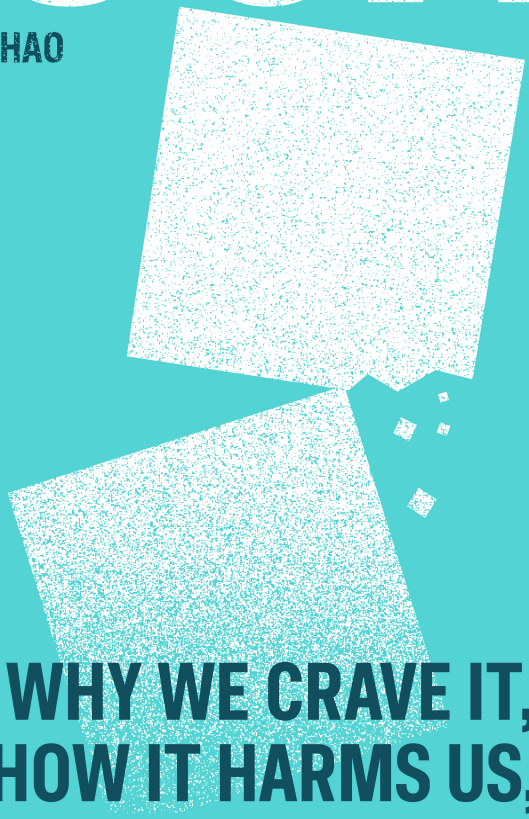
"YOUR BODY DOESN'T NEED ADDED SUGAR."
**– DR. JASON FUNG**

# MASTERING SUGAR

BY: FLORA ZHAO



## WHY WE CRAVE IT, HOW IT HARMS US, AND HOW TO BREAK FREE

EPOCH HEALTH

"Sugar is very important for our body and our brain. And I think this is where a lot of the difficulty [in cutting out sugar] lies."

*Jessica Russo, clinical psychologist*

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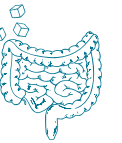






# CHAPTER 6



CHAPTER 1

# Why Your Brain Craves Sugar

"The brain is the most energy-demanding organ, which uses about half of all the sugar energy in the body."

*Jessica Russo, clinical psychologist*

Our brains often instinctively crave sugar. It could be a slice of cake during times of stress, a bar of chocolate when bored, or a sweetened coffee when needing a pick-me-up. The inability to quit sugar may not stem from a lack of willpower but rather from not fully grasping the nature of sugar and not finding the most effective methods to quit.

## Sugar: Fuel for Life

"Sugar is very important for our body and our brain. And I think this is where a lot of the difficulty

in cutting out sugar lies," Jessica Russo, a clinical psychologist in Philadelphia, told The Epoch Times during an interview.

Sugar serves as the primary energy source for every cell in our body and much of the food we eat is broken down into various sugars.

"The brain is the most energy-demanding organ, which uses about half of all the sugar energy in the body.

"We're biologically driven toward sweet foods," as this is a survival mechanism, Russo said, explaining that in nature, sweet-tasting foods are generally healthy, while toxic foods may taste bitter, and spoiled or rotten foods may taste sour.

Therefore, when we taste something sweet, our brains signal, "Oh, this is good!"

Besides helping us identify safe food, sweetness also plays a role in human survival and growth.

"We see babies being born with the ability to detect sweet taste and to prefer it," said Julie A. Mennella, a scientist at the Monell Chemical Senses Center in Philadelphia. It indicates that sweetness is associated with the quality of breast milk, which can attract infants to suckle.

There is evidence to suggest that children's preference for sweet foods may be linked to their higher caloric needs during the growth stage, which typically lasts from infancy until the end of puberty, she told The Epoch Times.

# Our Brain on Sugar

When we eat sugar, the receptors on our tongues send sweet signals to the brain, triggering the release of dopamine, which can induce feelings of joy and happiness.

"We taste with our brains," Mennella explained. Sweetness makes us feel good because these signals are sent to various parts of the brain, many of which are associated with rewards.

"The brain pathways used are significant for pleasure, memory, and reward," she said.

This means that when we engage in activities that trigger dopamine release, we experience joy, form memories, and look forward to doing it again.

"In the brain, it has very specific actions and is the most important molecule ... involved in bringing about well-being," said Kenneth Blum, a renowned scientist with a doctorate in neuropharmacology.

Dopamine can also counteract stress, said Blum, who is a professor at the Western University of Health Sciences Graduate College of Biomedical Science, and a part-time professor at the University of Vermont and Wright University.

"When you have stress, the dopamine is released 100 times above the normal rate." It can block the action of stress hormones such as adrenaline.

However, Blum emphasized the importance of maintaining a balance for this crucial molecule; otherwise, the brain could suffer severe negative

consequences.

Many people are unaware that excessive sugar consumption can lead to consequences very similar to drug abuse.

Blum explained that eating too much sugar can trigger acute dopamine release.

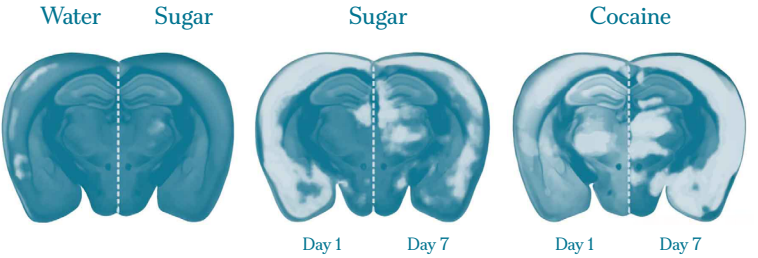
"It's like abusing alcohol or other drugs of abuse," he said. Over time, that can result in a chronic decrease in dopamine levels. Consequently, people may seek larger quantities of sugar to experience the same level of pleasure, eventually leading to an addictive state where they want more and more.

When you consume a large amount of refined sugar, "your brain lights up like a pinball machine due to the intense release of dopamine," said James DiNicolantonio, a cardiovascular research scientist and doctor of pharmacy at Saint Luke's Mid America Heart Institute in Kansas City, Missouri.

When ingesting refined sugar, the sweet receptors signal the brain's reward system more effectively than when eating fruit. The levels of dopamine released by the brain far exceed what we can handle.

In 2023, a study published in Translational Psychiatry revealed that when a mouse drinks water or is injected with saline, the brain remains relatively calm. However, when administered a sucrose solution or injected with cocaine, multiple regions of the brain's neurons become activated (highlighted in the image). Multiple brain regions that respond to sugar signals also exhibit responses to cocaine

**Brain Activation by Sugar and Cocaine**




Source: Translational Psychiatry

*Activation of brain neurons in specific regions upon sucrose and cocaine administration.*

signals. "Our research shows how similarly both addictive and onaddictive. rewards are processed by our brains, both on the whole-brain scale and on a cellular level," said Anna Beroun, the study's lead author and head of the Laboratory of Neuronal Plasticity at the BRAINCITY Center of Excellence for Neural Plasticity and Brain Disorders, part of the Nencki Institute of Experimental Biology, Polish Academy of Sciences, in Warsaw, Poland.

"Sugar/food becomes addictive if we value it over other rewards."

## Is Sugar a Drug?

Sugar is irresistibly alluring, not only because it stimulates the brain to produce dopamine, which

brings joy, but also because it triggers the production of endogenous opioids in the brain, which can lead to addiction and dependence.

Blum said that the brain has glucose receptors, and when they are stimulated by sugar, it triggers a series of signaling pathways that ultimately lead to the production of addictive substances. This mechanism is inherently present "so that if you abuse sugar, you're going to order the brain–reward circuitry in a negative way, as if you use heroin."

An experiment revealed that mice fed large amounts of sugar intermittently exhibited withdrawal symptoms when injected with a drug that blocks opioids. These symptoms included teeth chattering, forepaw tremors, and headshakes.

Sugar's effect on the brain not only shares similarities with drugs but also, in certain circumstances, is even more alluring.

Over the years, French researchers have conducted a series of animal experiments, showing that when given the choice between cocaine and sucrose, rodents consistently preferred sucrose over cocaine. This preference held even for mice previously addicted to cocaine before the experiments.

"When we over-consume sugar, there is a release of dopamine and endogenous opioids that cause a 'high,' but then we get a 'low.' If we do this over a prolonged period of time, this can lead to dependency on sugar, especially in those who are vulnerable," said DiNicolantonio, summarizing the

addictive mechanism of sugar.

When there is a deficiency of dopamine and endogenous opioids, one may feel sad, confused, sluggish, and unable to concentrate, all of which can further drive the desire to consume more sugar.

Additionally, numerous human experiments have demonstrated the link between sugar and addiction.

For example, a prospective observational study published in Addiction Biology in 2021 revealed that 40 percent of people with alcohol use disorder experienced an increased craving for sugar during their inpatient alcohol detoxification.

Additionally, a study published in Addiction showed that children with a family history of alcoholism and depression were more likely to prefer intense sweetness. On average, these children opted for water with a sucrose concentration of 24 percent, equivalent to about 14 teaspoons of sugar in a glass of water—more than twice the sugar concentration found in regular soda water.

In contrast, children without such familial backgrounds preferred water with a sucrose concentration of 18 percent.

## The Brain's Sweet Dilemma

Sugar and the brain share an innate strong con-

nection. Unfortunately, modern diets are filled with highly refined sugars that evoke drug-like allure. In fact, the sweetness we consume today differs significantly from what our ancestors experienced.

Russo vividly illustrated the body and brain's conflicting views on sugar with a lively scene, noting that our bodies resist certain sugars while being more receptive to others.

"The brain says, 'We need sugar; we must have sugar; we can't survive without it.' On the other hand, the body disagrees, saying, 'We don't like all types of sugar,'" she added.

There is an ancient Chinese saying: "If you know the enemy and know yourself, you need not fear the result of a hundred battles." To quit sugar, one must first understand sugar. However, the truth is some sugars and sweet substances are natural and even beneficial to the body.

CHAPTER 2

# Natural Sweeteners

# Stevia

"Stevia could be a very good substitute for the sugar that we are consuming too much of."

*Per Bendix Jeppesen, associate professor, Department of Endocrinology and Diabetes, Aarhus University*

Stevia has recently become one of the most popular natural sugar substitutes. Sugar is known to raise blood sugar levels, but stevia can actually lower them. In fact, it was used to treat diabetes in ancient times.

Stevia is also known as honey leaf, sweet leaf, or sweet herb. According to a paper published in Nutrition Today, it belongs to the sunflower (Asteraceae) family and is native to southern Brazil and northern Paraguay. The indigenous Guaraní people have been using stevia to sweeten their food and beverages for centuries. According to a 2019 meta-analysis

published in Nutrients, they have also used it for medicinal purposes, such as treating diabetes.

Stevia's sweetness mainly comes from steviol glycosides, which are about 200 to 300 times sweeter than sucrose.

High-purity stevia extracts contain 95 percent or more steviol glycosides, according to Nutrition Today. A 2023 study published in Molecules found eight different types of steviol glycosides that occur naturally in stevia leaves, with stevioside being the most abundant.

Because of its commercial potential and pharmacological properties, stevia has attracted widespread attention from the food and scientific community. As a result, stevia plantations can now be found in many regions around the world.

Stevia's glycemic index (GI) and calorie content are zero. The glycemic index measures how quickly and to what extent a food increases blood sugar (blood glucose) levels, with glucose being the standard at a GI value of 100.

## The Antidiabetic Sweetener

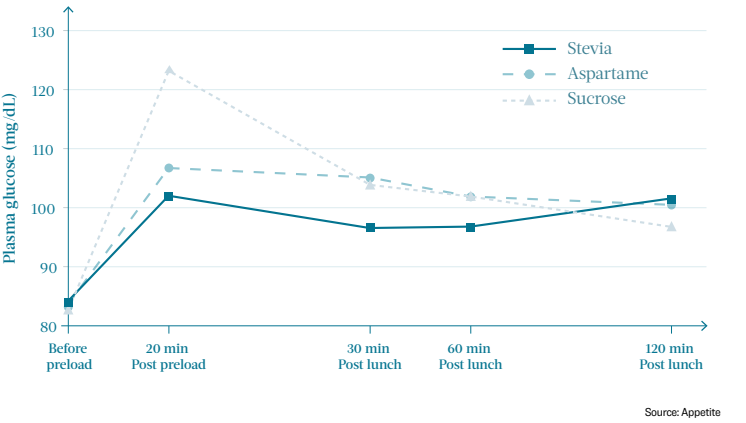
Modern research has found that stevia exhibits antidiabetic activity.

Stevia increases insulin secretion and activity and reduces insulin resistance. It also inhibits or

reduces the liver's production of glucose, which helps maintain healthy blood sugar levels. Additionally, the stevioside and steviol found in stevia help to regulate the activity of certain enzymes, preventing blood sugar from dropping too low and causing hypoglycemia. Researchers from the University of Florida conducted an experiment in which 31 adult participants fasted for 12 hours and ate the same breakfast. Twenty minutes before lunch and dinner, they were given tea and snacks containing sucrose, aspartame, or stevia, without knowing which type of sweetener they were ingesting. They were then free to eat lunch and dinner as they wished.

Their hunger and satiety levels were evaluated hourly, and blood tests were conducted. All participants completed three days of food tests.

**Impact of Sweeteners on Blood Glucose Levels**




Source: Appetite

*Consumption of stevia resulted in lower blood glucose levels right after lunch.*

## Impact of Sweeteners on Blood Insulin Levels


*Consumption of stevia resulted in lower insulin levels right after lunch.*

The results showed that participants who consumed stevia had significantly lower blood sugar levels right after lunch than those who consumed sucrose, and they had no significant fluctuations.

Additionally, after lunch, the insulin levels of participants who ingested stevia were overall lower than those of participants who consumed aspartame or sucrose.

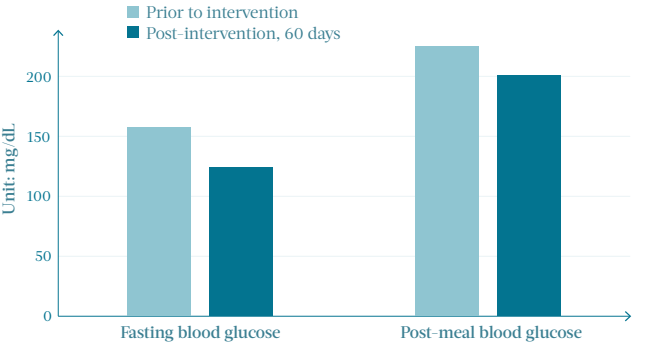
"It would suggest that compared to other types of sweeteners, stevia could be beneficial in helping people keep their glucose levels under control or in a healthy range after eating," study co-author Stephen Anton, a professor of physiology and aging at the University of Florida with a doctorate in clinical and health psychology, told The Epoch Times. "Compared to sucrose and aspartame, stevia could lead to better post-meal metabolic states."

