The Effects of Monosodium Glutamate Consumption on Oral Glucose Tolerance Test (OGTT) in Rats

Piyanard Boonnate1, Supattra Pethlert1, Amod Sharma1, Wiphaawi Hipkaeo2, Sakda Warnerasawapati3, Vitoon Prasongwattana1, Ubon Cha’on1.
1Department of Biochemistry, 2Anatomy, 3Pathology, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002

Background and Objective: Monosodium glutamate (MSG) is a sodium salt of glutamic acid, widely used as a food additive both in household and food industry. An injection of MSG into newborn mice causes of several metabolic disorders such as obesity, non-alcoholic fatty liver disease and type 2 diabetes. We aimed to investigate the effect of MSG consumption on glucose regulation in adult rats.

Methods: Twenty adult male Wistar rats were randomly divided into control and treatment groups. Both groups were fed ad libitum with a standard rat chow pellet and water, except the treatment group were received MSG (2 mg/g body weight/day) in drinking water for nine months. Oral glucose tolerance tests (OGTT) were investigated. Water intake, food intake and body weight were also recorded.

Results: There were no significant differences in OGTT results between control and MSG-treated animals. MSG-treated rats had significantly higher water intake compared to controls. However there were no significant differences in food intake and body weight between control and MSG-treated animals.

Conclusion: The results revealed that daily MSG consumption with the dose of 2 mg/g body weight /day for nine months had no effect on OGTT, an index of glucose regulation, in adult rats.

Key words: monosodium glutamate, oral glucose tolerance test, islets of Langerhans
For the determination of Oral glucose tolerance test (OGTT) rats were fasted overnight and were fed the glucose solution with the dose of 4 g/kg BW. Blood samples were withdrawn from the tail vein by a capillary tube. Glucose levels were determined at zero, 30 and 120 minutes after glucose load.

Results

During nine months of experiment, MSG-treated animals consumed water significantly higher than the controls (p< 0.05, Figure 1) whereas daily food intake and body weight were not different from the controls (Figure 2 and 3). There were no significant differences in glucose levels during OGTT (Fig. 4) between control and MSG-treated groups.

Figure 1 Water intake (mean ± SD) of control and MSG-treated rats *p<0.05

Figure 2 Food intake (mean ± SD) of control and MSG-treated rats.

Figure 3 Body weight (mean ± SD) of control and MSG-treated rats.
Conclusion

The results indicated that daily MSG consumption with the dose of 2 mg/g BW /day in adult rats has no effects on glucose regulation during nine months of MSG exposure.

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