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How Artificial Sweeteners Lead To Diabetes



Earlier this fall, a study was published in *Nature* that caused a stir both in medical circles and the mainstream media. Why? Because the researchers who conducted the study at the Weizmann Institute of Science in Israel concluded that the use of noncaloric artificial sweeteners (NAS) may induce glucose intolerance — that is, use of these products may actually increase a person's risk of developing diabetes.

But wait, if artificial sweeteners don't contain sugar, how can they be linked to diabetes? Diabetes is a sugar problem, right? Wrong. Diabetes is NOT a sugar problem. Rather, diabetes results from physiological disturbances in the management of blood sugar.

What's the difference, you may ask? That's precisely what I'm here to explain.

1. The sugar and starch you eat aren't the only factors that influence your blood sugar.

Most people believe that sugar in the blood must come from sugar or refined carbohydrates eaten in the diet. Certainly a great percentage of it does, but consumed sugar and starch isn't the only factor. Your body is capable of a process called gluconeogenesis, which refers to the ability of the liver to manufacture sugar from noncarbohydrate sources.

Why can the body do this? It's related to maintaining homeostasis and regulating how sugar and starch get in and out of cells. Gluconeogenesis is based on a complex array of chemical reactions — steps that have nothing directly to do with the sugar you put into your mouth.

2. The taste of sweet (real or artificial) triggers chemical reactions in the body.

When your tongue tastes something sweet, your brain receives a message: "Something sweet!" At this point, your brain doesn't know if the sweet taste is coming from real sugar or from an artificial sweetener. And the brain isn't the only organ taking an interest in that sweet taste on your tongue.

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2. The taste of sweet (real or artificial) triggers chemical reactions in the body.

When your tongue tastes something sweet, your brain receives a message: "Yum. Something sweet!" At this point, your brain doesn't know if the sweet taste is coming from real sugar or from an artificial sweetener. And the brain isn't the only organ taking an interest in that sweet taste on your tongue.

Do you know the same receptors for sweet found on your tongue are also found within your gastrointestinal tract? That's right: your intestines "taste" your food. And what happens when your intestines taste something sweet? They release chemicals called incretins, which are hormones that modulate the way sugar is used in the body. These chemicals are released based simply on the taste of sweet, regardless of whether it's sugar (glucose) or a synthetic sweetener.

And what happens next? Simply put, your body now needs to manage the message alert that's being sent out by the hormones. If the body manages this message in a way that leads to high blood sugar, that's called diabetes. If the body manages this message in a way that effectively metabolizes the sugar or the artificial sweetener, then that is not diabetes.

3. The days of simple models, like “eating sugar causes diabetes,” are gone.

How does your body make that management decision: diabetes or not diabetes? It's complex, to say the least. In the case of the study done in Israel, the researchers were specifically examining the role of the gut microbiota (the community of bacteria that live in our intestines).

Their findings suggested that the consumption of artificial sweeteners changed the balance of the bacteria in the gut, which then opened the door for a change in how the body would manage the message it was receiving. Our internal microbiome influences many biological functions, including the digestive processes, the assimilation of nutrients, our immune defense, and — directly and indirectly — even things that relate to our inflammatory signaling processes.

In recent years, research has demonstrated that changes in inflammatory and metabolic status can be associated with the development of obesity and diabetes. Other factors can play a role in gut microbiota composition as well. Toxins, stress, and other nutrients can all influence physiological response. This is an interesting new chapter for all of us as we continue to unravel the ways in which the human body reacts to environmental influences, including food and — in the case of artificial sweeteners — products that mimic food.

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