Moreover, participants who ingested stevia and aspartame had a significantly lower total caloric intake.

Although participants who consumed stevia before meals didn't gain any calories from it, they didn't compensate by eating more at lunch or dinner compared to those who consumed high-calorie sucrose. Additionally, their feelings of fullness were similar.

A randomized, controlled trial on diabetic patients published in the Journal of the Science of Food and Agriculture in 2016 further demonstrated the blood sugar-lowering effect of stevia. Twenty patients with Type 2 diabetes were randomly divided into two groups, one taking 1 gram of dried stevia leaf powder daily and the other not taking any. The experiment was conducted over 60 days.

**Effect of Stevia on Fasting and Post-Meal Blood Glucose Levels**




Source: Journal of the Science of Food and Agriculture

*Consumption of stevia resulted in lower fasting and postprandial blood sugar levels.*

The results showed that taking dried stevia leaf powder significantly reduced the fasting and postprandial blood sugar levels of the diabetic patients.

"I see that using stevia as a sugar substitute can bring about a huge change," said Per Bendix Jeppesen, an associate professor in the department of endocrinology and diabetes at Aarhus University in Denmark who is currently studying stevia extract as an antidiabetic drug and a healthy sweetener.

"It is a game changer," he told The Epoch Times.

That's because the main component of stevia has positive effects on the human endocrine system, especially for people with diabetes. In addition to studying stevia's effectiveness and extraction techniques, Jeppesen is involved in related experiments on antidiabetic drugs.

Modern people tend to engage in too little physical activity, eat too much food, and have diets high in sugar and fat.

"Stevia could be a very good substitute for the sugar that we are consuming too much of," Jeppesen said. "By adding stevia, it could really enhance public health, as the calorie intake would decrease when we consume less sugar."

## Mitigates Blood Pressure and Cholesterol

In addition to controlling postprandial blood sugar and other antidiabetic effects, stevia can lower blood pressure and blood lipids.

Steviol glycosides found in stevia can regulate the level of calcium in the blood, which can lead to vasodilation and reduced arterial contraction, both of which contribute to lowering blood pressure, according to the 2023 Molecules study.

Researchers in Taiwan conducted a randomized, double-blind, placebo-controlled trial on 174 hypertensive patients divided into two groups. One group took steviol glycoside capsules three times a day, each containing 500 milligrams of steviol glycoside, while the other group took a placebo. Two years later, those who took steviol glycoside showed significant improvements in their blood pressure. Their systolic blood pressure decreased from an average of 150 mm Hg to 140 mm Hg, and their diastolic blood pressure decreased from an average of 95 mm Hg to 89 mm Hg.

Notably, the beneficial effects of steviol glycosides on hypertensive patients were observed approximately one week after the start of the experiment and continued throughout the entire study. Additionally, the group taking steviol glycosides had significantly improved overall quality of life scores, as measured by a survey.

The Nutrients meta-analysis included seven studies and nine randomized controlled trials involving 462 participants. The analysis revealed that compared with taking a placebo, steviol glycosides significantly reduced systolic blood pressure by 6.32 mm Hg and diastolic blood pressure by 3.6 mm Hg. Additionally, there were nonsignificant reductions in body mass index, fasting blood sugar, and total cholesterol.

Stevia can also lower blood lipids. A review study showed that taking stevia extract can significantly increase the level of high-density lipoprotein ("good" cholesterol) and reduce the levels of total cholesterol, triglycerides, and low-density lipoprotein ("bad" cholesterol).

## Stevia's 100+ Protective Compounds

Stevia contains more than 100 compounds, many of which benefit our health. In addition to natural sweeteners and various trace elements, stevia contains terpenes, sterols, tannins, volatile acids, flavonoids, vitamins, enzymes, organic acids, and polysaccharides, all of which have biological activity.

According to the Molecules study, steviol glycosides have been found to suppress and control factors that trigger cell inflammation. They also play a protective role in the liver by preventing inflammation

and have been shown to enhance the body's innate immune system.

In addition, steviol glycosides exhibit antioxidant properties. The study published in Molecules in 2023 demonstrated that they can protect heart cells from damage caused by hydrogen peroxide, a reactive oxygen species produced during normal metabolic processes. Excess hydrogen peroxide can lead to oxidative stress, damaging cells and tissues. The steviol glycosides help protect heart cells, leading to increased vitality and improved antioxidant capacity, and prevent oxidative DNA damage in the liver and kidneys.

## Sweet With Minimal Side Effects

According to a paper published in the Experimental and Clinical Sciences (EXCLI) Journal, Paraguayans have been consuming stevia continuously for more than 1,500 years with almost no adverse effects reported. Additionally, a review study indicates that most reports on stevia consumption don't suggest any adverse events.

According to the U.S. Food and Drug Administration (FDA), highly purified steviol glycosides are generally recognized as safe (GRAS). However, stevia leaf and crude stevia extract are not considered GRAS "due to inadequate toxicological information."

The FDA regulates these as food additives rather than dietary ingredients or supplements.

In other countries like Japan, Australia, and Brazil, stevia leaf-derived products are approved for use as sweeteners in food. They are used in a variety of foods, including teas.

The acceptable daily intake of steviol glycosides, as defined by the FDA and the European Food Safety Authority, is 4 milligrams per kilogram, or approximately 1.8 milligrams per pound.

Jeppesen stated that these agencies took more than 10 years to conduct rigorous evaluations before listing stevia as a food additive. However, stevia extract has been widely used as a sweetener in Japan since the 1980s.

An earlier rat study mentioned in the EXCLI Journal suggested that stevia might affect the fertility of experimental animals. However, Jeppesen said that the final results of these studies generally weren't accepted.

## How to Choose Stevia Sweetener

Despite stevia's benefits, not all stevia products available for sale are high quality.

Some products have been found to contain artificial sweeteners sodium saccharin and sodium cyclamate. In addition, crude stevia extracts may have

a higher allergenic potential than high-purity stevia sweeteners containing at least 95 percent of steviol glycosides.

Because stevia is so sweet, most stevia products found in supermarkets are blended formulas. Steviol glycosides generally account for only about 1 percent of powdered products, while the remaining ingredients are usually sugar alcohols such as erythritol and xylitol. Certain products may also contain a combination of steviol glycosides and cane sugar or raw sugar.

Liquid-based stevia products mainly contain water and may also contain some preservatives such as alcohol. Colorless and transparent products are formulated using steviol glycosides as raw materials; products that are green in color are more likely to be directly extracted from the stevia plant.

Jeppesen recommended choosing products that combine soluble fiber and steviol glycosides for a calorie-free sweet taste and additional fiber intake. Also, the application and preparation methods of these products are similar to those of sugar, making them a practical alternative for use in cooking.

Some stevia products have a metallic or bitter taste from the stevioside compound.

Jeppesen said that the taste of steviol glycoside products will continue to improve as extraction technology advances. In fact, the aftertaste of metallic or bitter flavors can now be eliminated. In the future, there'll be more and more steviol glycoside products available to choose from.

# Growing Stevia Plants at Home

How can stevia plants be grown at home?

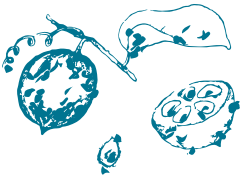
Stevia is a hardy plant that will thrive under the right conditions. Provided with adequate light and well-draining, lightweight soil, stevia plants will produce more leaves with higher levels of steviol glycosides.

Stevia leaves contain eight different steviol glycosides, with rebaudioside A noted for its more pleasant taste compared to stevioside. In recent years, high-quality stevia varieties with a higher rebaudioside A content than stevioside have been developed.

When the stevia flowers blossom, the leaves are less sweet. According to a study published in Applied Microbiology and Biotechnology, this is due to a significant decrease in the levels of sweet compounds in the leaves during the flowering process.

Adjusting watering levels and applying organic fertilizers based on temperature and humidity is also essential. Stevia is not cold tolerant, so it should be moved indoors during winter or have a thick layer of straw mulch added to its roots for insulation.

For inexperienced growers, starting with stevia seeds can pose obstacles, as they are quite difficult to germinate. It might be more convenient to propagate stevia through stem cuttings or purchase stevia seedlings directly.



# Monk Fruit

"During the summer, it is recommended to consume monk fruit when experiencing symptoms such as sore throat, throat discomfort, or cough."

*Jonathan Liu, director, Liu's Wisdom Healing Centre*

Following in stevia's footsteps, monk fruit has gained widespread attention as a natural sweetener. One significant benefit of this sweetener is that it can help manage blood sugar and lipid levels. It also might have antiviral effects against COVID19 and anti-cancer properties.

Monk fruit, also known as luo han guo, resembles a small melon on the outside. Ancient Chinese people used it for centuries as a natural sweetener and traditional medicine.

According to a review in Frontiers in Pharmacology, monk fruit contains various nutritious compounds, including mogrosides, vitamin C, trace elements, linolenic acid, and other unsaturated fatty acids.

"Monk fruit does actually contain natural sugars. Those are mainly fructose and glucose. However, unlike most fruit, the natural sugars from monk fruit aren't really responsible for the sweetness. Instead, the intense sweetness comes from a group of compounds called mogrosides," Taylor Wallace, an adjunct associate professor at the Friedman School of Nutrition Science and Policy at Tufts University and CEO at the Think Healthy Group, LLC, told The Epoch Times.

"The extracted mogrosides from monk fruit, obtained through processing, don't necessarily contain fructose or glucose. So these are very similar compounds to what you would see in other high-intensity sweeteners," Wallace said.

Mogrosides are 200 to 350 times sweeter than sucrose, and monk fruit sweetener is essentially derived from mogrosides. Mogrosides account for about 1.2 percent of fresh monk fruit and 3.8 percent of dried fruit powder, according to a review published in Molecules.

"Mogroside, as a natural sweetener derived from plants, is a series of molecules, and the taste of these molecules is different," Nate Yates, vice president of the Global Sugar Reduction Platform at

Ingredion Inc., told The Epoch Times.

Mogroside V is the most abundant sweetening compound in monk fruit, making it exceptionally sweet, according to the Molecules review.

"After further refinement and extraction, the taste is more pure and pleasant," Yates said.

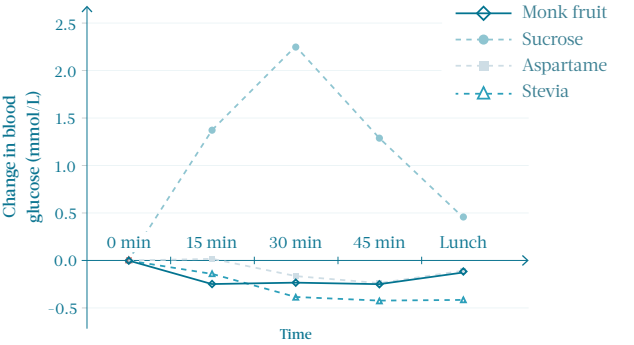
## Monk Fruit: Diabetes-Friendly Delight

Like stevia, monk fruit is a zero-calorie sweetener. It is often described as having a taste similar to that of cane sugar, which is a high-calorie sweetener.

In a randomized controlled trial published in the International Journal of Obesity in 2017, 30 healthy men were asked to eat a standardized breakfast, and one hour before lunch, they were provided beverages containing sucrose, aspartame, stevia, or monk fruit sweetener. They were then allowed to choose their lunch from the options provided, and their dinner was recorded. In addition, blood draws and appetite measures were conducted at various points throughout the study.

The results showed that those who drank beverages containing sucrose experienced an increase in blood sugar and insulin levels within an hour before a meal, and those who drank beverages containing one of the other sweeteners, including monk fruit, did not.

## Effect of Monk Fruit Consumption on Blood Glucose Level




Source: International Journal of Obesity

*Consuming monk fruit sweetener one hour before a meal does not increase blood sugar levels.*

After subsequent monitoring, the researchers concluded that natural sweeteners, including monk fruit sweetener, had the most negligible effect on post-meal blood sugar levels and insulin secretion compared with sucrose.

A recent systematic review and meta-analysis conducted by Canadian researchers showed that in the short term, like water, beverages sweetened with noncaloric artificial or natural sweeteners didn't affect metabolism and endocrine function.

There is currently limited human research on monk fruit sweeteners, unlike stevia. However, numerous cellular models and animal experiments have indicated that mogrosides provide various beneficial effects for Type 1 and Type 2 diabetes, according to a review published in Foods.

Mogrosides have been shown to regulate lym-

phocyte antigens in Type 1 diabetic mice and exhibit therapeutic effects on symptoms. Monk fruit extract can also alleviate and repair damage to pancreatic beta cells and promote insulin secretion, according to the Frontiers in Pharmacology review.

According to the Molecules review, mogrosides have been found to effectively reduce blood sugar and lipid levels in people with Type 2 diabetes. In a study involving mice with diabetes, those given monk fruit extract or mogrosides experienced significant decreases in fasting blood sugar, glycated serum protein, and insulin resistance. The treatment also resulted in a reduction in LDL cholesterol and an increase in HDL cholesterol levels. Additionally, mogrosides can alleviate symptoms of diabetic nephropathy, according to the Frontiers in Pharmacology review.

Monk fruit beverages, made from monk fruit powder and water, have been granted patent registrations in China. The review published in Frontiers in Pharmacology suggested that such drinks are suitable for people with diabetes.

Moreover, according to the Foods review, the flavonoid compounds found in monk fruit can significantly lower blood sugar levels and protect the pancreas, while the polysaccharides can ameliorate lipid disorders and reduce plasma glucose levels.

## A Promising Natural Approach to Lung Health

Monk fruit has long been used in traditional Chinese medicine (TCM) to treat cough, sore throat, bronchitis, and asthma. According to the Frontiers in Pharmacology review, records of its effectiveness in relieving phlegm, alleviating pain, clearing heat, and moisturizing the lungs—key concepts in TCM—can be traced back 2,000 years.

"In particular, during the summer, it is recommended to consume monk fruit when experiencing symptoms such as sore throat, throat discomfort, or cough," Jonathan Liu, a professor of Chinese medicine at Georgian College and the director of Liu's Wisdom Healing Centre in Canada, told The Epoch Times.

