

# Aspartame Effects Show Up in Offspring 2 Generations Later

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## STORY AT-A-GLANCE

- › A study published in PNAS linked aspartame consumption to anxiety and, worse yet, found the mental health changes were passed on to future generations
- › When you consume aspartame, it's broken down into aspartic acid, phenylalanine – a precursor of monoamine neurotransmitters – and methanol, which may have “potent” effects on your central nervous system
- › The research involved mice drinking water that contained aspartame at a dosage of approximately 15% of the FDA's maximum daily intake, equivalent to a human drinking six to eight 8-ounce cans of diet soda daily
- › The study came about after the research team looked at the transgenerational effects of nicotine, revealing epigenetic changes in sperm cells; similar effects may be occurring with aspartame
- › The shocking findings add yet another reason why you should toss any aspartame-containing products from your kitchen cabinets

The U.S. Food and Drug Administration approved aspartame in 1981, and it's now found in close to 5,000 food and beverage products.<sup>1</sup> Adults, children and pregnant women around the globe consume so much aspartame that 3,000 to 5,000 metric tons are produced every year.<sup>2</sup> Many believe they're doing their health a favor by swapping out sugar for artificial sweeteners, but the opposite is true.

Aspartame not only has harmful effects on its immediate consumer but also on multiple generations thereafter.<sup>3</sup> The shocking findings add yet another reason why you should

toss any aspartame-containing products from your kitchen cabinets.

## **Aspartame May Be Setting Up Future Generations for Anxiety**

Anxiety disorders affect 31.1% of U.S. adults.<sup>4</sup> That's nearly 1 in 3. There are many factors involved, but diet is among them — and within diet, aspartame may be a key player. When you consume aspartame, it's broken down into aspartic acid, phenylalanine — a precursor of monoamine neurotransmitters — and methanol, which may have "potent" effects on your central nervous system, Florida State University (FSU) College of Medicine researchers noted.<sup>5</sup>

Their study, published in PNAS, linked aspartame consumption to anxiety and, worse yet, found the mental health changes were passed on to future generations. The FDA's recommended maximum daily intake value for aspartame is 50 milligrams per kilogram. The FSU study involved mice drinking water that contained aspartame at a dosage of approximately 15% of the FDA's maximum daily intake for humans.

The dose was equivalent to a human drinking six to eight 8-ounce cans of diet soda daily.<sup>6</sup> The mice consumed the aspartame-laced water for 12 weeks, which led to "robust, dose-dependent anxiety."<sup>7</sup> "It was such a robust anxiety-like trait that I don't think any of us were anticipating we would see," study author Sara Jones said. "It was completely unexpected. Usually you see subtle changes."<sup>8</sup>

## **Aspartame's Generational Toxicity Builds on Nicotine Research**

The study came about after the research team looked at the transgenerational effects of nicotine, revealing epigenetic changes in sperm cells.<sup>9</sup> Epigenetics refers to changes in genetic expression. While the gene's sequences aren't modified, epigenetic changes can have significant effects. Science Alert explained:<sup>10</sup>

*"Epigenetic changes interfere with the usual function of a DNA sequence, such as by preventing it from being transcribed or by exposing it when it would*

*typically be hidden – essentially controlling if and how a gene works in the organism.*

*In most cases, epigenetic changes involve the addition of a methyl group (one carbon joined to three hydrogens) to the DNA structure; a change to a protein called a histone that keeps the DNA wrapped up tight; or use of non-coding RNA fragments to change the reading of a gene."*

Perhaps most concerning, the changes in genetic expression may affect sex cells, which are then transferred to future generations. "That means lifestyle factors can have a long-term impact on genes, influencing their expression not just later in life but potentially transferring the gene's control settings to future generations through affected sex cells," Science Alert explained.<sup>11</sup>

Similar effects may be occurring from artificial sweeteners. PNAS study co-author Pradeep Bhide, the Jim and Betty Ann Rodgers eminent scholar chair of developmental neuroscience in the department of biomedical sciences, noted, "We were working on the effects of nicotine on the same type of model. The father smokes. What happened to the children?" He added:<sup>12</sup>

*"What this study is showing is we need to look back at the environmental factors, because what we see today is not only what's happening today, but what happened two generations ago and maybe even longer."*

## **Aspartame Brain Effects Last Two Generations**

In the study, mice exposed to aspartame had changes in the expression of genes that regulate excitation-inhibition balance in the amygdala, a region of the brain involved in regulating anxiety and fear. The changes were seen in up to two generations from the aspartame-exposed mice.<sup>13</sup>

When mice were treated with the anxiety drug diazepam, their anxiety-like behaviors stopped. The drug regulates similar brain pathways as those affected by aspartame.<sup>14</sup> Writing in PNAS, the team explained:<sup>15</sup>

***"Taken together, our diazepam and gene expression data show that aspartame consumption shifted the excitation-inhibition equilibrium in the amygdala toward excitation. Even more strikingly, the anxiety-like behavior, its response to diazepam, and changes in amygdala gene expression were transmitted to male and female offspring in two generations descending from the aspartame-exposed males."***

Aspartame's neurotoxicity has been documented for years. A 2017 study published in *Nutritional Neuroscience* listed potential neurophysiological symptoms linked to aspartame, including:<sup>16</sup>

Headache	Seizure	Migraines
Irritable moods	Anxiety	Depression
Insomnia		

When aspartame is consumed, it may increase phenylalanine and aspartic acid in the brain, which in turn affect neurotransmitters, dopamine, norepinephrine and serotonin, which regulate neurophysiological activities. The team described aspartame as a "chemical stressor" that elevates cortisol, increasing the production of free radicals.

