

## Sugar Shock



**The average western resident now consumes some 22 teaspoons of sugar a day. And our sweet tooth isn't just making us fat — it's triggering all kinds of inflammation, fueling chronic diseases and even increasing our risks of cancer.**

As kids, we were taught that too much sugar would rot our teeth, but today we know that the ramifications of a lifelong sugar splurge are scarier than a finger-wagging dentist. Yes, sugar can cause cavities, but of much greater concern is the sweet stuff's link to bodywide inflammation.

Sugar can contribute to cellular inflammation, which is like a continuing series of paper cuts that compromise cell function. Deep inside the body, these microscopic wounds fester below the pain threshold. Because many of us don't see or feel the damage, there is little incentive to cut back on the inflammatory diet that is causing this constant cellular damage, so the party continues.

That is, until the body blows a gasket. Left unchecked, inflammation can unleash dozens of different diseases, including heavy hitters like diabetes, heart disease and autoimmune disorders. "It takes roughly 10 to 15 years of a high-sugar diet before a person develops a chronic illness," says Carolyn Dean, MD, ND, medical director of the Nutritional Magnesium Association. In the meantime, though, sugar can do plenty of other damage, depleting your immunity, disrupting your metabolism, contributing to yeast overgrowth and so on.

The good news: By curtailing sugar consumption you can prevent the damage. And this doesn't mean you have to squeeze every granule of sugar out of your diet. With a little awareness and restraint, you can still enjoy some sweetness while respecting your body's built-in limits.

### Sweet Beginnings

One of the five basic tastes, sweet is the first we encounter, thanks to the lactose in breast milk (as well as most infant formulas). That's one reason why people have a penchant for sugar. Another is that sugar is a source of quick energy for cells. So, biologically speaking, the body orients toward sweets the way a plant seeks out the sun.

Glucose, along with the sucrose and fructose it comes from, is one of the most abundant sugars in foods and is the body's preferred source of quick energy. It fuels every cell in the body, particularly muscle cells and brain cells. Deprive the body of blood glucose and it goes into a coma. Give it too much and it stalls and sputters, like gasoline flooding a carburetor.

"Sugar must be made available to cells in just the right amount," says Jacob Teitelbaum, MD, author of *Beat Sugar Addiction Now!* (Fair Winds Press, 2010). To maintain a healthy equilibrium in the body, he notes, the blood circulates roughly 2 teaspoons of sugar at any given time. But that's not a lot — a single orange may contain 16 grams of sugar, the equivalent of 4 teaspoons.

All naturally sweet foods, such as ripe fruits, yams, squash and dairy, tend to be relatively dense in nutrients and calories. That's why survival of the human species depended, in part, on our biological pull toward sweets, says Kevin Spelman, PhD, a postdoctoral fellow at the National Institute of Aging's Laboratory of Clinical Investigation in Baltimore: "We have a deep, instinctual, evolutionary drive to eat sweets."

The hitch is that the sweets our ancestors enjoyed came entirely from whole foods, like fruit, roots and tubers. These were available only in small quantities or at certain times of the year and contained health-enhancing macro- and micronutrients, such as fiber, antioxidants and other phytochemicals.

Thanks to the presence of all that naturally occurring fiber, our ancestors' bodies digested any sugar they ate much more slowly. So, glucose entered their bloodstream in a steady stream. And because they were active, they burned through that sugar almost immediately as much-needed fuel.

Today, basic human biology is the same, but most of the sugar in our diets doesn't come from whole foods; instead it is refined, purified, crystallized and liquified. And our lives are far more sedentary. As a result, the concentrated sugar in the modern diet hits the body like a hurricane, and often the energy it produces has nowhere good to go.

#### Invisible Sources

Early humans ate about 4 pounds of sugar a year. By comparison, in 2008, the average American ate 136 pounds of sugar in the form of white sugar (cane sugar and beet sugar), corn sweeteners, honey, molasses and other syrups. That boils down to roughly 22 teaspoons of sugar per person per day.

While some sources of sugar are obvious — the packet you pour into your coffee or the spoonful you sprinkle on your cereal — experts worry much more about the sugar you don't see. "Hidden sugar lies at the heart of many modern-day health epidemics," Teitelbaum says. "If you eat a standard American diet, you likely have a problem with sugar, whether you know it or not."

The main source of added sugar in the American diet is soda. A 12-ounce can of soda packs more than 8 teaspoons of sugar, usually in the form of high-fructose corn syrup.

But sugar also pops up in everything from breads to sauces to salad dressings. "No one would knowingly pour a packet of sugar over lettuce or spaghetti, but that's what food makers do all the time," says David Katz, MD, director and cofounder of the Yale-Griffin Prevention Research Center.

#### The Taste of Happiness

One reason that we find sugar so appealing, so addictive, is that it activates the brain's reward center, causing it to release feel-good substances, such as dopamine and beta-endorphins (natural pain killers). Some people have naturally lower levels of beta-endorphins, so they get a bigger rush from sweets, says Kathleen DesMaisons, PhD, author of *Potatoes Not Prozac: Solutions for Sugar Sensitivity* (Simon & Schuster, 2008) and a pioneer in the field of sugar and addiction. DesMaisons's research shows that people who are "sugar sensitive" have naturally lower levels of these feel-good chemicals and are biochemically driven to eat more sweets from a very early age.

Sugar is also seductive because it makes it easier for the amino acid tryptophan to get into the brain, where it is converted into serotonin. Dubbed the "happiness molecule," serotonin is known for its ability to bestow mellowness and calm. "Sugar calms us down, makes us feel relaxed and at peace with the world, but at a price. When it wears off, we are in big trouble," says DesMaisons.

What's more, studies suggest that each sweet indulgence reinforces those neuropathways, causing the brain to become increasingly hardwired to crave sugar. In a 2007 study published in *PLoS ONE*, for instance, laboratory rats chose sugar water over intravenous cocaine.

Think you're home free with calorie-free sweeteners? Sorry, the same thing happened when the rats were offered water mixed with saccharin, a common artificial sweetener.

### Sweet Nothings

The problem isn't limited to what sugar is, it's also what sugar is not. Fill up on sugar, and you won't have room for foods rich in important vitamins, minerals, phytonutrients and fiber. In a 2010 study published in the *Journal of the American Dietetic Association*, researchers found that, among kids ages 2 to 18, nearly 40 percent of their total energy intake came in the form of empty calories. Half of those empty calories were from a handful of foods, including grain-based desserts (cakes, cookies, donuts and granola bars), pizza, fruit drinks and soda. "That means 40 percent of their diet is stripped of all nutrients," says Teitelbaum. "Most people's diets don't have that much leeway."

To make matters worse, most simple carbohydrates, such as white bread, white rice and white potatoes, are quickly metabolized and digested as sugar (glucose). That's why it's important to keep the big picture in mind when watching sugar intake. "Excessive sugar in the typical diet is compounded by refined flours, which are compounded by artificial sweeteners," explains Katz. Simply eliminating sweets and added sugars won't even touch those concerns, he notes, but it's "a step in the right direction."