parameters of the oral fluid in children with chronic catarrhal gingivitis with underlying diabetes mellitus.	337
<b>Kasiyanchuk .V.</b> Nevrology manifestations in the clinic of dentistry: features of computer support in preclinical and clinical researches.	338
<b>Kilmukhametova Yu.H.</b> Visual observation of the effectiveness of the composite mixture of drugs with antioxidant and antimicrobial action on necrotizing ulcerative gingivitis.	339
<b>Kotelban A.V.</b> Oral microflora as a main risk factor in the development of dental caries in children.	340

<b>Mandziuk T.B.</b> Forming of oral hygiene skills among school-age children during quarantine.	341
<b>Mytchenok O.V.</b> Method of determination of the central occlusion height in patients with dental wear pathology.	342
<b>Mytchenok .P.</b> Premorbid condition of children with acute purulent lymphadenitis and odontogenic osteomyelitis.	342
<b>Ostafiichuk M.O.</b> The effect of lysozyme-containing drugs on the treatment of diseases of oral mucosa in patients with gastrointestinal pathology.	343
<b>Palis S.Yu.</b> Morphogenesis of the mandible in the prenatal period of human ontogenesis.	344
<b>Romaniuk D.G.</b> Innovative approaches to the prevention of dental caries in children and pregnant women.	345
<b>Roshchuk O.I.</b> Complex treatment of chronic generalized periodontitis in patients with fixed dentures in the presence of gastric and duodenal ulcer.	346
<b>Shostenko A.A.</b> Study of local immunity in patients with chronic generalized catarrhal gingivitis before and after complex therapy.	346
<b>Tokar O.M.</b> Improving of the local treatment of generalized periodontitis with a combination of medicines.	347
<b>Vitkovskiyi O.O.</b> Complex treatment of odontogenic jaw periostitis in children against the background of thyroid pathology.	348
. . .	349
. . .	350
. . .	350
. . .	351
. . .	351
. . .	352
COVID-19.	352
. . .	353
. . .	353
. . .	354
. . .	354
. . .	355
<b>T.I.</b>	355
. . .	356
. . .	356
. . .	357
. . .	357
. . .	358
. . .	359

<b>Chuprovskaya Yu.Ya.</b> Some features of breast cancer progression.	359
<b>Hovornyan S.L.</b> Oral cancer: what do we know about the risk factors?	360
<b>Ivashchuk O.I.</b> Oral cancer screening. Modern approaches and prospects.	361
<b>Morar I.K.</b> Some features of the postoperative eventration development on the background of the oncological process.	361
. . .	362
. . . -	363
. . .	363

<b>Boiko Ji.I.</b> HIV-associated neurological disorders taking into account the load of HIV in the CSF.	364
<b>Denysenko . . .</b> Comprehensive treatment of patients with allergic dermatosis using angioprotective means.	365
<b>Hayevska M. Yu.</b> Probiotics and hepatoprotectors usage in the comprehensive treatment of psoriasis.	366
<b>Hulei L.O.</b> The intestinal biocenosis disorders as key factor in allergodermatoses.	366
<b>Kolotylo T.R.</b> Peculiarities of immunological indicators in HIV infection in association with tuberculosis.	367
<b>Perepichka .P.</b> A comprehensive treatment of patients with rosacea considering functional changes of the hepatobiliary system organs.	368
<b>Semianiv . . .</b> Management of diabetes mellitus-tuberculosis.	369
<b>Sorokhan V.D.</b> The usage of ausak and reo-water solution in the complex treatment of patients with acute shigellosis.	370
<b>Sydorchuk A.S.</b> Ivermectin for prevention and treatment of covid-19: Pros & cons (brief review).	370
<b>Yeremenchuk .V.</b> Assessment of the prevalence of adverse reactions to antimycobacterial drugs in pulmonary tuberculosis.	371
. . .	372
. . .	373
. . .B	374
. . .	375
. . .	375
. . .	375
. . .	376
COVID-19.	376

