

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
ВИЩИЙ ДЕРЖАВНИЙ НАВЧАЛЬНИЙ ЗАКЛАД УКРАЇНИ
«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



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101 – ї

підсумкової наукової конференції

професорсько-викладацького персоналу

Вищого державного навчального закладу України

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У збірнику представлені матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м.Чернівці, 10, 12, 17 лютого 2020 р.) із стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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of sodium ions tended to reduce in the conditions of administering aluminum salts in immature rats. The relative reabsorption of sodium ions tended to decrease. The clearance of sodium was growing. The clearance index of sodium ions increased reliably ($p < 0,01$). The concentration of sodium ions in blood plasma did not change significantly. The distal reabsorption of sodium ions tended to reduce due to the administration of aluminum salts in immature rats. The proximal reabsorption of sodium ions tended to decrease. The distal and proximal reabsorption of sodium ions standardized by the glomerular filtrate speed, did not change significantly.

An analysis of the values of the ion regulating renal function in intact mature rats against the background of aluminum salts introduction, showed that the concentration of sodium ions in urine increased ($p < 0,001$). The excretion of sodium ions was growing. The filtration fraction of sodium ions in the conditions of administering aluminum salts in immature rats was characterized by a downward trend compared to the control. The trend toward the growth was recorded for the excretion of sodium ions, standardized by the glomerular filtrate speed. ($p < 0,02$). The clearance free of sodium water increased. The relative reabsorption of sodium ions was characterized by a downward trend compared to the control. The clearance index of sodium ions increased reliably ($p < 0,05$). The concentration index of sodium ions probably increased ($p < 0,001$). The concentration of sodium ions in blood plasma did not change significantly in group comparison. The distal reabsorption of sodium ions under the condition of aluminum salts introduction in mature rats was characterized by a downward trend compared to the control. Proximal reabsorption was tended to inhibition in group comparison. The distal and proximal reabsorption of sodium ions standardized by the glomerular filtrate speed, did not change significantly.

Thus, the difference between the indicators of the ion-regulating renal function in different age groups of animals, is caused by insufficient maturity of nephron tubules, juxtaglomerular apparatus, regulatory mechanisms in immature animals.

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VARIATIONS OF CYTOMETRIC INDICES OF SUPRAOPTIC NUCLEI OF HYPOTHALAMUS UNDER LIGHT DEPRIVATION

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The biological timer's exceptional mechanism is used by organisms at different phases and stages of development. Due to the periodic rhythmic cycles the adaptation to the environment and its rhythms, namely, day-night alternation, seasonal change occurs. The brain structures (hypothalamus, pituitary, pineal glands) and their hormones are of critical importance for the realization of various temporal processes as well as the stress response. However, the supraoptic hypothalamic nuclei and their response to desynchronization factors remain poorly studied and understood.

The study was aimed to elucidation the cytometric indices of the supraoptic nuclei of the hypothalamus of white rats under the changed photoperiod.

Experimental animals (mature non-linear male white rats) were divided into two series, sampling biomaterial at 2 a.m. and 2 p.m. on every 7th day of the experiment. The timing of the experiment was due to the different functional activity of the pineal gland and the production of the main chrono biotic, melatonin, in the specified time periods. The collected material was fixed with neutral buffered 10% formalin solution, dehydrated, poured into paraffin, and subsequently after deparaffinization histological sections 5 μ m thick were stained with hematoxylin and eosin. Cytometry was performed on digital copies of the image in a GIMP 2.8 computer environment.

In animals of the control group, statistical discrepancies between 2 a.m. and 2 p.m. were noted only for indicators of neurocyte nucleus volume and optic staining density of the hypothalamic supraoptic nuclei. In particular, at 2 a.m. the average nucleus volume was higher than at 2 p.m. (207 ± 1.3 and 201 ± 1.4 , $p = 0.010$), and the optical staining density of the neurocyte nucleus was on average lower at 2 a.m. compared to daily index (0.258 ± 0.0012 and $0.264 \pm$



0.0013, $p = 0.012$). The results obtained indicate a higher functional activity of the cells of the hypothalamic supraoptic nuclei at night, which causes their dependence on the period of day.

