



Bitter Sweet

By Ramona Emerson

Ieat kale. I do yoga. I know exactly how many calories are in my yogurt, and it's been ages since I ate fast food—OK, if your definition of "ages" is a matter of months. But still. I do everything basically right, and yet there's one thing I can't seem to stay away from: sugar. You could set your watch by my 3 P.M. trip to the vending machine—because that's where the Twizzlers live. And I'm not the only one.

My circle of friends is filled with Vitamixing, SoulCycling, health-conscious women who think nothing of following their lunch of dressing-on-the-side salad with a corn-muffin cookie from Momofuku Milk Bar in the afternoon. Seriously, do not get between us and our mini cupcakes, our Swedish Fish, our imported Maltesers. And so what? What's a little sweet indulgence, even every day, as long as you exercise, eat your vegetables, and stick to two glasses of wine?

The answer may be: a lot. There's mounting evidence that a substance we're hardwired to consume—a six-month-old baby already prefers sweetness to all other tastes—may do far more harm than good. In fact, it doesn't do much good at all. The USDA doesn't even have a recommended daily intake for sugar because, put simply, it's not recommended. It has no known nutrients, and while we do need sugar in microscopic amounts for basic cell function, there's nothing microscopic about how much of it we eat. Americans consume almost 40 percent more sugar now than they did in the 1950s, and many scientists blame that, at least in part, for out-of-control weight gain, chronic diseases,

and even premature aging. Robert Lustig, a pediatric endocrinologist at the University of California, San Francisco, and a leader of the anti-sugar movement among researchers and academics, says the sharp rise in sugar consumption may even lead to cancer. "Sugar when overdosed is a toxin—and we are overdosed," says Lustig.

Plenty of experts question whether there's enough evidence to declare war on sugar just yet, even as schools are carting away vending machines and New York City's mayor, Michael Bloomberg, tried (unsuccessfully) to outlaw supersize sodas. Scientific journals are filled with articles presenting conflicting evidence

about sugar's long-term health effects, and even stalwart institutions such as the American Heart Association and the American Diabetes Association differ over its role in causing illness.

The controversy has even arrived at the cosmetics counter, since one of the more interesting claims about sugar is that it has a negative impact on skin. When you allow yourself a spoonful of Nutella, for instance, the sugar attaches to protein and fat cells in your body in a process known as glycation, forming "advanced glycation end products"—or AGEs, as they are called in the lab. This happens in all the cells in your body, but the effect appears to concentrate in collagen and elastin, says Laura Goodman, a senior scientist at Procter & Gamble who specializes in skin-care products. These proteins, which give skin its strength and suppleness, become stiff; at the same time, an oxidative reaction can turn skin a yellowish hue, in the same way that sugar added to bread makes it brown in the oven. In other words, AGEs may make you look O-L-D.

Fredric Brandt, a dermatologist in New York City and Miami, believes so strongly in the dangers of sugar that he has significantly reduced his own intake. "Although glycation hasn't been studied as extensively as sun and smoking, it's probably up there in the top things that cause damage to your skin," he says.

Glycation's effects on the skin can easily be seen with

The Sweetest Things

White sugar is the most popular sweetener, but Americans are also sprinkling on a lot of imitators. The best-sellers:

1. **WHITE SUGAR**
(\$1.69 billion yearly retail sales)
2. **SPLENDA**
(\$287.7 million)
3. **TRUVIA**
(\$90.6 million)
4. **SWEET 'N LOW**
(\$74.5 million)
5. **EQUAL**
(\$45.9 million)

SOURCE: IRI





Will Cotton, *Forest*, 2003.
Oil on linen. Courtesy of
the artist and Mary Boone
Gallery, New York City.

a special complexion-analysis camera. But by the light of day, those effects are not as dramatic, and that leads some doctors to dismiss their impact. Dermatologist Heidi Waldorf suggests we'd be better off directing our energies elsewhere. "Yes, glycation is a real biological process, but I have never seen anyone who I could tell was getting too much sugar from looking at her skin. I'd much rather my patients drive themselves crazy over sunblock and not smoking," she says.

One thing you don't need a special camera to see are pimples, and new evidence suggests that sugar is caus-

ing those, too. A 2013 study analyzed 50 years' worth of data on acne and diet and found that eating foods with a high glycemic index—those that quickly raise blood-sugar levels—can trigger hormonal fluctuations that cause acne by stimulating the production of sebum. Noted offenders are white bread, pizza, and bagels.

Rarely will you see the word "sugar" on an ingredient list at the grocery store, since the sweet stuff comes in a myriad of varieties and goes by 56 different names. Be it maltose, lactose, dextrose, or evaporated cane juice, it can make us overeat by amping up the palatability of foods, and

then overeat again when it leaves us craving more. But the loudest debate over sugar is probably the one focused on fructose, a molecule found in fruits and vegetables and the defining ingredient in high-fructose corn syrup, the factory-made sweetener in everything from tonic water to frozen pizza that critics accuse of almost single-handedly widening America's waistbands. High-fructose corn syrup is sweeter and less expensive than table sugar, and it extends the shelf life of foods at the grocery store. This means manufacturers have taken to it like the fashion world to Cara Delevingne, adding the syrup to traditionally unsweetened foods simply because it's tasty and cheap.

