WHAT DO THE MAJOR HEALTH ORGANIZATIONS SAY?

It is highly unlikely that a food additive will ever be more thoroughly examined for safety than aspartame, both before, and after its approval in 1981.

It is well beyond the scope of this publication to examine even a fraction of these safety studies; so only selected statements from major health agencies will be cited.

The National Cancer Institute:

- *"NCI examined human data from the NIH-AARP Diet and Health Study of over half a million retirees. Increasing consumption of aspartame-containing beverages was not associated with the development of lymphoma, leukemia, or brain cancer."*

The U.S. Food and Drug Administration:

- *"Since it was first approved for use in the United States, the safety of aspartame has been questioned by some. To date, however, the agency has not been presented with scientific information that would support a change in our conclusions about the safety of aspartame. Those conclusions are based on a detailed review of a large body of information, including more than 100 toxicological and clinical studies regarding the sweetener's safety."*

The European Food Safety Authority:

- *"The sweetener aspartame and its breakdown products have been a matter of extensive investigation for more than 30 years including experimental animal studies, clinical research, intake and epidemiological studies and post-marketing surveillance. It has been found to be safe and authorised for human consumption for many years and in many countries following thorough safety assessments."*

Health Canada:

- *"As part of a post-market surveillance program, a study was conducted in 1987 to monitor the actual consumption of aspartame in Canada. This study which involved 5200 Canadian households and 7500 individuals, demonstrated that the actual consumption of aspartame was well below the recommended ADI even during the warmest period of the year when soft drink consumption would be expected to be high. Furthermore, follow-up studies on human subjects revealed that no adverse effects were observed even when humans were exposed to higher intakes than the established ADI."*

DOES ASPARTAME CAUSE OBESITY?

Recently, some researchers have suggested that intense sweeteners (including aspartame) can actually provoke obesity and metabolic syndrome via mechanisms that have not been substantiated in humans. Their theories are based upon either animal studies, or use only small groups of people. Moreover, there are no valid biological hypotheses to support such theories. At the least, large studies involving humans would be required to lend any semblance of validity to such highly implausible theories.

The American Heart Association embraces non-nutritive sweeteners (NNSs) as a way to "limit calories and achieve or maintain a healthy weight. ...Foods and beverages that contain NNSs can be included in a healthy diet, as long as the calories they save you are not added back by adding more foods as a reward later in the day."

The Academy of Nutrition and Dietetics also embraces NNSs. In an updated position paper on nutritive and non-nutritive sweeteners, the Academy says: "It is the position of the Academy of Nutrition and Dietetics that consumers can safely enjoy a range of nutritive sweeteners and nonnutritive sweeteners when consumed within an eating plan that is guided by current federal nutrition recommendations, such as the Dietary Guidelines for Americans and the Dietary Reference Intakes, as well as individual health goals and personal preference."

CONCLUSION

Despite decades of use, countless safety studies, and no evidence whatsoever of human harm, aspartame continues to be the poster child of the anti-chemical, anti-additive mindset. Whether this can be blamed on financial motives, faulty science – both intentional and otherwise – unfounded fears, conspiracy theories, or most likely a combination of all of these factors, this is one myth that simply refuses to go away.

But, persistence does not equal validity. There is overwhelming evidence that aspartame is a safe alternative to sugar for those who wish to restrict sugar or calorie intake.

This publication was written by **Dr. Josh Bloom**, Director of Chemical and Pharmaceutical Sciences, ACSH—and is based, in part, on the peer-reviewed book *Sugar Substitutes & Your Health* (ISBN 978-0-9910055-3-6). To purchase copies of the related book visit Amazon.com; To view the publication online visit ACSH.org.

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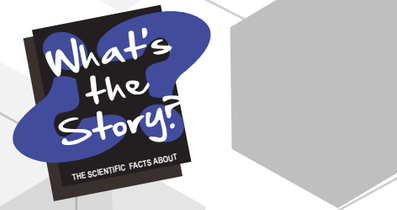

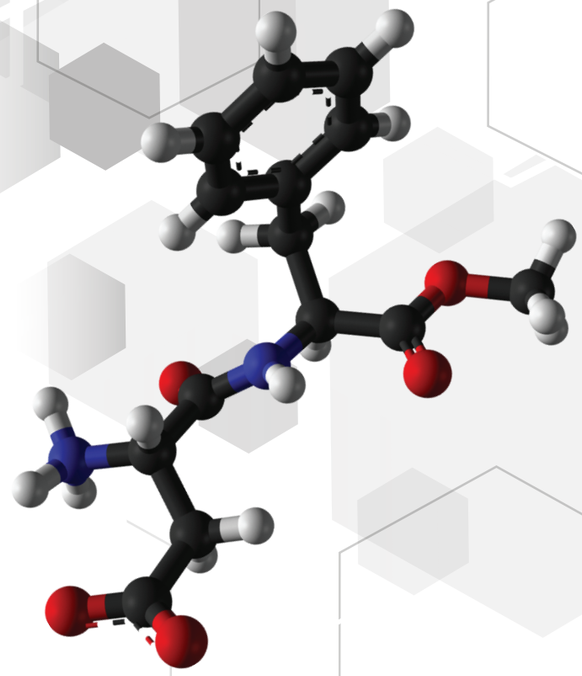

ASPARTAME

by Dr. Josh Bloom,
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INTRODUCTION: ASPARTAME—MYTH AFTER MYTH

For such a small molecule, the artificial sweetener aspartame has generated much controversy over the years. It has been fodder for numerous hoaxes, conspiracy theories, smear campaigns, and Internet websites replete with misinformation alleging that it causes a myriad of diseases and disorders, such as lupus, blindness, multiple sclerosis, obesity, migraines, and various cancers.

