

THE BIOCHEMICAL INDICATORS OF SUBCELLULAR FRACTIONS OF RAT LIVER UNDER CHRONIC EXPOSURE TO NITRIC OXIDE

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Introduction. Nowadays, nitric oxide is one of the most studied subjects of biochemical research. According to infinite number of scientific works, NO shows therapeutic action in a wide range of diseases, however, may lead to pathological changes in organism.

Purpose. The purpose of our research is to study the effect of inhaled nitric oxide on healthy rat's liver in chronically use of NO. For getting data we investigate dynamics of oxidizing and power metabolism in subcellular fractions of liver after nitric oxide inhalations use within 30 and 60 days.

Materials and methods. The research was conducted on 56 Wistar rats, divided on 7 groups. The 1st group was intact animals. Groups 2, 3, 4 were daily received NO inhalations during 5 min within 30 days from the NO generator (RFNC, Sarov) in concentrations such as 20ppm, 50ppm и 100ppm. Groups 5, 6, 7 after a course of inhalations (30 days) had a recovery period within another 30 days. Animals were brought out of an experiment by decapitation under anaesthetic. Subcellular fractions of liver were received by a path of differential centrifugation. For getting data we used biochemiluminescence (BHL) and spectrophotometry methods. In a homogenate, cytosol and mitochondrial fraction of liver the content of malonic dialdehyde (MDA), intensity of processes of a lipoperoxidation and the total antioxidant activity (TAA) were determined by biochemiluminescence method. Also we determined the activity of superoxide dismutase (SOD), catalase, aldehyde dehydrogenase (ALDH), alcohol dehydrogenase in direct (ADGred) and receive (LDGox) reaction, lactate dehydrogenase in direct (LDGred) and receive (LDGox) reaction. For identification metabolism violations the index of energy metabolism balance (IEMB) was calculated according to the formula $IEMB = (LDHred/LDHox)/(LDHox/LDHred) \times 100$.

Results. Intensity of the lipoperoxidation processes was established to be increased at concentration NO 100 ppm for the 30th day, as well as dose-dependent increase of the lipoperoxidation processes activity for the 60th day. On the 30th and 60th day was noted statistically reliable diminution of TAA at NO concentration 100 ppm.

It was shown that NO inhalations induce decrease of SOD activity as well as activity of the antioxidant system. Thereof increase of the MDA concentration in subcellular liver fractions was occurring. Dose-dependent NO effect is supposed to be connected with gradual accumulation of lipoperoxidation products in liver that may be explained by its function to protect organism by detoxification, thus accumulating toxins affect. It's confirmed by the data of dehydrogenase enzymes

and catalase activity. ADGred/ADGox balance specifies on reaction bias aside increase of aldehyde formation. In turn, ALDH and catalase activity increase that points to recycling of forming aldehyde. IEMB attests on displacement of glycolysis activity in the direction of anaerobic process. At the same time it's possible to trace relation on introduced NO concentration. It was find that NO concentration 100 ppm often shows the damaging action, 50 ppm induce an optimal rise of enzymes activity and 20 ppm corresponds to the weak influence and the fastest restitution of oxidoreductases activity balance in organism.

Conclusion. Dose-dependent effect was established according to the BHL data. 100 ppm NO appeared to be the most toxic concentration. At the 30th and 60th days after the beginning of exposure development of an oxidizing stress was revealed in homogenate fraction, which was proved by increase of the lipoperoxidation processes and decrease of TAA. Received data tells about damaging effect of the NO on liver, that proved by BHL and spectrophotometry. This effect is the most legible traced at 60th day, that let to assume an interrelation between damaging effect of the NO and liver functions. Also, the increase of ALDH activity was observed, especially expressed at use of NO concentration 20 ppm.