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Конференція внесена до Реєстру заходів безперервного професійного розвитку, які проводитимуться у 2023 році №5500074

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– поверталася до рівня тварин контрольної групи. Чотиримісячний ЦД активував p53-залежні проапоптичні механізми у полях CA1, CA3, CA4; у тварин цієї експериментальної групи в ранньому постішемічному періоді активність p53-залежних проапоптичних процесів у полях CA1, CA3, CA4 достовірно перевищувала таку в щурів з аналогічним втручанням без діабету, а в полі CA2 була суттєво нижчою. На 12-ту добу в щурів із діабетом активність p53-проапоптичних процесів стосовно показників за ЦД без порушення церебрального кровообігу в полі CA1 залишалася підвищеною, в полі CA2 поверталася до рівня в щурів із діабетом, а в полях CA3 та CA4 – знижувалася.

Отже, активація у ранньому постішемічному періоді в контрольних щурів проапоптичних процесів супроводжувалася посиленням синтетичних, про що свідчило зростання вмісту РНК. На 12-ту добу зростання вмісту РНК відбувалося на тлі відсутності динаміки проапоптичної активності, що засвідчує про компенсаторну активацію процесів синтезу в клітинах, які вижили. Незважаючи на те, що в щурів із ЦД в обидва терміни постішемічного періоду вміст РНК зростав стосовно відповідних показників за ЦД без порушення церебрального кровообігу на тлі зростання проапоптичної активності, однак це зростання, особливо в пізньому терміні спостереження, за абсолютними показниками було значно меншим, ніж у тварин без ЦД.

Висновок. У тварин без діабету активація проапоптичної активності супроводжується паралельним зростанням процесів синтезу в клітинах гіпокампа. За умов діабету в пізньому постішемічному періоді активність процесів синтезу значно нижча.

СЕКЦІЯ 4
АКТУАЛЬНІ ПИТАННЯ ХРОНОБІОЛОГІЇ ТА ХРОНОМЕДИЦИНИ

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INDICATORS OF OXIDATIVE MODIFICATION OF PROTEINS IN NEURONS OF THE LATERAL PREOPTIC NUCLEUS OF THE HYPOTHALAMUS OF RATS UNDER LIGHT STIMULATION AND THE INJECTION OF MELATONIN

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Introduction. To date, it has been proven that oxidative stress (OS), which develops as a result of imbalance between oxidant and antioxidant processes, plays an important role in the pathogenesis of many diseases. Reactive oxygen species, which are products of cellular metabolism, cause oxidative modification of proteins (OMB), which leads to pathological changes in the properties and functions of proteins. It has been established that OMB is directly related to the mechanisms of toxic cell death.

The aim of the study. To find out the effect of melatonin injections on the R/B ratio in the neurons of the lateral preoptic nucleus (LPO) of the hypothalamus of rats under light stimulation.

Materials and methods. Experiments were conducted on 36 mature white male rats. The material was collected at 12-hour intervals (2:00 p.m. and 2:00 a.m.) due to the cyclic nature of melatonin synthesis. Histological sections were stained with bromophenol blue according to the Mikel-Calvo method. Quantitative assessment of staining results was carried out by computer microspectrophotometry on digital copies of images. The final result of the research is the indicator (coefficient) R/B, which is a quantitative representation of the ratio between amino and carboxyl groups of proteins.

