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MORPHO-FUNCTIONAL ORGANIZATION OF THE HYPOTHALAMUS

Pardaeva Khurshida Olimjonovna

Senior Lecturer, Doctor of Philosophy in Biology,

Ph(D) of the Department of Biology of the JSPU named after A.Kadyri, Uzbekistan.

Abstract: This article covers the theory of critical stages of development of integrative activity of the brain in the phylogenesis of the vertebrate brain, considers quantitative parameters of temperature and their extreme fluctuations in natural conditions; it is considered that the duration and intensity of the increase, exposure to high temperature leads to the development of hyperthermia; facts of the negative impact of high temperature on physical performance are given, which leads to disruption of a number of body functions and the occurrence of stress reactions.

Keywords: hypothalamus, temperature, phylogenesis, hyperthermia, physical performance, integrative activity, heat load, stress reaction, individual adaptation.

The evolutionary approach to ecological patterns, physiological mechanisms of natural forms of adaptation, lability of functioning of a number of physiological systems in animals of different phylogenetic lines and ecological specialization in the process of their adaptation to the environment of modern neurobiology is of great importance in the field of research on this topic. From this point of view, the study of the comparative role of regulatory and motivational features of the organism and amazing natural forms of adaptation of a number of vertebrates to survive unfavorable environmental conditions seems to be a very urgent task [2, 4]. Based on the fundamental views of E. Haeckel on evolution as the combined development of the organism and the environment, the theory of aromorphosis by A.N. Severov, the evolutionary theoretical positions of L. Orbeli, the theory of the dominant by A.A. Ukhtomsky [6], the ecological-evolutionary views of D.A. Biryukov, the theory of critical stages in the development of the integrative activity of the brain in the phylogeny of the brain of vertebrates by A.I. Karolina and A.S. Batuev [1997], the development of these areas now forms a widely ramified network of studies [5]. It is known that among the ecological factors of the environment, temperature is a factor that has an intense effect on the organism [Slonim, 1976, 1986]. Quantitative parameters of temperature and their extreme fluctuations in natural conditions have conditional values for maintaining homeostatic processes. Under the influence of temperature, there is a significant strain on functional activity, the electrical activity of organs changes, shifts in the regulation of metabolism and water-salt metabolism occur, and the harmony and neuropeptide status of the body in various physiological states are determined [Nuriddinov 1991, Nuriddinov, Akhrorov 2010]. These studies show that the duration and intensity of increasing exposure to high temperatures leads to the development of hyperthermia, which is accompanied by a number of physiological and physicochemical changes that cause profound disturbances in the activity of functional systems. [5, 14-49]

Heat load causes losses, leads to a significant change in the volume of water and salts, the volume of electrolytes and blood composition, its formed elements, loss of live weight and bioenergetics of the body [Gafurov B.G., 1992, 1999].

Thus, the relevance of this problem is beyond doubt and is of extremely important fundamental significance associated with the activity of the body in extreme conditions. In Central Asia, this is evidenced by the facts of the negative impact of high temperatures on physical performance

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[Smirnov, 2012], which leads to disruption of a number of body functions and the occurrence of stress reactions [Meerov, Ptennikova, 1988, Sulimov, 1993].

Changes in the level of functional activity of individual systems, caused by the inclusion of mechanisms, contribute to an increase in heat transfer and thermogenesis. Of particular value in this regard are the statements of A. D. Slonim (1986), who, based on the teachings of A. A. Ukhtomsky (1966), attributes individual adaptation to environmental factors as the formation of a dominant functional system, to the natural developments of systemic and structural homeostasis in the cells of the body that are part of it.

