L-tyrosine Administration Effect on the Activity of Choline Acetyltransferase and Acetylcholinesterase in Brain of Rats Treated with Antioxidants

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INTRODUCTION: Tyrosinemia type II is an inborn error of metabolism caused by a mutation in a gene encoding the enzyme tyrosine aminotransferase then occurring a tyrosine accumulation in the body. Studies have shown that the cholinergic system may be changed at this inborn error of metabolism through oxidative stress. **OBJECTIVE:** Whereas the tyrosine accumulation can compromise the cholinergic system through oxidative stress, the objective of this study was to investigate the effects of chronic administration of L-tyrosine on the activity of choline acetyltransferase and acetylcholinesterase in the brain of rats treated with antioxidants. **MATERIAL AND METHODS:** The animals were divided into 3 groups: control, L-tyrosine, L-tyrosine + N-acetylcysteine (NAC) + deferoxamine (DFX). The administration occurred the 7th to the 28th day of life of the animal being administered L-tyrosine (500 mg/kg of body weight) intraperitoneally 12/12 hours and NAC (20 mg/kg) subcutaneous 12/12 hours and DFX (20 mg/kg) once every other day subcutaneous. Twelve hours after the last administration the animals were euthanized and structures cortex, hippocampus and striatum were separated for analysis. **RESULTS AND DISCUSSION:** The activity of choline acetyltransferase was decreased in the hippocampus in L-tyrosine and L-tyrosine + NAC + DFX groups, and in the cortex there was also a decrease in their activity, but only in the L-tyrosine group. The activity of acetylcholinesterase was increased in all analyzed structures, where the hippocampus and striatum structures antioxidants reversed this increase. **CONCLUSION:** The results show that the cholinergic system is changed, possibly by chronic administration of L-tyrosine. The decrease of choline acetyltransferase activity and increased acetylcholinesterase activity indicate a possible increase in acetylcholine. The results show that antioxidants used may partly restore this dysfunction of the cholinergic system.

Keyword: acetylcholinesterase, choline acetyltransferase, tyrosinemia type II.
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