There are two fundamental problems with fructose: what it does to your body and what it does to your brain. While we burn glucose for energy in almost every cell in the body, "fructose is not essential for any physiological function that we know of," says Luc Tappy, a researcher at the University of Lausanne in Switzerland. (For women, at least. It does have one vital function for men: the production of semen.) Fructose can only be metabolized by the liver, where it is converted to, among other things, fat. That fat can build up in the liver and is released into the bloodstream in the form of triglycerides, high levels of which have been linked to heart disease, diabetes, and metabolic syndrome (a precursor of these conditions). After just 12 days on a diet of fructose-sweetened drinks, adults in one study had increased levels of both triglycerides and cholesterol, which can lead to heart disease. Participants who drank a glucose-sweetened beverage did not.

The other problem with fructose is how it communicates with the brain, which, as it turns out, is not very well at all. When test subjects at Yale University drank a beverage sweetened only with glucose, they reported feeling satisfied. But when they were given the same amount of a fructose-sweetened drink, they remained hungry. This may be because fructose doesn't stimulate appetite-suppressing hormones that tell your brain to stop drinking. As lead researcher Kathleen Page explains it, "You may consume more and more because it tastes good but doesn't make you full."

But the case against fructose isn't a lock. "One of the problems with some of this data is that [the studies] were done on very high intakes of fructose, which most people wouldn't consume," says Rachel Johnson, who chairs the American Heart Association's nutrition committee. In one study published in *Nutrition and Metabolism*, moderate fructose consumption—10 percent of daily calories—was found to have no ill effects. But what can't be denied is that fructose, in large doses, is not good for you. "Fructose definitely raises blood-fat levels more than glucose. That's

Great Fakes

In the quest for the perfect sweetener, natural trumps artificial, and every calorie counts. Here's how two of the trendiest sugar substitutes measure up.

STEVIA Since the introduction of Truvia five years ago, sweeteners made from the stevia plant have jumped from the food co-op to the espresso bar. Truvia, which now outsells Equal and Sweet 'N Low, markets its fine white crystals as a natural alternative to artificial sweeteners—and, yes, they're derived from a plant. But the term "natural" has "no formal definition in any FDA statute or regulation," says Christine Gerbstadt, a physician and the author of *Doctor's Detox Diet* (Nutronics). As the plaintiff in a recent lawsuit alleged, Truvia products are not natural because they contain ingredients that are highly processed and derived from genetically modified organisms (GMO). (Cargill, the manufacturer, agreed to a settlement that would modify claims it makes on Truvia product labels.) A more serious challenger may be right at the grocery store: There's a new stevia sweetener, Pyure, that's both USDA-certified organic and non-GMO.

AGAVE What if a sweetener could actually be good for you? That's the reputation of agave, an amber syrup that is slightly higher in calories than sugar but is also more intensely sweet, so you theoretically use less. In fact, this product of the Mexican blue agave plant raises red flags among nutritional purists. Agave is no more natural than sugar made from sugar beets or corn, and like corn syrup, it tends to have a lot of fructose, a sugar that many people try to avoid. One popular brand, Madhava, is 67 percent fructose; the high-fructose corn syrup used in some soft drinks contains about 55 percent fructose. If you like the convenience of a sweet syrup, agave may be for you—just don't mistake it for a health food. —LEXI NOVAK

been shown by multiple researchers," says Miriam Vos, a pediatric liver specialist at Emory University in Atlanta.

At this point, you might be tempted to take matters into your own hands and permanently give up sugar. Good luck with that: Not only is our taste for sugar innate, but for some of us it borders on addiction. Sugar has been found to release dopamine in an area of the brain associated with reward and reinforcement in animal studies, says Nicole Avena, an assistant professor of psychiatry at the New York Obesity Research Center at Columbia University and the author of *Why Diets Fail (Because You're Addicted to Sugar)* (Ten Speed Press). "With most foods, dopamine is only released the first time you eat it, but with sugar it's released every time," Avena says. "That's one of the hallmarks of drug abuse." While a salted caramel isn't exactly heroin—"Drugs affect dopamine and other systems much more powerfully," she notes—when plied with sugar, rats demonstrate behavior such as craving, bingeing, and withdrawal. They will even run across an electrified grid to get their fix.

Someone who does liken sugar to a drug is Lustig. Four years ago, he posted a provocative video on YouTube

We Want Candy

The ten most popular sweets among American women ages 20 to 39, according to the consumer-research company GfK MRI, are remarkably similar in calories (210 to 270) and sugar content (21 to 30 grams, except Skittles, which have 46).



