



Alteration in Glutathione and Its Metabolizing Enzymes in Cardiac Tissue Upon Oral Ingestion of Monosodium Glutamate to Hypercholesteremic Adult Male Mice

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ABSTRACT : Monosodium glutamate (MSG) was orally administered at dose levels of 4 and 8mg/g body weight to hypercholesteremic adult male mice for 6 consecutive days and its effect was observed on 31st day after the last injection by evaluating the changes in total-sulfhydryl (TSH) group, Non-protein bound sulfhydryl (NPB-SH) group and protein bound sulfhydryl (PB-SH) and glutathione metabolising enzymes like glutathione reductase (GR) and glutathione peroxidase (GPx) enzymes in cardiac tissue of hypercholesteremic adult male mice. The animals were divided in four groups each comprising 6 mice. Group-I: Control, Group-II: Hypercholesteremic animals, Group-III: 4mgMSG/g body weight + hypercholesteremic animals and Group-IV: 8mgMSG/g body weight + hypercholesteremic animals. Animals were fasted overnight and sacrificed by decapitation. The 10 per cent homogenate was prepared in 100mM potassium phosphate buffer (pH7.5). The homogenate was centrifuged at 1,000g and supernatant was used for the estimation of TSH, NPB-SH, PB-SH, GR and GPx. The levels of TSH, PSH and NPBSH groups were significantly decreased in cardiac tissue of all the study groups. The glutathione metabolising enzymes such as GR and GPx was significantly decreased in cardiac tissue of hypercholesteremic adult male mice's without MSG (Group-2) and with MSG (Group-3 and group-4) ingestion. These observations suggested that ingestion of MSG at dose levels of 4 and 8mg/g body weight to hypercholesteremic animals had no beneficial effect instead it further weakens the antioxidant status in the cardiac tissue by significantly lower the levels of glutathione and its metabolising enzymes and thereby being responsible for the initiation of coronary heart disease/atherosclerosis.

Key Words :

Monosodium glutamate,
Hypercholesteremia,
Coronary heart disease,
Glutathione

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The use of MSG [$C_5H_8NO_4NaH_2O$], a sodium salt non essential L-form of glutamic acid is wide spreading due to increased craze for Chinese, Japanese, fast food and ready to serve foods like 2 minute noodles, soups, sauces etc. all containing MSG and plays a critical role as a part of socioeconomic development. Concomitantly, there is a tremendous increase in the incidences of CHD/ atherosclerosis in developed and developing nations like India^[1,2]. From our own laboratory, we reported that MSG at dose levels of 4 mg/g body weight and 8 mg/g body weight for consecutive 6 days induced hyperlipidemia without altering the levels of total cholesterol

and also initiated the oxidative stress in various tissues^[3-8] of normal adult male mice's, well known risk factors for various cardio-vascular disease (CVD) like coronary artery diseases/ atherosclerosis remained one of the main causes of death in all over the World. Coronary artery disease (CAD) is the single most important disease entity, in terms of mortality and morbidity in the entire World population. Both men and women between the age group of 40-60 years of age are susceptible to CAD^[9,10]. Despite all round efforts, it remains a challenge to the healthy managers and scientists. It is predicted that by the years 2020, this disease would be persists as the major and the most common threat to human

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