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ULTRASTRUCTURAL AND TISSUE REORGANIZATION OF RAT ATRIAL MYOCARDIUM UNDER THE INFLUENCE OF ACUTE AND CHRONIC PRENATAL HYPOXIA

The study was performed as a part of research work “Structural rearrangements of components of the cardiovascular system under conditions of normal and abnormal histogenesis in human and experimental animals” (state registration number 0114U005592).

ABSTRACT. Background. There are relatively few researches that focused on the study of the influence of hypoxia on atrial myocardium. However the results of previous researches are contradictory and fragmentary, that leads to the further study of this item. **Objective.** Purpose of the work was to determine the tissue, cellular and ultrastructural changes of the rat atrial myocardium during the stages of cardiogenesis under the conditions of acute and chronic prenatal hypoxia. **Methods.** Embryo hearts were investigated on 14th, 16th and 18th day of prenatal ontogenesis, newborn rat hearts and the hearts of rats on the 3rd, 14th and 30th day of postnatal ontogenesis. Animals were subdivided into three groups: first experimental group animals were exposed to acute prenatal hypoxia, second experimental group animals were exposed to chronic prenatal hypoxia and control group animals. Hypoxia modeling was conducted on pregnant females by injection of 1% sodium nitrite intraperitoneally in doses that lead to moderate hypoxia. During the work complex of histological, immunohistochemical and morphometric methods was used. **Results and conclusion.** Effect of acute hypoxia leads to stimulation of proliferative activity of fibroblasts and endothelial cells on the right atrium, which causes to increasing of the relative volume of connective tissue and blood vessels of microvasculature of myocardium. Relative volume of connective tissue of the atrial myocardium exceeds significantly the control level of newborn rats. Ultrastructural changes of the atrial cardiomyocytes in 3 days after the influence of acute prenatal hypoxia reveals on violation of mitochondrial structure, significant inhibition of myofibrils accumulation. Until the birth of most of morphometric parameters renewal and reach control levels, however changes of the degree of myofibrils orientation on the left atrium proves stability of hypoxic damages. Chronic prenatal hypoxia causes a significant increase of relative volume of connective tissue and microvessels content of the myocardium compared with control values. Proliferative activity of fibroblasts and endothelial cells stays increased on the atrial myocardium of newborn rats. Relative volume of connective tissue observed higher significantly in 30 days after the birth. Persistent intracellular hypoxic changes of cardiomyocytes, which observed in 30 days after the rats birth, are increase numerical density of mitochondria, decrease of relative volume of myofibrils and degree of myofibrils orientation on the left atrium.

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