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Changes in the Reactivity of the Hypothalamic – Pituitary Neurosecretory System During Exercise

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Abstrakt: Recently, the study and prevention of changes in the body of athletes in professional sports caused by a high level of tension remains one of the main problems in sports. The aim of the work is to assess the reactivity of the hypothalamic-pituitary neurosecretory system under mixed voltage. The experiment was carried out on 35 mongrel white male rats weighing 130-220 grams. The results obtained. It has been proved that with a shifted type of load with the help of a continuous adaptive reaction of the hypothalamic-pituitary-neurosecretory system was formed from the 28th day and was fully formed by the 90th day of the experiment.

Keywords: Displaced load, hypothalamus, pituitary gland, swimming.suprooptic nucleus, paraventricular nucleus.

In recent years, in professional sports, many scientific researches have been carried out on the changes that occur in the athlete's body during aerobic, mixed, anaerobic stress and their prevention, and significant progress has been made in studying the laws of pathological changes. Depending on the level and duration of physical exertion, morphological and physiological changes occur in the body of athletes, that is, in the central nervous system, hypothalamo-pituitary-adrenal gland, hypothalamo-pituitary -thyroid gland, pituitary-pancreas, hypothalamo-pituitary -gonadal system and other endocrine glands. , the mechanisms of pathological changes are highlighted. Depending on the dynamics of hormones in the human body, the complications of the integration of changes in the athlete's body, cardiovascular system, respiratory system, locomotor systems, somatic nervous systems, and other organs, and the mechanisms for preventing complications have been clarified and developed.

genetic mechanisms depending on stress levels in professional athletes are highlighted. The phase and level of development of the protective adaptive response mechanism in the hypothalamo-pituitary and endocrine systems in relation to such stresses have been studied. The obtained data show that after high-intensity stress neurohumoral control disorders, the development of latent or obvious endocrinopathy, changes in hormonal control at one or more stages are possible. Most often, this process is related to the control of the central nervous system, autonomic nervous system, endocrine system, synthesis, accumulation, secretion and transport of hormones, consumption by cells, storage, metabolism, inactivation, release of hormones, as well as disruption of specific tissue receptors. depends. The changes that occur in the endocrine system and other systems depending on the levels and duration of physical stress and their interrelation have not been fully studied until now. The analysis of the literature shows that there are few studies on the disruption of the endocrine system in aerobic, mixed, anaerobic stress and depending on the duration of the stress, mainly in the plane of the adenohypophysis, thyroid gland, adrenal gland, gonads, and pancreas. However, the changes in reactivity of the hypothalamic-pituitary-neurosecretory system depending on the level and duration of physical stress were not improved.

Research materials and methods. The experiment was carried out on 35 white adult rats weighing 160-180 g. In them, physical stress caused by chronic swimming in forced water against a load of 10% of body weight Karkishchenko N.N., Karkishchenko V.N. (2017) method is called using .

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Morphofunctional reactivity was studied in rats during chronic swimming and 1 minute after swimming, 7-14-, 21-, 28- days, 2-, 3-months, supraoptic nucleus (SOYa) and paraverticular (PVYa), hypothalamo-pituitary tract and neurohepaphysis (NG). In each group vital indicators are monitored: appearance, breathing, swimming activity went The reactivity of the hypothalamo-pituitary neuroreactive system was assessed by physiological, histological, morphological, histochemical, and cytophotometric methods. Statistical analysis was performed using the standard package of Microsoft Office programs - Excel 2000.

Obtained data and its analysis. The dynamics of the following morphofunctional changes were observed in the reactivity of animals subjected to mixed stress - i.e. swimming in water with a load of 10% of body weight - and in the hypothalamus-pituitary-neurosecretory system. (Graph. 1).

On the first day of chronic mixed stress compared to aerobic stress, when animals subjected to chronic stress by swimming were observed, the water swimming of rats was active, waterfall, and at the same time short in duration. neurosecretor with high functional activity It was found that the amount of cells (NSH) increased, the amount of neurosecretory substances (NSM) increased, and neurosecretory substances (NSM) decreased significantly compared to aerobic exercise.

When animals subjected to chronic mixed stress were observed, swimming of rats was active, splashing, and at the same time of short duration, it was found that the amount of NSH with high functional activity in the hypothalamo-pituitary neurosecretory system SOYa, PVYa increased, neurosecretory substances decreased, and relatively more were released into the blood.

By the 7th day of chronic mixed stress, rats' swimming in water was active and its duration increased, compared to the aerobic group, NSH with high functional activity in the hypothalamo-pituitary neurosecretory system SOYa, PVYa, as well as an increase in the amount of glial cells, a decrease in neurosecretory substances and blood separation was determined.

By the fourteenth day of the stress, it was observed that the swimming of the rats was regular, strong, and its duration increased, and the amount of NSH with high functional activity compared to aerobic stress in the nuclei of SOYa and PVYa, hyperhydratation of the nucleus, NSH, the index relative to the amount of glial cells, and the increase of the surface, at the same time, the amount of NSH subjected to karyolysis increased. increase NSX , in the middle lobe (O'D), hypothalamo-pituitary tract (GGT) neurosecretory substances were observed to decrease

Graph.1. Hypothalamic-pituitary-neurosecretory system reactivity in animals chronically challenged by mixed exercise—i.e., swimming in water at 10% load

By the 28th day of mixed chronic stress, the water swimming of rats is highly developed, strong, and the duration of free swimming activity is high. In SOYa and PVYa, the morphofunctional activity of NSH has the maximum activity, the amount of NSH with high functional activity increases to the maximum, the amount of NSH with medium and low functional activity decreases, the amount of NSH subjected to karyolysis increases, the index of the cell nucleus, relative to the cell cytoplasm, The amount of NSH, the indicator of the ratio to the amount of glial cells reduction, increase in the size of glial cell nuclei, maximum decrease in the amount of neurosecretory substances (NSM) was observed in NSHs, midbrain (O'D), neurohypophysis (NG).

In the 2nd month of physical stress, swimming of rats in water is normal, highly formed, activity is free, swimming duration is high. In SOYa and PVYa, the morphofunctional activity of NSH is preserved in the plane of the front group and has maximum activity. An invisible decrease in the amount of NSH with high functional activity, an invisible increase in the amount of NSH with medium and low functional activity, an increase in the amount of karyolysis NSH, cell nucleus, relative to cell cytoplasm, a decrease in the ratio of NSH to the amount of glial cells, glial cells core increase in size, invisible increase in the amount of NSM in NSH, O'D, NG was observed.

Summary

When rats were chronically challenged with a mixed strain of 10% load by swimming in water, after 3 months of the provided mixed type of physical strain, the rats' swimming in water was highly formed, their activity was free, and their swimming duration was high. When examining the morphofunctional reactivity in the hypothalamic-pituitary-neurosecretory system, the process of protective adaptation to chronic stress was ensured in both SOYa and PVYa. By the 3rd month, the functional activity of SOYa, PVYa NSX remained around the indicators of the 2nd month on the 28th day, increased the amount of karyolysis NSH, the cell nucleus, the index relative to the cell cytoplasm, decreased the amount of NSH, the ratio index to the amount of glial cells, increased the size of the nucleus of glial cells going, in NGOs, In O'D, in NG, there was an invisible increase in the amount of NSM.

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