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MORPHOFUNCTIONAL FEATURES OF THE THYROID GLAND ARE NORMAL

Jo'rayeva Farangiza Erkinovna
Bukhara State Medical Institute named after Abu Ali ibn Sina

Abstract: The influence of thyroid hormones on the formation of the brain has been shown by numerous classical studies. However, the presence of neurons, astrocytes and microglia in the brain The 2021 release of TRα and TRβ receptors was associated with low TSH levels and poorer performance on tests of cognitive development in older adults with a mean age of (49.5 ± 7.4) years, without overt thyroid dysfunction.
Key words:thyroid gland, cerebral hypoperfusion, physical activity, cognitive abilities.

Introduction: Our experimental studies revealed that animals with a high level of cognitive abilities with cerebral hypoperfusion after 2–3 months in the thyroid gland there is a greater decrease in the specific proportion of perfused perifollicular hemocapillaries and mast cells than in animals with a low level of cognitive abilities [4,8,9]. Chronologically, these changes coincide with the second peak of mortality in animals with a high level of cognitive abilities, observed after bilateral ligation of the common carotid arteries [1,3].This is consistent with the results of clinical studies that demonstrated that serum triiodothyronine levels on admission to hospital with ischemic stroke can predict the patient's cognitive decline [7].
The aim of the study was to assess the dynamics of structural changes in the follicular apparatus and the hemomicrocirculatory bed of the thyroid gland in rats with cerebral hypoperfusion in rats with different levels of learning ability under prolonged exposure to physical exertion.
Materials and methods: The experiment was carried out on 240 rats of both sexes (120 males and 120 females), weighing 180–200 g, Wistar strain. The thyroid gland was studied 1, 6, 8, 8, 14, 28, 35, 60 and 90 days after surgery (comparison group), as well as when it was combined with 15 minutes of physical activity (experimental group). The animals of the experimental group, starting from the 7th day after surgery, were subjected to forced swimming in the pool every day for 15 minutes. In each group, two subgroups of equal size were identified: males and females (64 in the comparison group and 56 in the experimental group), animals with low and high levels of anxiety (64 in the comparison group and 56 in the experimental group), as well as animals with high and low levels of cognitive functions (64 and 56 animals, respectively). The thyroid gland was fixed in 10% neutral buffered formalin, and wiring was carried out with intermediate Blik mixtures. On serial microtome sections (5 μm) stained with Mayer's hematoxylin-eosin, the height of the thyroid epithelium of the follicles (Ht), the average diameter of the follicle (Df), and the area of a single island of interfollicular epithelium (Si) were determined. The specific proportion of hemocapillaries on the section (Sh) was also determined as a percentage of the total section area. Statistical analysis of the results was carried out using the StatSoft Statistica v6.0 software package. To assess the relationship between the studied indicators, the Kendal correlation coefficient was used. The significance of the differences in the measured parameters was assessed using the nonparametric Mann–Whitney test for two independent samples. P values $p<0.05$ were considered significant differences.
Results and discussion: changes in isolated cerebral hypoperfusion are characterized by periodicity – when a short-term increase in organ activity is replaced by its decrease. Also, results were obtained on a greater amplitude of changes in the studied parameters and a later growth of signs of organ activity in a subgroup with a high level of cognitive abilities. A single

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physical activity leads to a greater increase in the activity of the thyroid gland during cerebral hypoperfusion, which may have a positive value, based on the ability of its hormones to stimulate the neuroprotective mechanisms of astrocytes and shift the vector of differentiation of progenitor cells towards neurons. Average follicle diameter comparison group Control 10,2 ± 0,7; 9,3 ± 0,8; 45,0 ± 2,2;48,5 ± 2,1 ; experimental group 1 сут. 9,4 ± 0,4 8,9 ± 0,4; 49,5 ± 2,3; 53,0 ± 2,4; 6 сут. 6,0 ± 0,3; 8,3 ± 0,3; 37,5 ± 1,5 53,3 ± 2,5 : 8 сут. 5,8 ± 0,3 7,3 ± 0,3 6,1 ± 0,2* 8,0 ± 0,3*38,5 ± 1,6 53,3 ± 2,2 43,2 ± 1,8: 58,7 ± 2,4* 14 сут. 7,4 ± 0,3 7,6 ± 0,3 6,5 ± 0,3* 6,7 ± 0,3* 41,1 ± 1,8 46,0 ± 1,9 41,9 ± 1,7* 35,4 ± 1,4* 21 сут. 9,7 ± 0,4 8,5 ± 0,3 8,4 ± 0,4* 7,9 ± 0,3* 57,7 ± 2,8 49,2 ± 2,4 40,6 ± 1,7* 39,6 ± 1,7* 28 сут. 8,6 ± 0,4 9,7 ± 0,4 9,4 ± 0,4: 10,5 ± 0,5 58,2 ± 2,4 55,4 ± 2,4 35,1 ± 1,8* 44,4 ± 1,9* 35 сут. 7,6 ± 0,3 13,4 ± 0,6 10,1 ± 0,5^ 14,6 ± 0,7* 58,6 ± 2,4 60,7 ± 2,6 30,5 ± 1,4* 39 ± 1,9*60 сут. 9,8 ± 0,5 7,6 ± 0,3 7,8 ± 0,3* 6,5 ± 0,3* 47,5 ± 2,2 45,8 ± 2,2 53,3 ± 2,2* 51,7 ± 2,3^ 90 сут. 12,0 ± 0,5 10,0 ± 0,5 6,9 ± 0,3* 7,5 ± 0,4* 46,2 ± 2,3 40,8 ± 1,8 32 ± 1,4* 47,9 ± 2 м The active participation of the thyroid gland, which we revealed in the current study, not only in the development of cerebral hypoxia, but also in the neuroprotective mechanisms caused by physical exercise in individuals with a high level of cognitive abilities is potentially an important component of individualized therapy for ischemic brain damage. In addition, the shift of peaks of follicular activity from a later period to an earlier one and the elimination of intergroup heterochrony confirm our previously stated concept of restarting adaptive-compensatory mechanisms during cerebral hypoperfusion under the influence of physical activity

Conclusions: physical activity against the background of cerebral hypoperfusion leads to a restart of the adaptive-compensatory syndrome, which, in turn, is accompanied by an increase in the activity of the thyroid epithelium in the subgroup with a high level of cognitive abilities after 3 weeks, associated with a decrease in mortality.

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