

Data demonstrating the toxicity of MSG – the human studies

There are few published reports of MSG-induced human adverse reactions. Funding for studies of the safety of MSG comes primarily from the glutamate industry, and only those industry-sponsored studies with negative results (no harm done by MSG) are published.

The first indication that MSG causes adverse reactions was published in 1968 in a letter to the *New England Journal of Medicine (NEJM)* by a physician asking for help in identifying the cause of symptoms that followed dining in a restaurant serving Chinese food.

The first study of MSG-induced brain damage was published in 1969. They were two entirely independent events. The research published in 1969 was undertaken by a neuroscientist interested in understanding the brain-damaging potential of glutamic acid. Ultimately, he focused his entire career on study of the brain.

Animal studies demonstrating glutamate-induced brain damage have been discussed in **“Data from the 1960s and 1970s demonstrating the toxicity of MSG – the animal studies”**

[https://www.truthinlabeling.org/Data%20from%20the%201960s%20and%201970s%20demonstrate 2.html](https://www.truthinlabeling.org/Data%20from%20the%201960s%20and%201970s%20demonstrate%202.html).

Review and critique of animal studies mounted by the glutamate industry to refute the findings of MSG-induced brain damage have been detailed in **“The alleged safety of monosodium glutamate (MSG) - The animal studies: A review of the literature and critique of industry sponsored animal research”**

https://www.truthinlabeling.org/assets/review_studies.pdf.

By 1980, the toxic effects of monosodium glutamate were so well understood that researchers were using monosodium glutamate as an ablative or provocative tool with which to kill brain cells in laboratory animals. The treated animals would be studied by researchers interested in brain function, or researchers involved in development of pharmaceuticals to treat brain damage, and the fact that monosodium glutamate causes brain lesions and neuroendocrine disorders in laboratory animals became undeniable. Never caught off guard, Ajinomoto acted to draw attention from the toxicity of their product by proclaiming that animal studies do not represent the human condition. In addition, Ajinomoto’s International Glutamate Technical Committee (IGTC) began production of human studies that would fail to show a relationship between ingestion of monosodium glutamate and “Chinese restaurant syndrome (CRS),” -- the name assigned to the reactions mentioned in Dr. Robert Ho Man Kwok’s 1968 letter to the *NEJM*.

The only reactions that industry acknowledged being caused by ingestion of monosodium glutamate were the few mentioned in the *NEJM* letter, which were said to occur 15-20 minutes after ingestion and last for approximately two hours. And no one

challenged that assertion. Consequently, should a researcher find that subjects in his study expressed fibromyalgia, atrial fibrillation, or went into anaphylactic shock for example following ingestion of MSG, the conclusion of that study would be that there was no evidence of reaction to MSG.

Prior to 1980, glutamate-industry focus had been on refuting the animal studies that demonstrated that MSG caused brain damage. But when that battle appeared to be lost, industry stopped talking about MSG not causing brain damage, and turned to producing **human studies** (often double-blind studies) carefully designed to produce negative results (no harm done by MSG). These studies were then offered to the FDA as proof that MSG was safe. Research protocols used to guarantee their negative results are discussed in **“The *alleged* safety of monosodium glutamate (MSG) – The human studies rigged to produce negative results”**
https://www.truthinlabeling.org/assets/designed_for_deception_short.pdf.

Evidence of MSG-induced human adverse reactions

The 1968 letter to the *NEJM* by Dr. Kwok(175), senior research investigator at the National Biomedical Research Foundation in Silver Spring, Maryland, told colleagues that for several years, since he had been in the United States, he had experienced a strange syndrome whenever he ate in a restaurant serving Northern Chinese food -- an experience he had never experienced in his native land. He reported that 15 or 20 minutes after beginning to eat, he experienced "...numbness at the back of the neck, gradually radiating to both arms and the back, general weakness and palpitation." The syndromes lasted about two hours. He had never heard of such a syndrome until he received complaints of the same symptoms from both medical and nonmedical friends. Through the *NEJM*, he asked his colleagues if they might be interested in seeking more information about this "rather peculiar" phenomenon which someone at the journal dubbed, "Chinese Restaurant Syndrome."

