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4 THINGS TO LOOK FOR IN A KICK-BUTT FITNESS CLASS *p. 60*

GOODBYE ALLERGIES

Alternative Treatments That Really Work

p. 66

A Proactive Path Out of Depression

p. 54



SUGAR SHOCK

You're Eating A Lot More of It Than You Think

p. 41

Overcome Your Resistance To Change

Two Harvard Researchers Show You How *p. 78*

Unstoppable!

CLIMBER **ALEX PUCCIO** SHARES HER SECRETS FOR OVERCOMING OBSTACLES OF ALL KINDS.

p. 18

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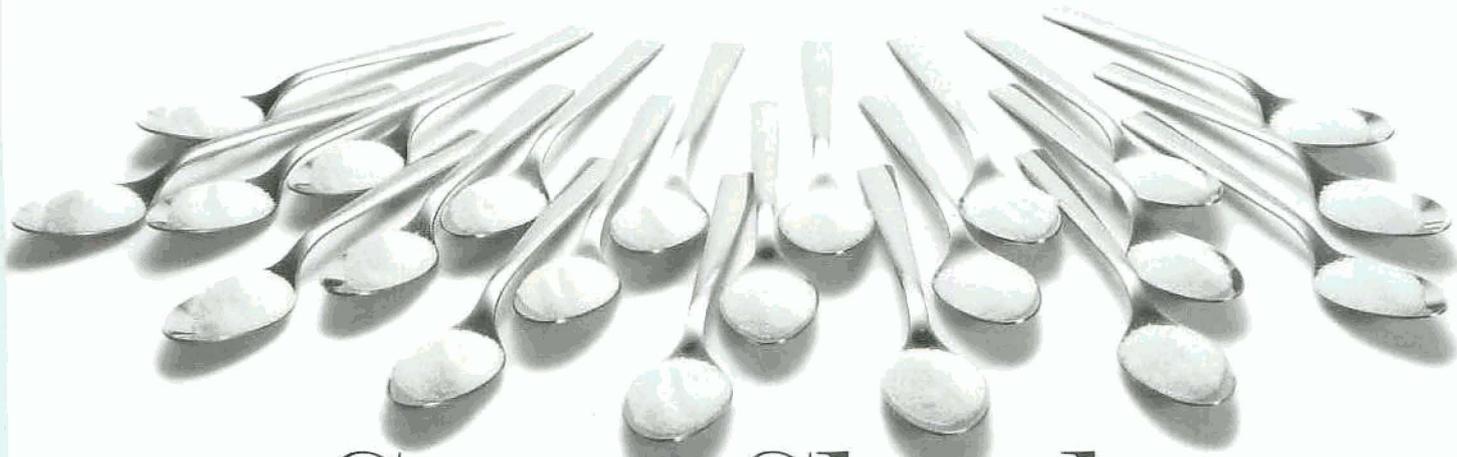


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Sugar Shock

The average American 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.

By CATHERINE GUTHRIE

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."

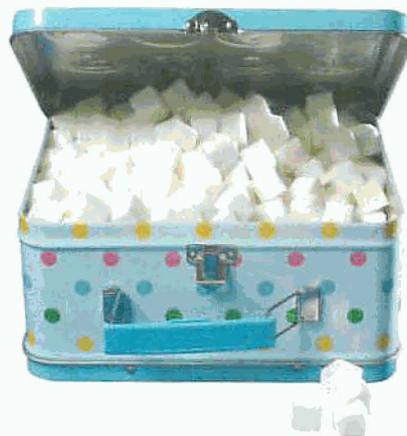
The main source of added sugar in the American diet is soda. A 12-ounce

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.



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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."

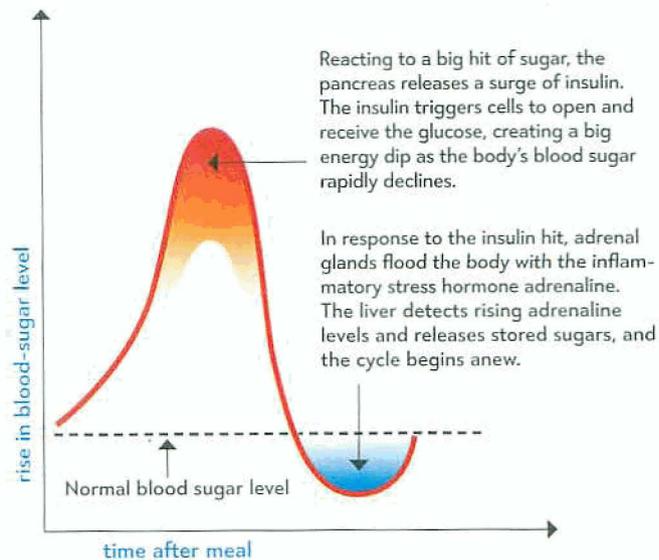
To learn more about how and why to moderate the sugars in *your* diet, read on.