Results. Under the standard light mode (light from 8 a.m. to 8 p.m.) the R/B ratio at 2:00 p.m. was 1.24±0.005, and at 2.00 a.m. – 1.26±0.006. The obtained data indicate that the LPO neurons of the hypothalamus of mature rats are composed of proteins in which carboxyl groups predominate. Under light stimulation (light 24 hours a day), the R/B ratio increases sharply at 2:00 p.m. and at 02:00 a.m. In particular, the R/B ratio at 2 p.m. was 1.48±0.008, and at 2.00 a.m. – 1.39±0.009. At the same time, there is an unevenness in this process among different neurons, which is especially noticeable in the central zones of the hypothalamus. Neurohormone melatonin

plays an important role in neuroprotection and maintaining the oxidant-antioxidant balance of the human body. The injection of exogenous melatonin on the background of constant illumination leads to the normalization of the R/B ratio in the neurons of the LPO of the hypothalamus. In particular, at 2 p.m. it was 1.08±0.007, and at 2.00 a.m. – 1.16±0.004 ($p<0.001$).

Conclusions. 1. The described characteristic indicates a high intensity of exchange and oxidation of proteins in the neurons of the lateral preoptic nucleus of the hypothalamus of rats. 2. Light stimulation leads to an increase in the R/B ratio, which can be interpreted as an increase in the intensity of protein oxidative modification processes in the hypothalamus lateral preoptic nucleus neurons. 3. Injection of melatonin on the background of constant lighting leads to the normalization of the R/B ratio in the neurons of the lateral preoptic nucleus of the hypothalamus.

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THE INFLUENCE OF MELATONIN UPON THE IMMUNOHISTOCHEMICAL STATUS OF MELATONIN TYPE 1A RECEPTORS IN THE NEURONS OF THE SUPRAOPTIC NUCLEUS OF THE HYPOTHALAMUS UNDER LIGHT STRESS

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Introduction. Biological rhythms are a fundamental property of the organic world, which ensures the organism's ability to adapt and survive in cyclically changing environmental conditions. One of the important links of the neuroendocrine system of the hypothalamus is the supervisory supraoptic nuclei (SON). They are involved in ensuring the neuroendocrine response to various types of stress - immobilization, pain, hypoxia, light, and other stress. Numerous clinical and experimental data indicate the key role of melatonin (MT) in the regulation of the main circadian rhythm of the body - the sleep-wake cycle. Receptors to MT have been found in various nuclei of the hypothalamus, retina, neurogenic tissues, etc.

The aim of the study. To study the optical density of specific staining for type 1A melatonin receptors in SON neurons of the hypothalamus of rats under conditions of 24-hour illumination and injection of melatonin.

Materials and methods. The experiments were conducted on 36 white male rats. The animals of the first group were kept for 7 days under the conditions of a standard lighting regime (light from 8 am to 8 pm). The rats of the second group were exposed to 24-hour lighting for 7 days. The animals of the third group were given intraperitoneal daily melatonin (Sigma, USA) at a dose of 0.5 mg/kg of rat body weight on the background of round-the-clock lighting. Taking into account the cyclic nature of melatonin synthesis, the material was collected at 12-hour intervals (2:00 pm and 02:00 am). Polyclonal antibodies to melatonin receptors type 1A (Abcam, Great Britain) and streptavidin-biotin visualization system LSAB2 (peroxidase label + diaminobenzidine) manufactured by Chemicon International Inc. (USA) were used to perform the immunohistochemical technique.

Results. The optical density of the specific staining of MT-receptors type 1A in hypothalamus SON neurons of rats is subject to circadian organization. The highest level of optical density of a specific color is observed at 2 am, and at 2 pm it decreases. Modifications of the photoperiod led to a marked violation of the diurnal fluctuations of the investigated values. Under light stress, the optical density of the specific color of the studied structures is probably lower than under light deprivation. In addition, the immunohistochemical study showed that under conditions of constant lighting, the circadian rhythm of the functioning of MT receptors in neurons of the hypothalamus is disturbed, which is characterized by an improbable difference in indicators ($p>0.05$) in the studied periods of the day.The weekly injection of MT on the background of long-term lighting is manifested by a tendency to normalize the optical density of specific staining for type 1A MT receptors in neurons of the SON of the hypothalamus of rats, which is especially noticeable in the samples taken at 2 am when the indicator was within 0.412±0.0025 units of optical density.