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Monosodium glutamate-induced cerebellar toxicity: Possible role of nitric oxide in adult albino rats

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Introduction: Several studies indicated that monosodium glutamate (MSG) disrupts the metabolism, the development, and the functions of various organs, such as liver, thymus, ovaries, kidney, and many parts of brain, including cerebellum. Nitric Oxide (NO) is known to be responsible for the organization of many biological events in the mammalian body as a second messenger and a neural messenger. Some studies found that NO is a neuroprotective substance while others qualify it as a neurotoxic.

Aim: This study was designed to investigate the effect of non-selective inhibition of nitric oxide synthase enzyme isoforms on cerebellar structure and function in normal rats and in rats with MSG-induced cerebellar toxicity.

Materials & Methods: The study groups included thirty two SD rats which were divided into 4 groups; control, LNAME-treated, MSG- treated and LNAME+MSG-treated groups. Motor coordination was assessed by rotarod test. Cerebellar nitrite concentration was measured. Histopathological evaluation of cerebellar structure and immunohistochemical examination for caspase-3 were done.

Results: Both LNAME and MSG treatments significantly impaired cerebellar function and resulted in marked cerebellar injury and an increase in apoptosis. This effect was most prominent with combined treatment with LNAME and MSG.

Conclusion: Current study results suggest that NO has a neuroprotective role in the cerebellum as inhibition of nitric oxide synthase enzyme impaired cerebellar function in normal rats and accentuated MSG-induced cerebellar toxicity.

Biography

Heba Youssef has completed MD in Clinical Toxicology from Faculty of Medicine Ain Shams University, Cairo Egypt in 2005 and Postdoctoral studies from ASU School of Medicine. She was the initiator of Medical Crisis Management Unit Faculty of Medicine ASU from 2011-2013. Currently, she is the vice dean for community services and environmental development affair Faculty of Medicine Port Said University since November 2014. She has published more than 18 papers in reputed journals at national and international levels.

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