The increase of glomerular filtration consequently leads to the elevation of filtration load of the nephron: filtration charge of sodium is found to be increased by 1,9 times (P<0,001), sodium excretion – absolute (by 3,7 times, P<0,001) as well as standardized in volume of glomerular filtrate (by 1,9 times, P<0,001) is reliably raised, that causes the loss of this electrolyte by the body considering the tendency to augmentation of urine sodium concentration (by 2,1 times, P<0,001). According to the ratio of sodium and potassium concentrations in the urine of the examined patients, the excretion of the latter one prevails – ratio coefficient of urine concentrations of sodium and potassium in patients with DM type 1 3,3-folds exceeds the level of healthy individuals (P<0,001), accompanied by a reliable decline of potassium concentration in the urine of the examined patients (by 1,5 times, P<0,01).

Reliable 1,3-fold elevation of urine pH in diabetic patients (P<0,001), accompanied by a substantial intensification (by 2,1 times, P<0,001) of the release of ammonia and titrated acids are indicative of the activation of acid-excretory renal function and mobilization of reserve mechanisms.

Glomerular hyperfiltration, attributive to the initial stages of diabetic nephropathy, is followed by the enhancement of filtration sodium load to the nephron. Under conditions of osmotic diuresis, caused by hyperglycemia and glucosuria, the impairment of proximal and distal transport of tubular fluid and sodium results in significant natriuresis. Intensification of urine acidification processes develops despite the inhibition of sodium-dependent ammonia- and acidogenesis, contributing to the progression of renal dysfunctions in case of diabetes mellitus.

Olenovych O.A.

THE STATE OF PRO- AND ANTIOXIDANT SYSTEMS OF KIDNEYS IN CASE OF EXPERIMENTAL HYPERTHYROIDISM

Department of Clinical Immunology, Allergology and Endocrinology
Higher State Educational Establishment of Ukraine
«Bukovinian State Medical University»

Nowadays a great attention is paid to the study of free radical oxidation processes, which can be considered both as adaptation body reaction and as a universal mechanism of alteration of biostructures in case of pathology, including thyroid ones. Pluripotent influence and universality of biologic effects of thyroid hormones determines the close connection between their level and the intensity of free radical oxidation, lipid and protein peroxidation processes non-specific markers of the dysfunction of the inner organs, including kidneys. Functional condition of the latter is known to influence all metabolic processes in the body. The fact of mutual influence of thyroid status of the body, lipid and protein peroxidation processes and renal function status is undisputed. The investigation of peroxidation processes and antioxidant system state (AOS) in the renal tissue in case of thyropathy will widen the possibilities of targeted pathogenic corrective influence on the initial stages of renal dysfunction in order to prevent its chronization.

The objective of this study was to establish the character of influence of thyroid hormone excess on the processes of lipid and protein peroxidation in the renal tissue.

The experiments were carried out on 28 matured nonlinear male rats under standard vivarium conditions. For the experimental modeling of hyperthyroidism 18 animals were administered to L-thyroxine («Berlin-Chemie AG», Germany) intraperitoneally in the dose of 200 μg/kg. 14 days after the beginning of pathology formation 18 hypothyroid rats and 10 animals of the control group were euthanized by decapitation under the slight diethyl ether anesthesia. The object of the research was renal tissue, removed, washed out of blood and homogenized for the further investigations right after animals' decapitation.

The state of lipid peroxidation (LPO) was assessed by quantification of malondialdehyde (MDA) and diene conjugates (DC), antioxidant protection – by the contents of enzymatic (superoxide dismutase (SOD), catalase (CT), glutathione peroxidase (GPO)) and non-enzymatic systems (glutathione S-transferase (GST), sulfhydryl groups (SH-groups). Dinitrophenylhydrazones (DPH) concentration was determined to assess the intensity of protein oxidative modification (POM).

The data obtained were statistically processed with the establishment of Student's coefficient (t).

As the results of the investigation showed (table), MDA level in renal tissue of hyperthyroidal rats was twice higher as compared to the control parameters (p<0,001). DC contents was found to be increased as well. The activity of SOD in the renal tissue of hyperthyroidal rats reliably decreased by 46,4% as compared to the control level, GPO – by 29,0%, whereas the activity of such antiradical enzymes as CT (by 53,9%) and GST were found to be elevated. Such biochemical changes are significant of the exhaustion of the enzymatic intrarenal antioxidant system. Though there were no changes of SH-groups level, found in renal tissue, the contents of neutral and basic DPH in the renal tissue was elevated by 80,6 и 76,0 respectively. Accumulation of the latter evidences, that the intensity of free radicals generation in the renal tissue of hyperthyroidal rats tends to become excessive regarding the compensatory intrarenal antioxidant system, resulting in the intensification of POM processes.

The findings mentioned above evidence, that due to the exhaustion and failure of the compensatory intrarenal antioxidant system, the intensity of accumulation of lipid and protein peroxidation end-products in the renal tissue of hyperthyroid rats tends to become excessive, causative of renal dysfunction, reduction of glomerular filtration rate, proteinuria, increased permeability of renal basic membranes, decrease of renal blood flow and tubular sodium reabsorption. Their high nephrotoxicity may lead to the ischemic, toxic or immunologic damage of the renal tissue.

