

# Aspartame Classified as 'Possibly Carcinogenic'

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## STORY AT-A-GLANCE

- › Aspartame breaks down into methanol in your body, which is not safely bound like it is in fruits and vegetables. This can lead to symptoms of methanol poisoning, such as headaches, dizziness and vision problems
- › Unlike animals, humans lack the protective mechanism to effectively convert methanol into harmless formic acid. Instead, it's converted into carcinogenic formaldehyde
- › The World Health Organization's International Agency for Research on Cancer (IARC) classified aspartame as "possibly carcinogenic to humans" (Group 2B) in the summer of 2023
- › Aspartame has been linked to various health issues beyond cancer, including metabolic disorders, neurological symptoms, mood disturbances, and exacerbated cortisol production which can adversely impact your neurobehavioral health, immune function and more
- › To determine whether aspartame is to blame for your health problems, eliminate all artificial sweeteners from your diet for at least two weeks, then reintroduce it at high dosage to gauge your sensitivity

The artificial sweetener aspartame is primarily made up of aspartic acid and phenylalanine. The phenylalanine has been synthetically modified to carry a methyl group, which provides most of the sweetness. That phenylalanine methyl bond, called a methyl ester, is very weak, which allows the methyl group on the phenylalanine to easily break off and form methanol.

You may have heard the claim that aspartame is harmless because methanol is also found in fruits and vegetables. However, in fruits and vegetables, the methanol is firmly bonded to pectin, allowing it to be safely passed through your digestive tract. Not so with the methanol created by aspartame; it's not bonded to anything that can help eliminate it from your body.

Symptoms of methanol poisoning include headaches, ear buzzing, dizziness, nausea, vision problems (including retinal damage and blindness), gastrointestinal disturbances, weakness, vertigo, chills, memory lapses, numbness, shooting pains in the extremities, behavioral disturbances and neuritis. Many of these are also experienced after aspartame consumption.

## **How Aspartame Wrecks Your Health**

Methanol acts as a Trojan horse; it's carried into susceptible tissues in your body, like your brain and bone marrow, where the alcohol dehydrogenase (ADH) enzyme converts it into formaldehyde, which wreaks havoc with sensitive proteins and DNA.

All animals – except humans – have a protective mechanism that allows methanol to be broken down into harmless formic acid. This is why toxicology testing on animals is a flawed model. It doesn't fully apply to people.

Both animals and humans have small structures called peroxisomes in each cell that help detoxify a variety of chemicals. Peroxisome contains catalase, which help detoxify methanol specifically.

Other chemicals in the peroxisome convert the formaldehyde to formic acid, which is harmless, but this last step only occurs in animals. While humans have the same number of peroxisomes in comparable cells as animals, human peroxisomes cannot convert the toxic formaldehyde into harmless formic acid.

So, in humans, methanol is allowed to be transported in your body to susceptible tissues where this enzyme, ADH, then converts it to formaldehyde – a known carcinogen.

## Aspartame Ruled 'Possible' Cause of Cancer

Considering formaldehyde is a recognized carcinogen, it makes sense that aspartame might be carcinogenic as well, and that's precisely what the World Health Organization's International Agency for Research on Cancer (IARC) has concluded.

Based on the available evidence, the IARC classified aspartame as "possibly carcinogenic to humans" (Group 2B) in the summer of 2023.<sup>1,2,3</sup> As reported by the WHO:<sup>4</sup>

*"After reviewing the available scientific literature, both evaluations noted limitations in the available evidence for cancer (and other health effects).*

*IARC classified aspartame as possibly carcinogenic to humans (Group 2B) on the basis of limited evidence for cancer in humans (specifically, for hepatocellular carcinoma, which is a type of liver cancer). There was also limited evidence for cancer in experimental animals and limited evidence related to the possible mechanisms for causing cancer."*

## 'Safe' Limit Is Unlikely To Be Safe

However, despite the risk, they didn't recommend avoiding aspartame-containing products altogether. Based on research by the Food and Agricultural Organization's Joint Expert Committee on Food Additives (JECFA), the IARC set the "safe" limit for aspartame at 40 milligrams per kilogram of body weight per day.

That means a person weighing 154 pounds (70 kilos) would have to drink more than 14 cans of diet soda to exceed the daily safety limit – assuming that's the sole source of aspartame in their diet. I don't know about you, but that hardly seems prudent considering all the other carcinogenic compounds people are exposed to and consume daily.



