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**LIVER STRUCTURE AND FUNCTIONAL STATE OF TWO-MONTH-OLD RATS WITH PRENATAL NUTRIENT DEFICIENCY**

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Diseases of the digestive system are one of the leading causes of disability and mortality of the population in Ukraine and the European region. Contemporary scientists have proven the relationship between the conditions, to which the fetus was subjected, and the development of diseases in adulthood. Thus, rats subjected to prenatal protein deficiency have been found to have retardation of growth and development, and also adult rats developed atherosclerosis, type 2 diabetes mellitus, and other diseases. Although there are studies of the effects of nutrient deficiency on the rat mothers’ organism, it is its effect on the liver of offsprings that has not been studied enough.

**The purpose** of our study was to determine the morphofunctional state of the liver in two-month-old rats, who have suffered from prenatal nutrient deficiency.

**Materials and methods.** The study was conducted in offsprings of 13 randombred female rats from the WAG population: 7 of which were given a basic vivarium diet and represented a control group; and the remaining 6 were given a diet with insufficient nutrients and comprised the second group. The rat offsprings from both groups were withdrawn from the experiment immediately after birth in the number of 26 animals (50% of which were control) by decapitation. The immunohistochemical method was used to detect the expression of nitrogen oxide markers, eNOS and iNOS, in liver tissue using concentrated polyclonal rabbit antibodies produced by Thermo Scientific (Germany). The functional state of the liver was assessed by the level of glycogen in the organ tissue, which was measured by the spectrophotometric method according to V.G. Asatiani. Statistical processing of results was carried out using the GraphPadPrism5 software. The Mann–Whitney U test was used to determine the significance of differences.

**Results and discussion.** The immunohistochemical examination of endothelial dysfunction markers revealed a moderate decrease in the expression levels of endothelial nitric oxide synthase (eNOS) in all liver samples of the two-month-old offsprings from the second group in comparison with the control, which indicated the high intensity of damage to the liver parenchyma of the rat offsprings. In addition, progressive reduction of iNOS was found in endotheliocytes of sinusoids, muscular layer of the vascular wall, portal tract stroma, and hepatocytes. This also suggested severe damage to the organ structure. The functional state of the liver was assessed by the level of glycogen in the organ tissue. A decrease in its level by 4.89% (p 0.0039) was found in rats of the second group compared to the control group, which indicated impairment of the processes of glycogen synthesis and disposal, and suggested reduced functional activity of the organ. The identified changes in the structure and functional state of the liver in the two-month-old rat offsprings subjected to prenatal nutrient deficiency allow assuming the inclusion of mechanisms of epigenetic programming of morphofunctional liver disorders, which can become a risk factor for the development of various organic pathologies of the organ in future.

**Conclusions.** Thus, the obtained study data allow to draw a conclusion about the negative effect of nutrient deficiency in rat mothers on the morphofunctional state of the liver of their two-month-old offsprings that was manifested by significant damage to the liver endothelium as well as reduced functional activity of the organ, which can either worsen further and cause such diseases as type 2 diabetes mellitus or may be reversed with time.