

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.

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

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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**

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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

regulatory organs of adaptive process are a typical manifestation of organic reaction to hypobaric hypoxia. A moderate intermittent hypoxia is used for altitude training to develop adaptation at both the systemic and cellular level.

The nature of proteolytic activity in peripheral tissues changes in the process of response to a variety of environmental factors that may be both a manifestation of regenerative processes, and their involvement in the mechanisms of apoptosis, in particular, due to oxidative modification of proteins.

Aim of research is to investigate sex-related dependence of the reaction of protein metabolism in tissues of the adrenal glands of immature albino rats under conditions of systemic intermittent hypobaric hypoxia and altered photoperiod. Experiments were carried out on 56 male and 60 female immature laboratory rats aged 1 month. Hypobaric hypoxia, equivalent to an altitude of 4000 m above sea level, was used for 2 hours, for 14 days in the background of three lighting modes: natural lighting, constant round-the-clock lighting and constant round-the-clock darkness. Proteolytic activity was determined according to azoalbumin, azokazein and azokol lysis as indices of low molecular weight protein lysis, high molecular weight protein lysis and collagen lysis. The degree of oxidative modification of proteins in the adrenal glands was assessed by the amount of 2,4-dinitrophenylhydrazone of neutral and alkaline nature.

A sex dependent difference in the activity of proteolytic processes and intensity of protein peroxidation in the adrenal glands in immature rats was found. In intact male rats intensity of proteolysis is significantly lower than in female rats. Modeling of a decreased melatonin-producing function of the pineal gland by application of constant lighting resulted in significant increase of the activity of proteolytic processes in the tissues of the adrenal glands in both male and female immature rats, that may be indicative of intensification in elimination of oxidation-modified protein molecules, formed by reducing of tissues antioxidant capacity according to melatonin deficiency. Simultaneous action of hypobaric hypoxia and permanent lighting caused the utmost increase of intensity of proteolysis in the experimental groups, particularly in regard to macromolecular proteins. Simultaneous action of hypobaric hypoxia and permanent darkness caused a reverse response, which was manifested in normalization of proteolysis indices, decreased by hypoxia. These results can be indicative of the fact that constitutional sexual differences are pronounced more in case of an isolated action of the applied factors, while in case of considerable exertion of adaptive mechanisms in combination of hypoxia with pineal gland dysfunction such kinds of differences are leveled.

The sex related dependence of response mechanisms of proteolytic processes in their interaction with the processes of peroxidation of proteins and their role in adaptive restructuring of the adrenal glands tissues under conditions of hypoxic preconditioning of the damaging effects of the modified duration of photoperiod by using of moderate hypobaric hypoxia require further investigation and comprehensive analysis.

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