# Aspartame: Could Your Diet Coke Give You Cancer?

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Nothing like an ice-cold Diet Coke on a hot summer day! It tastes sweet and refreshing but doesn't contribute calories or added sugars to your diet. The sweet taste of Diet Coke comes from aspartame. This low-calorie, sugar-free sweetener has been on the market for almost 50 years and is among the most studied food additives in the human food supply.[1] Nonetheless, in July of 2023 the World Health Organization (WHO) classified it as a possible carcinogen. [2] Does this mean we should avoid aspartame-containing foods?

Chemically, aspartame consists of two amino acids: phenylalanine and aspartic acid. It was inadvertently discovered in the 1960s when James M. Schlatter, a researcher working on antiulcer drugs, licked his finger to turn a page and tasted a sweet flavor. Its use as a sweetener was first approved by the FDA in the 1970s and is now used in beverages, chewing gums, yogurts, and the tabletop sweetener Equal. In 1983 the FDA established an acceptable daily intake (ADI) for aspartame of 50 mg /kg body weight. [1] The ADI is the maximum amount considered safe for an adult to consume daily over a lifetime. The FDA continues to evaluate the safety of aspartame as new data becomes available. [1,2]

The WHO International Agency for Research on Cancer (IARC) has been monitoring aspartame as well and recently classified it as a Group 2B carcinogen, "possibly carcinogenic to humans" (see Table). This designation was based on evaluation of three studies that found limited evidence of a positive association between artificially sweetened beverage consumption and the risk of liver cancer. The proposed mechanism is related to the release of methanol from the breakdown of aspartame in the gastrointestinal tract. Methanol is oxidized in the liver to formaldehyde; formaldehyde is directly toxic to liver cells and associated with cancer development.[3]

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| Group 1 | Carcinogenic to humans |
| Group 2A | Probably carcinogenic to humans |
| Group 2B | Possibly carcinogenic to humans |
| Group 3 | Not classifiable as to its carcinogenicity to humans |
| Group 4 | Probably not carcinogenic to humans |

Based on the IARC designation, one would think that aspartame should no longer be approved for use. However, according to the WHO Joint Expert Committee on Food Additives (JECFA), there is no reason to change current guidance on the use of aspartame. [2] This apparent disparity is because these two WHO agencies are tasked with different responsibilities. The IARC reviews scientific evidence to determine whether an agent can cause cancer in humans, but they do not specify the risk of developing cancer at a given exposure level. The JECFA performs risk assessments to determine the probability that a food additive, such as aspartame, will cause harm at a particular level of exposure. The FDA agrees with the JECFA's assessment that the current recommended limits for aspartame consumption are safe.[1]

So, is it OK to enjoy that refreshing beverage? The ADI suggests that the equivalent of about 200 fluid ounces (17 cans) of aspartame-containing soda per day is safe for a healthy adult, but this does not mean it is safe for everyone. Individuals with the genetic disease phenylketonuria (PKU) should not consume aspartame because they cannot metabolize the amino acid phenylalanine normally. When they ingest phenylalanine, it builds up in the blood, potentially resulting in brain damage and other health and developmental problems. Other concerns with aspartame relate to its possible effect on body weight and metabolism. While aspartame is commonly used to improve health by reducing the intake of added sugars, helping to manage blood glucose, and lowering calorie intake, the use of artificial sweeteners has ironically been suggested to stimulate appetite, cause weight gain, increase the risk of hypertension and cardiovascular events, and disrupt the gut microbiota leading to glucose intolerance and an increased risk of type 2 diabetes.[4,5] Currently the data supporting these adverse effects is primarily observational or from animal studies so further research is needed to characterize the health impact of aspartame.[3]


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## Conclusion

Recommendations for a healthy diet tell us to limit our intake of added sugars, particularly from sugar-sweetened beverages. However, there are growing concerns that excessive consumption of aspartame and other artificial sweeteners may adversely impact health in the long term. The best advice may be found in the words of Dr. Francesco Branca, director of WHO's Department of Nutrition … Food Safety: "If consumers are faced with a decision on whether to take cola with

sweeteners or one with sugar, I think there should be a third option considered, which is to drink water instead."[6]

## References


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