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DYNAMICS OF BRAIN ENZYMES ACTIVITY IN RAT EXPOSED TO HYPOXIA

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Abstract

The aim of the work was to study the dynamics activity of lactate dehydrogenase (LDH; EC 1.1.1.27), aconitase (AH; EC 4.2.1.3), NAD-dependent malate dehydrogenase (MDH; EC 1.1.1.37), succinate dehydrogenase (SDH; EC 1.3.99.1) in homogenates and sub-fractions of brain structures of rat prenatally endured hypoxia at the organogenesis stage (in 11–15 days of development) and their role in the formation of compensatory - adaptive mechanisms in brain in postnatal ontogenesis. It was revealed that increasing of lactate dehydrogenase and malate dehydrogenase activity ($P<0.001$; $P<0.01$, correspondently) in the brain structures of the rats prevented metabolic disturbances in the regulation mechanisms of biosynthetic and bioenergetics processes in the brain. It has been shown that prenatal hypoxia upregulates aconitase activity in postnatal development and this process, probably, has a reversible character ($P<0.01$), the highest indices of succinate dehydrogenase activity were noticed in the hypothalamus and cerebellum of 30-day-old rat as compared to the other structures ($P<0.001$). Based on the data obtained, it can be concluded that hypoxia at the stage of organogenesis leads to a change in the energy supply process of the brain structures and, possibly, is irreversible. Analysis of changes in the enzymatic system in ontogenesis allows us to identify adaptation mechanisms and to assess the dynamics of changes in enzyme activity when the functional state changes, which make it possible to identify adaptive reserves of enzymes LDH, AH, MDH and SDH in brain exposed to hypoxia.

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