Are Fake Sugars Fooling Anyone?

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From 1987 to 2000, the number of Americans that regularly consumed artificial sweeteners such as aspartame, saccharin or sucralose, more than doubled, from 70 million to 160 million. Paradoxically, obesity rates increased in about equal proportion during this time, from 15% to 30% of the American population. Scientists Susan Swithers and Terry Davidson argue these two events may be more than just unfortunate irony. After studying the effects of artificial sweeteners on the eating habits and body mass of rats, they've concluded that the calorie-free sweeteners promoted to help consumers get thin may in fact do the opposite, abetting consumers to get even fatter.

Swithers and Davidson conducted three controlled experiments, each designed to investigate the effects of artificial sugar on weight and eating behavior. In the first, they gave one group of rats sugar-sweetened yogurt, and the other saccharin-sweetened yogurt. Both groups had constant access to lab chow as well, which comprised the rest of their diet. Surprisingly, rats on the artificially-sweetened yogurt not only compensated for the lack of calories from the artificial sweetener by eating more lab chow, but overcompensated, resulting in a significantly greater overall caloric intake. By the end of the five-week experiment, the rats on artificially-sweetened yogurt gained an average of 20% more weight than the glucose-eating rats, and the size of their fat tissue increased an average of 5%.

The second experiment measured how much of a Chocolate Ensure Plus (350 calories and 22 grams of sugar) each rat group would eat while on the artificially sweetened or glucose-sweetened yogurt diet, respectively. Low and behold, those on the artificial-sweetener diet ate much more Chocolate Ensure Plus, consuming more calories overall than the rats who ate glucose yogurt. Once again, the rats overcompensated for the calories saved by saccharin in lieu of real sugar.

The third experiment tested the effect of artificial sugar on physiological responses. When your taste buds sense (or even anticipate) something sweet, they signal the body to release insulin to prepare for the impending calories, which triggers your metabolism. Your heart rate is signaled to increase, your eyes dilate and your body temperature rises, all in order to process incoming calories, which usually means to use them towards biological functions—or, to put it in diet terms, to burn them—which is good if you want to shed pounds.

But what happens when your taste buds sense something sweet, but your body doesn't receive the calories that it associates with such sweetness? To test what happens, Swithers and Davidson surgically inserted devices into the rats that measured their body temperature and activity rate (the energy expenditure) in the intestines. When rats consumed treats with fake sugar, their heart and thermal

rates did not increase as they normally would in response to sweetness. Their bodies realized that they were getting tricked, and thus their metabolisms did not increase to prepare for the incoming food. Even more distressing, when the rats regularly consuming fake sugar received the real stuff, their bodies still didn't respond. They no longer associated sweet tasting foods with calories, and so instead of a sweet sensation triggering their metabolisms, as it is supposed to, the sugar went straight to being stored as fat. In other words, it's the age-old story of the boy who cried sugar. When the boy wasn't lying, for once, it was already too late. All credibility was lost.

Of course, we must keep in mind that humans are not rats. While the metabolic effects are likely the same since we share most of our physiology, we thankfully don't share the same mental capacity. We may be able to compensate for the lowered metabolic response to real sugar by restricting our access to it. Unlike rats, we can ration our diets with rationale, using our higher level of consciousness to keep away from the constant temptation of lab chow. Furthermore, according to Barry Popkin, the director of the Interdisciplinary Obesity Center at University of North Carolina, most of the influences on human obesity are portion size, mindless eating and stress binging, all which would occur with or without artificial sweeteners in our diets. In short, mental stress forces us to tip the scales more than any specific dish or ingredient. All the same, anyone trying to lose weight should stay away from the Diet Cokes.