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Aspartame Alters Gut Bacteria and Triggers Cancer Genes in Glioblastoma

Analysis by Dr. Joseph Mercola | August 07, 2025

STORY AT-A-GLANCE

- Aspartame consumption activates cancer-driving genes even without visible tumor growth, raising glioblastoma risk at a molecular level
- This artificial sweetener disrupts your gut-brain axis by depleting beneficial bacteria like Rikenellaceae, which normally produce compounds that help suppress tumor progression
- RNA methylation, a powerful gene regulation process, is altered by aspartame exposure, increasing expression of genes tied to more aggressive brain cancer
- Artificial sweeteners like aspartame and neotame damage gut bacteria, disrupt intestinal barriers, and increase your risk of metabolic and inflammatory diseases
- Eliminating aspartame and supporting gut health with healthy carbs, fermented foods, and collagen will help restore immune balance and reduce cancer-promoting conditions

Aspartame, the artificial sweetener used in everything from diet soda to chewable vitamins, doesn't just sweeten your food — it alters your genetic landscape and heightens your risk of glioblastoma, one of the deadliest forms of brain cancer, according to a new study.

What's even more concerning is that these genetic shifts were traced back to disruptions in gut bacteria. If you still believe the claims that aspartame is "harmless," these new findings will open your eyes to just how dangerous this widely used additive is.

Aspartame Activates Brain Cancer Genes, Study Finds

A recent animal study published in Scientific Reports investigated the effects of aspartame on gene expression and gut bacteria in mice with glioblastoma. Researchers assessed whether aspartame could influence tumor progression on a molecular level, even in the absence of visible tumor growth.[1]

- **The mice used in the study had gliomas induced by transplanting cancerous cells —** These test subjects were then split into two groups. One received aspartame in their drinking water, while the control group was given plain water.
- **One of the most striking findings was the activation of cancer-linked genes —** The researchers discovered dramatic internal changes — particularly at the genetic and microbial level — in the aspartame-exposed group. Specifically, they observed a significant upregulation of three key genes — myelocytomatosis (MYC), cyclin-dependent kinase inhibitor 1A (CDKN1A), and transforming growth factor-β (TGFB1).
- **These three genes are well-established contributors to cancer progression —** MYC is an oncogene, meaning it plays a direct role in driving uncontrolled cell growth, while TGFB1 is often associated with a poor prognosis in glioblastoma due to its ability to suppress immune function and promote tumor cell survival. CDKN1A is typically involved in controlling the cell cycle, but when dysregulated, it contributes to tumor aggressiveness.
- **The most unsettling part?** These changes happened without any measurable increase in tumor size. That means even if your tumor isn't growing, it could still be genetically evolving into something far more dangerous.

Aspartame Alters Your Gut Microbiota by Affecting the Gut-Brain Axis

Aspartame was accidentally discovered in 1965 and had been used in consumer products since the 1980s. Being a low-calorie sweetener that's 200 times sweeter than regular sugar, it became widely popular among people who want to cut back on their calorie consumption. It's now used in over 6,000 different products worldwide, including diet soda, sugar-free gum and candy, and even condiments like ketchup and salad dressings.[2]

However, aspartame is not as safe as it seems — in fact, it has been associated with a long list of health problems, such as **obesity**, headaches, and depression.[3] In 2023, the World Health Organization's International Agency for Research on Cancer (IARC) declared **aspartame as possibly carcinogenic to humans**[4] — and now, this animal study provides stronger evidence backing up this classification.

- **The changes in gene activity were traced to a powerful biological process called RNA methylation —** These changes occurred specifically along the N6-methyladenosine (m6A) pathway. RNA methylation is a chemical modification of messenger RNA (mRNA), the molecule your body uses to translate DNA into proteins.

  This modification acts like a dimmer switch — it fine-tunes how active a gene becomes. When aspartame exposure elevated this process, the dimmer switch turned all the way up on cancer-promoting genes.

- **Aspartame increases glioblastoma risk by affecting the gut-brain axis —** This is the bidirectional pathway by which your gut and brain communicate with each other. Your gut bacteria synthesize short-chain fatty acids (SCFAs) like butyrate and metabolize dietary components like tryptophan into molecules that regulate the tumor microenvironment.

  When these metabolites reach tumor sites, they improve immune surveillance mechanisms and alter cellular metabolic processes to inhibit tumor growth.

- **Conversely, tumors also influence gut microbial composition —** Certain gut bacteria that colonize tumor tissues contribute to carcinogenesis through multiple mechanisms — they induce DNA damage, suppress the immune system's ability to recognize tumor antigens, and disrupt vital metabolic pathways. These create conditions conducive to tumor survival and proliferation.

  To put it simply, some gut bacteria produce substances that help fight cancer, while others actually help tumors grow and spread; Aspartame alters your gut to increase the growth of tumor-spreading bacteria.

