

Abstract

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The influence of L-carnitine supplementation on the antioxidative abilities of serum and the central nervous system of ethanol-induced rats.

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OBJECTIVE: The brain is exceptionally susceptible to oxidative stress that may be caused by xenobiotics such as ethanol. Alcohol metabolism is accompanied by enhanced free radical formation and a decrease in antioxidant abilities. However, L-carnitine appears to have antioxidant properties and the ability to regulate ethanol metabolism. The present study was designed to estimate the effect of L-carnitine on the antioxidant capacity of the rat brain and blood serum.

METHODS: For 5 weeks during the study, L-carnitine was given to rats in the amount of 1.5 g/l of drinking water, and from the second week the rats were intragastrically treated with ethanol.

RESULTS: A significant decrease in the activity of antioxidant enzymes (Cu,Zn-SOD, GSH-Px, GSSG-R and CAT) and in the level of non-enzymatic antioxidants (vitamin C, E, A, GSH and GSH-t) as well as a significant increase in the level of GSSG in the brain and blood serum of ethanol intoxicated rats have been demonstrated. It has also been shown that alcohol caused a significant increase in the level of lipid peroxidation products-lipid hydroperoxides, malondialdehyde and 4-hydroxynonenal-and an increase in dityrosine, as well as a decrease in tryptophan-markers of protein oxidative modifications. The administration of L-carnitine to ethanol intoxicated rats partially normalized the activity of the examined enzymes and the level of the above non-enzymatic antioxidants. Moreover, L-carnitine significantly protects lipids and proteins against oxidative modifications.

CONCLUSION: In conclusion, it has been proved that L-carnitine protects rat brain and blood serum against oxidative stress formation and it is possible that this small molecular amine has a similar beneficial effect on the human CNS.

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