All of this has, of course, proven to be nonsense, as we will discuss later, yet some people continue to view aspartame as dangerous, despite the fact that it has been in use for 40 years. The aspartame story is the quintessential example of how phony scares can run rampant, especially since access to the Internet became commonplace.

Following is a summary of the real science behind aspartame. It could not be more different from the rumors and phony scares that are so prevalent.

WHAT IS ASPARTAME?

Aspartame (Figure 1) is made from, and breaks down to three common natural products: Aspartic acid, phenylalanine, and methanol. The first two are two of the twenty amino acids that make up all proteins. Since proteins are digested in the gut to form amino acids, which are then absorbed, virtually any food that contains protein will result in ingestion of both these amino acids.

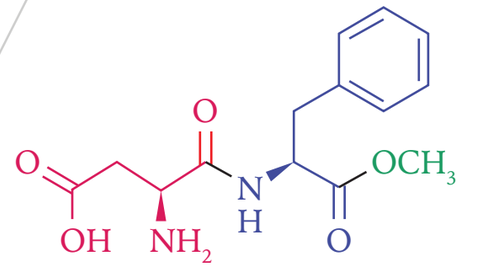

Figure 1. The Structure and Composition of Aspartame

SAFETY CONCERNS: IS THERE ANYTHING TO WORRY ABOUT?

The Methanol Scare

The presence of methanol in the molecule is a common knock against aspartame, but this is a red herring. One packet of aspartame contains about 20 mg of methanol. Since the estimated acute lethal dose of methanol in humans ranges from 30-120 mL, one would have to consume between 1,900 and 7,600 packets of aspartame at once to reach lethal levels of methanol.

The 15th century saying, "the dose makes the poison" has been true since its inception.

The same principle holds true for aspartame, but even more so. Unlike the three-fold difference in dose between normal and toxic doses of acetaminophen, this number is roughly 5,000-fold for the amount of methanol found in aspartame.

The human body is well equipped to handle small amounts of methanol. It occurs naturally in fruit, fruit juice and vegetables. There is no difference between the methanol in foods and the methanol in aspartame. They are identical in every way.

The Formaldehyde Scare

Perhaps the most pervasive aspartame scare involves formaldehyde: Once methanol is released upon digestion of aspartame, it is converted to formaldehyde, which is potentially toxic at a high enough dose.

Technically, this is true, but it is completely irrelevant in this context. The formaldehyde that is formed—a minuscule quantity—doesn't last long. The half-life (the amount of time required for 50 percent of any given chemical to be eliminated) of formaldehyde in human blood is estimated to be 1.5 minutes. This means that within 10 minutes virtually all of it is gone.

As they do with methanol, aspartame critics constantly point out the toxicity of formaldehyde—without discussing the exposure. What they fail to say is that formaldehyde is found in a variety of fruits and vegetables, including bananas, pears, cauliflower, and apples. The reason formaldehyde is not harmful in foods is the same reason that it is not harmful in soda—a very small amount is present.

The only evidence of human carcinogenicity of formaldehyde comes from workplace exposure, such as embalmers, who are exposed to large amounts of the chemical over a long period of time. Some studies have found a correlation between nasopharyngeal cancer, and certain leukemias and exposure to larges quantities of formaldehyde, and some have not. As is the case with methanol, these instances of high dose toxicity do not apply to minuscule quantities of the chemical.

The phenylalanine and aspartic acid scares

One would think that amino acids, the building blocks of protein, would be immune from health scares, however, even these have been the subject of unwarranted criticism. Certain amino acids are excitatory neurotransmitters—brain chemicals that activate synapses. One of these is aspartic acid. However, you consume much more of this simply by eating protein than the amount in a serving of aspartame. Aspartic acid is widely available in large quantities as a dietary supplement, supposedly useful in building muscle.

There is one legitimate health concern with phenylalanine. About one in 15,000 newborns per year in the US have a genetic deficiency called phenylketonuria—the inability to properly metabolize phenylalanine. Phenylketonurics must avoid aspartame, as well as foods that are rich in phenylalanine, such as cheese, nuts, fish and chicken. Phenylalanine does not harm anyone other than phenylketonurics. It is also widely sold in supplement stores and online.

The Bioaccumulation Scare

A common myth about toxicity is that during our lives we take in chemicals and drugs, and these build up our bodies, causing toxic levels of these substances. This is, with very few exceptions, completely false.

The liver, where most foods, drugs and other chemicals are broken down, is exquisitely designed for this purpose. Other common sites of metabolism are the gut and blood. Liver metabolism produces fragments of drugs and chemicals, many of which are soluble in water and subsequently excreted in the urine.

The same holds true—even more so—for aspartame. The process of conversion of methanol to formaldehyde, and then to formic acid is rapid. And the amount of methanol in aspartame is so low—thousands of times less than toxic levels—that neither methanol nor its metabolites even remotely approach anything resembling a toxic dose. The presence of methanol in a wide variety of fruits, vegetables, and juices—in greater amounts than what is formed upon decomposition of aspartame—is further evidence that the human body is well equipped to handle small quantities of the substance.

The following chart, derived from the NHANES (National Health and Nutrition Examination Survey) study should put any remaining fears to rest. If eight ounces of Diet Coke is toxic, a banana or a glass of tomato juice or milk must be more so.

Phenylalanine, Aspartic Acid & Methanol Content of Common Foods (mg)

Food/Beverage	Phenylalanine*	Aspartic Acid*	Methanol
Diet Coke (8 oz.)	60	48	12
Milk (8 oz.)	404	592	–
Banana (med)	58	146	21
Tomato Juice (8 oz.)	39	231	71