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Ultrastructural changes of the thymus' hemocapillares in the condition of mild general dehydration

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Background. The microvascular bed, along with stromal and hematopoietic elements, is one of the most important tissue components of a thymus.

The study of morphological changes of thymic hemocapillaries under the influence of various factors allows, in particular, better understanding of the hematothymic barrier function as a selective structure in the immunogenesis regulation and its role in the development of compensatory-adaptive responses under specific conditions.

Aim. The objective of the study was to establish features of ultrastructural changes of rats` thymus hemocapillaries under conditions of the mild general dehydration.

Methods. 12 rats were involved in the experiment. 6 rats formed the control group and were kept under normal vivarium conditions. The mild degree of dehydration was modelled in other 6 rats and achieved in 3 days. Rats were kept on a completely waterless diet and fed by granulated feed.

When animals were taken away from the experiment, we selected the thymus and prepared samples for investigating the organ ultrastructure by electron microscopy.

Results. Under experimental conditions of the mild general dehydration, we observed deformation and lumen narrowing of some hemocapillaries in the rat`s thymus. The nuclei of capillary endotheliocytes acquire an elongated shape with pronounced invaginations, directed both towards the lumen of the capillary and towards the basal membrane. Chromatin is redistributed, acquiring mainly the form of a peripherally thickened band located along the contour of the nucleus, but does not completely lose its diffuse distribution.

The nucleolus has a typical structure. Areas of cytolysis are noted in the cytoplasm, free ribosomes are found. Mitochondria are hypertrophied and characterized by decomplexation straightening of cristae and dissociation of membranes. The endoplasmic reticulum has the appearance of elongated cisterns. Golgi complexes in most cells are represented by flat cisterns with bound vesicles. The basement membrane has a different thickness. Narrowing of the subendothelial zone may be a sign of changes in pressure in the blood capillaries at the initial stage of hypoxic disorders.

Conclusion. Structural changes in the thymus under conditions of the general mild dehydration significantly affect the hemocapillaries and form the morphological basis for the development of endothelial dysfunction, which in turn contributes to the formation of compensatory-adaptive response of the body to dehydration.

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