Ten people responded almost immediately. Eight had experienced similar, but not necessarily identical reactions when dining in certain Chinese restaurants ([179](#),[180](#),[181](#),[182](#),[183](#),[184](#),[185](#),[186](#)) and, as in Kwok's case, had no clear cut notion of what the causative factor might be. Two had experienced similar reactions which they traced to probable muscarine poisoning([187](#)) or to the potent nonprotein neurotoxin tetrodotoxin, found in the puffer fish([188](#)).

In 1968 Kwok had offered, as one of several hypotheses, that the syndrome might be attributable to the ingestion of "MSG," while a subsequent issue of the *NEJM* carried letters from both Schaumburg and Byck([189](#)) and a group of New York University pharmacology students who had studied the condition for an elective project([190](#)) who stated, unequivocally, that the syndrome which Kwok and his friends had experienced was a reaction to ingesting "MSG."

Schaumburg and Byck(189) pointed out that the reaction being discussed was well known to experienced allergists and Chinese-restaurant owners, and they offered preliminary hypotheses pertaining to the nature of the reaction. Ambos et al.(190) added

that although the reaction had not been cited in the literature, it had been clearly recognized by "...certain persons and within some families." There was general agreement that "MSG" caused a reaction in sensitive individuals which most often consisted of the reactions mentioned by Kwok. Schaumburg and Byck mentioned that syncope, tachycardia, lacrimation, fasciculation and nausea were noticed among the people they had found to be "MSG" sensitive, but all of these were attributed to causes other than MSG. Onset time was 10 to 25 minutes with a duration of 45 minutes to 2 hours. Schaumburg mentioned that 5 grams of "MSG" would produce a reaction in a sensitive individual. Ambos et al.(190) indicated that 2 teaspoons per 6 ounce glass of tomato juice was needed to provoke a reaction in females, while 4 teaspoons per 6 ounce glass was needed to provoke a reaction in males.

In 1969, Schaumburg et al.(191) reported results of studies they had undertaken. This time, both headache and chest pain were added to the symptom list, and a point was made of the fact that there is considerable variability in threshold dose among individuals. Experiments were done with a wide range of test materials and a variety of experimental conditions. Schaumburg et al. concluded "We now have shown that MSG can produce undesirable effects in the amounts used in the preparation of widely consumed foods"(191).

The first article designed to discredit the notion of MSG induced adverse reactions appeared in *Nature* in 1970(195). Morselli and Garattini reported on a study designed to "...assess the significance of subjective reactions." What was meant by "assessing the significance of subjective reactions" was not made clear.

Morselli and Garattini studied both subjective and objective parameters. The 24 subjects were randomly divided into two groups, one group given beef broth with MSG added (the experimental group), the other group (the control group) given beef broth without MSG. All reported subjective symptoms on forms provided. At the same time, blood pressure, pulse, and respiration rate were recorded.

The authors found no statistically significant differences between experimental and control groups in reports of the **symptoms of Chinese Restaurant Syndrome(CRS)** or in objective measures. They reported one female who experienced a panic-like syndrome after being given MSG, "...but it was not associated with any significant modification of objective parameters such as arterial pressure, pulse or respiration rate." And since, "The only subject who described a panic-like syndrome did not experience any burning feeling," the authors conclude that "...MSG administered orally in relatively high doses does not provoke any symptoms of Chinese restaurant syndrome." This, as translated by the food industry, morphed into "MSG is safe."

Noteworthy of the work of Moreslli and Garattini are the following:

- 1) Objective parameters studied were arterial blood pressure, pulse, and respiration rate. None had ever been shown to be associated with adverse reactions to MSG.

2) Morselli and Garattini discounted the importance of the panic-like syndrome because it is not associated with the objective parameters they had arbitrarily chosen to observe.

3) Subjects were 24 in number, too few to generate statistically significant findings in light of the extreme variability associated with MSG adverse reactions.

4) Seventeen of the 24 subjects were male (believed at the time to be less sensitive to MSG than females(194).

5) Subjects were "healthy volunteers" (never having had any of the symptoms of MSG sensitivity).

6) Subjects were neither randomly selected nor suspected of being MSG sensitive.

Other articles designed to discredit the notion of MSG induced adverse reactions followed. Often results demonstrated MSG toxicity, but in discussion the claim was made that observed reactions were from something other than MSG.