Keeping animals under light conditions led to a decrease in the volume of nuclei in neurocytes (195 ± 1.0 and 191 ± 0.9 , $p = 0.008$) and the volumes of neurons in the supraoptic nuclei of the hypothalamus (944 ± 10.9 and 898 ± 11.3 , $p = 0.009$) at 2 p.m. compared to the nightly rate. At 2 a.m., the indicator of the standard deviation in the color intensity of the nucleus of the neurons of the hypothalamic supraoptic nuclei significantly increased compared with the indicator in the daytime (8.5 ± 0.13 IO and 8.0 ± 0.11 IO, $p = 0.009$). An increase in the nuclear cytoplasmic coefficient (0.213 ± 0.0021 and 0.206 ± 0.0024 , $p = 0.042$) and the optical density of cytoplasm staining (0.326 ± 0.0025 and 0.308 ± 0.0028 , $p = 0.003$) were also revealed at 2 p.m. compared to a night indicator.

Comparing the studied parameters in animals under constant light conditions and in animals of the control group, we observed statistically significant changes in all the estimated cytometric parameters of the neurons of the supraoptic nuclei of the hypothalamus, each of which indicated a significant decrease in the functional activity of the nuclei, which under conditions of chronic stress can lead to irreversible disruption of their functioning.

Yosypenko V.R.

**AGE CHARACTERISTICS OF THE DENSITY OF MELATONIN RECEPTORS IN THE
NEURONS OF THE VENTROLATERAL PREOPTIC NUCLEUS OF THE
HYPOTHALAMUS UNDER THE LIGHT STIMULATION**

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The most significant and noticeable biological rhythm observed in the human body is the sleep-activity rhythm and related changes in physical and mental processes. Sleep is not just a lack of consciousness; it is an active process that involves the activities of the special centers that generate and support it. One of these centers is the ventrolateral preoptic nucleus (VLPO) of the hypothalamus. A key role in studying the relationship between sleep and circadian rhythms is the presence of melatonin receptors in VLPO neurons.

The aim of the study was to investigate the quantitative characteristics of the density of melatonin receptors 1A in VLPO neurons of the hypothalamus of mature and old rats at different time of the day under light stimulation.

The experiments were performed on 48 white nonlinear male rats with light conditions consistent with the simulated photoperiod. Density of melatonin's receptors was studied by immune histological analysis.

Under light stimulation (light 24 hours a day), the number of positively stained melatonin receptors of type 1A VLPO neurons in mature rats at 2 AM was 0.182 ± 0.0017 optical density units. At 2 PM there was no significant difference, in this period of time the indicator reached 0.180 ± 0.0018 optical density units. The indicators in the control group were in the range: 2 AM - 0.264 ± 0.0016 optical density units, at 2 PM - 0.248 ± 0.0018 optical density units.

The optical density of melatonin receptors 1A in VLPO neurons of old rats, which were under round-the-clock illumination, at 2 AM was 0.132 ± 0.0012 optical density units, while at 2 PM it was 0.148 ± 0.0013 optical density units. The data of the control group were: 2 AM - 0.216 ± 0.0013 optical density units, at 2 PM - 0.211 ± 0.0014 optical density units.

Thus, the highest receptor density for melatonin 1A is noted at 2 AM, whereas at 2 PM it decreases, it indicates a clear circadian organization. Light stimulation led to a marked violation of the quantitative characteristics of the density of melatonin receptors 1A in VLPO neurons of the hypothalamus. In older rats, melatonin receptor density is lower than in mature rats; it is explained by age-related changes in the pineal gland and a decrease in melatonin synthesis.