**“... statistically significant increases were reported for some cancers, such as hepatocellular, breast and hematological (non-Hodgkin lymphoma and multiple myeloma) cancers, in some cohort studies ...” ~ IARC**

It's also important to recognize that while the IARC and JECFA claim the evidence for carcinogenicity is “limited,” that doesn't mean they've proven that it's safe – at any level. As stated in the IARC's report:<sup>5</sup>

*“The Committee noted that statistically significant increases were reported for some cancers, such as hepatocellular, breast and hematological (non-Hodgkin lymphoma and multiple myeloma) cancers, in some cohort studies conducted with aspartame or beverages containing aspartame ...*

*However, a consistent association between aspartame consumption and a specific cancer type could not be demonstrated. All the studies had limitations in how they estimate exposure, especially the ones that used non sugar sweeteners exposure as proxy for aspartame exposure.*

*Reverse causality, chance, bias and confounding by socioeconomic or lifestyle factors, or consumption of other dietary components, could not be completely ruled out.”*

Note the IARC says they couldn't find a consistent association between aspartame consumption and “a specific cancer type.” They did, however, find “statistically significant increases” in several different types of cancer.

In fact, three large-scale studies that reviewed the link between aspartame and liver cancer specifically ALL found it raised the risk. The IARC downplayed this trend, however, because “bias or confounding could not be ruled out as an explanation for the positive findings.”

Three animal studies also found “an increased incidence of malignant neoplasms or a combination of benign and malignant neoplasms in two species (mouse and rat),” but these were downplayed as well due to “concerns over the study design.” The take-home message is that you rely on the IARC/JECFA “safe” limit at your own risk, because both rodent and human studies indicate aspartame has carcinogenic potential.

## **FDA Issues Empty Assurances**

In response to the IARC’s report and classification of aspartame as a possible carcinogen, the U.S. Food and Drug Administration issued a rebuttal stating it does not agree with the findings and will not update its recommendations. Here’s an excerpt of the FDA’s response, published the same day the IARC’s report was issued:<sup>6</sup>

*“Aspartame being labeled by IARC as ‘possibly carcinogenic to humans’ does not mean that aspartame is actually linked to cancer ...*

*FDA scientists reviewed the scientific information included in IARC’s review in 2021 when it was first made available and identified significant shortcomings in the studies on which IARC relied ...*

*Aspartame is one of the most studied food additives in the human food supply. FDA scientists do not have safety concerns when aspartame is used under the approved conditions ...”*

## **Other Health Impacts of Aspartame**

Cancer isn’t the only, or perhaps even primary, health concern of aspartame though. Studies have also linked aspartame and other artificial sweeteners to a range of other health problems, including:

**Digestive issues** such as bloating, gas and diarrhea, and microbiome disruptions that contribute to poor gut health<sup>7</sup>

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**Weight gain** – Even the WHO warns against the use of artificial sweeteners for weight control, as the evidence shows they promote rather than inhibit weight gain<sup>8</sup>

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**Metabolic disorders** such as insulin resistance and Type 2 diabetes<sup>9</sup>

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**Headaches**<sup>10</sup> and migraines<sup>11</sup>

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**Neurological symptoms**, including seizures<sup>12</sup> and memory and learning problems<sup>13</sup>

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**Mood disorders** such as irritability, agitation, anxiety, and depression<sup>14,15</sup> – A 1993 study<sup>16</sup> found that individuals with preexisting mood disorders are particularly sensitive to aspartame, suggesting its use in this population should be discouraged.

The study was halted by the Institutional Review Board after 13 individuals had completed the trial because of the severity of reactions within the group of patients with a history of depression.

Similarly, in 2008, researchers asserted that excessive aspartame ingestion might be involved in the pathogenesis of certain mental disorders, and may compromise learning and emotional functioning<sup>17</sup>

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**Behavioral problems**<sup>18</sup>

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**Infertility**, likely due to its effect on hormones and inflammation<sup>19</sup>

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**Insomnia**<sup>20</sup>

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**Dizziness**<sup>21</sup>

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**Fatigue**<sup>22</sup>

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In addition to the conditions listed above, adverse events related to aspartame consumption reported to the FDA's Adverse Events Reporting System (FAERS) also include:<sup>23</sup>

Immune system disorders

Nervous system disorders

Respiratory disorders

Eye disorders

Renal and urinary disorders

Cardiac disorders

## Aspartame Elevates Cortisol

Aspartame also elevates cortisol, which can have adverse health consequences. As noted in one 2017 paper:<sup>24</sup>

*“Aspartame acts as a chemical stressor by elevating plasma cortisol levels and causing the production of excess 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.”*

In addition to chronic inflammation and neurobehavioral health consequences, cortisol can also lead to muscle breakdown and impaired immune function when chronically elevated. Cortisol is also the primary aging hormone.