In 1971, a study by Ghadimi et al.(197) focusing on mechanisms which might be relevant to the adverse reactions associated with MSG, demonstrated adverse reactions. They found that the reactions which followed MSG ingestion were "...strikingly similar to those induced by acetylcholine." More important, the discussion does not follow from the results of the study. The authors demonstrated that there were adverse reactions to MSG, but these were not the reactions defined as CRS. The food industry used (and still uses) this as evidence that there is no reaction to MSG.

Following the negative 1970 Morselli and Garattini article(195), came one in 1971 by Rosenblum et al.(198). In the result section of their article, Rosenblum et al. state that using 50 subjects in one of their studies, they found subjects who ingested "MSG" to exhibit significantly more reactions than subjects who had not ingested "MSG." Yet the discussion section states that "...these studies...failed to reveal a single subject who had experienced the triad of symptoms suggestive of the Chinese Restaurant Syndrome." As was often the case, it was the phenomenon of CRS, not the phenomenon of MSG sensitivity, that was studied. The food industry used (and still uses) this as evidence that there is no reaction to MSG.

In 1972, Upton and Barrows(192) warned that, based on their observations of an epileptic woman, it would seem reasonable to advise patients on diphenylhydantoin to avoid foods rich in "MSG."

The next study was one done in 1972 by Kenney and Tidball(15). They reported that "Thirty-two percent of the persons tested responded at the 5-g level when challenged by a single placebo-controlled exposure [to MSG]." They also suggested that "It seems likely that monosodium L-glutamate taken as the salt is not physiologically equivalent to glutamic acid ingested in protein."

It is of interest to note that after the 1972 report, Kenney began to turn out studies as needed for The Glutamate Association. In a 1979 paper, Kenney(199) quotes from his

earlier work, provides evidence from two studies which demonstrate human adverse reactions to MSG, has a "however" in the discussion and conclusions, which relates to some percentage figures for MSG levels (that defy interpretation), and finally suggests that what might appear to be a reaction to MSG can be explained away as an esophageal reaction.

A variety of human studies and comments on human adverse reactions were published between 1973 and 1978.

Reif-Lehrer's first article appeared in 1975(200) as correspondence in the *NEJM*. She wrote that children react to MSG ingestion, and described symptoms similar to adults with almost the same degree of prevalence. She presented three cases and discussed the relation between shudder in children, epileptic "seizures", "MSG shivers", and the fact the MSG has been reported to cause convulsive disorders in animals. Subsequently, Andermann, et al. commented on a possible relationship between MSG and essential tremor(201).

During the next two years, Reif-Lehrer published an additional report of children's apparent adverse reactions to MSG(202); results of a questionnaire study establishing that 25% of those responding to the questionnaire, and 30% of the persons reporting that they had been exposed to Chinese restaurant food, reported adverse reactions (203); and a lengthy review and report on the possible significance of adverse reactions to MSG in humans (174). In the last report, published in 1976, Reif-Lehrer raised the question of whether particular groups of individuals might be adversely affected by eating unregulated amounts of MSG.

Colman(204) wrote to the *NEJM* in 1978, reporting two cases of psychiatric reactions to MSG.

From time to time, case reports were published describing instances of adverse reactions associated with ingestion of MSG. There are reports of tachycardia(213), hyperactive or hysterical activity in children(214,215), paraesthesiae of hands and feet(216), severe "burning" headache(217), severe upper abdominal pain and pressure accompanied by diaphoresis and a burning sensation in the chest(217), angio-oedema(218), and a hypertensive reaction(219) in the form of vascular headache typical of those seen in patients taking monoamine oxidase inhibitors. Ratner et al.(217) reported that the initial diagnoses in seven patients whose complaints were eventually resolved as MSG sensitivity were migraine (twice), myocardial infarction, brain tumor, neurosis, functional colitis, and depression.

Comments and observations also have been published. In 1976, Neumann(220) reported having seen reactions involving frequent ventricular premature beats. He cautioned that, "Because sensitivity to MSG is not rare and because of the unpredictable consequences given a damaged, vulnerable, or irritable myocardium, patients with a tendency to rhythm disturbances should be made wary of prefabricated soups, and meat 'tenderizers,' in addition to the fare of Chinese restaurants. Incidentally, the term 'Chinese restaurant syndrome,' while picturesque, is too narrow

considering the tons of MSG used in less exotic foods. The syndrome should really be termed what it is, an MSG atopy. And the cardiovascular system is its chief target" (220).

