

Artificial Sweetener Linked to Heritable Learning Deficits, Scientists Say

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Artificial sweeteners are associated with learning and memory deficits which can be passed on to the next generation, scientists say.

These effects were seen after consuming as little as 10 percent of the Food and Drug Administration's daily recommendations.

Aspartame is an artificial sweetener that is used in a variety of products, from diet drinks to baked goods, chewing gum and even toothpaste. While the additive has been approved by the FDA for use in food and drinks, studies have found that aspartame is linked to a range of health problems, including type 2 diabetes, obesity, mood and behavioral disorders, hormonal disruption and damage to DNA.

And while the product is generally considered to be safe at low doses, the World Health Organization said in July that the sweetener can "possibly" cause cancer.

In a recent study, published in the journal *Nature Scientific Reports* on August 31, researchers from Florida State University found that even low doses of aspartame over a sustained period can result in spatial learning and memory deficits, at least in mice.

"We administered to mice a dose of aspartame that was equivalent to only about 10 to 15 percent of the dose stipulated by the FDA as the maximum safe daily intake value for humans [which is 50 milligrams per kilogram of body weight per day]," co-author Pradeep Bhude, the Jim and Betty Ann

Rodgers Eminent Scholar chair of Developmental Neuroscience in the Department of Biomedical Sciences at Florida State University told *Newsweek*.

"In a previous paper, this low dose produced anxiety, which was heritable via the male line of descent for up to two generations. In the present study, this low dose produced learning and memory deficits that were heritable via the paternal line from fathers to their children."

Aspartame itself is not absorbed into the bloodstream. Rather, it is broken down into phenylalanine, aspartic acid and methanol in the digestive tract.

"All three breakdown products enter the circulation, cross the blood-brain barrier and are neuroactive," Bhude said.

In the brain, phenylalanine and aspartic acid can affect the transmission of signals between brain cells, while methanol is neurotoxic, which may be the underlying cause of these cognitive deficits. Previous studies have also linked aspartame to disruption of the gut microbiome, which plays an important role in supporting mental health.

These studies were done in mice, so what does this mean for humans?

"Our research in mouse models when extrapolated to humans...suggests that consuming two to four 8-ounce cans of aspartame-containing drinks daily for about six months could produce anxiety and spatial working memory deficits," Bhude said. "If the daily consumption continued further [it] could produce learning and memory deficits."

"I emphasize that these are extrapolations based on exposure of young adult mice to aspartame in drinking water daily, which produced anxiety and spatial working memory deficits in four weeks and learning and memory deficits in 12 weeks. Extrapolation of data from well-controlled laboratory experiments in mice to humans is always risky. The extrapolations give us insights into what could happen rather than what will happen."

While this research is still in its early stages, Bhude said that people should pay attention to these findings. "More importantly, our regulatory agencies should become vigilant," he said.

"[The] FDA maintains that aspartame is safe when consumed within the maximum daily intake value (50 mg/kg/day). Our studies suggest that consuming only 10 to 15 percent of this maximum daily dose could compromise the mental health of the individuals who consume it as well as their descendants who may not consume it," Bide said. Artificial sweeteners do have a place in the diets of individuals with metabolic disorders, such as diabetes. However, healthy individuals may want to consider cost-benefit."

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