Sick of Sweets

A constant sugar deluge robs the body of its ability to fend off stress and chronic illness. Slam a soda and initially your blood sugar soars. The pancreas responds by releasing insulin, prompting cellular doors to swing open and glucose from the blood to rush into the cells. The result? Blood-sugar levels decline and energy dips. Next, the adrenal glands kick into high gear and flood the body with the stress hormone adrenaline, triggering inflammation. When the liver detects rising adrenaline levels, it releases stored sugars and the cycle begins anew.

In response to repeated, excessive spikes in blood sugar, the adrenal glands eventually exhaust themselves. When that happens, the immune system falters, setting the stage for more colds and flu, and a general fatigue sets in – which causes many people to reach for more sugar.

“The body wasn’t designed for sugar’s massive yo-yo effect,” says Henry Lodge, MD, an associate clinical professor at Columbia University in New York and coauthor of *Younger Next Year: A Guide to Living Like 50 Until You’re 80 and Beyond* (Workman Publishing Company, 2005). “All it can do in response is to break.” And, eventually, that’s exactly what happens.



Here are just a few of the malfunctions related to a lifetime of sweet indulgence.



Diabetes

Type 2 diabetes, a deadly disease that can cause blindness and nerve damage, and can lead to amputations of digits and limbs, is perhaps the most direct and serious repercussion of excess sugar in the diet. In the United States, nearly 24 million people have been diagnosed with diabetes and another 57 million suffer from insulin resistance or prediabetes. Some experts estimate that by 2050 one in three Americans will have the disease. In the early stages of type 2 diabetes, cells stop responding to insulin. Unable to enter the cells, glucose builds up in the blood, triggering inflammatory health conditions. Left untreated, insulin resistance often escalates into type 2 diabetes. But long before that diagnosis, the inflammation associated with prediabetes (sometimes called metabolic syndrome) wreaks havoc on the body, setting the stage for heart disease

and cancer, among other serious problems.



Heart Disease

Results of a 2010 study published in the *Journal of the American Medical Association* showed that people who got at least 25 percent of their daily calories from added sugars were 3.1 times more likely to have low levels of HDL (good) cholesterol than people who got less than 5 percent of their calories from sweets. People on the high end of the sugar spectrum were also more likely to have dangerously high levels of blood fats called triglycerides.



Cancer

Scientists have long known that cancer cells love glucose. A common scan used to detect cancer in the body, called a PET, starts with a person downing a sugary so-

lution. After the sugar is absorbed into the bloodstream, the scan identifies possible malignancies by highlighting areas that gobble up the most sugar. “Data supports the general hypothesis that cancer cells are addicted to glucose and that, by restricting glucose metabolism, one can stop their growth,” says Don Ayer, PhD, a cancer researcher at the University of Utah and the Huntsman Cancer Institute in Salt Lake City.



Candida

Yeast is a natural inhabitant of the gut. Healthy bacteria help keep yeast levels in check. But when antibiotics, illness or chronic stress kill off healthy bacteria, yeast can run amok. Sugar compounds the problem by feeding yeast growth. “Sugar enables yeast to go from a budding stage to a tissue invasion stage,” says Carolyn Dean, MD. Yeast overgrowth can cause problems ranging from

yeast and fungal infections to rashes, thrush and leaky gut syndrome.



Immune System Snafus

Because a diet laden with sugar creates body-wide biochemical stress and inflammation, it can overstress and thereby weaken the immune system in a variety of ways. One way, as noted before, is by triggering leaky gut syndrome, which leads to undigested food molecules getting into the bloodstream. When that happens, the immune system has to finish the digestive process, an overwhelming and distracting effort. “In short, our defense forces get exhausted by the sugar,” says Teitelbaum, “so that when real trouble comes down the pike, the immune system can’t respond.” A leaky gut can also underlie disorders characterized by an overactive immune system, such as rheumatoid arthritis, lupus and psoriasis. ➔



Tame Your Sweet Tooth

When it comes to sugar, it helps to be strategic, says **Jacob Teitelbaum, MD**: "I'm not saying you can't have pleasure in the form of sugar, but it's time to start making informed choices." Here are some tips:

- **Treat all sugars equally.**

"The taste buds don't care if you're eating raw sugar or high-fructose corn syrup," says David Katz, MD. "If you bathe them in sweetness, they are going to want more, more, more." Yes, some sweeteners, like honey, maple syrup and molasses, contain a few beneficial micronutrients. But, in the long run, putting health halos on some sweeteners and demonizing others only perpetuates an unhealthy addiction to sweets.