<b>Basaraba R.Yu.</b> Investigation of the hepatoprotective effect of the common cat's foot herb dry extract.	377
<b>Batranovska S.O.</b> Use of sulfur ion donors as a novel strategy for organ protective therapy.	378
<b>Drachuk V.M.</b> Antioxidant potential of glutathione in the conditions of development of acetaminophen-induced acute renal injury.	379
<b>Ezhned M.A.</b> Marketing analysis of phytochemicals based on Marshmallow ( <i>Althaea officinalis</i> L.).	380
<b>Fedotova M.S.</b> Study of the epidemiology of dementia and Alzheimer's disease in Ukraine and in the world.	381
<b>Filipets N.D.</b> Protective role of the activator of $\text{Ca}^{2+}$ -sensitive channels of flocalin on models of experimental nephropathies.	382
<b>Horoshko O.M.</b> Chronorhythmic features of lipin on antioxidant protection indicators in rats with model pathologies.	383
<b>Kopchuk T.G.</b> Histological changes in the kidney structure in the dynamics of fever development.	383
<b>Korovenkova O.M.</b> The effect of thiocetam on the excretory function of the kidneys under the conditions of blockade of prostaglandin synthesis.	384
<b>Kostyshyn L.V.</b> The acute toxicity study of <i>Tagetes lucida</i> av. dry extract.	385
<b>Matushchak M.R.</b> The analysis results of medical prescriptions and drug consumption in patients with lymphogranulomatosis in Ukraine.	386
<b>Melnychuk S.P.</b> Changes in the excretory kidney function in the dynamics of chronic hypoxia development.	387
<b>Muzyka N.Y.</b> Experimental study of pharmacological properties of a new herbal preparation of altabor suppositories.	388
<b>Novychenko S.D.</b> Characteristics of hypertension in the patients with diabetic nephropathy.	388
<b>Pazyniuk A.Yu.</b> Features of pharmaceutical education abroad.	389
<b>Shchudrova T.S.</b> Therapeutic potential and perspective on melatonin use for drug-induced nephropathy.	390
<b>Shliusar O.E.</b> Voltamperometric determination of thioridazine As its s, s'-dioxide, obtained by caro acid.	391
<b>Zamorskii I.I.</b> Perspectives of the clinical use of melatonin.	392
. . . . .	392
. . . . .	393
. . . . . «                      »	394
. . . . .	395
. . . . .	396
. . . . . <i>Toxocara Canis</i> .	397

..	398
..	399
.. B	400
..	401
..	402
..	402
..	403
..	404
<b>I.M.</b>	405
..	406
..	407
..	408
<b>20</b>	-

<b>Bartosh I.A.</b> ase technology as an effective technology in teaching professionally oriented oral communication in English.	409
<b>Bebykh V.V.</b> Methodology for analysis of the terminological subsystem "Infectology".	410
<b>Kaizer I.Yu.</b> Polish allusions in the lyrical-epic works of Ivan Franko from the point of view of Mahdalyna Laslo-Kutsiuk.	411
<b>Karatintseva K.P.</b> Basic methods of terms indicating dental infections creation.	411
<b>Lapa G.M.</b> Cognitive and discursive aspects of terminological structures in the English professional language "Infectology".	412
<b>Maksymyuk M.V.</b> Interactive technologies use in higher educational institutions.	413
<b>Manchul B.V.</b> The Asymmetry Of Interdisciplinary Scientific Research.	414
<b>Marchuk I.V.</b> Theoretical And Methodological Analysis Of Approaches To The Study Of Nurses' Palliative Competence.	414
<b>Matiichuk K.D.</b> Infectious diseases with multiple transmission mechanisms: morphological-syntactic and semantic-cognitive analysis.	415
<b>Namestiuk S.V.</b> Morpho-syntactic and semantic-cognitive research of English professional disco.	416
<b>Nykyforuk T.M.</b> Versification of works by S. Vorobkevych.	417
<b>Osypenko V.A.</b> Using Thepsychotherapy Practice In The Mental Health Care Of Student's Youth.	418
<b>Rak . .</b> Lexical and semantic comparative characteristic of the verb facere in Latin and French.	419
<b>Rusnak Yu.M.</b> Names which denote tuberculosis in the Olga Kobyl'yanska's artistic discourse.	420



