

Aspartame

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The safety of artificial sweeteners, particularly aspartame (aka NutraSweet, Equal, etc.), is rife with controversy. Opinions range from a "have all the diet soft drinks you want" to "avoid them like the plague." What's the truth?

For starters, aspartame's approval process itself was problematic. In 1981, the then-head of the FDA, Jere Goyan, was dismissed on the first day of Ronald Reagan's presidency (January 21, 1981). Goyan was hesitant to approve aspartame due to scientific studies regarding the substance and cancer incidence. Reagan appointed Arthur Hull Hayes, MD to replace Goyan in April, 1981. Against an FDA Public Board of Inquiry's recommendations, Hayes approved aspartame as a food additive.

How did this happen?

The Board of Inquiry was comprised of three independent scientists who, upon sifting through all available data, expressed concern that aspartame could induce brain tumors. This is what led to Goyan's concerns. The G.D. Searle chemical company held the patent to aspartame. In the face of the resistance to aspartame's approval, Searle's Chairman Donald Rumsfeld (yeah, that Donald Rumsfeld) stated that he would politically "call in his markers" to reverse the FDA opinion.

On the day Goyan was removed from office, Searle reapplied to have aspartame approved. When Hayes took over as FDA commissioner, he appointed a five-person scientific committee to review the Board's previous decision. When it became clear that the newly appointed committee would uphold the previous decision by a 3-2 vote, Hayes installed a sixth member, who then dead-locked the vote at 3-3. What to do? Why Hayes, as commissioner, needed to break the tie, of course - which he did, leading to the approval of aspartame.

Hayes left the FDA in 1983 to join the public relations firm of Burson-Marsteller (to the tune of \$1000 per day), who represented G.D. Searle and Monsanto. In 1985, Monsanto purchased Searle. Since leaving the FDA, Hayes has never spoken publicly about aspartame.

Then there's the evidence of health-related problems and aspartame . . .

Almost 100 symptoms and syndromes related to aspartame intake have been reported. Scientific investigation of the relationship between aspartame and these complaints has yielded mixed results. Unfortunately, (for aspartame) almost all of the studies which show no health risks have been funded by the soft drink industry.

(An aside: [Here's a truth about scientific research, gentle reader: When evaluating the outcome of studies, it's always important to follow the money.](#) This isn't to say that all research is crooked. However, there is a tendency for studies to show the outcome that the funding agency desires, especially if the funding agency is a private company whose bottom line depends on said outcome. Researchers are only human, and the myth of the completely impartial scientist is just that - a myth. Scientists are people and people have biases, prejudices, and a need to make a living. For example, in *Survey of Aspartame*

Studies: Correlation of outcome and funding sources, 166 studies of aspartame in peer reviewed

medical literature were examined. According to the review, 74 studies had NutraSweet industry related funding and 92 were independently funded. 100% of the industry funded research attested to aspartame's safety, whereas 92% (85 of 92) of the independently funded research identified a problem. This calls to mind recent findings that the bulk of pharmaceutical studies are conducted by individuals with ties to the company that manufactures the drug. Again, please understand that I am not condemning all scientific research here. I'm simply pointing out that there are complicating factors that may skew the results of a study.)

The cause of the problems?

Part of the difficulty is how aspartame metabolizes. It does so very quickly and causes a spiking of its components in the bloodstream. Aspartame is composed of two amino acids (l-aspartic acid and phenylalanine) and a small amount of methyl ester which break down in the body as follows:

- Methanol, which is then converted into formaldehyde (10%)
- Phenylalanine (50%), and
- Aspartic acid (40%)

Formaldehyde is the stuff you remember from high school. You know, the stuff in which they stored the frogs you dissected in biology class? I don't think I'll ever forget the smell. Now, small amounts of formaldehyde are normally produced in human metabolism, and they are dealt with by enzymatic processes. However, the concern is that the amount contributed by aspartame intake can spike formaldehyde concentration in the blood, which over time can lead to chronic toxicity. It's like you were being "pickled" from the inside out. By the way, embalming fluid typically contains from 5 to 29% formaldehyde, and works by fixing tissues so that they cannot be metabolically active. (While it is true that we take in a little formaldehyde when we eat fresh fruit, for instance, that formaldehyde is bound to pectin, which makes it unavailable to the human body. In other words, formaldehyde from fruit passes through us unabsorbed.)