1. Reese's Peanut Butter Cups



2. Kit Kat



3. Snickers



4. Peanut M&Ms



5. Twix

called "Sugar: The Bitter Truth," which has since been viewed almost 4 million times. Among his followers it is an article of faith that, in addition to all the problems sugar may cause—making us fat, taking the place of nutrients we need to thrive—the molecule itself is poisoning us. Lustig cites as evidence his study showing that in countries where sugar is more readily available, diabetes rates have continued to climb even when the population is not putting on weight. This means sugar may not be just the cofactor in that illness—it may be *the* factor. "Sugar," as he likes to say emphatically, "is evil." When I tell him that Elizabeth Seaquist, the president of the American Diabetes Association, categorically disputes that point, things start to get heated. "I would love to debate her in a forum, because I would take her apart limb from limb," he says.

If there's a demilitarized zone in the sugar wars, a place where everyone can come together and have a glass of unsweetened iced tea, it's the idea that we simply need to eat less of it. "At the end of the day, added sugars don't do anything except add calories and displace other nutritious foods," says Johnson. The American Heart Association, the only U.S. advisory body to recommend a firm limit on sugar consumption, says women should get no more than six teaspoons, or 24 grams, of added sugars per day, which is to say one black cherry fruit-on-the-bottom yogurt. Kind of bleak, right?

While nutrition labels don't differentiate between added sugars and naturally occurring ones, a good rule of thumb is that if the food doesn't contain milk (lactose) or fruit (fructose), any sugar is probably added, whether it comes in a container labeled "cookies" or a jar labeled "pasta sauce." An astonishing 70 percent of the added sugar that Americans consume comes from processed foods, according to the Centers for Disease Control and Prevention's latest National Health and Nutrition Examination Survey, and a lot of those foods don't even taste sweet. Bread, ketchup, crackers—all are examples of savory foods that are sweetened to make them taste better, look better, or last longer.

But trying to avoid high-fructose corn syrup may not be the answer, since for all its bad press, this sweetener usually contains only a little more fructose (around five percent) than table sugar. "It's very possible that fructose is doing the

Buzz Kill

You dutifully declined dessert, but that pre-dinner drink provided plenty of sugar. The biggest offenders on the cocktail list—and how to cut the sweetness.

MOJITO

9 grams of sugar (or one roll of Smarties*)

The remix: Use a sugar substitute instead of sugar, or try a modified Cuba Libre (Diet Coke, rum, lime juice, and muddled mint).

MARGARITA ON THE ROCKS

11.5 grams of sugar (a Tootsie Pop)

The remix: Replace the triple sec with fresh-squeezed orange and lime.

GIN AND TONIC

12.1 grams of sugar (half a pack of Starburst)

The remix: Use half tonic and half seltzer water.

WHISKEY SOUR

13.5 grams of sugar (seven Pixy Stix)

The remix: Combine stevia and lemon juice instead of bottled sour mix.

COSMOPOLITAN

16 grams of sugar (half a Snickers bar)

The remix: Make it a vodka soda with a splash of cranberry juice and a squeeze of lime.

PIÑA COLADA

35 grams of sugar (one Milky Way bar)

The remix: Add more whole fruit and ice and trade the coconut cream for unsweetened light coconut milk.

*Amounts are approximate.

most harm, but I talk to my patients about sugar in general, since both glucose and fructose come together in most foods," says Vos. Ironically, one sweetener that many consumers believe is best for them—agave—is made primarily from fructose. "It's promoted as a healthy alternative. Unfortunately, it may be worse, since you're getting the calories but not feeling satisfied," says Page.

The effective ways to lower your sugar intake are neither new nor exciting, but they can do you good. First, don't drink your calories. "We have randomized, controlled clinical trials linking sugar-sweetened beverages to obesity, so that's pretty much a slam dunk," says Johnson. Not only do sugary drinks contain a ridiculous amount of sugar—a small sweetened cappuccino from Dunkin' Donuts has 24 grams, your entire daily allowance according to the American Heart Association—but liquid calories don't make us feel full the way food calories do, meaning you'll probably end up eating more later.

Second, eat real food—i.e., the kind that you make, instead of just removing it from a package. This is possible, if slightly more time-consuming. In the name of science, I replaced my presweetened instant oatmeal with plain oatmeal sweetened by hand with brown sugar. Instead of the three-plus teaspoons of sugar that comes in the premade stuff, I was able to make mine perfectly sweet with just one. I've also started looking at labels, and not just at the calories. Ingredients are listed by weight, so avoid anything in which sugar is one of the first three ingredients. Also look out for different sugars sprinkled on the ingredient list. A good rule of thumb is that if it ends in "ose," it's sugar.

According to a surprising array of the best scientific minds, however, there's no need to cut it out completely. "Sweetness is part of the pleasure of life," says Vos. Even Lustig said I could have my Twizzlers as long as everything else I ate that day was free of added sugars. On a recent Saturday,

I was at brunch at a Brooklyn restaurant when I spotted something called savory oatmeal on the menu. It was oats topped with bok choy and other vegetables, and my companion ordered it and pronounced it good. I smiled politely as I cut into my brioche French toast. We have to make choices, but we also have to live. ♦



6. Skittles



7. Milk Chocolate M&M's



8. Hershey's bar



9. Butterfinger



10. Dove bar