- **Mice fed aspartame had a significant drop in bacteria from the Rikenellaceae family —** Rikenellaceae are part of a group of microbes involved in producing SCFAs, which, as mentioned above, help inhibit cancer formation. According to the study authors:

  > *"The composition and abundance of gut microbiota, particularly the Rikenellaceae family, are closely associated with the levels of volatile fatty acids, such as acetic acid, propionic acid, and butyric acid.*
  >
  > *Numerous findings have provided compelling evidence of a robust connection between the abundance of the Rikenellaceae family in the gut and a diverse array of metabolic health conditions, including Parkinson's disease and nonalcoholic fatty liver disease (NAFLD).*
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  > *Our study concluded that although the aspartame diet did not significantly affect tumor growth, it did induce changes in the composition of the gut microbiota, particularly a decrease in the relative abundance of the Rikenellaceae family. We speculated that gut microbiota could influence the progression of glioblastoma multiforme by gut-brain axis."*[5]

Previous Studies Have Associated Artificial Sweeteners with a High Risk of Cancer

There's no doubt in my mind that artificial sweeteners like aspartame are among the most pernicious ingredients to ever make into our food supply. On the outside, swapping sugar for aspartame seems beneficial for your health, but on the contrary, this is one of the worst decisions you can make, with damaging, life-long implications.

This featured study now adds to the growing list of research linking artificial sweeteners to cancer and tumor growth. Among the most notable ones are:

- **A 2006 lifespan rat study published in Environmental Health Perspectives —** The researchers note that aspartame "is a multipotential carcinogenic agent, even at a daily dose of … much less than the current acceptable daily intake."[6]
- **A 2010 study published in the American Journal of Industrial Medicine —** The research confirms that this artificial sweetener is "a carcinogenic agent in multiple sites in rodents, and that this effect is induced in two species, rats (males and females) and mice (males)."[7]
- **A 2012 paper published in the American Journal of Clinical Nutrition —** Conducted by researchers from Harvard University, the study found a positive link between aspartame intake and Non-Hodgkin lymphoma and multiple myeloma (among males), and leukemia (in both males and females).[8]
- **A 2022 study published in PLOS Medicine —** The study found a link between aspartame and acesulfame-K, another artificial sweetener, and a higher risk of breast and obesity-related cancers.[9]

In 2024, the nonprofit organization U.S. Right to Know released a review highlighting **multiple independent studies that linked aspartame** not just to an increased risk of cancer, but to multiple health problems as well. The review notes:[10]

> *"Dozens of studies have linked the popular artificial sweetener aspartame to serious health problems, including cancer, cardiovascular disease, Alzheimer's disease, seizures, stroke and dementia, as well as negative*

effects such as intestinal dysbiosis, mood disorders, headaches and migraines.

Evidence also links aspartame to weight gain, increased appetite and obesity-related diseases … This evidence raises questions about the legality of marketing aspartame-containing products as 'diet' drinks or weight-loss products."

Artificial Sweeteners Disrupt Your Gut Health in Many Ways

Your gut microbiome is composed of trillions of good and bad bacteria that influence various factors, such as regulating digestion, metabolism, and immune function. However, when you consume artificial sweeteners, especially on a day-to-day basis, your gut microbiome changes. Studies have found that consuming artificial sweeteners disrupts your gut's delicate balance, which leads to a cascade of health issues.

- **Aspartame blocks a gut enzyme associated with weight management —** An aspartame breakdown product called phenylalanine was found to inhibit the activity of a gut enzyme called alkaline phosphatase (IAP). Previous animal studies have associated IAP with the prevention of metabolic syndrome development, as well as reducing its symptoms in those with the condition.[11]

- **Neotame causes serious damage to the intestines and overall gut health —** A relatively new artificial sweetener that's chemically similar to aspartame, neotame not only damaged bacteria commonly found in the gut, but also led to intestinal cell death, one study reported. This sweetener also disrupted the intestinal barrier, leading to increased leakage and decreased presence of claudin-3, a protein important for cell binding. According to the study authors:[12]

  "The study is the first to show that neotame can cause previously healthy gut bacteria to become diseased and invade the gut wall — potentially leading to health issues including irritable bowel syndrome and sepsis —

and also cause a breakdown of the epithelial barrier, which forms part of the gut wall."[13]

- **Consuming sucralose induces gut dysbiosis and alters glucose and insulin levels —** A study published in Microorganisms found that ingesting this sweetener in amounts "far lower than the suggested ADI [acceptable daily intake]"[14] — for just 10 weeks was enough to induce gut dysbiosis and alter glucose and insulin levels in healthy, young adults. The sweetener affects bacteria belonging to the phylum Firmicutes, which are involved in glucose and insulin metabolism.

If you truly value your overall health, tending to your gut health is key — and one of the most significant changes you can make is to avoid artificial sweeteners.