Mogrosides can also inhibit the release of inflammatory factors, effectively suppressing and reducing pulmonary fibrosis.

According to the Molecules review, numerous animal studies have demonstrated that monk fruit extract can significantly inhibit cough and enhance sputum excretion. It also possesses anti-inflammatory properties and can help manage asthma. Additionally, mogrosides show a protective effect against acute lung injury.

# Wide-Spectrum Protection and Benefits

## Anticancer

Mogrosides exhibit comprehensive anticancer activities, as evidenced by various experiments. According to the review in Foods, they can inhibit the invasion and migration of lung cancer cells, induce cell apoptosis, and impede the proliferation of colorectal and laryngeal cancer cells. Moreover, mogrosides can disturb the growth cycle of pancreatic cancer cells and cause cell death. According to the Frontiers in Pharmacology review, monk fruit extract has also been found to have inhibitory effects on liver cancer.

Additionally, mogrosides can help inhibit the toxicity of carcinogens, according to a paper published in Cancer Letters. For instance, they can help prevent skin cancer induced by exposure to certain chemicals, according to commentary published in Future Medicinal Chemistry.

Animal studies mentioned in the Cancer Letters paper have shown that phytochemicals in monk fruit can directly kill tumor cells.

## Improves Cognitive Health

Mogrosides can alleviate neuroinflammation in brain cells and help manage Alzheimer's disease, according to the Molecules review. They can also reduce memory impairments and prevent hippocampus apoptosis. In addition, animal studies mentioned in the Foods review have shown that mogrosides can effectively improve schizophrenic behaviors in mice and modulate partial permanent impairment of the nervous system.

## Powerful Antioxidant

The Molecules review states that mogrosides are antioxidant agents, enabling them to scavenge reactive oxygen species and protect cells. They can also inhibit DNA oxidative damage, thereby slowing the aging process. Additionally, mogrosides demonstrate significant protective effects against exercise-induced tissue damage, including cardiac injury. The Foods review indicated they could also improve nonalcoholic fatty liver disease by preventing liver fat accumulation and inhibiting lipid peroxidation.

In addition, the flavonoids and polysaccharides found in monk fruit also show vigorous antioxidant activity.

# Who Should Avoid Monk Fruit Sugar?

"Monk fruit sweetener seems to be fairly safe, though it undergoes an artificial extraction process," Wallace said.

According to the information published by the FDA, monk fruit extract is classified as "generally recognized as safe." However, no specific acceptable daily intake has been established for monk fruit extract, because evidence of the ingredient's safety is established for amounts well above that needed to achieve the desired effect in food.

According to TCM, monk fruit has a slightly cold nature and is associated with minimal side effects. However, Liu advised that people with cold constitutions, such as those who frequently experience loose stools, have a large, pale tongue, or exhibit prominent tooth marks on the edges of the tongue, may want to avoid monk fruit consumption.

In addition, monk fruit belongs to the Cucurbitaceae family, which includes common plants such as cucumber, zucchini, pumpkin, and melon. Therefore, people allergic to these foods are more likely to be allergic to monk fruit.

## What to Know When Buying Monk Fruit

Monk fruit offers numerous health benefits, but its cultivation can be challenging. It has low germination rates and requires specific environmental conditions for successful growth.

Fresh monk fruit is also tough to store and rarely seen in the market. However, dried monk fruit can be found in some Asian grocery stores, Chinese herbal medicine stores, and online.

The traditional drying method for monk fruit involves high-temperature hot air drying. However, in recent years, there has been a rise in the use of low-temperature freeze-drying for dried monk fruit, which helps retain a higher concentration of beneficial compounds, especially mogrosides.

Because of their potent sweetness, solid powdered monk fruit sweeteners commonly found in supermarkets are often mixed with other substances, such as erythritol, and some products may even contain sucrose. Monk fruit may only account for about 1 percent of the composition of these products.

## Homemade Monk Fruit Recipe

You can try making homemade monk fruit syrup using dried monk fruit.

1. Remove the peel of the monk fruit and extract the flesh and seeds. Soak the monk fruit flesh and seeds in 194 F degrees water for 30 minutes at a ratio of 1 gram of dried fruit to 15 milliliters of water, as described in the Foods review. Then, strain the liquid and store it for later use.
2. Afterward, you can pour in fresh hot water and continue soaking the flesh and seeds, but remember to extend the soaking time appropriately with each subsequent infusion.
3. By boiling the infused monk fruit water, you can reduce it to obtain monk fruit syrup.

Another simple way to incorporate monk fruit is by adding dried monk fruit to your tea during brewing. This makes the tea sweeter and provides the benefits of monk fruit's compounds.

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CHAPTER 3

# Natural Sugars

# Honey: When Sugar Is Not Sugar

"Honey should not be categorized as free sugar. It is different."

*Tauseef Khan, research associate, University of Toronto*

Currently, most health organizations, including the World Health Organization (WHO) and the FDA, still classify honey as either free sugar or added sugar. Although honey contains a significant amount of sugar, it differs from regular sugar. Numerous studies and experts have indicated that honey may benefit metabolism by reducing blood sugar levels.

# Honey's Unique Composition

Honey is a delightful gift from nature. With variations based on the source plants and other factors, there are more than 300 types of honey worldwide.

In general, honey is made up of about 17 percent water, and 95 percent to 99 percent of the remaining dry matter is sugar. Among these sugars, the major components are fructose and glucose. On average, 100 grams of honey contains approximately 38.5 grams of fructose and 31 grams of glucose.

Notably, 14 percent of the sugars in honey are rare sugars, many of which are formed during its maturation process. These rare sugars are uncommon in nature and are believed to have beneficial health effects.

"Honey should not be categorized as free sugar. It is different," Tauseef Khan, a research associate in the Department of Nutritional Sciences at the University of Toronto's Temerty Faculty of Medicine, told The Epoch Times.

Khan said honey is a "complex mixture of sugars" and that rare sugars, which have unique benefits, aren't complex carbohydrates but are usually found in the form of monosaccharides or disaccharides. These sugars possess potential metabolic effects, and many also serve as prebiotics.

Compared with regular sugar, honey can lower fasting blood sugar levels, reduce bad cholesterol, and raise good cholesterol.

"Those effects are very surprising; if it was normal sugar, then those effects should not have been there," Khan said.

In a statement discussing the discovery that honey can reduce cardiometabolic risk, Dr. John Sievenpiper, professor of nutritional sciences and medicine at the University of Toronto, said: "The word among public health and nutrition experts has long been that 'a sugar is a sugar.' These results show that's not the case."

## Honey's Glycemic Magic

The glycemic index of glucose is 100, while sucrose averages about 66 and fructose 24. Because of variations in sugar composition, the GI values of different types of honey fall within the range of 35 to 74, with an average of 60.

Interestingly, because of its high level of fructose, honey is 25 percent sweeter than sugar.

Nevertheless, honey has lower GI values and calorie content than refined sugar.

Fructose has a bad reputation that may be unwarranted. Researchers at the University of Toronto published a study in The American Journal of Clinical Nutrition reviewing 169 clinical trials related to fructose. The study concluded that naturally occurring fructose found in fruits and honey isn't

likely to contribute to weight gain and may even positively affect weight loss. Another review published in Molecules indicated that fructose in honey may slow intestinal absorption, prolong gastric emptying, and reduce food intake. Additionally, fructose in honey was found to enhance the liver's metabolic capacity for glucose.

## Honey Versus Sugar: Diabetic Effects

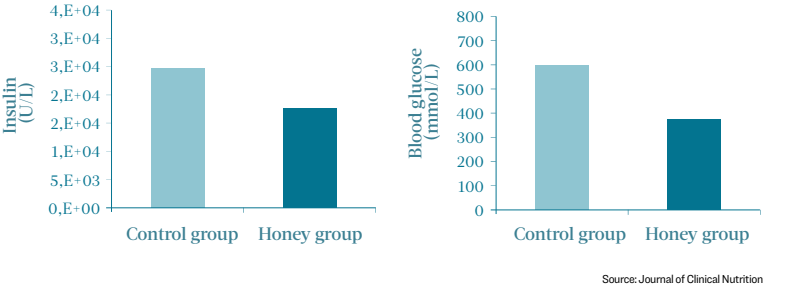
Using honey as a substitute for refined sugar in one's diet offers additional benefits.

The blood sugar-lowering and antidiabetic effects of honey have been proven in animal and human studies.

In a 2008 study, 55 overweight or obese people were divided into two groups, with one group receiving a daily intake of 70 grams of sucrose and the other receiving 70 grams of honey, both for 30 days. The results showed that compared with the pre-intervention period, the group consuming honey experienced a 4.2 percent decrease in fasting blood sugar levels and improved insulin resistance. Honey also resulted in a slight reduction in body weight and body fat percentage by 1.3 percent and 1.1 percent, respectively, alongside a 3 percent decrease in total cholesterol, an 11 percent decrease in triglycerides, and a 3.3 percent increase in good cholesterol.

On the other hand, people who received sucrose experienced different changes. Not only did their fasting blood sugar levels rise by 2.2 percent, but their body weight and body fat percentage also increased.

**Reduced Post-Meal Insulin and Blood Glucose Levels With Honey Consumption**



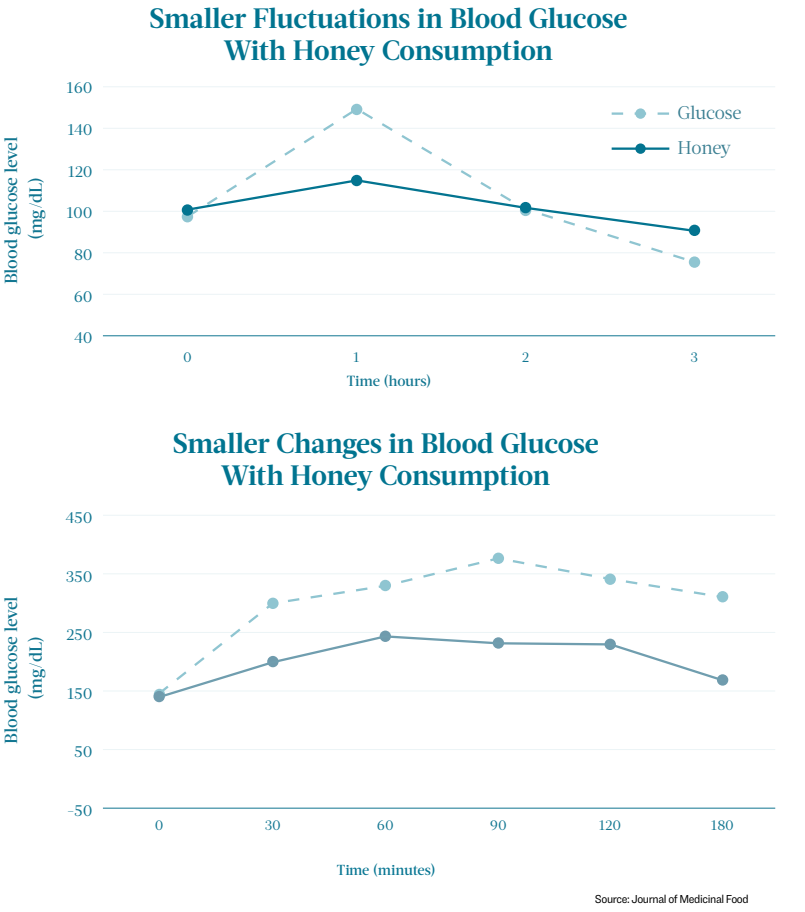

Source: Journal of Clinical Nutrition

*Replacing carbohydrates with honey results in decreased postprandial blood glucose and insulin levels.*

According to a controlled experiment published in 2017, healthy adults who replaced 25 percent of their dietary carbohydrates with honey for eight consecutive days experienced decreased postprandial (post-meal) insulin and blood sugar levels.

In another experiment comparing honey and glucose effects on diabetic and healthy people, healthy subjects were given an equal quantity of honey or glucose. The results revealed that honey intake resulted in significantly smaller fluctuations in blood sugar and insulin levels than glucose consumption. After consuming honey for 15 consecutive

days, healthy people experienced an average 6 percent decrease in blood sugar levels compared to their levels before honey consumption. Diabetic patients also exhibited noticeably smaller changes in blood sugar levels when consuming honey instead of glucose.




*Both healthy individuals and diabetic patients experienced smaller fluctuations in blood glucose levels when consuming honey.*

In a long-term intervention trial conducted in Egypt, 20 participants diagnosed with diabetes drank honey water, prepared by dissolving 50 milliliters (3 tablespoons) of honey in water, on an empty stomach twice per day before meals. They consumed an additional 25 milliliters of honey as the sole sweetener in their diets.

During the trial, none of these patients experienced diabetic ketoacidosis or hyperglycemic hyperosmolar state (common symptoms include dry skin or tongue, fruity breath, drowsiness, confusion, difficulty breathing, rapid heartbeat, abdominal pain, and vomiting). Long-term consumption of honey led to weight reduction, controlled blood pressure, and improved cardiovascular conditions in all patients.

A 2018 review published in Oxidate Medicine and Cellular Longevity revealed that honey has beneficial effects on diabetes, a complex disease. Compared with sugar, consuming honey can reduce weight and lower blood sugar levels in healthy people and patients with diabetes. A systematic review and meta-analysis published in Nutrition Reviews in 2022 also confirmed the positive effects of honey on blood sugar and metabolism.

# How Does Honey Mediate Blood Sugar?

How can honey lower blood sugar levels despite being a type of sugar?

Khan explained that honey contains 30 to 40 different types of rare sugars, which play a role in regulating appetite-related hormones and insulin secretion, ultimately promoting glucose metabolism.

These rare sugars can help mitigate the effects of fructose and glucose, resulting in lower fasting blood sugar levels and improved blood sugar control. Some of these sugars also nourish beneficial gut bacteria, while others have immune-enhancing properties.

The compounds and flavonoids found in honey possess antioxidant properties that can improve the progression of diabetes caused by oxidative stress and metabolic disorders associated with the condition. Interestingly, the antioxidant capacity of honey is associated with its color, with darker honey having a higher antioxidant value.

The trace elements found in honey, such as zinc and selenium, are also believed to contribute to blood sugar control.

Specific proteins present in honey can activate the body's innate immune system.

# Raw Versus Processed Honey: What's the Difference?

Khan said the data suggest that raw honey has more benefits than honey that has undergone high-temperature processing. Those who consume processed honey also experience benefits, "but they might be more muted or less."

Raw honey retains more of its beneficial components and bioactivity, while the processing of honey can alter its composition and reduce its bioactivity.

