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COGNITIVE DISABILITY IN ESTROGENECTOMITED AND OLD RATS WITH DIABETES MELLITUS

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In recent years there have been many works concerning 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, the 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 questions remain unresolved. Therefore, the aim of our study was to establish the effect of estrogens on the indices of spatial memory in ovariectomized and old rats against the background of the development of experimental diabetes. The study was conducted on 30 adult female rats, 4-5 months and 20 months. The study groups were ovariectomized and experimental type 2 diabetes mellitus with protamine sulfate was reproduced. The study of spatial memory was carried out in an eight-sleeved radial labyrinth. Menopause is closely associated with memory loss and cognitive impairment. Estrogen plays an important role in neuroplasticity, for example, an increase in the population of the dendritic CA_1 segment in the hippocampus, prolonged potentiation and neurogenesis. In the experiments, the memory and density of dendritic spines are reduced in the prefrontal cortex and the hippocampus after ovariectomy; the ability to recognize the object was found to decrease after 1 week of ovariectomy and spatial memory decreases after 4 weeks.

Studies have shown that physical activity and stress influences upon the improvement of spatial memory of ovariectomized rats and are associated with increased extragranular aromatisation. In their turn, they affect the expression of estrogen receptors. The data we obtained on ovariectomized animals indicate that on the second day the cognitive function is somewhat improved compared with the first day of testing, which is associated with physical activity in the labyrinth. There is a similar tendency in the old animals on the second day, but indicators of spatial memory are much worse. Diabetes causes a significant memory deterioration.

Changes occurring after ovariectomy suggest estrogen involvement in the regulation of cognitive functions. In patients with type 2 diabetes cognitive dysfunction has been detected in the form of memory reduction, attention, and optic-spatial activity interrelated with chronic hyperglycemia. With an increase in the level of HbA1c in patients with type 2 diabetes, BDNF (brain neurotrophic factor) in blood plasma decreases and affects cognitive function.

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GENETICALLY MEDIATED SYSTEMIC AND TISSUE MECHANISMS OF ADAPTATION TO HYPOBARIC HYPOXIA

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Today there is no doubt that the body possesses both congenital and acquired regulatory programs that allow realization of both urgent and long-term compensatory adjustments aimed at eliminating oxygen deficiency. Of all the causes of exogenous hypoxia, high-altitude and experimental hypobaric hypoxia are the most studied, as the controlled use of hypoxic effects is considered a promising direction to prevent the development of many diseases involving the so-called hypoxic cascade. High-altitude hypoxia caused by low barometric pressure challenges human ability to survive and reproduce due to exerting constant selective pressure on the mechanisms of the evolution of adaptive responses.

This study summarizes the mechanisms of response to hypobaric hypoxia, including population characteristics of compensatory reactions of oxygen transport systems, reproductive mechanisms of adaptation in the population of highland regions and cellular mechanisms of

response to experimental hypobaric hypoxia in accordance with modern scientific medical data and the results of our own research.

The mechanisms of long-term adaptation of humans and animals to hypobaric hypoxia are known to be genetically determined, but the process of formation of the systemic structural-functional compensatory mechanisms of the body's response to exogenous hypoxia is influenced by a complex set of environmental factors.

Aim of research is to analyze the data on genetically determined mechanisms of long-term adaptation of the organism to hypobaric hypoxia depending on a set of environmental factors in the modern scientific medical literature.

Having analyzed the available sources of scientific literature, it can be argued that the formation of the uniqueness of genomic compositions among representatives of natural populations of geographically separated high-mountain regions of the world occurred under the combination of natural environmental factors, where hypobaric hypoxia acted as the main adaptogenic factor, but the mechanisms of compensation for hypoxic effects were formed in the presence of a modulating effect of duration daylight hours, seasonal changes in temperature and humidity, which determine the presence of population-specific features of the adaptive reaction and affect its course.

The parameters of hypoxic influence, the presence of trace effects from previous adaptation to this factor, the range of functional reserves of physiological systems, genetic sensitivity and resistance to hypoxia play an important role in the formation of an individual strategy of systemic reactions of the organism to hypoxia.

Despite the universality of hypobaric hypoxia as a natural factor in the high mountainous regions, specific features of oxygen transport play a unique role in the adaptation of different continental inhabitants of the highlands. Thus, in the Andean and Tibetan highlands, the increased intrauterine transplacental oxygen supply to the altitude is explained by an increase in total blood flow in the uterine artery, which results in a smaller intrauterine growth restriction compared to newly arrived altitude populations. In our research, we have found that the regime of experimental intermittent hypobaric hypoxia as well as alteration of photoperiod, produce a significant effect on reaction of specific and nonspecific structural-functional indices of the endocrine glands in laboratory rats depending on sex and age of animals.

Accumulated scientific data on biochemical, physiological, genetic and epigenetic mechanisms of response to hypobaric hypoxia partially explain the dynamics of systemic and cellular responses of the body to oxygen deficiency, but further comprehensive studies of signaling pathways and their regulation are needed to develop adequate methods for human adequacy under physiological conditions and in pathology, which can positively affect the quality of life of people.

Анохіна С.І.

ВПЛИВ ЕКЗОГЕННОГО МЕЛАТОНІНУ НА ПОКАЗНИКИ ФІБРИНОЛІЗУ В ТКАНИНІ СЕРЦЯ ОСЛІПЛЕНИХ ЩУРІВ, ЗА УМОВ ГІПО- ТА ГІПЕРТИРЕОЗУ

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Відомо, що епіфіз – нейроендокринне утворення, яке сприяє трансформації сигналів зовнішнього середовища в гуморальні стимули і яке здатне регулювати функціювання гіпоталамо-гіпофізарно-тиреоїдного комплексу. Наявні деякі повідомлення про підвищення рівня мелатоніну у хворих із серцево-судинними захворюваннями. Особливо небезпечне, порушення збалансованості хроноритмів взаємозалежних або каскадних ферментативних реакцій. Питання фібринолізу привертають увагу широкого кола медичних фахівців клінічного та теоретичного напрямків. Статистика виникнення інфарктів міокарда яскраво демонструє добову залежність даної патології, що може бути обумовлено циркадіанними коливаннями фібринолітичного потенціалу.

Отже метою нашого дослідження було з'ясувати роль екзогенного мелатоніну в механізмах регуляції фібринолітичних процесів у тканині серця білих щурів. Провести аналіз змін фібринолітичної активності які відбуваються в тканині серця енуклейованих гіпер- та