Phenylalanine is a common amino acid in our diets and is considered safe for everyone except those suffering from phenylketonuria (PKU), a rare genetic disorder. Under normal circumstances, phenylalanine is converted to tyrosine, which is important as a precursor to epinephrine and norepinephrine ("fight or flight" hormones/neurotransmitters), as well as thyroid hormones. But with the increased amounts of phenylalanine present due to aspartame intake, there is the possibility of an imbalance in the prevalence of fight or flight chemicals, potentially leading to mood disturbances, panic attacks, and seizures. Also, it is uncertain whether the blood spiking of phenylalanine after the intake of aspartame interferes with the body's ability to make use of other amino acids. Finally, there is concern that large amounts of phenylalanine could collect in the brain tissue of a fetus, and caution is advised here for pregnant women.

Aspartic acid is part of a group of chemicals that in high concentrations act as an excitotoxin, damaging to brain and nerve cells. Excitotoxins have also been implicated in the aggravation and even precipitation of neurodegenerative diseases like Alzheimer's or Parkinson's. The effect of spiking levels of excitotoxins seems to be more pronounced in infants and young children when compared to adults. Long-term effects may even appear

in adults, but the data are scanty. Coming full-circle, however, there is also evidence that aspartic acid can potentiate the effects of formaldehyde. This would pickle our innards faster, if you will.

But what about obesity? Doesn't drinking diet soft drinks help keep the pounds off?

Apparently not . . .

Studies, such as a longitudinal study conducted by the University of Texas Health Sciences Center, published in 2005, have shown that aspartame usage parallels an increase in weight, not a decrease. It's been shown time and again that total soft drink usage is correlated with obesity. A surprising fact, though, is that when studies look at people who drink only diet soft drinks, the risk for obesity is even higher. In light of this, a closer look at the data was warranted. Analysis showed that a large part of the obesity risk from soft drink usage was accounted for by diet soda intake. Even as little as one can of aspartame-sweetened soda per day was correlated with weight gain. An interaction between the metabolites of aspartame and bodily function, perhaps?

It would seem so. One possible explanation is that due to the extra effort by the liver to metabolize the spikes in the components of aspartame, there is less capacity available to process dietary fat, causing fat storage. Another possibility is the unstable sugar level instigated by artificial sweeteners. This could lead to increased appetite as the body believes, upon monitoring the blood sugar level, that it is starving. While these are only theories, the fact remains that the more aspartame one takes in, the more likely one is to be overweight.

Finally, it's incredibly important to read the labels of the food we buy. Aspartame can appear as NutraSweet, Equal, or as its components - aspartic acid and phenylalanine. In the UK, it's listed as E951. (Pretty tricky system the British have.) It is in many things you might not think of, such as chewing gum, meal replacement bars, yogurt, and vegetable drinks. In short, be aware of what you are putting into your body.

As for myself, I avoid aspartame. I've had it a couple of times (once unknowingly) and I've gotten a headache each time. Also, the phony, chemical taste it imparts is enough to put many people off. In my opinion, the risks are real and may compound over time. So, how about some good old high fructose corn syrup, which is the "natural" sweetener use in ordinary soft drinks (and in many other processed foods)? No thanks, but that's a topic for another time.

A very informative video exploring the hazards of aspartame can be found on the internet, and much of the information in this article, including scientific studies, can be found in more detail there. It's called [Sweet Misery: A poisoned world](#). Get yourself something thirst-quenching and settle in for an informative 90 minutes.