During production, honey is often briefly heated to reduce moisture and yeast content, but this process can also lower the amount of diastase enzyme. Diastase aids in the breakdown of starch, and its reduction may affect the honey's overall bioactivity.

Heat processing of honey can lead to an increase in a substance known as hydroxymethylfurfural (HMF). When metabolized in the human body, HMF can convert into a genotoxic compound, diminishing honey's beneficial effects.

During heat processing, the beneficial bacteria present in honey are also reduced.

Some of the antioxidant compounds in honey are also lost during heat processing and can diminish honey's ability to promote metabolism and lower fasting blood sugar levels. One study showed that heat processing can reduce the antioxidant capacity of honey by 33.4 percent.

Khan said that choosing honey from a single floral source ensures "the composition of honey will be consistent," making it easier to derive specific benefits.

Honey sourced from multiple floral origins may come from different regions, suppliers, or even countries, resulting in significant variations in their rare sugar content. Mixing honey from different sources diminishes its overall benefits, Khan said. The aforementioned review from 2022 indicated that, within a healthy dietary pattern, honey from a single floral source, particularly acacia and clover, can improve blood sugar control and lipid levels.

According to Khan's research, optimal benefits were observed when people consumed roughly 2 tablespoons, or about 40 grams, of honey per day as a replacement for sugar.

# Honey: An Ancient Medicine

"We've already got this great gift from nature that is a solution to superbugs."

*Nural Cokcetin, research fellow, Australian Institute for Microbiology*

Honey is a sweet food and medicine that nature has gifted us. Its history of medicinal use can be traced back 8,000 years. Sometimes, the therapeutic effects of honey surpass even those of medications, particularly the outstanding antibacterial and antiviral properties.

## Naturally Superior to Antibiotics

"Bacteria quickly learn how to fight off the effects of the antibiotic drugs, but they don't have honey resistance," Nural Cokcetin, a research fellow at the Australian Institute for Microbiology and Infection in the science faculty at the University of Technology Sydney, told The Epoch Times.

Honey has been used to treat skin problems and wound infections for thousands of years. For instance, ancient Greeks and Egyptians would apply honey topically to the skin to treat wounds and burns. Honey's effectiveness in treating wounds and eczema was also documented in Persian traditional medicine. Interestingly, the concept of microorganisms such as bacteria and fungi causing wound infections during those historical periods might not have even been known.

The broad-spectrum antibacterial activity of honey has been increasingly recognized and substantiated. In recent years, the prevalence of wound infections caused by antibiotic-resistant bacteria has become a major global health care challenge. Honey can disrupt biofilms formed by resistant bacteria and sometimes penetrate the biofilm structure to eliminate the embedded bacteria. An article published in the journal of the American Society for Microbiology in 2020 reported no documented cases of bacteria developing resistance to honey.

In clinical settings, medical-grade honey has

been utilized in various ways. It's formulated into topical ointments, dressings, and bandages treating of postoperative wound infections, burns, necrotizing fasciitis, nonhealing wounds, boils, venous ulcers, diabetic foot ulcers, eczema, psoriasis, and dandruff. Additionally, it has proven effective in preventing and treating infections caused by multidrug-resistant microorganisms.

In vitro studies have shown that honey can kill Helicobacter pylori. Furthermore, eating honey can reduce the duration of bacterial diarrhea.

## Key Antimicrobial Components

The antibacterial properties of honey originate from its inherent characteristics and a diverse array of components derived from nectar-producing plants and bees. Additionally, some of these components are formed during the maturation process of honey.

### High Viscosity and pH

Honey has a high sugar content, reaching up to 82.5 percent. As a result, it has a viscous and syrupy consistency, exhibiting hygroscopic properties (ability to absorb moisture) and high osmolarity. Bacteria that come into contact with honey undergo dehydration

and ultimately perish.

Honey is acidic due to its various organic acids, with a pH value ranging from 3.2 to 4.5. Bacteria can't survive in honey—their optimal pH typically ranges between 6.5 and 7.5.

## Honey's Weapon: Hydrogen Peroxide

An important enzyme in honey derived from bees facilitates the oxidation of glucose, resulting in the production of hydrogen peroxide.

Hydrogen peroxide is an effective bactericidal agent that can inhibit and kill microorganisms.

Water is necessary to induce honey's hydrogen peroxide production. The maximum level of hydrogen peroxide can be obtained by diluting honey to a concentration of 30 percent to 50 percent, according to a paper in the International Journal of Microbiology.

## Bee Defensin-1

Bee defensin-1 is another natural antibacterial component in honey originating from the honeybee's hypopharyngeal gland.

Bee defensin-1 is an antimicrobial peptide that can kill various bacteria and microorganisms. Specifically, the defensin protein has been shown

to create pores within the bacterial cell membrane, leading to cell death.

Additionally, bee defensin-1 can aid in wound healing by stimulating keratinocytes, the most common type of skin cell.

## Manuka Honey: Enhanced Antibacterial

Manuka honey is often mentioned in studies regarding the antibacterial effects of various kinds of honey. As a globally recognized honey with high antibacterial potency, it possesses a unique natural component called methylglyoxal (MGO).

After honeybees gather nectar from the flowers of manuka trees, a natural substance found in the trees undergoes spontaneous dehydration, leading to the formation of MGO in the honey.

"The more [methylglyoxal] there is, the more antibacterial that honey is," Dee Carter, a professor from the School of Life and Environmental Sciences at the University of Sydney, told The Epoch Times.

MGO exhibits remarkable antibacterial properties by itself. It can alter the structure of bacterial fimbriae and flagella (appendages) and induce damage to the bacteria's cell membranes, ultimately resulting in cell death.

However, this substance is sensitive to heat.

Heating manuka honey to 98.6 degrees Fahrenheit can increase the levels of MGO, and heating it to 122 degrees Fahrenheit results in the loss of MGO.

## Honey's Benefits Regarding COVID-19

Honey also exhibits antiviral effects, which help protect the body and boost the immune system. Many people find relief from symptoms of cold and respiratory illnesses by drinking honey water. There is a valid basis for this remedy.

MGO can inhibit the growth of enveloped viruses, including the virus that causes COVID-19.

According to a study published in the Eurasian Journal of Medicine and Oncology in 2020, computer simulations revealed that multiple compounds found in honey can bind to the protease of SARS-CoV-2, effectively inhibiting its replication.

MGO in manuka honey can also inhibit the replication of influenza viruses, including drug-resistant strains.

Currently, scientists are researching the potential of MGO for managing and treating COVID-19.

Honey can activate several immune cells, enabling them to eliminate viruses effectively. For example, oligosaccharides present in honey can enhance the activity of natural killer cells. Additionally, certain immune cells can "remember" specific

viruses during the antiviral response, offering future protection against the same viral invasions.

Honey encourages the proliferative activity of immune cells, thus increasing their quantity.

Honey can promote autophagy, crucial in combating deadly viruses such as SARS-CoV-2, which causes COVID-19. It's an internal cellular process that involves the degradation and metabolism of cells, allowing for the removal and recycling of unwanted or damaged cells and impurities. This process contributes to the generation of healthier cells and promotes recovery.

## Honey: Good in the Mouth and Gut

Inflammation is a common occurrence in bacterial or viral infections. Left unchecked, it can significantly harm the body, potentially leading to life-threatening complications.

Honey has been suggested to have a dual role in inflammation control, It can downregulate anti-inflammatory factors, thereby reducing inflammation damage and stimulating the production of inflammatory mediators, promoting wound healing.

In one of Cokcetin's studies, honey was found to reduce inflammation levels in the intestines. She attributed this effect to the abundant presence of phenolic compounds found in honey.

Honey also contains oligosaccharides and polysaccharides, which are complex sugars. These compounds serve as prebiotics, supporting the growth of beneficial bacteria in the gut and inhibiting the growth of harmful bacteria, Cocketin said. Additionally, consuming honey promotes the production of short-chain fatty acids in the intestines.

## The UMF Factor: How to Choose Your Honey

Generally, raw and darker honey varieties tend to have more robust efficacy.

Commercially available honey found on supermarket shelves differs from raw honey sold by beekeepers or at farmers markets, as it's generally pasteurized. Research has shown that heat processing can lower the antioxidant capacity of honey by 33.4 percent. Alternatively, you can choose honey processed using high-pressure techniques.

Honey comes in a diverse colors, from light yellow to amber to dark red and even nearly black. These colors reflect the varying composition of honey, such as polyphenols, minerals, and pollen. Numerous studies suggest that dark-colored honey generally contains higher levels of phenolic compounds and exhibits more potent activity.

To obtain manuka honey with exceptional

antibacterial properties, it's recommended to opt for pure honey sourced from New Zealand and Australia.

The manuka tree is exclusive to specific New Zealand and Australian regions, and its annual yield is limited. Certain products labeled as manuka honey may contain blends of other honey types, potentially affecting the honey's properties. Furthermore, some of these products may even include low-quality ingredients such as sucrose.

Opting for single-origin honey sourced exclusively from the manuka tree and checking for its Unique Manuka Factor (UMF) rating is recommended. A higher UMF rating indicates higher levels of substances related to MGO. Some honey products also specify the amount of MGO in milligrams per kilogram.

However, manuka honey with a higher UMF rating may have a strong flavor that some people find pungent.

Cokcetin recalled that when she began her research on the antibacterial properties of honey, a professor she worked with said, "We've already got this great gift from nature that is a solution to superbugs—we just have to figure out how it works and why it works the way it does."


# Maple Syrup

"If you're stranded on a deserted island and could bring only one food, maple syrup is the food for you."

*Navindra Seeram, chair of the Department of Biomedical and Pharmaceutical Sciences, University of Rhode Island College of Pharmacy*

Maple syrup is undeniably sweet and tasty. Perhaps you're like Ross from "Friends," often finding yourself indulging in a box of maple candies to the point of intoxication. (If not, don't start: This is a bad idea.) When eaten in moderation, maple syrup is healthier than standard refined sugar.

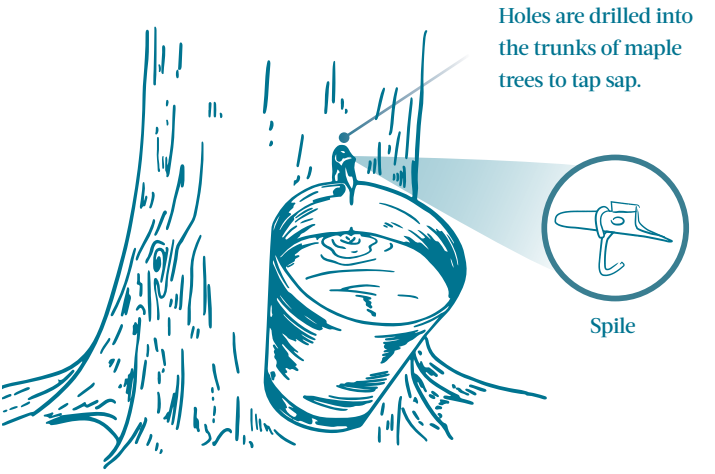
Some even consider maple syrup a superfood.

"If you're stranded on a deserted island and could bring only one food, maple syrup is the food for you," Navindra Seeram, professor and chair of

the Department of Biomedical and Pharmaceutical Sciences at the University of Rhode Island College of Pharmacy, said during an interview with The Epoch Times.

## How Is Maple Syrup Made?

Maple syrup is a natural sweetener extracted from the sap of maple trees, collected and concentrated without the addition of chemicals. The method for collecting maple sap and making syrup was introduced to North American settlers by Native Americans. It takes about 40 liters of tree sap to make 1 liter of maple syrup.



Sap collecting to make maple syrup typically starts in late winter or early spring, usually from February to March, and lasts only a few weeks. Maple trees accumulate starch during growth, which is converted into sugar during the spring thaw. This sugar then mixes with water absorbed by the tree's roots to form maple sap. As the pressure changes due to rising temperatures and the ground thawing, maple producers bore holes into the tree, and taps are installed, allowing the sap to flow from the trunk.

Maple syrup can vary significantly from region to region and tree to tree. Maple syrup's characteristics continuously evolve throughout the harvesting season. At the beginning of the season, the syrup is relatively clear with a slight sweetness. As the season progresses, the syrup becomes darker and develops a range of distinct flavors, including vanilla, hazelnut, floral, and coffee and can even be spicy.

Canada is responsible for about 75 percent of the world's maple syrup production, and its syrup is classified into two primary grades: Canada grade A and Canada processing grade. Canada grade A is further graded into four color classes:

- **Golden:** delicate flavor
- **Amber:** rich flavor
- **Dark:** robust flavor
- **Very dark:** strong flavor

Canada processing grade maple syrup doesn't have color classes and is commonly used for large-scale commercial applications.

## The Composition of Maple Syrup

Based on data from the U.S. Department of Agriculture (USDA), sugars comprise about 60 percent of maple syrup, while water accounts for 32 percent.

Maple syrup contains three types of sugars: sucrose, glucose, and fructose. Sucrose is a disaccharide composed of one glucose molecule and one fructose molecule, accounting for 98.3 percent of all sugars in maple syrup, followed by glucose at 1.1 percent and fructose at 0.6 percent.

While sucrose makes up most of the sugar in maple syrup, the GI of maple syrup is lower than that of sucrose, with maple syrup having a glycemic index value of 54 and sucrose having an average GI value of 66. This means that consuming an equal amount of maple syrup compared to sucrose would result in a relatively smaller increase in blood sugar levels.

"Maple syrup is a much better option than refined sugar. It's actually sweeter, which is beneficial because you can get away with using less of it," Amy Gonzalez, a registered dietitian, told The Epoch Times. In other words, a smaller amount of

maple syrup is required to achieve the same level of sweetness compared to refined sugar.

She said that we can reduce the amount by a quarter when using maple syrup as a substitute for regular sugar in cooking. For example, if a recipe requires 1 cup of white sugar, ¾ cup of maple syrup would suffice.

## Maple's Nutrient Cocktail

In contrast to refined sugar, primarily composed of sucrose, maple syrup contains a range of more than 250 substances. These compounds either occur naturally in the maple tree or are formed during processing.

"It also contains a cocktail of other substances," Seeram said.

Maple syrup contains oligosaccharides, organic acids, amino acids, vitamins, and various minerals. It's also rich in phenolic compounds, which exhibit a range of biological activities.

There are more than 67 grams of carbohydrates in 100 grams of maple syrup. It also contains 225 milligrams of potassium; 109 milligrams of calcium; magnesium, manganese, zinc, and iron; and trace amounts of thiamin, riboflavin, and niacin.