Eliminate Aspartame (and Other Artificial Sweeteners) from Your Life

The research is clear — Aspartame isn't harmless. It disrupts your gut microbiome, activates genes tied to tumor aggressiveness, and hijacks your cellular energy machinery. If you want to protect your body from chronic diseases and avoid a glioblastoma diagnosis, I recommend following these strategies:

1. **Cut aspartame and all artificial sweeteners from your daily intake —** If you're still drinking diet sodas or using sugar-free products like flavored waters, gum, or chewable vitamins, it's time to stop. These are common sources of aspartame. Ideally, remove all ultraprocessed foods from your diet, as many are hidden sources of artificial sweeteners.

   I also advise reading labels carefully. Aspartame and other sweeteners often hide behind other names, so make sure to closely check the label of the products you buy.

2. **Switch to natural sweeteners —** Raw Manuka honey, maple syrup, and coconut sugar, all consumed in moderation, are some of the best choices. If you're trying to transition off sweeteners entirely, fresh fruit is an excellent way to satisfy your

cravings while keeping your blood sugar balanced.

3. **Restore your gut microbiome immediately —** Focus on foods that help your body rebuild a healthy microbial balance. Start with whole fruits, well-cooked vegetables, and well-tolerated, cooked starches.

   Fermented foods like sauerkraut, kefir, and kimchi provide natural probiotics that help rebalance your microbiome. Collagen-rich bone broth supports the gut lining, and dietary fiber from well-tolerated fruits helps feed beneficial bacteria (but make sure your gut is in optimal condition, so the fiber will feed your good bacteria instead of the bad bacteria).

4. **Don't skimp on targeted carbohydrates —** Most adults need around 200 to 250 grams of carbs per day for proper mitochondrial function. That includes the brain. Restricting carbs starves your body of energy and leads to reductive stress, which only worsens the cellular chaos tied to glioblastoma. I recommend slowly reintroducing safe carbs based on your gut's tolerance.

5. **Remove other common triggers of cellular damage —** If you're serious about disrupting the root cause of glioblastoma progression, eliminate the other big offenders that compromise mitochondrial and microbiome health. That includes seed oils, electromagnetic (EMF) exposure, xenoestrogens from plastics, and processed foods.

Frequently Asked Questions (FAQs) About Aspartame and Glioblastoma

Q: How does aspartame increase the risk of glioblastoma?

A: Aspartame alters gene activity tied to cancer progression by activating RNA methylation pathways, especially the N6-methyladenosine (m6A) pathway. This boosts the expression of genes like MYC, TGFB1, and CDKN1A, which are known to

drive tumor growth and make glioblastoma more aggressive — even if the tumor itself doesn't visibly enlarge.

Q: What role does the gut microbiome play in brain cancer development?

A: Your gut bacteria influence your brain through the gut-brain axis. Aspartame disrupts this by reducing bacteria like Rikenellaceae that help produce anticancer compounds. These microbial imbalances weaken immune surveillance and encourage tumor-supporting conditions in the brain.

Q: Are artificial sweeteners really worse than sugar?

A: Yes. While marketed as safer low-calorie options, artificial sweeteners like aspartame have been linked to cancer, metabolic dysfunction, gut damage, and disrupted gene regulation. The evidence shows these additives are not harmless alternatives and could cause long-term harm to your health.

Q: What should I do if I've been consuming aspartame regularly?

A: Start by eliminating all artificial sweeteners from your diet — this includes checking labels on diet sodas, flavored waters, gum, vitamins, and condiments. Then, support your gut with natural carbs, fermented foods, dextrose water, and collagen-rich broths to help rebalance your microbiome and restore gene regulation pathways.

Q: Is there a safer way to satisfy my sweet cravings?

A: Yes. Transition to moderate use of natural sweeteners like raw honey, maple syrup, or coconut sugar. Better yet, rely on whole fruits with fiber, which offer natural sweetness while supporting gut and brain health. Always prioritize food sources that feed your beneficial bacteria, not fuel disease.

Sources and References

- [1, 5] Sci Rep. 2025 Jul 2;15:23298
- [2] ScienceDirect, Aspartame
- [3] Nutr Neurosci. 2018 Jun;21(5):306-316
- [4] World Health Organization, July 14, 2023
- [6] Environ Health Perspect. 2005 Nov 17;114(3):379–385
- [7] Am J Ind Med. 2010 Dec;53(12):1197-206
- [8] The American Journal of Clinical Nutrition, December 2012, Volume 96, Issue 6, P1419-1428
- [9] PLOS Medicine 19(3): e1003950
- [10] U.S. Right to Know, March 27, 2025
- [11] Proc. Natl. Acad. Sci. U.S.A., 2013, 110 (17) 7003-7008
- [12] Front. Nutr., 24 April 2024, Sec. Nutrition and Microbes, Volume 11 – 2024
- [13] ARU, April 24, 2024
- [14] Microorganisms 2022, 10(2), 434