"High cortisol levels and excess free radicals may increase the brains vulnerability to oxidative stress which may have adverse effects on neurobehavioral health," they noted.<sup>17</sup> Considering the PNAS study's findings highlighting transgenerational effects, aspartame's health burden could be far larger than currently realized. According to the PNAS study:<sup>18</sup>

***"Extrapolation of the findings to humans suggests that aspartame consumption at doses below the FDA recommended maximum daily intake may produce neurobehavioral changes in aspartame-consuming individuals and their descendants. Thus, human population at risk of aspartame's potential mental health effects may be larger than current expectations, which only include aspartame-consuming individuals."***

## WHO: Don't Consume Artificial Sweeteners for Weight Loss

Many people start consuming artificial sweeteners, which have no calories, because they assume they help with weight loss. However, most aren't aware that a systematic review and meta-analysis conducted by the World Health Organization revealed "there is no clear consensus on whether non-sugar sweeteners are effective for long-term weight loss or maintenance, or if they are linked to other long-term health effects at intakes within the ADI."<sup>19</sup>

In May 2023, WHO took it a step further, releasing a new guideline that advises people not to use non-sugar sweeteners (NSS) for weight control because they don't offer any long-term benefit in reducing body fat in adults or children.<sup>20</sup> Francesco Branca, WHO director for nutrition and food safety, said in a news release:

*"Replacing free sugars with NSS does not help with weight control in the long term. People need to consider other ways to reduce free sugars intake, such as consuming food with naturally occurring sugars, like fruit, or unsweetened food and beverages. NSS are not essential dietary factors and have no nutritional value. People should reduce the sweetness of the diet altogether, starting early in life, to improve their health."*

WHO's systematic review also revealed "potential undesirable effects from long-term use of NSS, such as an increased risk of Type 2 diabetes, cardiovascular diseases, and mortality in adults." The recommendation applies not only to aspartame but also other artificial sweeteners, including acesulfame K, advantame, cyclamates, neotame, saccharin and sucralose.

## Artificial Sweeteners May Damage Your DNA

Aspartame is linked to a number of serious health problems beyond anxiety, including:<sup>21</sup>

Cancer

Cardiovascular disease

Alzheimer's disease

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**Seizures****Stroke and dementia****Intestinal dysbiosis**

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**Mood disorders****Headaches****Migraines**

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Other artificial sweeteners, like sucralose (Splenda), are equally concerning. Consuming sucralose – in "amounts, far lower than the suggested ADI"<sup>22</sup> – for just 10 weeks was enough to induce gut dysbiosis and altered glucose and insulin levels in healthy, young adults.

Other research published in May 2023, in the *Journal of Toxicology and Environmental Health*,<sup>23</sup> also highlighted concerns of genotoxicity and DNA damage.<sup>24</sup> The problem is compounds formed when sucralose is digested. One, called sucralose-6-acetate, is genotoxic and breaks up DNA in cells. It's not only produced when sucralose is metabolized but also exists in the chemical "off the shelf."

In a news release, study author Susan Schiffman, adjunct professor in the joint department of biomedical engineering at North Carolina State University and the University of North Carolina at Chapel Hill, noted:<sup>25</sup>

*"Our new work establishes that sucralose-6-acetate is genotoxic. We also found that trace amounts of sucralose-6-acetate can be found in off-the-shelf sucralose, even before it is consumed and metabolized.*

*To put this in context, the European Food Safety Authority has a threshold of toxicological concern for all genotoxic substances of 0.15 micrograms per person per day. Our work suggests that the trace amounts of sucralose-6-acetate in a single, daily sucralose-sweetened drink exceed that threshold. And that's not even accounting for the amount of sucralose-6-acetate produced as metabolites after people consume sucralose."*

Perhaps it's not surprising, then, that past research has found people who consumed higher levels of artificial sweeteners had a higher risk of overall cancer compared to nonconsumers.<sup>26</sup>

Among the artificial sweeteners studied, aspartame and acesulfame-K, in particular, were associated with increased cancer risk, while aspartame intake was linked to higher risks of breast cancer and obesity-related cancers, including stomach, liver, colon and rectal cancers.

Total cancer risks increased by 13% among artificial sweetener consumers, while the risk of breast cancer rose by 22% and the risk of obesity-related cancers increased up to 15%.<sup>27</sup> "These results suggest that artificial sweeteners, used in many food and beverage brands worldwide, may represent a modifiable risk factor for cancer prevention," the researchers noted.<sup>28</sup>

## Is It Worth the Risk?

As evidence mounts that artificial sweeteners produce multiple toxic effects, a choice must be made about whether their sweet flavor is worth the risks to your health. Satisfying your sweet tooth with a healthy choice, like berries, will give your well-being a boost, while consuming some fermented veggies or a glass of lemon water can help kick your sweet cravings to the curb.

If emotions are triggering you to reach for a diet drink, the video above shows how to use the Emotional Freedom Techniques (EFT), a psychological acupressure tool, when you feel a craving coming on. It can help you overcome the urge to consume a poisonous artificial sweetener.

Be aware that to eliminate artificial sweeteners from your diet, you should avoid low-calorie, sugar-free and "diet" products, while also reading labels to look for unexpected sources. Ultraprocessed foods are common culprits when it comes to artificial sweeteners, so by focusing your diet on fresh, whole foods, you'll easily steer clear of these toxins.

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