# Maple Syrup as a Superfood

Seeram said maple syrup contains numerous substances that warrant further research and development. Its phenolic compounds exhibit a range of beneficial activities, including anti-mutagenic, antiradical, antioxidant, anti-inflammatory, antidiabetic, and even anti-cancer properties.

# Antidiabetic

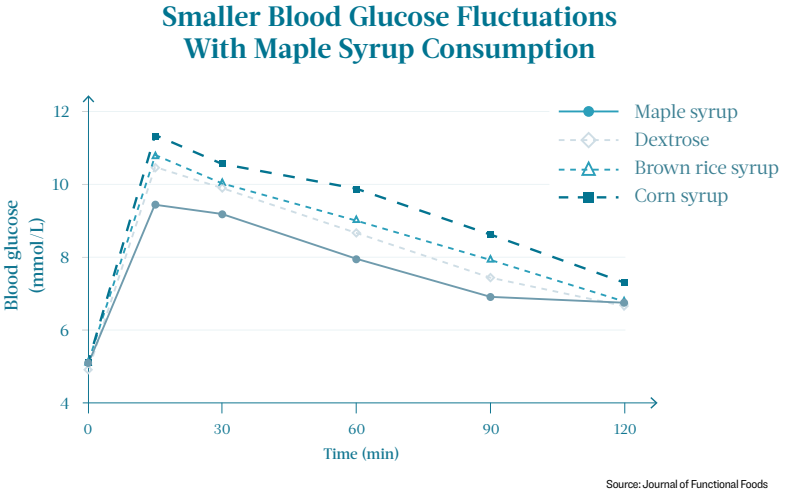
Blood sugar levels rise when food is broken down and absorbed by enzymes. Inhibiting these enzymes is considered an important strategy for treating Type 2 diabetes.

Maple syrup extract is rich in phenolic compounds, including ethyl acetate and butanol, which can inhibit the enzymes responsible for breaking down starch into sugars. These compounds can also hinder the enzymes that aid in the absorption of sugars in the small intestine, slowing the rapid digestion of carbohydrates and suppressing post-meal blood sugar.

Abscisic acid (ABA) found in maple syrup is believed to have potential antidiabetic properties. This plant hormone shares structural similarities with a class of antidiabetic drugs known as thiazolidinediones, and animal studies have demonstrated the

protective effects of ABA against Type 2 diabetes.

A study conducted at Laval University in Canada revealed that compared to brown rice syrup, corn syrup, and pure dextrose, consuming maple syrup resulted in more minor fluctuations in blood sugar and better responses in insulin secretion and other related indicators.




*Compared to brown rice syrup, corn syrup, and pure dextrose, consuming maple syrup results in more minor fluctuations in blood sugar levels.*

## Reduces Oxidative Stress and Inflammation

Stress, physical injuries, viral infections, exposure to chemical substances, and other factors can trigger the release of toxic substances from cells, including free radicals. Oxidative stress caused by

excessive free radicals has been linked to aging and various degenerative diseases, including cancer, heart disease, multiple sclerosis, Parkinson's disease, autoimmune diseases, and dementia.

Research has confirmed that phenolic compounds in maple sap and syrup exhibit antioxidant activity and can scavenge free radicals. A study published in the Journal of Medicinal Food indicated that while pure maple syrup's ability to clear free radicals is lower than that of blueberry juice, it's comparable to orange and strawberry juices. Additionally, darker varieties have more pronounced antioxidant activity due to their higher phenolic content.

## Anti-Cancer and Anti-Mutagenic

Maple syrup contains various phenolic compounds, including kaempferol, luteolin, quercetin, myricetin, and catechin, which exhibit potent anti-tumor and anti-mutagenic properties.

It can inhibit the growth of various cancer cells, including prostate, lung, breast, and colorectal. In experiments, maple syrup specifically targets rapidly growing cancer cells while leaving normal cells unaffected.

Maple syrup extract also protects cells and can counteract the mutagenic effects caused by toxic chemicals.

## Quebecol: Unique Maple Compound

Quebecol is a unique chemical compound discovered in maple syrup in recent years, believed to possess anti-inflammatory properties. Interestingly, it isn't naturally present in maple sap and is found only in small quantities in maple syrup. "The chemical is produced during the transformation of the sap in maple syrup, which requires lots of heating and boiling and evaporation," Normand Voyer, a professor at Laval University's Department of Chemistry, told The Epoch Times. He and his colleagues have developed a method for synthesizing quebecol, which scientists worldwide are now studying.

"The source of inspiration was nature," Voyer said, noting that nature serves as inspiration for many other drugs on the market. "Nature serves us in providing beautiful chemical structures and natural substances that are unique."

In lab studies, quebecol has shown significant potential in treating inflammatory diseases. For instance, it has been proven to positively affect conditions such as periodontitis and psoriasis.

## How to Choose Maple Syrup

Before using maple syrup as a substitute for refined

sugar in your diet, it's crucial to read the product labels and instructions carefully.

Some maple syrup products may actually be high-fructose corn syrup with added maple flavor, and a GI value of up to 68—much higher than that of pure maple syrup. Long-term high artificial sugar intake can lead to metabolic disorders such as insulin resistance, abdominal fat accumulation, and high blood lipids.

Look at the ingredient labels and select only those labeled as "100 percent real maple syrup".

Additionally, choose darker-colored varieties, as they contain more phenolic compounds.

Despite its benefits, it's important not to eat too much maple syrup.

"First and foremost, it is indeed a sweetener. You should not use a large amount of any sweetener," Seeram said.

"Do I believe that it is a functional sweetener or smarter sweetener [than] unrefined sugar? The answer is yes," with the caveat, "you should drizzle, not guzzle."

According to the 2020–2025 Dietary Guidelines for Americans, developed by the USDA, limiting intake of free sugars to less than 10 percent of total daily calories is recommended. For someone with a daily calorie intake of 2,000 calories, the upper limit of free sugar would be 200 calories. Sixty milliliters (approximately ¼ cup or 4 tablespoons) of maple syrup provides 270 calories.

The British government takes it a step further in its recommendations, suggesting that the energy from free sugars should be limited to below 5 percent. This means that for adults, the total daily intake of free sugars shouldn't exceed 30 grams, equivalent to less than 40 milliliters of maple syrup (1 tablespoon has 15 milliliters).

# Coconut Sugar

"Research has confirmed that there are five main phenolic compounds [in coconut sugar]."

*Yus Aniza Yusof, professor, Department of Process and Food Engineering, Universiti Putra Malaysia*

When it comes to healthy natural sugars, many people think of coconut sugar. Some might assume that coconut sugar is extracted from coconut fruit. However, this type of sugar is actually "coconut blossom sugar," as it's derived from sap that flows from the coconut tree's inflorescences—clusters of flowers on a stem. Coconut sugar boasts numerous health benefits not widely known.

## How Is Coconut Sugar Produced?

To obtain coconut sugar, coconut farmers usually climb coconut trees twice a day. During this process, they adeptly employ knives to cut into the unopened inflorescences of the coconut trees, collecting the sap that flows from them. The sap is then boiled, concentrated, and processed into sugar syrup, blocks, or granules.

The main producers of coconut sugar are Southeast Asian countries, such as the Philippines, Indonesia, and Thailand.

A single inflorescence from a coconut tree can yield 1.5 liters of sap each day, which contains 15 percent sugar, enough to produce 200 grams of coconut sugar. On average, a coconut tree grows a new inflorescence each month, and each can be tapped for sap for more than 40 consecutive days. This harvesting cycle can extend up to 20 years.

## The Composition of Coconut Sugar

In general, foods with a GI of 55 or lower are classified as low-GI foods, as they result in a gradual change in blood sugar levels after consumption. Foods with a GI value between 56 and 69 are classified as medium-GI foods, and foods with a value of 70 or higher are considered high-GI foods.

Various sources indicate that the GI of coconut sugar falls between 35 and 54, similar to that of maple syrup and lower than that of honey, which has a GI value of 60.

Coconut sugar also contains a certain amount of inulin, approximately 4.7 grams per 100 grams. Inulin is a type of dietary fiber that can help slow the rise of blood sugar.

# The Health Benefits of Coconut Sugar

## Lowers Blood Pressure

The process of boiling coconut sap involves a Maillard reaction—an interaction of sugars, amino acids, and other macromolecules. The products of the Maillard reaction contribute to the nutritional value and sensory experience of coconut sugar. However, the effects of the Maillard reaction are intricate and heterogeneous and can result in advanced glycation end products—something that should generally be avoided. However, some of these substances also possess antioxidant and anti-inflammatory activities.

American scientists conducted a small-scale pilot study employing a double-blind, randomized, placebo-controlled design published in the Journal of Applied Physiology. The study demonstrated the

potential cardioprotective effect of coconut sugar on middle-aged and older adults.

Nineteen adults around the age of 55 participated in the experiment. One group of participants consumed 1.5 grams of coconut sugar daily, and the other received a placebo. After eight weeks, the participants who consumed coconut sugar experienced a reduction in systolic blood pressure from 117 to 109 mmHg. The consumption of coconut sugar was associated with an improvement in arterial stiffness among participants.

## Polyphenol Potential

One of the factors leading to Type 2 diabetes is oxidative stress, which can induce insulin resistance and impair insulin secretion. Coconut sugar contains high levels of polyphenols, which can reduce oxidative stress.

"Research has confirmed that there are five main phenolic compounds, such as gallic acid, protocatechuic acid, caffeic acid, p-coumaric acid, and alanine in coconut sap. These will be in coconut sugar, but the amount will definitely change (increased in this case) due to longer processing time and higher processing temperature," Yus Aniza Yusof, from the Department of Process and Food Engineering at the Faculty of Engineering, Universiti Putra Malaysia, told The Epoch Times.

Experiments have demonstrated that coconut sugar possesses a inhibitory effect on alpha-amylase. A study published in the International Journal of PharmTech Research in 2015 suggested that coconut sugar could be used to treat Type 2 diabetes.

Coconut sugar also contains amino acids such as leucine, arginine, and isoleucine, which may have antidiabetic properties.

In a study published in Foods in 2022, researchers fed diabetic rats cookies made from various raw materials. The results show that, compared with cookies containing added sucrose and margarine, rats that ate corn cookies made with coconut sugar and coconut oil experienced a significant reduction in blood sugar levels and oxidative stress. Notably, their previously low hemoglobin levels and body weight also improved. After maintaining this diet for four weeks, the blood sugar indicators of the diabetic rats improved, and their overall condition became comparable to that of normal rats.

## Nutrient Rich

Yusof said that coconut sap contains 0.27 percent ash, which represents the content of minerals and trace metals such as calcium, magnesium, manganese, copper, sodium, potassium, zinc, and iron.

"...The minerals are more stable and don't destroy even by burning, hence they are present in

coconut sugar too," she explained.

The iron, magnesium, and zinc content in coconut sugar is twice, four times, and 10 times higher than in cane sugar, respectively. Coconut sugar also contains more phosphorus and potassium.

According to Yusof, although the quantities of these substances in coconut sugar aren't substantial, consuming coconut sugar can, to some extent, provide the body with minerals and trace metals.

Coconut sugar contains the amino acids required for protein synthesis, and it's also a rich source of vitamins B1, B2, B3, and B6.

## The Golden Mean of Coconut Sugar

Coconut sugar contains 16 calories per teaspoon, the same as regular sugar. Although coconut sugar has some nutritional components, the quantities are relatively limited. Excessive consumption can offset the benefits because of the overall intake of sugars.

German researchers conducted a sensory evaluation of various coconut sugars, and interestingly, coconut sugar was described as having neither the aroma nor the taste of coconut.

The more affordable coconut sugars tend to have a darker color and coarser granules and are primarily characterized by their sweetness.

On the other hand, the more expensive coconut sugars tend to be light brown, have a finer texture, and exhibit higher fluidity. They were described as having a combination of sweet, caramel, malt, and roasted flavors.

CHAPTER 4

# Surprising Effects of Quitting Sugar

"Your body doesn't need added sugar."

*Dr. Jason Fung, nephrologist*

"Your body doesn't need added sugar," Dr. Jason Fung, a nephrologist specializing in reversing Type 2 diabetes, told The Epoch Times.

Despite that reality, if you're eating the standard American diet, you're likely getting quite a bit of added sugar. If you decide to cut added sugar out of your diet, with a few reasonable exceptions, you will experience some unexpected changes, research finds.

## Increased and Sustained Energy

"I often call sugars 'The Great Deceiver,'" Becky Gillaspy, a chiropractor and author of the book "Intermittent Fasting Diet Guide and Cookbook,"

told The Epoch Times. Added sugar quickly breaks down into simple sugars, providing a quick burst of energy, "but then it turns around and robs that [energy]from us."

In the first few days of ceasing added sugar intake, we may experience some discomfort. According to Gillaspy, this is because the body has become accustomed to relying on the quick energy sugar provides and, as a result, exhibits cravings for it.

However, the body gradually receives more stable and sustained energy when we shift to obtaining carbohydrates and other nutrients from natural foods and whole grains.

Many people find themselves more energetic after quitting sugar for a while.

The body quickly adapts and can run on whatever fuel is most available. "Our metabolism switches from being a better sugar burner to being a better fat burner," Gillaspy said. This leads to a more sustained energy level, increased metabolic flexibility, and reduced food cravings.

"Your body will reset, becoming a body that doesn't need sugar," Fung said.

## Improved Insulin Sensitivity

Stable blood sugar is a natural benefit of quitting sugar, and what's even better is that quitting also

improves insulin resistance.

High sugar intake raises blood sugar levels, prompting the pancreas to release more insulin to shuttle sugar into cells, including fat cells. If this happens often, our cells begin to resist insulin's demands to take in this sugar, leaving it in the bloodstream where it poses significant health risks.

According to a review study published in Advances in Clinical and Experimental Medicine in 2019, the prevalence of insulin resistance ranges from 10 percent to 30 percent among different populations.

A previous study conducted by the University of Southern California showed that reducing added sugar intake by 40 grams and decreasing calorie intake from added sugar by 5 percent can lead to a 20 percent decrease in insulin secretion. Another study based on the National Health and Nutrition Examination Survey database in the United States revealed that each 8-ounce sugar-sweetened beverage increases insulin resistance by 6 percent.

Fasting insulin is one of the markers used to measure insulin resistance. A study involving 2,500 adults showed that those who did not consume sugar-sweetened beverages had lower fasting insulin levels than those who did.

