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Structural-Functional Properties of Stress and Thymus

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Annotation: Relevance of the study. It is known that stress has an immunomodulatory effect associated with an increased risk of developing infections, tumors and autoimmune conditions, but despite the number of consistent studies in this regard, it is possible to fully understand the essence of immunomodulation that causes stress there is no possibility.

Keywords: thymus, immunity, stress, ontogenesis, morphology

Relevance. It is known that the thymus is the central organ of the immune system. Over the thymus, the connective tissue capsule is covered and its continuation trabeculae divide the organ, but the base of the thymus is the cell elements thymus lymphocytes and the epithelial cells that make up the "skeleton" of the thymus forms several species. The ability of the body to respond to stress by modulating its immune functions to a number of factors, in particular, it depends on age, gender, life history, type of stress and duration of exposure. Experimental on the features of age-related changes in immunomodulation that cause stress when data on this topic are consideredthe work is mainly devoted to the opposite change in the immune response in young and old people, while infancy, the age of transition to self-feeding and early childhood are the least studied. Immunity during this period is infectious caused by many infectious diseases, especially capsular bacteria (Haemophilus influenzae, Streptococcus pneumoniae, Neisseria meningitidesalthough it is known to be very susceptible to disease, because it is an immune reaction of bacteria to capsular polysaccharides. it develops towards the end of the infantile period and is annually in the world5 million children under 5 years of age die from these infections. The study of immunomodulatory shifts in the body is of interest from a practical point of view, in particular, the development of therapeutic tactics (preventing the development of post-stress pathology). The type of stress factor (physical, psychological, mixed) also affects the level and nature of immunomodulation. The human Cube has been more susceptible to the effects of psycho-emotional stress factors since centuries, psycho-emotional stress models for extrapolating the results of experimental studiesit is advisable to focus on. In the early stages of ontogenetic development, the influence of various types of stress factors, both physical and psycho-emotional, on the structure of immune organs has been poorly studied, and it is still the basis of quantitative immunohistochemistryit has not been studied using modern methods. There are many contradictions in understanding the direction of immune shifts caused by stress and the mechanisms of their formation. Thus, numerous studies have shown that chronic stress is immunosuppressive to the human body and experimental animalsit demonstrates its effects, but a number of studies have shown its ability to enhance immune response. One of the main manifestations of thymic movement involution is the attenuation of lymphoid cells: to a greater extent it comes from the cortical and to a lesser extent from the medulla, but its causes remain unclear: cessation of lymphocyte proliferation, cell death or acceleration of exportsfunctionally immature cells lead to hypoplasia - the answer to this

question can only be given by a thin complex quantitative immunohistochemical analysis of lymphocyte subpopulations in the area of the thymus itself and peripheral lymphoid organs. timik by immigrantsplaced.

Taking into account the above, we conducted a comparative study of the chronic immunomodulatory effects of various

The growing organ of experimental animals using modern methods of morphological research (immunohistochemistry and automatic image analysis A criminal case has been initiated on this fact, an investigation is underway. Morphological examination is a modern technique (immunohistory and motor vehicle analysis) experimental stress learning the effect (physical and psycho-emotional)is considered very important. The purpose of this study is to study ontogenetic dependence of physical and psycho-emotional stresses on immunomodulatory effects during the development of thymus random involution in a growing organism.

To achieve this goal, the following tasks were set:

1. To study the influence of chronic stress caused by the influence of physical factors on the structure of the thymus of the growing organism of experimental animals in the periods of breast, breastfeeding and baby.

2. A comparative study of the peculiarities of thymus involution during psycho-emotional stress in the early stages of postnatal ontogenesis. 3. Determination of the relationship between the processes of proliferation of thymocytes and cell death in various chronic stresses.

Microscopic structure of the thymus in humans and other mammals

Phylogenetically, the thymus is a very conservative organ, which apparently reflects the perfection of histophysiology, which was formed much earlier on the phylogenetic ladder. The thymus is a lobe cell surrounded by a thin fibrous capsule in young and humans and other mammals, whose invagination forms connective tissue SEPTA, divides the thymus lobes into many small "pseudolobules" and controls blood vessels. and nerves penetrate into the center of the organ. In each lobule there is the most superficial subcapsular zone (cells consisting of 4-5 cells, where the progenitor cells begin the path of differentiation), a Cortex containing immature developing thymocytes, and an internal medulla, from where mature T cells migrate to peripheral immune organs. The subcapsular / subtrabecular layer, limited to Type I epithelium, is the most important in the structure of the thymus, since it initiates thymopoiesis and produces most of the thymic hormones, but this is not recognized by all researchers. In addition, the cortical substance has an intermediate or middle zone and a zone bounded by the medulla (inner zone), the zone bounded by the medulla by the cortical substance and the deep zone of the medulla. The cellular division of the thymus provides in its territory a micro-environment optimal for thymocytopoiesis, which to some extent is reflected in the phylogenetic conservatism of the structure of organs. This micromohit, on the one hand, is limited to the basic histocompatibility complex, on the other hand, it provides a unique opportunity to quickly create a diverse, functional T-cell Repertoire, limiting itself to self-tolerance. The subcapsular (subcapsular) zone and the cortico-medullary border are the places of entry of thymocytes into the parenchyma of the organ of the precursors of the bone marrow. Regardless of the location of the entrance, they quickly move to the subcapsular zone and experience many important events along the path of differentiation, for example, induction of T-cell commitment, cell reproduction, reorganization of the T-cell receptor gene, accessory receptor

expression. including cytokine receptors. There is a tendency for hereditary development along the CD4 line in the cortex. Cells that represent the CD4 differentiation cluster can migrate directly to peripheral immune organs, bypassing the medulla's two main zones of the thymus: the outer and inner layers of the cortex differ from each other not only in cell composition. Induction of reproduction and differentiation of thymocytes at different stages of the cell cycle of thymocytes and at different stages of differentiation indicates that programmed death and positive selection occur in the outer layers of the cortical substance, and in the inner layers. Thus, the stages of maturation of thymocytes, determined by their specific phenotypes, are associated with their location in thymus units. The thymus is characterized by complex cooperation between the parenchymal and stromal elements of the organ. Stromal epithelial cells are a stable component of certain regions of the thymus lobules, while lymphoid cells are temporary elements, the precursors of which pass from the bone marrow to the thymus, and after ripening, most of the thymocytes migrate to the peripheral departments of the immune system. The cellular and humoral microenvironment factors formatted by stromal elements and thymic epithelial cells act on the precursors of T lymphocytes and control the maturation of T cells, their differentiation in subpopulations and clonal selection. T lymphocytes are derived from stem cells originating from the red bone marrow. T lymphocytesthere is a migration of precursors from Red Bone support to the thymus, followed by the emigration of mature thymocytes to peripheral immune organs. In short, the changes that occur in the thymus affect not only the IMUN system, but also the nervous system to some extent.

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