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Do Diet Drinks Promote Glucose Intolerance?

By James J. Kenney,
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The short answer appears to be yes. This assertion comes from the results of a series of studies in mice conducted by a group of researchers at the Weismann Institute of Science in Israel and published in the journal *Nature* (1). The article's title is "Artificial sweeteners induce glucose intolerance by altering the gut microbiota." In one set of experiments, lead author Dr. Suez and colleagues fed groups of mice a high fat diet (HFD) and either plain water or water sweetened with either saccharin or glucose. They found that the saccharin-fed mice developed significantly more glucose intolerance than mice fed either plain water or glucose-sweetened water. Another in vitro study showed that adding saccharin to mice stool cultures increased Bacteroidetes (from 70 to 89% of the stool bacteria) while reducing the Firmicutes (from only 6% up to 22% of total). Remarkably, when

this saccharin-altered microbiota was transferred to germ-free mice, it resulted in significantly increased glucose intolerance in those mice compared with germ-free mice inoculated with the control stool culture from mice not fed saccharin. Firmicutes and Bacteroidetes are the two dominating phylum of gut bacteria. Growing research suggests that altered gut bacteria may not only change gut bacteria metabolism but may also play a critical role in altering human metabolism in ways that may lead to insulin resistance, increased inflammation, and obesity. Other research suggests that high-fat diets may promote insulin resistance, glucose intolerance, and obesity in both rodents and human subjects, in part by promoting an increase of Firmicutes and relative reduction of Bacteroidetes bacteria in their intestines. This shift in the dominant gut bacteria may promote more efficient use of caloric intake, leading to the gaining

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of weight and obesity and other metabolic problems such as glucose intolerance (2).

Does this Study Prove that NAS Promote Glucose Intolerance and Obesity in People?

Not necessarily. The results of Dr. Suez’s study do appear to show that saccharin alters the gut microbes in a way that promotes more glucose intolerance. However, the mice in most of Dr. Suez’s experiments were fed a diet with 60% fat calories. When saccharin- (or aspartame or sucralose) sweetened water was given to the mice instead of water sweetened with glucose or sucrose, the mice given the sugar-sweetened water reduced their intake of the very high fat diet. If, say, half the mice’s calories came from the sugar-sweetened water, then their overall calorie intake would have only been 30% fat instead of 60% fat calories. Mice given NAS or plain water would still have been consuming a 60% fat diet. Also, whether the mice were given NAS or sugar-sweetened water, their fluid

intake increased markedly compared to mice that were given only plain water to drink. Might a marked increase in fluid intake also have altered the gut microbes? Clearly these were confounding variables that Dr. Suez’s team did not control for, and these could have contributed to what they observed. In addition, Dr. Suez’s study included observational data in human subjects. This data showed that people who consumed more NAS were more likely to be overweight and have glucose intolerance. However, when Dr. Suez et. al. claimed: “Our findings suggest that NAS may have directly contributed to enhancing [the obesity epidemic] that they themselves were intended to fight,” they went far beyond what their research actually supports. Blaming the obesity epidemic on the growing use of NAS is naïve for many reasons. Yes, there is a correlation between obesity and the intake of NAS, but could it be that people who are struggling with their weight are more likely to choose foods with NAS instead of sugar-

sweetened foods? If so, then Dr. Suez et. al. may be confusing effect with cause. Perhaps drinking more NAS-sweetened drinks is driven by people attempting to prevent more weight gain. A study by Dr. Peters and colleagues looked at the effects of encouraging people on a 12-week weight loss program to consume either plain water or NAS beverages. This study of 303 people found that those instructed to consume the NAS-sweetened drinks lost an average of 13 pounds (lbs) compared to only 9 lbs for those instructed to only drink water (3). The results of Dr. Peter’s clinical trial are the exact opposite of what Dr. Suez’s group suggested would happen. Data from the National Weight Control Registry (NWCR) that tracks the habits of Americans who have lost at least 30 lbs and kept it off for more than a year also seriously undermine claims that NAS-sweetened beverage intake undermines loss and weight control...

Continued at <https://foodandhealth.com/drinks-glucose-intolerance/>.

Book Review: *French Kids Eat Everything*

As a registered dietitian, my go-to baby shower gift is Ellyn Satter's *Child of Mine: Feeding with Love and Good Sense*. Satter's advice is simple: parents are in charge of the food served, children are in charge of how much (and whether) they eat. This was my mantra when raising my two sons. Our dinner table was a pretty positive place, and I ended up with one "good" eater and one "picky" eater (and there's still hope for that one too!).

I'm still a fan of Ellyn Satter. But I wish all new parents could read Karen Le Billon's *French Kids Eat Everything* (William Morrow 2012). Le Billon moved from Canada to France with her French husband and young daughters, and she saw firsthand how French parents raise their children to be "good" eaters almost from birth. By tri-

al and error, Le Billon implemented these habits with her own daughters.

Here are some of her observations about how the French instill healthy eating habits for life:

- Parents teach healthy eating habits. Just like potty training or learning to read, the French "assume...that all children will learn to like vegetables."
- Food isn't used as a reward or to keep kids occupied while running errands. You won't see sippy cups and on-the-go containers of fish-shaped crackers littering minivans and strollers.
- Children grow up eating what their parents eat. There are no kid versions of real food and no children's menus!

- Mealtimes are scheduled social occasions. The family eats together, sitting down at the table.
- School lunch is important. Kids get at least 30 minutes to eat. Many schools have chefs and cook from scratch. Food is served on real plates and eaten with real utensils.
- Food is something to be enjoyed. The French always eat sitting down.
- There is no between-meal snacking. Children learn that it's ok to be hungry between meals. As a result, children are hungry when it's time to eat.

Le Billon's newest book is *Getting to Yum: The 7 Secrets of Raising Eager Eaters* (William Morrow 2014). I'll have more to say about this one in the future!

By Hollis Bass, MEd, RD

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