## Reduced Inflammation and Pain

"The best part [of quitting sugar] is no pain," Pat, a photographer gratefully told Gillaspy. She used to suffer from severe joint and muscle pain—almost to the point of giving up her photography job, which required standing all day. Now, "52-year-old Pat runs literal circles around the 35-year-old former Pat," Gillaspy described.

Excessive sugar consumption triggers the release of pro-inflammatory substances in the body. A study involving nearly 10,000 adults in England showed that those who intook more added sugar from beverages and tea, coffee, and cereal had higher levels of inflammatory markers in their blood.

Research in the field of immunology has indicated an urgent need to understand the impact of excessive sugar intake on the development of inflammatory diseases. High levels of sugar in the diet can lead to rheumatoid arthritis, multiple sclerosis, psoriasis, inflammatory bowel disease, and low-grade chronic inflammation.

## Easier Weight Management

Losing weight becomes easier after quitting sugar.

Russo, a clinical psychologist in private practice in Philadelphia, told The Epoch Times that one of

her patients, who had struggled with binge eating and excess weight, lost 10 pounds within a month after cutting out added sugar and other refined carbohydrates.

Another individual who successfully lost 54 pounds told Gillaspy that most of their weight was shed after seriously committing to quitting sugar.

Sugar stimulates insulin secretion, and elevated insulin levels promote fat storage which is why insulin resistance makes weight loss challenging. A low-sugar diet leads to lower insulin levels, which, in turn, encourages cells to release fat.

A meta-analysis assessing more than 60 studies published in the BMJ indicated that reducing dietary sugar intake led to an average weight loss of 0.80 kilogram (approximately 1.76 pounds). Another prospective cohort study involving 120,877 individuals found that consuming sugar-sweetened beverages resulted in a continuous weight gain of up to 1 pound over four years, while drinking one less sugar-sweetened beverage a day reduced annual weight gain by approximately 25 percent.

## Sharpness, Focus, and Mood Enhancement

Russo explained that sugar depletes vitamin B, and vitamin B is crucial for the human brain. A deficiency

in vitamin B can lead to reduced cognitive clarity and a decline in thinking abilities, which is also one of the reasons sugar consumption can cause irritability.

According to Russo, depression and anxiety are linked to inflammation. Eliminating sugar and reducing inflammation helps people feel more relaxed and hopeful. We often notice this difference when we pay a bit more attention. Therefore, when feeling down, we can reflect on whether it is due to excessive sugar consumption.

A study published in the Frontiers in Public Health in 2023 involving 16,009 obese American adults revealed that those with higher total sugar intake in their diets had a higher prevalence of depressive symptoms. Those with the highest total sugar intake had a 50 percent higher risk of developing depression than those with the lowest, a conclusion corroborated by other meta-analyses and cohort studies.

## Reset Sweet Tooth and Rediscover Flavor

When people get used to eating fewer sweet foods, they often realize that they do not need as much sweetness.

“One of the most common things that shocks

people when they give up sugar is that they lose their taste for sugar," Gillaspy said. Russo also noted that many people find very sweet foods unpleasant in taste after cutting back on their sugar intake.

This is because when following a high-sugar diet, the brain's chemical responses and taste buds can become dulled to sweetness. However, cutting out sugar can restore sensitivity to these organs, allowing us to find satisfaction with smaller amounts of sugar.

"It [giving up sugar] opens up this whole new flavor world for foods that you would have not enjoyed before," Gillaspy said, using her own story as an example. When she was younger, she had a strong sugar addiction and was overweight, and foods like Brussels sprouts and sauerkraut would never have been found on her plate. However, after quitting added sugar, she acquired a taste for these ingredients and found them incredibly delicious.

## Reversed Fatty Liver

Excessive sugar consumption leads to fatty liver, "essentially due to the way fructose is metabolized," explained Fung.

He said that when referring to sugar, we are usually talking about sucrose, which comprises one glucose molecule and one fructose molecule. While

every cell in the body can utilize glucose as an energy source, fructose cannot be used by any cells. Instead, it goes directly to the liver, where some of it is converted into fat.

"So fructose, refined sugars, are much worse for you than regular sugar," said Fung. They are far worse than empty calories or even regular starch. That is why quitting sugar is crucial in preventing fatty liver disease progression.

A study published in Gastroenterology involving children and adolescents showed that when total calorie intake remained the same, reducing added fructose intake over nine consecutive days (controlled at 4 percent of total calories) decrease the median liver fat percentage from 7.2 percent to 3.8 percent. Furthermore, the conversion of fructose to fat in the liver significantly decreased. In another eight-week trial, restricting dietary sugar intake led to a reduction in the conversion of fructose to liver fat from about 35 percent to about 24 percent.

A study published in the BMJ Open in 2017 suggests that reducing added sugar intake by 20 percent could reduce the prevalence of hepatic steatosis, fatty liver disease, cirrhosis, and liver cancer. A 50 percent reduction in intake would have an even more significant proportional effect.

## Improved Gut Health and Immunity

Many may not realize that digestive discomfort or frequent colds could be attributed to excessive sugar consumption.

Research suggests that dietary sugar affects immune cells in the gut, replacing beneficial bacteria with harmful ones. Furthermore, the body alters the gut microbiota to detoxify toxins from excessive sugar intake, disrupting the natural balance. This disruption reduces intestinal epithelial integrity and mucosal immunity.

Additionally, excessive sugar consumption and high blood sugar levels can increase gut permeability, compromising the protective barrier and enhancing infection susceptibility.

Russo also pointed out that sugar intake can reduce the body's zinc levels, which are crucial for the immune system.

## Improved Skin Health

Quitting sugar might be the most straightforward and cost-effective approach to appearing younger and eliminating facial and skin blemishes.

Sugar undergoes oxidative reactions with proteins in our bodies, producing advanced glycation end products (AGEs). AGEs are a complex group of

substances, and apart from some individual components, are generally toxic to the body and can accumulate in tissues.

Over time, skin problems may arise, such as browning, yellowing, poor elasticity, and deeper wrinkles.

AGEs can also cause internal changes in the skin. They hinder wound healing, disrupt skin cell function, induce apoptosis, and trigger inflammation.

In addition to promoting healthier and more youthful skin omitting sugar also reduces toxins in the body, thus preventing age-related diseases.

AGEs can contribute to age-related diseases, including neurodegenerative disorders, atherosclerosis, and chronic inflammatory conditions. The accumulation of AGEs is accelerated in conditions like insulin resistance and diabetes, leading to a range of comorbidities.

## Reduced Chronic Metabolic Disease Risk

After quitting sugar for a period, you will notice improvements in several blood markers mainly associated with reduced fructose intake.

Half of sucrose consists of fructose, whereas high-fructose corn syrup, widely used in processed foods, is 42 percent to 55 percent fructose.

Clinical evidence suggests a high-fructose diet can lead to too many lipids in the blood and related metabolic diseases.

Additionally, liver metabolism of fructose leads to an increase in uric acid, a precursor of gout. A large-scale prospective cohort study confirmed that frequent consumption of sugar-sweetened beverages and high fructose intake is associated with an elevated risk of high levels of uric acid and gout.

Given the detrimental links between dietary sugar intake and various endocrine and metabolic issues, an umbrella review published in the BMJ in 2023 stated, “No reliable evidence shows beneficial associations between dietary sugar consumption and any health outcomes.”

CHAPTER 5

# Common Diseases Linked to Sugar

# Sugar and Mental Health

"Sugar could be contributing to her depression."

*Jessica Russo, clinical psychologist*

At 55, Kate (a pseudonym) suffered from depression, anxiety, and post-traumatic stress disorder. Her emotions swung dramatically, and she struggled with binge eating, resulting in obesity. These issues persisted for decades without any sign of improvement.

She also had a sweet tooth.

It was only when her psychologist encouraged her to give up sugar that her symptoms began to improve.

Two weeks after quitting sugar, Kate had lost four pounds and experienced reduced irritability. She no longer craved sugar, and her energy remained stable throughout the day without the "shakiness and anger" that used to arise a few hours after meals.

Additionally, her sleep quality improved. The nightmares she experienced several times a week were gone. She noticed that when she indulged in sugar again, the "toxicity" she'd come to associate with it would reemerge, leading to bloating and anxiety.

"The old feelings would come back once more," she said.

Russo, who treated Kate, said that "sugar could be contributing to her depression."

## Sugar: Culprit of Depression and ADHD

Kate's condition isn't an isolated case. Extensive research has shown that added sugar is linked to various mental disorders, with a high-sugar diet contributing to anxiety, stress, and hyperactivity.

Excessive sugar consumption "can exacerbate mood disorders," according to clinical psychologist Laurel Basbas. She has observed too many such cases in her clinical practice over the years, she told

The Epoch Times.

In a 2023 study published in Frontiers in Public Health, researchers assessed the association between total sugar intake and depressive symptoms in 16,009 American adults. The findings indicated that the prevalence of depressive symptoms increased with higher sugar intake. Individuals in the top 20 percent of sugar intake had a 56 percent higher likelihood of experiencing depression compared to those in the lowest 20 percent.

The habit of drinking sugary beverages is one of the most significant contributors to excess sugar intake in the modern diet. A single can of soda contains as much as 40 grams of sugar.

A meta-analysis published in the Journal of Affective Disorders in 2019 that included 10 observational studies involving more than 365,000 people revealed that those who drank more sugar-sweetened beverages had a 31 percent higher combined risk of depression compared to those who drank the least sugar-sweetened beverages. A prospective study in the UK also found similar results.

Excessive sugar stimulation to the brain can lead to an inability to concentrate and may even exacerbate symptoms of attention-deficit hyperactivity disorder (ADHD).

A systematic review and meta-analysis published in 2020 that included seven studies involving nearly 26,000 individuals confirmed a positive relationship between overall sugar and sugar-

sweetened beverage consumption and symptoms of ADHD. Another systematic review and meta-analysis published in the Journal of Affective Disorders in 2019 that included 14 studies proposed that a diet rich in refined sugar and saturated fat could increase the risk of ADHD by 41 percent.

# How Sugar Increases Mental Disorder Risk

## Sugar Depletes Essential Nutrients

Sugar can induce symptoms of mental disorders because it alters the gut microbiome, leading to a deficiency of nutrients required by the brain and nerves.

"We have to be careful with nutrition because good nutrition can help, [and] bad nutrition is going to exacerbate the problem," Basbas stated.

"The gut microbiome produces B vitamins and vitamin K, which are our foods," Sheridan Genrich, an Australian clinical nutritionist and naturopath, told The Epoch Times.

B vitamins are crucial for the brain.

"When they are deficient, people can experience fogginess, even paranoia—just generally troubled thinking as sort of a depressive state," Russo

said. The production of red blood cells decreases as B vitamin levels decrease, leading to a reduced oxygen-carrying capacity of the blood and lower energy levels. Additionally, B vitamins are essential for the synthesis of neurotransmitters.

The gut microbiome also produces neurotransmitters, which are stored in the brain and are "the key for mood," Genrich said. For instance, the gut produces serotonin, which is responsible for feelings of happiness and well-being. It's also a precursor to melatonin, which can help promote restful sleep.

In the brain, a substance called brain-derived neurotrophic factor (BDNF) preserves synaptic integrity and improves neuronal survival. Reduced levels of BDNF can promote depression and hippocampal atrophy. Animal models have confirmed that a high-sugar diet can lead to a decrease in BDNF.

Calcium and magnesium are both "minerals significantly depleted due to a high-sugar diet," Genrich said. "Our bodies are so intelligent—they always strive to protect our safety."

When we consume too much sugar, calcium and magnesium are drawn from our bones to buffer blood sugar fluctuations and create a balanced internal environment. Their deficiency leads to bone loss and affects the nervous system. In particular, magnesium "puts on the brakes" for our intensifying emotion can make "someone feel less relaxed,"

according to Genrich.

Excessive sugar intake leads to deficiencies in essential nutrients such as iron and vitamin C, contributing to emotional fluctuations, cognitive decline, inability to concentrate, and irritability, she said. It gives rise to that "wired yet tired" feeling, as Genrich described it. This is why some people may feel extremely tense despite their strong desire to sleep.

## Sugar Induces Inflammation

Excessive sugar can lead to inflammation. Inflammation is being researched as a contributing or causal factor in mental disorders, including depression and anxiety.

"I think if you just look at the basics of what sugar is and what table sugar or refined sugar is, it just would make sense," Russo said.

Inflammation is a key mediator of sugar-induced depression—emotions are affected as inflammatory markers increase in the bloodstream. Inflammation is also recognized as a physiological trigger of depressive symptoms, such as fatigue, low energy, sleep problems, and changes in appetite.

A review study published in 2020 indicated that added sugar perturbs various metabolic, inflammatory, and neurobiological processes, significantly impacting the inflammation processes within the

body and the brain. Research has confirmed that higher sugar intake from nonalcoholic beverages and sugar added to tea, coffee, and cereals is associated with elevated inflammatory markers in the bloodstream.

Sugar can also trigger gut inflammation. Genrich stated that our intestinal lining has a thick layer of cells, acting as a barrier similar to our skin and protecting the body from external substances. However, sugar can compromise the function of the protective barrier in the intestines, altering its permeability. Consequently, substances that shouldn't directly enter the body can pass from the intestines into the bloodstream, leading to inflammation.

## Sugar Disrupts Brain Function

Russo said that people who consume excessive sugar often have elevated blood sugar levels, which can harm the brain's blood vessels. These vessels play a crucial role in supplying oxygen-rich blood to the brain, and when they are damaged, blood flowis reduced, resulting in the death of brain cells.

"This is what's called brain atrophy," she said.

Sugar stimulates the brain to release pleasure-inducing dopamine, although prolonged excessive sugar intake can decrease dopamine secretion. This prompts people to intake more sugar to maintain the feeling of satisfaction, initiating a vicious cycle.

As a result, the brain's reward system becomes disrupted, leading to emotional issues.

## Other Contributing Factors

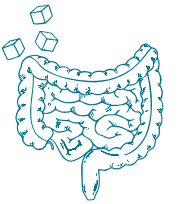
Eating excessive amounts of added sugar can lead to elevated blood sugar levels and insulin resistance. Insulin resistance is associated with an increased risk of depressive symptoms and is also more common among those with such symptoms. Furthermore, researchers believe insulin resistance's consequent disruption in energy use may directly cause depressive symptoms.

Sugar generates reactive oxygen species (ROS) during the metabolic process, and excessive sugar intake can lead to oxidative stress, resulting in cellular damage, inflammation, and accelerated aging. A meta-analysis of 29 studies indicated that individuals with depression exhibit higher levels of oxidative stress and lower levels of antioxidants than healthy individuals.

