THE GLUTAMATE ASSOCIATION UNITED STATES

Statement on MSG and Body Weight
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A recent article in the journal *Obesity* (He et al., Association of Monosodium Glutamate Intake with Overweight in Chinese Adults, *Obesity* 2008,16:1875) suggests a potential association between intake of MSG and risk of becoming overweight based on interviews with individuals in rural China. The article suffers from numerous design flaws, including suggesting an association between MSG and obesity when the group with the purported highest MSG intake had an average body mass index (BMI) considered neither "overweight" nor "obese." This group also reported higher consumption levels of animal protein and fat, perhaps a more plausible explanation for their slightly higher BMI scores. Another design flaw involved the crude estimate used to calculate MSG intake, which was calculated by asking each participant to "demonstrate the amount" of monosodium glutamate (MSG) they typically shake on food when cooking. The authors also failed to consider other sources of dietary glutamate. These and other issues raise serious questions about the "conclusions."

The facts are these:

- MSG, the sodium salt of the dietary amino acid glutamate, is a widely used flavor enhancer. The average person in the United States consumes approximately 11 grams of glutamate daily from all food sources (primarily dietary protein), while the body produces about 50 grams of free glutamate daily. Dietary glutamate from MSG averages less than one half gram/person/day (about 1/10 teaspoon) in the U.S., one of the lower intakes in countries for which data exist.
- World Health Organization data shows that countries with high MSG intakes do not have high population Body Mass Indices (BMI's). In fact, countries with high BMI's generally have low MSG intakes. Within Asia, countries with relatively moderate MSG intakes have higher BMI's than countries with higher MSG intakes.
- A recent study (Essed et al., *Appetite* 2007,48:29) attempted to increase food (and hence caloric) intake and body weight over a 4-month period among elderly individuals by enhancing food taste with MSG. Interestingly, no increases in body weight could be achieved, suggesting little if any relationship between MSG intake and body weight. Other studies (Bellisle et al., 1996; Schiffman and Warwick, 1993) have made the same observation.
- A recent rat study (Kondoh and Torii, *PhysiolBehav*2008,doi:10.1016/j.physbeh.2008.05.010) demonstrated that MSG actually *suppresses* weight gain, fat deposition and plasma leptin levels in rats that are given free access to a 1% MSG water solution.

In He et al., authors asked individuals in rural China to "demonstrate the amount" of MSG they typically shake on food when cooking. The population group was then divided into four groups based on how heavily they said they sprinkled MSG on their food during preparation. Glutamate from other dietary sources other than soy sauce apparently was not taken into account. The levels of intake described in the paper all are less than one gram/day, a level previously shown in controlled clinical studies to have a no meaningful impact on blood glutamate levels.

Average BMI of those who used no MSG was 22.3; for those in the highest quartile of estimated MSG use, average BMI was 23.5. According to the CDC, an adult with a BMI between 18.5 and 24.9 is considered a normal or healthy weight, between 25 and 29.9 is considered overweight, and 30 or higher is considered obese. (See http://www.cdc.gov/nccdphp/dnpa/obesity/defining.htm.) Some have suggested that the optimal BMI among Asian populations is slightly lower than for other population groups, although the WHO Expert

Consultation (*The Lancet* 2004 363:157) says that "available data do not necessarily indicate one clear BMI cut-off point for all Asians for overweight or obesity." Rather it suggests a continuum of risk public health approach with BMI increases above the "underweight" category. The individuals in the group consuming the highest purported MSG intake, therefore, were on average considered to be "normal weight" under the existing CDC and WHO international classification system.

The percentage of animal protein and fat (SFA, MFA and PFA) were all higher in individuals with the highest reported use of MSG. Although the authors made some adjustments to account for diet and lifestyle variables, one must question the practical significance of the BMI differences (much less the contribution of MSG during food preparation), particularly given the fact that the major dietary sources of glutamate were ignored.

The authors also refer several times to animal studies that presumably are consistent with an MSG/weight gain hypothesis. In fact, those references are to neonatal studies in which rodents were directly injected with so much MSG that it caused brain lesions – *not* to situations in which MSG is part of a normal food matrix. The Kondoh and Torii work (cited above) shows that dietary intake of MSG does *not* lead to weight gain in rodents, in fact, quite the opposite.

Numerous regulatory authorities and expert committees, including FAO/WHO, FDA, Health Canada, EFSA and FSANZ, all conclude that monosodium glutamate is safe when used as an ingredient in food. Obesity is a complex and multi-factorial condition. The search for silver bullets as suggested by these authors simply clouds the discussion of weight management and is of little practical value.