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Effect of chronic exposure to aspartame on oxidative stress in the brain of albino rats.

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Abstract

This study was aimed at investigating the chronic effect of the artificial sweetener aspartame on oxidative stress in brain regions of Wistar strain albino rats. Many controversial reports are available on the use of aspartame as it releases methanol as one of its metabolite during metabolism. The present study proposed to investigate whether chronic aspartame (75 mg/kg) administration could release methanol and induce oxidative stress in the rat brain. To mimic the human methanol metabolism, methotrexate (MTX)-treated rats were included to study the aspartame effects. Wistar strain male albino rats were administered with aspartame orally and studied along with controls and MTX-treated controls. The blood methanol level was estimated, the animal was sacrificed and the free radical changes were observed in brain discrete regions by assessing the scavenging enzymes, reduced glutathione, lipid peroxidation (LPO) and protein thiol levels. It was observed that there was a significant increase in LPO levels, superoxide dismutase (SOD) activity, GPx levels and CAT activity with a significant decrease in GSH and protein thiol. Moreover, the increases in some of these enzymes were region specific. Chronic exposure of aspartame resulted in detectable methanol in blood. Methanol per se and its metabolites may be responsible for the generation of oxidative stress in brain regions.

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