Excessive sugar intake promotes the generation of advanced glycation end products (AGE) in the body, leading to a series of harmful reactions. Animal experiments have confirmed that high levels of AGEs can affect the generation of new neurons in the hippocampus, thereby impairing hippocampal function, which can result in depression and

cognitive decline.

Sugar harms the body and affects our brains, moods, and nerves. If you haven't already, it is time to consider removing it from your diet.



# Sugar, Your Gut, and Colorectal Cancer Risk

"Consuming large amounts of sugar leads to an increase in stored energy in the form of fat, indirectly raising the risk of colon cancer."

*Dr. Jeremy Kortmansky, associate professor, Yale School of Medicine*

Here's a fact you may find hard to believe or might not want to accept: Sugar can damage our intestines and even increase the risk of colorectal cancer.

## Sugar and Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) is widely regarded as the intestinal disorder most directly associated with sugar.

Crohn's disease and ulcerative colitis are the two main types of inflammatory bowel diseases. These conditions can be highly debilitating, often leading to symptoms such as persistent diarrhea, abdominal pain, rectal bleeding, bloody stools, weight loss, and fatigue.

IBD has become increasingly prevalent in recent times.

A narrative review published in Clinical Gastroenterology and Hepatology in 2022 highlighted that multiple epidemiological data indicate a direct correlation between the high consumption of sugar in Western diets and an increased risk of IBD.

The journal Inflammatory Bowel Diseases published a large-scale study that revealed, based on surveys of more than 366,000 adults from various European countries, that individuals who consumed the highest amounts of sugar and soft

drinks had a 1.68 times higher incidence of ulcerative colitis compared to those who consumed the least. Another review showed that for every additional 10 grams of sugar consumed per day, the risk of Crohn's disease increased by approximately 1 percent.

Additionally, numerous population-based studies have indicated that about 10 percent of patients with IBD believe that eating sugary foods can trigger disease flare-ups and worsen symptoms. The previously mentioned 2022 narrative review also pointed out that Crohn's disease patients often reported increased sugar consumption prior to feeling ill.

## Sugar Triggers Intestinal Inflammation

### Disrupts the Gut Microbiome

A high-sugar diet can lead to significant changes in gut microbial composition in a very short period. Bacteria that thrive on simple sugars multiply rapidly, whereas those dependent on fibers, such as Bacteroides, may decrease in number. Bacteroides are highly beneficial for the human body and gut health, partly due to their ability to break down dietary fiber into short-chain fatty acids.

Short-chain fatty acids are essential for the gut, serving as vital nutrients for intestinal mucosal cells. They support the gut's immune and barrier functions and stimulate gut repair, thus alleviating gut inflammation. In a high-sugar diet, short-chain fatty acids in the gut are rapidly depleted.

A decrease in the levels of short-chain fatty acids has been observed in the guts of patients with IBD.

A high-sugar diet can also reduce the quantity of Akkermansia bacteria, beneficial microbes that regulate mucus layer thickness and support intestinal barrier function.

At the same time, sugar promotes the rapid growth of harmful bacteria.

An experiment published in Science Translational Medicine in 2020 revealed that sucrose-fed mice exhibited a significant increase in mucin-degrading bacteria in their intestines, resulting in the thinning of the intestinal mucus layer, aggravating colitis.

"It is direct evidence that eating sugar makes your body highly sensitive to developing colitis," Hasan Zaki, an assistant professor in the pathology department at the University of Texas Southwestern Medical Center, told The Epoch Times. "All of this can happen within a few days."

A high-sugar diet also leads to an increase in the relative abundance of Proteobacteria in the gut. These bacteria carry toxic lipopolysaccharides,

leading to inflammation and the impairment of intestinal epithelial integrity.

Sugar disrupts the balance of gut bacteria and decreases overall microbial diversity. The production of short-chain fatty acids also relies on a diverse gut bacterial environment and the cooperation of different bacterial species.

## Exacerbates Leaky Gut

Sugar can lead to increased intestinal permeability, commonly referred to as "leaky gut."

It may also alter the architecture of the intestinal mucosa, leading to the thinning of the gut and high levels of reactive oxygen species, ultimately causing damage.

Substances that shouldn't typically enter the body, such as bacterial lipopolysaccharides, entering the bloodstream from the gut can lead to endotoxemia, exacerbating local and systemic chronic inflammation.

Additionally, the accumulation of sugar in the colon increases the intestinal osmotic load, which retains excess water in the intestines. This also accelerates the fermentation rate of gut microbiota, resulting in bloating, abdominal pain, and intestinal dysfunction.

## Inhibits Gut Regeneration

The colon's regeneration rate is rapid, with intestinal stem cells continuously dividing while old cells are continually shed. However, a study published in 2023 found that a high-sugar diet can disrupt regeneration. The study also found that sugar directly affects the proliferation of colonic epithelial cells, inhibiting their growth, and damage intensifies with higher sugar concentrations.

Furthermore, a high-sugar diet can alter the colon's innate immune function and reduce the number of intestinal immune cells, diminishing their responsiveness to tissue damage.

Zaki emphasized the importance of recognizing the harm that sugar inflicts on the human body, stating: "We spend a lot of money to deal with those diseases, but that's not the solution.

"I think we should have some kind of policy from governments to make sure that we understand that sugar is harmful, just like smoking is harmful."

## Colorectal Cancer Risk

Sugar is associated with the occurrence, recurrence, and mortality rates of colorectal cancer.

In a prospective cohort study involving stage three colon cancer patients, it was found that indi-

viduals who drank two or more servings of sugar-sweetened beverages per day experienced a 67 percent increased risk of colon cancer recurrence or mortality compared to those who drank less than two servings monthly. The risk increased even further, reaching 122 percent, for patients who were both overweight and less physically active.

An older case-control study conducted by University of Utah researchers revealed that high sugar intake and a high glycemic index diet increase the risk of developing colon cancer by more than 50 percent.

"Consuming large amounts of sugar leads to an increase in stored energy in the form of fat, indirectly raising the risk of colon cancer," Dr. Jeremy Kortmansky, associate professor of clinical medicine (medical oncology) at Yale School of Medicine, chief network officer at Smilow Cancer Hospital, and clinical director of the gastrointestinal medical oncology division at Yale Cancer Center, told The Epoch Times.

The indirect connection between sugar consumption, obesity, and cancer can be explained in several ways. According to Kortmansky, one particularly compelling theory involves the relationship between obesity and insulin resistance. Obese people often have higher insulin levels, which can stimulate cancer's insulin-like growth factor receptors, thus activating pathways that promote cancer development and growth. This interferes with

intestinal cell growth and division, resulting in abnormal cell renewal in which old cells fail to die off.

As for the theory suggesting that sugar-induced inflammation increases the risk of cancer, Kortmansky explained that inflammation in the body often leads to local damage and DNA changes in cells. Normally, inflammation would cause these problematic cells to die, but if they survive, there's a potential risk of cancer development.

Additionally, some studies have established a direct connection between sugar and cancer.

An animal study published in Nature in 2019 confirmed that high-fructose corn syrup directly promotes the growth and progression of colorectal cancer tumors independent of obesity. Lewis Cantley, the lead researcher of the study and a professor at Harvard Medical School's Department of Cell Biology, told The Epoch Times that this effect might also apply to humans.

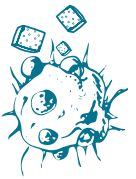
"Consumption of high-fructose corn syrup dramatically increased in the 1960s. Over the following 20 years, there was a dramatic increase in colorectal cancer in relatively young adults," he pointed out, noting that such people typically have KRAS mutations. KRAS mutations are oncogenes with the highest mutation rate among cancers and are linked to cancers with high mortality rates.

"We showed that giving mice high-fructose corn syrup orally had the same effect of enhancing colorectal cancers in the context of KRAS mutations."

Just 5 to 25 grams of fructose can saturate the absorption capacity of the small intestine, after which fructose enters and comes into direct contact with the colonic lumen of the proximal colon.

In a clinical preliminary study published in The American Journal of Clinical Nutrition in 2022, an analysis of lesion location was conducted on 2,733 cases of colorectal cancer deaths. The study found direct associations between high consumption of sugar-sweetened beverages and total fructose intake and an increased incidence and mortality rate of proximal colon cancer.

This significant relationship didn't exist in the distal colon or rectum. Researchers believe that these findings provide evidence that dietary sugar can directly contribute to the development of colorectal cancer.



# How Sugar Fuels Cancer

"The relationship between sugar and cancer is a complicated one."

*Dr. Jeremy Kortmansky, associate professor, Yale School of Medicine*

You may have heard that sugar can feed cancer cells. Is that true?

## Sugars 'Nourish' Cancer Cells

For cancer patients, "sugar intake can indeed nour-

ish cancer cells," Mingyang Song, associate professor of clinical epidemiology and nutrition at the Harvard T.H. Chan School of Public Health, told The Epoch Times.

This is supported by strong epidemiological evidence, he said.

A study published in PLoS One involving 1,011 colon cancer patients with a follow-up period of over seven years found that compared to patients consuming less than two servings of sugar-sweetened beverages per month, those who consumed two or more servings per day experienced a 67 percent increased risk of colon cancer recurrence or mortality.

Another Spanish study published in Clinical Nutrition in 2021 involving over 7,000 participants found that for every additional 5 grams of sugar consumed in liquid form per day, cancer incidence increased by 8 percent. People with the highest intake experienced a 46 percent increase.

A can of soda usually contains 30 to 45 grams of sugar.

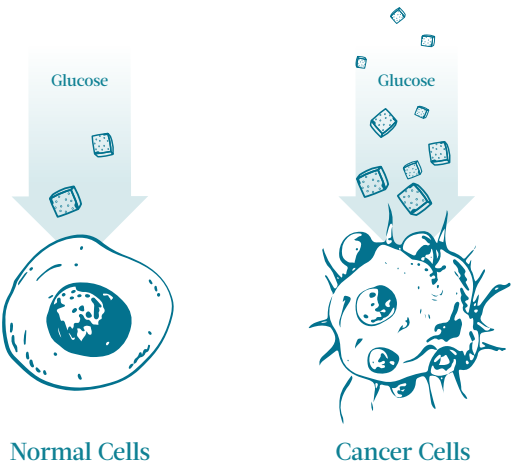
A shift in a population's sugar consumption can significantly affect cancer rates. Cantley, used Taiwan as an example in an email to The Epoch Times. He wrote that before World War II, Taiwan had relatively low rates of cancers, including colon, endometrial, and breast. That was when sugar-sweetened beverages were scarce. Then, in the 1960s and 1970s, with the introduction of Western diets—particularly sugary drinks—cancer rates there steadily

began to rise. They've now reached a level comparable to those in the United States.

Cancer cells require a substantial amount of glucose to survive. In the 1930s, Otto Warburg, a German biochemist, discovered that both cancer cells and normal cells require sugar, but their metabolic pathways differ. Normal cells primarily convert glucose into energy through aerobic respiration, while cancer cells obtain energy through glycolysis instead of using oxygen.

Cancer cells produce very little and inefficient energy due to their unique method of metabolizing sugar, which is why they voraciously consume sugar—at a rate 200 times faster than normal cells. That appetite can have wide-ranging effects.

"Cancer cells, in some sense, hijack metabolic processes in the body," Lorenzo Cohen, professor




*Cancer cells consume sugar at a rate 200 times faster than normal cells.*

and director of the integrative medicine program at MD Anderson Cancer Center and author of "Anticancer Living," told The Epoch Times.

## Tripartite Effect: Sugar, Obesity, Cancer

"The relationship between sugar and cancer is a complicated one," said Kortmansky.

The prevailing theory is that sugar doesn't directly cause cancer but rather indirectly contributes to it through obesity.

High energy intake, or too many calories, and low energy expenditure are primary risk factors for many types of cancer, Ellen Kampman, a nutritional epidemiologist and chair in nutrition and disease at Wageningen University in the Netherlands, told The Epoch Times. A high sugar intake in the diet increases energy intake.

"Keeping a healthy weight is the most important thing you can do to prevent cancer," she said.

A prospective study with more than 35,000 participants revealed that people who drank sugar-sweetened soft drinks more than once per day had an 18 percent increased risk of developing obesity-related cancers than those who rarely did.

A comprehensive review published in Cancers in 2023 indicated that about 4 percent to 8 percent

of cancer cases are attributed to obesity. Obesity is linked to 13 types of cancer, including breast, colorectal, endometrial, liver, stomach, and thyroid.

A high-sugar diet can lead to the accumulation of body fat, especially visceral fat. Scientists recognize that the role of fat goes beyond energy storage—it acts as a highly active endocrine organ capable of secreting various substances, including hormones. Excessive fat can lead to an imbalance of these substances, contributing to cancer development.

However, there are many other ways that sugar could contribute to cancer, according to experts and various studies.

## The Difficulty in Studying Sugar Cancer Risk

Proving a direct link between eating sugar and cancer is challenging because of ethical concerns and practical difficulties in conducting such experiments.

"I certainly would not want my children to be in such a trial," said Cantley, whose work has significantly impacted cancer cell biology.

Nevertheless, prospective cohort studies—a type of observational study focused on following a particular group of people over a period of time without interfering with their eating habits—can provide valuable insights into the relationship be-

tween sugar intake and cancer risk.

One such study, published in The American Journal of Clinical Nutrition in 2020, tracked more than 100,000 French adults for several years. Those who consumed the most sugar had a 17 percent increased cancer risk compared to those with the lowest sugar intake. This elevated risk was particularly notable for breast cancer, with a 51 percent increase.

This association remained significant even after adjusting for factors such as weight gain and body mass index. The study suggested that sugar may increase cancer risk through mechanisms other than just weight gain.

## The Many Ways Sugar May Lead to Cancer

Processed sugar is a potent energy source. Beyond weight gain, it causes a variety of changes in your body that increase cancer risk.

### Impairs Metabolism

"Another mechanism through which sugar increases the risk of cancer is its impact on metabolism," Song said.

High sugar intake can alter the metabolic pro-

file, triggering inflammation and insulin resistance, both risk factors for tumor development.

This is a major mechanism that causes cancer, independently of obesity, he said. Obese people are more prone to inflammation and insulin resistance, but these can also occur in lean individuals.

Sucrose, fructose, and refined carbohydrates cause a significant spike in blood sugar levels. To maintain sugar balance, the body must increase insulin accordingly, and "excess amounts of increased insulin are inflammatory," according to Cohen.