- **Do the math.** Food labels list sugar in grams. A gram of sugar is hard to picture, so divide the number of grams by 4. Four grams of sugar equals a teaspoon. In 2009, the American Heart Association advised adults to eat no more than 6 teaspoons of added sugars a day for women and 9 teaspoons for men (recommendations are based on average weight for women and men).

- **Put protein, healthy fat**

and fiber in the mix. All of them slow down the digestion process, averting blood-sugar spikes. Get creative by adding slow-digesting nutrients to your favorite sweets. If you're going to have jam on your toast, make sure you're also having an egg, some nut butter or other fat with your breakfast. If you're going to eat cereal, put some walnuts on it. Top pear slices with crumbled Gorgonzola. Choose dark chocolate, which contains some fat, over fat-free candies.

- **Don't fall for fake.**

Artificial sweeteners, often used in diet drinks, are non-caloric chemicals designed to stimulate the sweet receptors in the mouth. Aside from their questionable safety, a pressing concern is that these chemicals are up to 600 times sweeter than sugar itself. "When people rely on artificial sweeteners, they tend to prefer all of their other foods sweeter because the intensity of the sweetener propagates a sweet tooth," says Katz. "You are simply cultivating a preference for more sugar."

- **Curb omega-6 fatty acids.** High levels of carbohydrates, including sugar, in

the diet activate the enzymes that convert the omega-6 fatty acids found in common vegetable oils, such as soy, corn and safflower oil, into arachidonic acid, the building block necessary to generate cellular inflammation, says Barry Sears, PhD, creator of the Zone Diet and author of the *Anti-Inflammation Zone: Reversing the Silent Epidemic That's Destroying Our Health* (Harper Collins, 2005). "A diet rich in refined carbohydrates and omega-6 fats is like adding a lighted match to a barrel of gasoline. Americans have been doing this for 30 years."

- **Limit fruit juice.** Remember, it's the fiber as well as the nutritional value that makes fruit a win-win. Fiber is what makes fruit filling. Depending on its size, an orange may pack up to 4 teaspoons of sugar, but that sugar is absorbed over a couple of hours. Compare that to the 8 teaspoons of sugar in 8 ounces of orange juice that is absorbed in 20 minutes. "That sugar is hyper-absorbed," says Henry Lodge, MD. "Remember that insulin is released according to how much sugar gets into your bloodstream and how quickly."

- **Prioritize low-sugar fruit.** When it comes to sugar, not all fruits are created equal. Inside the body, some fruits, such as bananas, convert to sugar more quickly than others, like raspberries, clementines and strawberries. That's not to say you can't enjoy a banana now and then, but just try not to overdo it.

The trick to enjoying the sweet things in life is to ferret out hidden sugars in the diet and save small doses of sugar for dessert, where it belongs. "You can subtract grams and grams of sugar out of your diet without ever touching dessert," says Katz. "You can systematically reverse-engineer the damage the modern food supply is doing to your body by simply making better choices." 🍌

Catherine Guthrie is a health writer in Bloomington, Ind., and a contributing editor to Experience Life.

WEB EXTRA!

Confused by what constitutes sugar on an ingredient list? Check out the online version of this article at experiencelife.com for a list of some of the names to watch out for.

It All Adds Up: Sugars abound in virtually every meal. Four grams equals 1 teaspoon.

	Spaghetti sauce (1 cup)	23 grams		Pineapple (canned in syrup) (1 cup)	43 grams
	Frosted Flakes (1 cup)	15 grams		Low-fat chocolate milk (1 cup)	25 grams
	Barbecue sauce (1/2 cup)	33 grams		Pink lemonade (from concentrate) (1 cup)	25 grams
	Cola (1 can)	33 grams		Water with added vitamins (1 cup)	13 grams
	French dressing (1 tbs.)	3 grams		Fat-free fruit yogurt (1 cup)	47 grams
	Ketchup (1 tbs.)	3 grams		Bottled ice tea (1 cup)	22 grams