In 1980, Gore and Salmon(221) observed 55 subjects given randomized MSG and placebo trials, and noted that although the reactions to MSG were significant, the symptoms recorded were not those of the CRS. They questioned the meaning of reaction to symptoms which were not CRS. Sauber(222) pointed out that the meaning was perfectly clear -- that the symptoms which Gore and Salmon found to be most prevalent, were, indeed, the most prevalent visible effects of MSG.

Asthma was studied extensively by Allen who published in 1981 and 1987(223,224). He explored and discussed the possible relation of MSG to asthma, questioning the possible links, and exploring possible mechanisms for a relationship. In a single blind study using 32 subjects with asthma, some of whom had histories of severe asthma after Chinese restaurant or similar meals, he found a dose dependent reaction which in some cases was delayed up to 12 hours.

Moneret-Vautrin(225) reported finding a "...very small subset of patients with intrinsic asthma..." with an intolerance to high doses (2.5g) of MSG.

Studies that discuss the toxic effects of MSG are not done in the United States. Industry will not fund them, medical journals will not publish them, American media will not discuss them, and in cases that are important to the glutamate industry, those who report adverse reactions will be denigrated (237).

An excellent example of this last point is the work of David Allen, M.D, which was of the utmost importance to the glutamate industry. The glutamate-industry plan was to establish the claim that it took 3 grams or more MSG to trigger a reaction, even though few, if any, products actually contained 3 grams or more MSG. Then if pressure to clearly label products that contained MSG became problematic for the industry, they would assert that only MSG in products that contained 3 grams or more MSG needed to be identified; the FDA would be oblige them; and most of the MSG in processed foods would go unlabeled.

Allen, a physician in private practice in Australia, had found that 3 grams of MSG could trigger asthma, and had published his research in a peer reviewed journal. That research would be cited by the glutamate industry as demonstration of the fact that 3 grams of MSG could cause an adverse reaction -- without mention of the fact that evidence that 3 grams of MSG triggers adverse reactions is in no way evidence that amounts less than 3 grams wouldn't do the same. But industry had a problem with using Allen's data, for Allen had also found that .5 grams of MSG could trigger asthma. And if that information surfaced, it could kill the 3-gram scheme.

The plan to establish 3 grams as the cutting point for identifying MSG in processed food was set in motion years ago in anticipation that there might be renewed pressure on the FDA to warn of the dangers of MSG. It beautifully illustrates the skill of the glutamate

industry in manipulating fact, and the strong bonds between government and industry. How the glutamate industry handled this possibility is covered in the book, *It Wasn't Alzheimer's, It Was MSG*(237).

Although no researcher in the United States today dares to suggest MSG might be toxic, there are researchers outside of the United States who have warned of the dangers of ingesting MSG. The file "**Researchers warning that manufactured free glutamate in food might contribute to adverse events**" https://www.truthinlabeling.org/assets/researchers_warnings.pdf offers that information.

Possibly more telling of the toxicity of MSG and its excitotoxic manufactured free glutamate component (MfG) are the MSG-safety studies done (and rigged to produce negative results) under the direction of IGTC chairman Andrew Ebert, Ph.D., (Ajinomoto's agent in charge of research at the time). Those studies were aimed at convincing the medical community as well as the public that MfG, along with MSG, are harmless.

There is a significant body of such literature proclaiming the safety of MSG. Cleverly contrived to conclude (not prove) that MSG is harmless, it involved a variety of researchers from various universities and medical schools, all given study protocols and supervised by Ebert. Although they had common elements, no two studies were identical. There was, however, one element that was shared by all -- the use of placebos that would cause reactions identical to those caused by MSG.

These studies lay the foundation for industry propaganda wherein the claim is made that the toxicity of MSG has never been demonstrated, and, therefore, MSG is harmless. They are discussed in "**The *alleged* safety of monosodium glutamate (MSG) – The human studies rigged to produce negative results.**" https://www.truthinlabeling.org/assets/designed_for_deception_short.pdf

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