The concept of "motivation" means "to occupy a certain place in physiology and to be involved in explaining the facts about the higher nervous activity (HNA) of animals that was disrupted at the dawn of the study. As A. S. Batuev rightly writes (1986), it becomes obvious that by ignoring the incentive motives of purposeful behavior, some scientists have combined its analysis and are ultimately forced to resort to such concepts as attraction, “motivation,” which are close to the concepts of motivation. [3; 130-157]

From the point of view of a physiologist, motivation, as well as the encompassing circle, which includes, in particular, appetite, hunger, satiety, thirst, are mechanisms underlying the satisfaction of the biological needs of the body [Meerov, 1990]. According to the author, this approach allows us to eliminate some of the ambiguity that arises when using physiological terms. This opinion is in good agreement with the ideas of I. P. Pavlov, A. A. Ukhtomsky (1966) about the dominant that determines the nature of behavior. From here it can be assumed that the motivation of thirst is a typical example of a physiological dominant that arises in connection with a deficit of water in the body and directs the corresponding search behavior. [7, 31-47] The leading role in creating a subjective state of thirst is assigned to the structures of the hypothalamus, where osmoreceptors are located, an activating influence is formed, addressed to other signaling apparatuses of the brain, up to the cerebral cortex. Given the scattered and contradictory nature of information concerning the central mechanisms of thirst, we consider it appropriate to conduct a systematic study of the mechanisms of participation of the hypothalamic nuclei in the formation of thirst motivation in rats and cats; behavioral reactions aimed at satisfying the body's need for water were studied. It seems important, using an objective electrophysiological method, to trace the specificity of the response of the lateral hypothalamus and associated cortical areas under conditions of thirst to the presentation of conditioned signals of varying importance. For this purpose, it was necessary to study the nature of changes in electrically active data of brain structures in free behavior and during the performance of a system of conditioned reflex runs associated with food reinforcement of various natures. [4; 167]

For the first time, a picture of the bioelectrical activity of the posterolateral nuclei of the hypothalamus and the sensorimotor cortex of the brain of animals (rats, cats) kept on a salt diet was revealed; It has been established that with instantaneous bilateral destruction of the posterolateral nuclei of the hypothalamus, conditioned reflex activity is developed with difficulty, and absolute positive right-sided conditioned reactions are not formed at all. It has been experimentally proven that with a normal diet, conditioned reflex runs and the receipt of unconditional reinforcement (food) take place in a strictly defined stereotype. A significant ease in the formation of conditioned reflex runs to fresh food is noted, compared to salty food. It was found that on the side of fresh reinforcement, rats ate grain of such a degree of saltiness in the first trials, which were previously rejected during runs to the salty feeder. This is also evidenced by the fact that against the background of strong and prolonged thirst, not only a decrease in the dynamics of the right-sided conditioned reflex was noted with salty food reinforcement, but also disinhibition of differentiated inhibition to sound signals occurred. This is also evidenced by the fact that against the background of strong and prolonged thirst, not only a decrease in the

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dynamics of the right-sided conditioned reflex with salty food reinforcement was noted, but also disinhibition of differentiated inhibition to sound signals occurred.

All of the above indicates that under conditions of a shift in the water-salt balance towards an increase in sodium chloride in the body and a lack of water, an adequate analysis of stimuli signaling the nature of food reinforcement was ensured due to the mutually combined activity of external taste and internal viscero-chemical receptors.

References:

1. Galyshenkov S.P. Blood physiology. The homeostasis system during muscle activity and at rest. - Saransk. - 2004. - P. 14-49.

2. Gafurov B.G., Khaidarov A.K. Motivation of thirst // Dushanbe.: DANRT. - 1996. - V. 39. - №1-2. P. 79-82.

3. Kassil V. G. Motivation as a factor in the formation of behavior in ontogenesis. In the book: Physiology of behavior. - L.: Nauka, 1987. - P. 130-157.

4. Meerson F. Z., Pshennikova M. G. Adaptation to stressful situations and physiological loads. - M., Nauka, 1988. - 218 p.

5. Nuritdinov E. N. Neuropeptides and behavior. - Dushanbe.: Sino, 2002. -150 p.

6. Nuritdinov E. N., Ivazov N. I. Hibernation and behavior. - Dushanbe; Donsh. 1992. - 197 p.

7. Pavligina R.A. Dominant and its importance in animal behavior. - M., 1982. - V. 13. - P. 31-47.