If it is chronically elevated, you simply will die prematurely as it is highly catabolic, meaning it breaks down tissues. To stay healthy as you age you need to be anabolic and build healthy tissues like muscle and mitochondria, and high cortisol will seriously impair those efforts.

Importantly, cortisol can behave differently in various parts of the body due to different feedback mechanisms.<sup>25</sup> There’s a central mechanism in your brain that usually tells your body to slow down cortisol production when there's enough (negative feedback).

However, outside the brain, in other parts of the body (peripheral feedback), the mechanism actually works the opposite way (positive feedback). This means that in these areas, elevated cortisol can lead to even more cortisol being produced.

There's also a difference between the cortisol level in your blood versus that in your tissues. Even if blood tests show normal or low levels of cortisol, it's possible to have high levels of cortisol in your tissues. This can happen because of an enzyme called 11 $\beta$ -HSD1, which helps make cortisol and is found in most parts of the body.

It's the rate-limiting step in synthesizing cortisol and evidence suggests the activity of the 11 $\beta$ -HSD1 enzyme in the tissues (not just the cortisol level in the blood) is a good indicator of whether someone might develop Type 2 diabetes,<sup>26</sup> and again, Type 2 diabetes is another side effect that has been linked to aspartame consumption.

## **Is Aspartame Causing Your Health Problems?**

Unfortunately, aspartame toxicity is not well-recognized by physicians, despite its frequency. Diagnosis is also hampered by the fact that it mimics several other common health conditions. It's quite possible that you could be having a reaction to artificial sweeteners and not even know it.

To determine if you're having a reaction to aspartame or other artificial sweeteners, take the following steps:

1. Eliminate ALL artificial sweeteners from your diet for two weeks.
2. After two weeks of being artificial sweetener-free, reintroduce your artificial sweetener of choice in a significant quantity (about three servings daily).
3. Avoid other artificial sweeteners during this period.
4. Do this for one to three days and pay close attention to how you feel, especially as compared to when you were not consuming artificial sweeteners.
5. If you don't notice a difference in how you feel after re-introducing your primary artificial sweetener for a few days, it's a safe bet you're able to tolerate it acutely, meaning your body doesn't have an immediate, adverse response. However, this doesn't mean your health won't be damaged in the long run.



6. If you've been consuming more than one type of artificial sweetener, you can repeat steps 2 through 4 with the next one on your list.

## Report Side Effects to the FDA

If you do experience side effects from aspartame, please report it to the FDA (if you live in the United States). It's easy to make a report – just go to the [FDA Consumer Complaint Coordinator page](#), find the phone number for your state, and make a call to report your reaction.

## Sources and References

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- <sup>1, 5</sup> [IARC Summary of Findings of the Evaluation of Aspartame June 2023](#)
- <sup>2</sup> [Lancet Oncology August 2023; 24\(8\): 848-850](#)
- <sup>3</sup> [Yahoo! Life July 14, 2023](#)
- <sup>4</sup> [WHO July 14, 2023](#)
- <sup>6</sup> [FDA Response to External Safety Reviews of Aspartame July 14, 2023](#)
- <sup>7, 8, 9, 19</sup> [NDTV April 9, 2024](#)
- <sup>10</sup> [Neurology February 1989](#)
- <sup>11</sup> [Headache February 1988](#)
- <sup>12, 14, 18, 24</sup> [Nutritional Neuroscience February 2017; 21\(5\): 1-11](#)
- <sup>13</sup> [Pharmacological Research 2006 Jan;53\(1\):1-5](#)
- <sup>15, 20, 21, 22</sup> [American Journal of Clinical Nutrition March 1986; 43\(3\): 464-469](#)
- <sup>16</sup> [Biological Psychiatry July 1993: 34\(1\); 13-17](#)
- <sup>17</sup> [European Journal of Clinical Nutrition 2008;62: 451–462](#)
- <sup>23</sup> [FAERS Public Database, Adverse Events for Aspartame, Reaction Groups](#)
- <sup>25, 26</sup> [Haidut.me February 26, 2024 \(Archived\)](#)