Acute Administration of L-tyrosine Alters Energetic Metabolism of Hippocampus and Striatum of Infant Rats

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**INTRODUCTION:** Tyrosinemia type II is an inborn error of metabolism caused by mutations in the gene that encodes tyrosine aminotransferase, an amino acid responsible for the syntheses of thyroid hormone, melanin pigmentation, and catecholamines, which leads to increased blood tyrosine levels. Considering that the BBB of infant rats would have greater permeability to catecholamines and also be susceptibility to oxidative stress, in the present study, we evaluated the effect of acute administration of L-tyrosine on the activities of enzymes citrate synthase, malate dehydrogenase, succinate dehydrogenase, and complexes I, II, II-III, and IV of the mitochondrial respiratory chain in the posterior cortex, hippocampus, and striatum of infant rats.

**MATERIAL AND METHODS:** Wistar rats were killed one hour after a single intraperitoneal injection of tyrosine (500 mg/kg) or saline. The activities of energy metabolism enzymes were evaluated.

**DISCUSSION AND RESULTS:** Our results demonstrated that the acute administration of L-tyrosine in rats after 10 days inhibited the citrate synthase enzyme (48.83%), and complex I (23.94%) and II (82.42%) activity of the mitochondrial respiratory chain in the striatum. The malate dehydrogenase, succinate dehydrogenase enzymes, and complex II-III activity were increased in the hippocampus (100%, 52.73% and 33.33% respectively). Furthermore, complex IV activity was not altered by an acute administration of L-tyrosine. In particular, several groups reported that systemically administered tyrosine is differentially distributed across brain regions.

**CONCLUSION:** In conclusion, our results indicate an alteration of the energetic metabolism in the hippocampus and striatum of infant rats. If the alteration of these enzymes activities also occur in the brains of patients, it is possible that energy metabolism and function may be altered.

Keywords: Tyrosine; tyrosinemia type II; energy metabolism.

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