

NITRATES AND NITRITES SIGNIFICANCE IN THE DEVELOPMENT OF ALCOHOLIC LIVER DISEASE

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Alcoholism is one of the most common addictions affecting health and the immune system in people worldwide. Chronic alcohol consumption over a prolonged period of time causes metabolic liver injury, along with arginine metabolism and nitric oxide (NO) synthase disorders. Ethanol intoxication under cumulative nitrooxidative and nitrosative stress conditions, as well as in inflammation, stimulates the production of NO anion (NO⁻) and superoxide anion (O₂⁻), i.e. peroxynitrite formation in hepatocytes and endothelium. Mitochondrial dysfunction and disorders of adenosine triphosphate (ATP) molecules synthesis in hepatocytes cause disorders of intra - and extracellular antioxidants synthesis (glutathione and superoxide dismutase) and neutralization of toxic nitrates and nitrites. Peroxynitrites damage cell membranes lipoproteins, as well as the membrane enzyme systems and the mitochondrial matrix. They also damage the enzymes of ethanol and arginine metabolism in cytosol, and nucleic acid repair enzymes in hepatocytes. In the development of alcoholic liver disease (ALD), peroxynitrites cause reversible injuries of the structure and function of hepatocytes that proceed irreversibly, and vascular sinus endothelial damage, mediated by the mechanisms of apoptosis and necrosis.

Considering the fact that 3.3 million people die of ALD and its complications annually, the measures should be taken and aimed at reducing the onset, development, and progression of ALD. The priority is timely ALD diagnosis, as well as the severity of alcoholic liver damage. The studies have shown that the values of peroxynitrite elevation correlate with the severity of liver injury. It can be concluded that timely determination of peroxynitrite values followed by suitable antioxidant therapies may slow down the processes of hepatocyte apoptosis and necrosis, as well as the course of ALD.

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