Table

Characteristics of changes of pro- and antioxidant systems
in the renal tissue of rats with experimental hyperthyroidism (X±Sx)

Indices	Group, number of animals	
	Control, n=10	Hyperthyroidism, n=18
Malondialdehyde, μmol/1 mg of tissue	83,71±0,76	167,92±2,20; p<0,001
Diene conjugates, nmol/1 mg of protein	1,18±0,03	1,41±0,12; p>0,1
Superoxide dismutase activity, un./1 min./1 mg of protein	0,28±0,01	0,15±0,02; p<0,001
Catalase activity, μmol/1 min./1 mg of tissue	94,80±0,89	145,91±4,26; p<0,001
Glutathione S-transferase activity, μmol/1 min./1 mg of tissue	14,30±0,53	16,40±0,49; p<0,02
Glutathione peroxidase activity, μmol/1 min./1 mg of protein	87,31±1,08	62,04±2,31; p<0,001
Level of SH-groups, mmol/1 mg of tissue	0,029±0,001	0,028±0,002; p>0,7
Neutral dinitrophenylhydrazones, mmol/1 g of protein, 370 nm	1,03±0,06	1,86±0,10; p<0,001
Basic dinitrophenylhydrazones, un.o.d./1 g of protein, 430 nm	9,14±0,49	16,09±0,98; p<0,001

Note: P statistically significant difference in comparison with control group; n number of experimental animals.

Pavlovych L.B.

TREATMENT OF SYMPTOMS OF METABOLIC SYNDROME

Department of Clinical Immunology, Allergology and Endocrinology
Higher State Educational Establishment of Ukraine
«Bukovinian State Medical University»

Metabolic syndrome is a problem of modern society. It is characterized by abdominal obesity, insulin resistance, type 2 diabetes, dyslipidemia and hypertension. Revealing metabolic syndrome has significant clinical implications, as this condition is reversible, since the appropriate treatment can result in disappearance or reduction of the severity of its main manifestations.

The objective of the research was to study the efficacy of *Stifimol* and *Metformin* in patients with metabolic syndrome.

The given study involved 30 patients with symptoms of metabolic syndrome (14 men and 16 women) aged from 30 to 65 years. We determined the BMI, waist and hip circumference, biochemical analysis of blood, levels of insulin, C-peptide and HOMA index. All the patients were divided into 2 groups: Group 1 included15 patients who were taking *Stifimol* 1 capsule 3 times a day, patients of the second group were given *Stifimol* 1 capsule 3 times daily and *Metformin* 500 mg 1 tablet at lunch.

Stifimol. Pharmacological properties. The main component of the drug is the extract of *Garcinia Cambodia*. The main component of this extract is hydroxycitric acid, which inhibits lithogenesis reducing the formation of cholesterol and fatty acids, increases the production of glycogen in the liver, reduces appetite, increases heat production by the body through the activation of thermogenesis.

Chromium picolinate regulates glucose uptake by cells of the body and helps to maintain normal physiological glucose level in the blood. It regulates carbohydrate, lipid, particularly cholesterol metabolism in the body.

A unique feature of L-carnitine is that it increases the permeability of the membranes to fatty acids. L-carnitine improves lipid utilization and energy with the aim of slowing the rate of synthesis of fat molecules in the subcutaneous fat depot. After administration of L-carnitinea steady loss of adipose tissue is initiated, the efficiency of fat oxidation in the body increases significantly, the production of free radicals decreases while the content of ATP increases.

L-tyrosine improves the exchange of catecholamines. One of the major target tissues of catecholamines in the body is adipose tissue. Tyrosine reduces appetite, promotes production of melatonin, and improves the function of the thyroid and adrenal glands. Tyrosine is involved in the regulation of emotional state, helps relieve anxiety and overcome depression.

Brown algae extract, due to the presence of iodine in its content, improves the functioning of the thyroid gland, activates metabolic processes, promotes the breakdown of lipids in the adipose tissue.

The therapy of patients showed a positive tendency, the overall health of patients was noted to improve, the frequency of demonstrating bad eating habits decreased, the clinical and biochemical status become normalized. There were significant (p<0,05) lipidogram improvements of glycemic blood parameters. Patients receiving *Stifimol* and *Metformin* presented much better after the therapy and in the second group, insulin levels decline was noted in 53,3%, and in case of the treatment by *Stifimol* only the decline was 26,6%. The level of leptin decreased in 46,6% of patients in the second group and in 13,3% in the first group. The use of *Stifimol* and *Metformin* made it possible to eliminate insulin resistance in 33,3% for a month. Throughout the therapy one could also note decrease in anthropometric parameters while the indicators were more pronounced with the combined use of *Metformin* and *Stifimol*.

The use of *Stifimol* and *Metformin* in the treatment of patients with the signs of metabolic syndrome leads to the improvement of the overall condition of patients, positive changes in anthropometric, clinical and biochemical parameters. The scheme of combined use of *Metformin* and *Stifimol* demonstrated (p<0,05) more positive dynamics in patients with metabolic syndrome.