

Why zero-calorie sweeteners can still lead to diabetes, obesity

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Increased awareness of the health consequences of eating too much sugar has fueled a dramatic uptick in the consumption of zero-calorie artificial sweeteners in recent decades. However, new research finds sugar replacements can also cause health changes that are linked with diabetes and obesity, suggesting that switching from regular to diet soda

may be a case of 'out of the frying pan, into the fire.'

Artificial sweeteners are one of the most common food additives worldwide, frequently consumed in diet and zero-calorie sodas and other products. While some previous studies have linked [artificial sweeteners](#) with [negative health consequences](#), earlier research has been mixed and raised questions about potential bias related to study sponsorship.

This new study is the largest examination to date that tracks biochemical changes in the body—using an approach known as unbiased high-throughput metabolomics—after consumption of [sugar](#) or sugar substitutes. Researchers also looked at impacts on vascular health by studying how the substances affect the lining of [blood vessels](#). The studies were conducted in rats and cell cultures.

"Despite the addition of these non-caloric artificial sweeteners to our everyday diets, there has still been a drastic rise in obesity and diabetes," said lead researcher Brian Hoffmann, PhD, assistant professor in the department of biomedical engineering at the Medical College of Wisconsin and Marquette University. "In our studies, both sugar and artificial sweeteners seem to exhibit negative effects linked to obesity and diabetes, albeit through very different mechanisms from each other."

Hoffmann will present the research at the American Physiological Society annual meeting during the [2018 Experimental Biology meeting](#), held April 21-25 in San Diego.

The team fed different groups of rats diets high in glucose or fructose (kinds of sugar), or aspartame or acesulfame potassium (common zero-calorie artificial sweeteners). After three weeks, the researchers saw significant differences in the concentrations of biochemicals, fats and amino acids in blood samples.

The results suggest artificial sweeteners change how the body processes fat and gets its energy. In addition, they found acesulfame potassium seemed to accumulate in the blood, with higher concentrations having a more harmful effect on the cells that line blood vessels.

"We observed that in moderation, your body has the machinery to handle sugar; it is when the system is overloaded over a long period of time that this machinery breaks down," Hoffmann said. "We also observed that replacing these sugars with non-caloric artificial sweeteners leads to negative changes in fat and energy metabolism."

So, which is worse, sugar or artificial sweeteners? Researchers cautioned that the results do not provide a clear answer and the question warrants further study. It is well known that high dietary sugar is linked to negative health outcomes and the study suggests artificial sweeteners do, too.

"It is not as simple as 'stop using artificial sweeteners' being the key to solving overall health outcomes related to diabetes and obesity," Hoffmann added. "If you chronically consume these foreign substances (as with sugar) the risk of negative [health](#) outcomes increases. As with other dietary components, I like to tell people moderation is the key if one finds it hard to completely cut something out of their diet."

Provided by Experimental Biology 2018

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