Abstract 7

Measurement of DNA damage, oxidative stress, and gene expression of β-catenin and p53 genes in liver and brain of male mice receiving monosodium l-glutamate monohydrate

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Objective: Monosodium L-glutamate (MSG) monohydrate is widespread nutritional additive and flavoring agent frequently consumed all over the world. In this study, we investigate the action of daily oral intake of MSG monohydrate *in vivo* using mammalian systems.

Methods: Mice divided as follows: Group I (normal control), Group II, and Group III treated with MSG for 2 and 4 weeks, respectively. Brain and liver dissected out for the detection of fragmented DNA, DNA damage, and assay of oxidative stress markers. Moreover, expression levels of ß-Cat and p53 genes were measured by a real-time quantitative polymerase chain reaction.

Results: The results showed a significant difference in MSG treated group at the two-time intervals than the control one regarding parameters of oxidative stress reflected by the significant rise of malondialdhyde (MDA), nitric oxide (NO) and oxidized glutathione (GSSG) and these were accompanied by a significant decline in glutathione (GSH) and a ratio of oxidized and reduced GSH (GSH/GSSG) in both tissues. Significant elevation of laddered DNA and oxidative DNA damage was observed in groups treated with

MSG. In addition to a significant decline in gene expression of ß-Catenin in liver and brain tissues with elevations in the gene expression of p53 in the brain. Furthermore, the p53 gene in liver tissue was significantly up-regulated in mice administered MSG for 15 days and was down-regulated after 30 days of MSG intake compared with the control.

Conclusion: According to our results, oral consumption of MSG leads to oxidative stress-mediated DNA damage and apoptosis.

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