

Why Diet Soda is (probably) Bad for You, According to Science

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Diet sodas have long been marketed as weight loss tools. The idea is that they allow people to enjoy the sweetness of regular sugary soda, but without the calories and weight gain.

Scientists, however, are highly skeptical of the marketing claims. They all agree that regular soda is terrible for you and should be avoided. But they have serious questions about whether diet soft drinks, which tend to contain artificial sweeteners, are any better. The researchers I spoke to said they try to stay away from both types of drink and opt for water instead.

"The big controversy in this area is whether artificial sweeteners and diet beverages might be contributing to the obesity epidemic and a parallel diabetes epidemic, which is exactly what they're supposed to help curb," explained Vasanti Malik, a Harvard researcher who has studied diet soda.

That's because the evidence on whether drinking diet soda causes people to gain weight, leading to other chronic diseases, is genuinely mixed. One study from 2008 looked at the relationship between consumption of artificially sweetened beverages and long-term weight gain in 3,682 people. Drinking diet soda was associated with an almost doubled risk of overweight and obesity. "These findings raise the question whether artificial sweeteners use might be fueling — rather than fighting — our escalating obesity epidemic," the authors of that study wrote.

But that wasn't the end of the story. Another study, published in 2012, found that people who replaced sugary soft drinks with diet beverages actually *lost* some weight. (In fact, they fared about as well as people who gave up sugary soft drinks and drank water instead.)

"So there are some studies that are reporting that consuming diet beverages actually contributes to weight gain," said Malik. "Others report consuming diet beverages contribute to an increased risk of diabetes. Others say that's not the case, that these studies are flawed." Malik predicts we'll have firmer answers in five years, as more studies are done.

Susan Swithers, a professor at Purdue University who has studied artificial sweeteners, agreed that the evidence is still murky. "Anybody who claims the consequences of diet soda for weight are clear is not understanding what the bulk of the literature actually says," she told me.

Part of that murkiness could be due to the fact that people who drink diet beverages are fundamentally different somehow from those who don't. People who choose to drink diet pop over regular soda might do so, for instance, because they already have weight troubles — which could confound the results.

Even so, scientists are increasingly questioning whether artificial sweeteners are as benign as they seem. One 2015 study in the *British Medical Journal* analyzed all the best available research on the association between sugar-sweetened beverages, artificially sweetened drinks, juices, and Type 2 diabetes. What they found was startling: Regular consumption of sugary drinks was associated with diabetes — but so was consumption of diet drinks. (Other research on diabetes has come to similar conclusions, though the weight of evidence suggests artificial sweeteners don't cause cancer.)

One key question is *why* diet soda might be so bad for your health. In the absence of a firm answer, researchers have come up with several hypotheses.

First, there's the idea that the act of drinking diet soda might change people's behaviors. Here's how Stanford's Christopher Gardner put it: "If you have a Diet Coke in the afternoon, and then it is dinnertime and you remember that you had a Diet Coke, you might reward yourself with a bowl of ice cream." Capturing this compensation effect is really tough. But it could explain why studies show that diet soda drinkers gain weight and have related health issues.

Or it may be something about the artificial sweeteners in diet sodas themselves. Some researchers have wondered whether these sweeteners affect our gut flora — the bacteria in our digestive tracts that helps with metabolism (and many other critical bodily functions). Emerging evidence — albeit from research that's only been done on rodents — suggests the chemicals in artificial sweeteners cause disturbances in the gut, which are associated with metabolic disorders like diabetes and obesity.

There's also research that suggests fake sweeteners work on the brain in weird ways. Diet drinks seem to affect sugar cravings, for one thing. Experimental research in humans has found that the taste of sweetness, whether real or artificial, can boost appetite and cause people to eat more.

Other small studies suggest that when people are given sucralose, they experience a rush of insulin that doesn't lead to a decrease in blood glucose levels, as if the artificial sweetener is preventing the insulin from being as effective as it ought to be. This is the hallmark of insulin resistance and a harbinger of diabetes.

The underlying idea here is that fake sugars throw off our responses to real sugar. Our bodies and brains are conditioned to deal with sweetness in a certain way. When we taste something sugary, our body releases hormones like insulin and gears up energy for metabolism, so that when the sugar and calories hit our gut we're prepared to deal with them.

When you introduce artificial sweeteners, the body gets ready for sugar — which then doesn't arrive. "The learned responses get blunted or go away," explained Swithers. "Your body says, 'Wait a minute, the last time I tasted something sweet, I didn't get anything. This time, I don't know what's going to happen, so I'm not going to get ready to metabolize that much energy.'" (This theory aligns with the mounting evidence that artificial flavors may fool our sensory systems in other ways, leading us down the path to bad health.)

That's not to say that loading up on beverages sweetened with real sugar is a good idea. They're usually devoid of nutritional value, and deliver a mega dose of calories without any accompanying satiety. But if you're weaning yourself off regular soda, drinking a bit of diet soda for a short period might be better overall for your health. If you're not a sugary drinks addict, stick to water — replacing sugar with fake stuff may not be doing your body any favours, and could actually be harmful.