Nerve Growth Factor Levels are Decreased in Hippocampus of Rats after Acute Administration of Branched Chain Amino-acids

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Introduction: Maple Syrup Urine Disease (MSUD) is a neurometabolic disorder that leads to the accumulation of branched chain amino-acids (BCAA) leucine, isoleucine and valine and their α-keto branched chain. Objectives: Considering that neurotoxic mechanisms in MSUD are poorly known, this study aimed to evaluate the effects of BCAA administration on the levels of nerve growth factor (NGF) in rat brain. Methods: Wistar rats (10 and 30 days) received three injections of a pool of BCAA (15.8 μL/g body weight) containing leucine (190 mmol/L), isoleucine (59 mmol/L) and valine (69 mmol/L) or saline (control group), at intervals of one hour between injections, subcutaneously. One hour after the last administration the rats were killed by decapitation, the brain was removed and cerebral cortex, hippocampus and striatum were isolated. NGF levels were analyzed by enzyme-linked immunoassay. Results: We observed that there was a decrease in the levels of NGF only in the hippocampus of 10 and 30-day-old rats after administration of BCAA. Conclusions: Given that an fluctuations in the levels of NGF in the central nervous system lead to a series of learning disabilities and impaired memory, we speculate that our findings may be related to cognitive deficits observed in MSUD patients.

Keywords: Maple syrup urine disease; branched chain amino-acids; NGF
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