**NMAD2B** expression in hippocampus of rat treated with flavor enhancing agents containing monosodium glutamate

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**Statement of the Problem:** Glutamate is abundant excitatory neurotransmitter in the brain. Glutamate acts through ionotropic and metabotropic glutamate receptors. One family of ionotropic receptors is N-methyl-D-aspartate (NMDA) that may participate in synaptic transmission and synaptic plasticity in the hippocampus that are abundant in the adult hippocampus and cerebral cortex, which are critical regions in the brain for learning and memory processes. The purpose of this study is to assess the effect of mono sodium glutamate (MSG) neurotoxicity elicited by activation of NMAD2B gene in rat hippocampus.

**Methodology & Theoretical Orientation:** 16 male Wistar rats were divided into 2 groups as the following: Control (n=8): Rats were received vehicle (0.7% carboxymethylcellulose; CMC) via orogastric gavage once day after day for four successive weeks. MSG group (n=8): rats were received 4 mg/kg MSG dissolved in distilled water via orogastric gavage once day after day for four successive weeks. At the end of the experimental period, rats were sacrificed via decapitation under light ether anesthesia. The entire hippocampus was removed and homogenized. The homogenates of hippocampus were centrifuged and supernatants were separated and used for RT-PCR gene expression of NMAD2B.

**Findings:** MSG group was showing a significant elevation in NMAD2B expression (6.2±0.1, P<0.001) compared to control group.

**Significance:** Glutamate excitotoxicity involves over-activation of NMAD2B receptors which may lead to release of Ca\(^{2+}\) from the intracellular stores, which causes over activation of enzymes like protein kinases leading to the degradation of proteins and membranes, thus enhancing cellular damage.

**Recommendations:** MSG intake is advised to be less consumed or to be added to another complementary flavor to ameliorate the flavor associated neuro-toxicity and overcome expected other MSG toxicities in other organs.

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