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## Protective role of co-administration of vitamin D in monosodium glutamate induced obesity in female rats

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**Introduction:** Obesity in females is an emerging health problem. The consumption of MSG has been considered as a risk factor for obesity. The taste makers in Chinese and fast foods, such as fish sauce and soy sauce, contain very high levels (up to 1.38 g/100 g) of glutamate. The deficiency of vitamin D is associated with obesity and metabolic syndrome.

**Objective:** The present study aimed to determine the effect of co-administration of vitamin D on body weight control in MSG induced obese rats.

**Materials & Methods:** Eighteen adult female Wistar rats were randomly divided into three groups equally. The first group received a daily oral dose of 5 g/kg body weight of MSG; the second group received the same dose of MSG along with calcitriol (0.2 mcg per kg BW) for 15 days. The third group was treated with saline served as the control. The body weight, food and water intake was measured.

**Results:** MSG induced rats showed a significant increase ( $P < 0.001$ ) in the body weight, food and water intake but significant decrease ( $P < 0.001$ ) was observed in the rats treated with MSG along with Vitamin D.

**Conclusion:** Ingestion of vitamin D suppresses body weight gain in MSG induced obese rats. Active agents in vitamin D are useful for the prevention and treatment of obesity. Foods tested with high glutamate levels can be fortified with minute quantities of calcitriol to combat the adverse effects without compromising on the taste of the food processed. On a small scale, this also gives an additional benefit of overcoming the largely vitamin D deficient population.

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## Antioxidative and anti-adipogenesis activity of flavonoids

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Flavonoids are secondary metabolites produced from plants. Human obtain flavonoids through consumption of vegetables, fruits, tea and legumes. Health benefits of flavonoids, such as anti-oxidant, anti-bacteria, anti-hypertension and anti-adipogenesis are widely known among researchers as well as consumers. Flavonoids are benzo- $\gamma$ -pyrone derivatives consisting of phenolic and pyrane rings. There are five subclasses of flavonoids; flavonols, flavanols, anthocyanidins, flavones and flavanones, which differ in the arrangements of hydroxyl, methoxy and glycosidic side groups. In this study, we examined anti-oxidative and anti-adipogenesis activity of three groups of flavonoids: (1) Flavone: luteolin, apigenin (2) Flavonol: Quercetin, kampferol (3) Flavanone: Naringenin, eriodictyol. Antioxidative activity was performed using four assays; ABTS, DPPH, ORAC and xanthine oxidase. 3T3-L1 cell line was used to examine anti-adipogenesis. Different antioxidative trend was observed due to mechanisms of each method. Among six flavonoids, quercetin showed the lowest IC<sub>50</sub>. Anti-adipogenesis activity in which, lipid and triglyceride accumulation and expression of peroxisome proliferator-activated receptors gamma (PPAR $\gamma$ ) gene were investigated in the pre-adipocyte cell line. Correlation between antioxidative activity of flavonoids and anti-adipogenesis will be studied. Structure-function relationship of flavonoids in both antioxidative and anti-adipogenesis will be investigated.

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