<b>Shalajeva A.V.</b> Theoretical problems of the normalization of special vocabulary in the field of infectious diseases.	421
<b>Shutak L.B.</b> Metaphorical processes during the creation of medical terms.	422
<b>Skakun I.O.</b> Anthropocentrism In Modern Natural Science.	422
<b>Skrytska N.V.</b> Testing as the necessity of the educational process.	423
<b>Teslenko M.O.</b> Termforming models of the English professional language in the field of Infectology urse: hemo-contact infections	424
<b>Tomashevskaja A.Yu.</b> Linguistic features of the English sublanguage of pharmacy.	425
<b>Tsurkan M.V.</b> Processes of humanization and humanitarization of higher medical education.	426
<b>Tymofiieva M.P.</b> Theoretical And Methodological Analysis Of Problem Of Doctor-psychologists Health-preserving Competency.	427
<b>Voytkevich N.I.</b> Morphologic-syntactic study of English professional discourse in infectiology.	428
<b>Vykliuk A.O.</b> Lexical-semantic field “Infectious diseases of cutaneous covering” in film-discourse.	429
. .	430
. .	430
. .	431
. .	432
. .	433
. .	433
. .	434
. .	434
. .	435
(1974–2020 .).	435
. .	436
. .	437
. .	438
. .	438
19. . .	439
. .	440
. .	441
( . . )	441

<b>Bezruk V.V.</b> The results and effectiveness of the implementation of local protocols and clinical trials of patients with nephrological diseases in medical institutions of Chernivtsi region.	442
<b>Biduchak A.S.</b> Healthy lifestyle of students in a ovid-19 pandemic.	442
<b>Chornenka Zh.A.</b> Morbidity and mortality from tuberculosis amongthe population.	443

<b>Domanchuk . .</b> Incidence and mortality from gastric cancer of men and women in Ukraine.	444
<b>Hrytsiuk . .</b> The influence of coronavirus disease 2019 on cardiovascular diseases.	445
<b>Lytvyniuk N.Ya.</b> Risk factors and measures for the prevention of gestational diabetes.	446
<b>Mandryk-Melnychuk .V.</b> History of discovering of «medical» papyrus.	447
<b>Vlasyk L.Y.</b> Prevalence of major noncommunicable diseases among the economically active population of chernivtsi region and factors affecting it.	448
<b>Yasinska E. Ts.</b> The risk of cardiovascular diseases in patients with arterial hypertension.	449
. . . . .	450
. . . . .	450
. . . . . « ' »	451
. . . . .	452
. . . . .	452
. . . . . -19.	453

22

<b>Fediv V.I.</b> Quantum dot as fluorescence/magnetic resonance dual-modal imaging agent.	454
<b>Galushko K.S.</b> Poynting vector components of quasimonochromatic field.	455
<b>Gutsul O.V.</b> Influence of infrasonic oscillations on liquid flow in capillaries.	455
<b>Ivanchuk M.A.</b> Statistical analysis of medical-psychological research.	456
<b>Kulchynskiy V.V.</b> Polymer fibers fabricated by electrospinning technique: applications and problems.	457
<b>Makhrova Ye.G.</b> Bone plate for osteosynthesis in screw fractures.	458
<b>Nahirniak V.M.</b> The use of curve-fitting in matlab for finding the main parameters of the compartment model of epidemic.	459
<b>Olar . .</b> Nanotechnologies - health hazards.	459
<b>Tkachuk I.G.</b> The Formations and characteristics of nanocomposite materials based on nanoparticles of 2d layered crystal inorganic and gaseous and solid Me(NO <sub>3</sub> ) ion salts (Me K, Na, Rb, Cs).	460
. . . . .	461
. . . . .	462
. . . . . O	463
. . . . . P	464
. . . . .	465

23

<b>Abramova N.O.</b> Correlation between 25-hydroxyvitamin D status and body composition, physical activity and insulin resistance.	465
<b>Marchuk Yu.F.</b> Obesity and hyperandrogenism in women – mechanisms of mutual development and peculiarities of metabolic disorders.	466

<b>Olenovych O.A.</b> Tubulointestinal syndrome development in the dynamics of alloxan-induced experimental diabetes mellitus.	<b>467</b>
<b>Pashkovska N.V.</b> Peculiarities of amylinemia depending on the type of diabetes mellitus.	<b>468</b>
<b>Pavlovych L.B.</b> Nervous conductivity indicators in patients with diabetic polyneuropathy depending on the duration of diabetes mellitus.	<b>468</b>
<b>Piddubna . .</b> The lipid profile features in patients with metabolic syndrome in combination with hypothyroidism.	<b>469</b>
<b>Tsaryk I.O.</b> Relationship between amylinemia level and kidney function in patients with diabetes mellitus and chronic kidney disease.	<b>470</b>
. . COVID-19	<b>471</b>
. .	
6	<b>472</b>
. .	<b>472</b>
. .	
2	<b>473</b>
. .	
-	<b>474</b>
. .	<b>474</b>