Thomas Seyfried, a professor of biology at Boston College, told The Epoch Times that high blood sugar is linked to systemic inflammation, which can lead to mitochondrial damage and, ultimately, cancer.

## Triggers DNA Mutation

Inflammation and insulin resistance can also directly promote mutations in cell genes, leading to alteration in cell behavior.

Song further explained that the normal cell life cycle is disrupted in such cases. Cells don't undergo normal timely cell death, instead growing and proliferating without limits, fueling tumor development.

Many experiments have confirmed these mechanisms. For example, mutations of genes related to insulin signaling can contribute to tumor development in various tissues, increasing the risk of cer-

tain types of cancers, including breast, endometrial, and thyroid.

A study published in Cell Metabolism found that the likelihood of gene mutations leading to pancreatic cancer increases fivefold in a high-glucose environment compared to a normal one.

## Affects Gut Microbiota

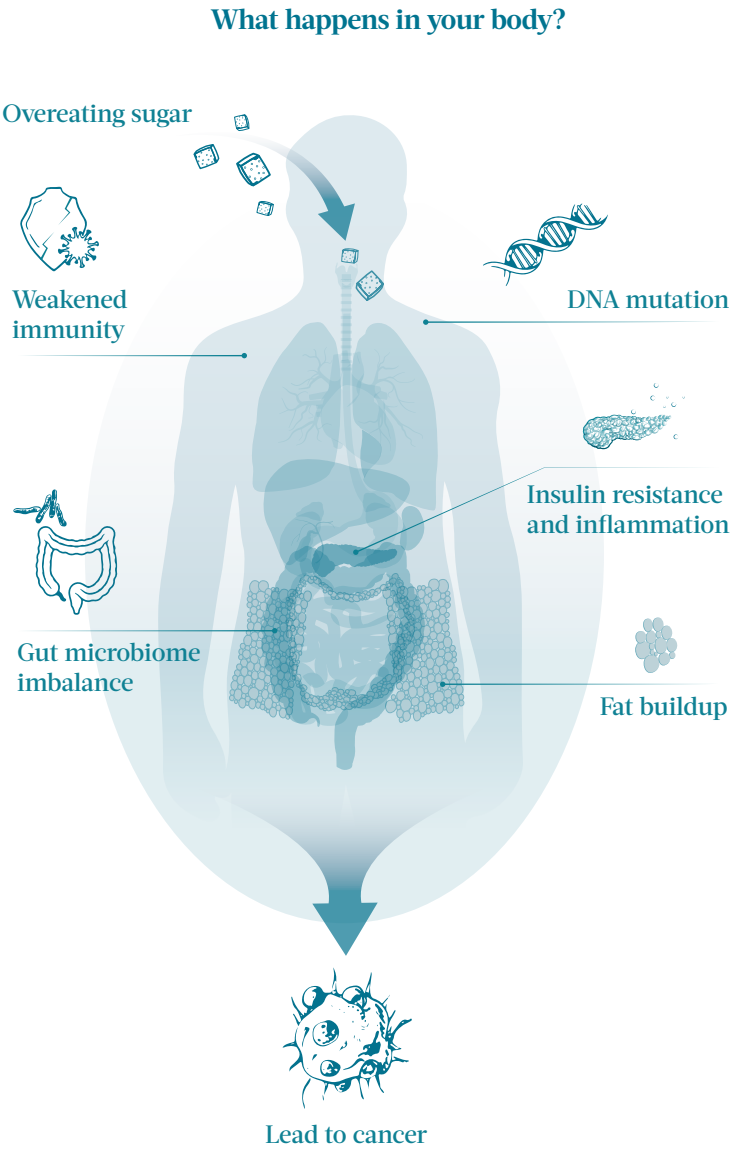
"Only in recent years have people started to recognize the significance of gut microbiota [in relation to cancer risk]," Song said.

Sugar can disrupt the structure and function of gut microbiota and replace beneficial bacteria with harmful ones, ultimately resulting in the development of tumors in the intestines and even elsewhere.

Song explained several mechanisms by which the gut microbiome affects tumor development, which have also been a focus of recent research.

Sugar can increase certain harmful bacteria, which produce carcinogenic proteins on their surfaces, leading to gene mutations and directly promoting tumor development. Some harmful gut bacteria can also affect metabolism, causing uncontrolled cell growth.

Additionally, certain gut bacteria can harm the immune system, compromising its surveillance function. They may also produce specific metabolites that, upon entering the bloodstream from the




*Sugar causes a variety of changes in your body that ultimately lead to increased cancer risk. Illustration by The Epoch Times, Shutterstock*

gut, induce inflammation and immune dysregulation at distant sites, ultimately contributing to the development of tumors in those areas.

### Undermines Immunity

Under normal circumstances, the immune system is responsible for clearing out problematic cells and maintaining a state of equilibrium. Overeating sugar for a prolonged period can disrupt equilibrium, rendering the immune system unable to resist mutated cells or other pathways that promote cancer development.

Generally, experts believe that sugar affects processes related to cancer, such as inflammation, glucose metabolism, lipid metabolism, and immune regulation. “I think obesity is just a byproduct [of these processes],” Cohen said.

According to Kortmansky, more extensive research is needed to better understand the potential pathways through which sugar might affect cancer.

## Fructose: The Most Dangerous Sugar

Among the theories exploring the potential link between sugar and cancer, scientists emphasize the effects of fructose, in particular, on the body.

When we refer to "sugar" in general, we're often talking about sucrose, Fung told The Epoch Times.

A sucrose molecule consists of one glucose molecule and one fructose molecule. Every cell in the body can absorb glucose and use it as an energy source. However, fructose molecules aren't used by any cells in the body. Instead, they enter the liver directly, where some are essentially converted into fat, leading to increased insulin resistance.

Researchers at the MD Anderson Cancer Center conducted an animal experiment in which they injected breast cancer cells into mice, fed different diets. Mice on starch-based diets had a 30 percent tumor development rate, while those on sucrose-based diets had a rate exceeding 50 percent. These mice had larger tumor masses, and lung metastasis was more common.

The researchers further discovered that among several diets based on sucrose, glucose, fructose, and a combination of glucose and fructose, the mice on the fructose-based diet exhibited the most severe conditions, with the highest breast cancer tumor weight and the most aggressive tumor growth. Cancer metastasis was also more common.

"Fructose and glucose are processed very differently in the body," said Cohen, who was involved in the study. This experiment demonstrated that fructose directly promotes the growth of breast cancer.

Another study indicated that high-fructose corn syrup, another commonly added sugar in processed

foods and beverages, directly promotes the growth and progression of colorectal cancer tumors.

High-fructose corn syrup, comprised of 45 percent glucose and 55 percent fructose, is frequently used in soft drinks and other sweetened foods.

Cantley, who led this study, said that in recent years, there was "a dramatic increase" in colorectal cancer among younger populations, which is associated with the sharp rise in how much high-fructose corn syrup people have consumed over the past half-century.

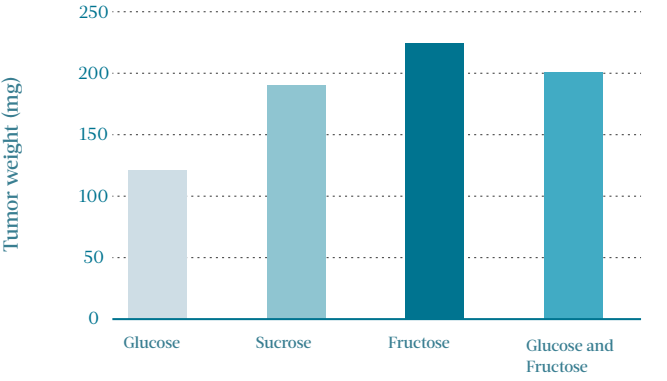
The study from Spain mentioned earlier discovered that the consumption of liquid sugars is linked to a more significant increase in cancer risk than that of solid sugars, especially liquid fructose and fructose in fruit juices. A high intake of liquid fructose was associated with the highest increase in cancer mortality.

Fructose in processed food and drinks differs from fructose in actual fruits. When eating an apple, you consume small quantities of fructose with fiber, slowing digestion.

But drinking an 8-ounce bottle of apple juice is like drinking the sugar from three to four apples all at once, Cohen said.

"I do recommend that people who are at risk focus on a diet that is low in added sugar and then a lifestyle that is high in physical activity," Kortmansky told The Epoch Times. "That's the best way to control the sugar that is in our system."

## Fructose Intake Promotes Tumor Growth




Source: Cancer Research

*Among several diets based on sucrose, glucose, fructose, and a combination of glucose and fructose, the mice on the fructose-based diet exhibited the highest breast cancer tumor weight.*

# Sugar and Autoimmune Disease

"Most people in our culture eat more sugar than the body was designed to handle."

*Datis Kharrazian, clinical research scientist*

The immune system is like an army, defending against threats, both domestic and foreign. However, when the immune system turns against the body itself, it can cause significant harm, which is what happens in individuals with autoimmune diseases. Many people may not be aware that such diseases could be associated with the added sugars in their diet.

## The Multifaceted Nature of Autoimmune Disease

Autoimmune disease refers to many conditions. "Now we know about 100 different types of autoimmune diseases as the name," Aristo Vojdani, clinical professor in the Department of Preventive Medicine at Loma Linda University in California and founder of Immunosciences Lab, told The Epoch Times.

Certain conditions, including Type 1 diabetes, rheumatoid arthritis, lupus, multiple sclerosis, and inflammatory bowel diseases, all fall under the category of autoimmune diseases. For example, in rheumatoid arthritis, the immune system attacks the joints, causing swelling, pain, and even disability. In Type 1 diabetes, the immune system targets the insulin-producing beta cells, resulting in insulin deficiency.

However, there are still many rare autoimmune diseases that prove challenging to diagnose, causing patients to endure years of suffering before receiving a proper diagnosis. Moreover, many of these conditions remain incurable, with some requiring lifelong treatment that offers only symptom relief.

## When the Body Turns on Itself

"The immune system is like your body's army," said

Nicholas Norwitz, who has a doctorate in physiology, anatomy, and genetics from the University of Oxford and is a candidate for a medical doctorate at Harvard Medical School. It's equipped with "powerful inflammatory weaponry of all sorts" to protect us from both internal and external threats, he said in an email to The Epoch Times.

However, long-term triggers for the immune system can also cause harm. "Imagine some trigger (let's say sugar) is constantly provoking your immune army to stay active and tossing grenades left and right," Norwitz said, describing the damage that an overactive immune system can inflict on the body.

In autoimmune diseases, the immune system either fails to differentiate between the body's tissues and foreign cells, leading to self-attack, or it can't regulate the intensity of the immune response.

There are many factors influencing the development of autoimmune diseases, Epoch Times contributor Datis Kharrazian, a Harvard-trained clinical investigator, functional medicine practitioner, and associate clinical professor at Loma Linda University School of Medicine, told The Epoch Times. These factors include diet-induced inflammation, toxins, molds, viruses, parasites, chronic stress, and metabolic disorders, he said. The interplay between these environmental and genetic factors contributes to the development of autoimmune diseases.

However, according to a study published in International Immunology in 2020, twin studies from

different countries indicated that genetics alone can predict only 22 percent of common autoimmune disease cases, leading to a growing recognition of the importance of environmental factors.

Additionally, epidemiological studies have found that in Western countries the shift away from traditional dietary patterns correlates with the incidence of autoimmune diseases being typically higher and steadily increasing.

"Most people in our culture eat more sugar than the body was designed to handle," Kharrazian said. "Excessive sugar intake can trigger inflammation through various pathways, and the enhanced immune activity resulting from chronic inflammation creates "an environment in the brain and body that raises the risk of developing autoimmunity."

"In nearly a hundred autoimmune diseases, what we commonly see is a person who is in a chronic state of heightened inflammation."

## Connecting the Dots

In recent years, with an increasing number of researchers investigating the relationship between high-sugar diets and inflammation, it has become evident that excessive sugar consumption is closely associated with low-grade chronic inflammation and the onset of autoimmune diseases, such as

rheumatoid arthritis.

"People who consume a lot of sugar or sugary soft drinks have a higher risk of rheumatoid arthritis," Ranjeny Thomas, professor of rheumatology at the University of Queensland's Frazer Institute, told The Epoch Times. Numerous studies have confirmed this.

A large-scale prospective cohort study analyzed more than 20 years of follow-up data from nearly 200,000 young and middle-aged women. The study found that women who drank one or more servings of sugar-sweetened soda per day had a 63 percent increased risk of rheumatoid arthritis compared with those who drank less than one serving per month. This association was even stronger in those who developed the condition later in life (after age 55), with a risk increase of up to 164 percent. Notably, this effect was independent of other dietary and lifestyle factors.

A 17-year study tracking more than 200 rheumatoid arthritis patients revealed that approximately one-quarter reported that food could impact their symptoms. Among the mentioned foods, sugar-sweetened soda and desserts were most often reported to worsen symptoms.

In 2020, the journal Nutrients published a cross-sectional study that examined the diets of 193 patients with systemic lupus erythematosus. The researchers found that higher consumption of free sugars had adverse effects on the activity and complications of this disease.

A tracking study involving nearly 2,000 children at high genetic risk for Type 1 diabetes found that among children with autoantibodies to insulin, those with higher sugar intake had a significantly increased risk of developing Type 1 diabetes, elevated by 75 percent, when compared with children with low sugar intake. Among children with risk genes, the risk was elevated by 84 percent.

Neuromyelitis optica spectrum disorder is a rare inflammatory autoimmune disease that affects the central nervous system. A case-control study published in 2019 compared 70 patients with this condition to 164 control subjects. It was discovered that for every 10 gram increase in total sugar intake, the likelihood of developing this disease increased significantly, by 72 percent.

Norwitz stated that he has acquired "limited strong human data" in the research, which, to some extent, supports the claim that sugar can cause or exacerbate autoimmune diseases. Additionally, there's a valid biological rationale for restricting carbohydrates in treating autoimmune diseases. However, he also pointed out that high-quality trials in this area are still relatively scarce, partly because of significantly lower research funding for dietary interventions than for drug testing.

# Autoimmune Diseases Linked to Gut Health

"Many autoimmune diseases start in the gut," Vojdani said.

Many harmful bacteria, such as Escherichia coli (E. coli) and Salmonella, are particularly fond of sugar. "They grow like crazy" while feasting on sugar, he said. Eating added sugar disrupts the balance of the gut microbiome, causing a reduction in beneficial bacteria and an increase in harmful ones. This imbalance can lead to gut inflammation and ultimately result in the "breakdown of the gut barrier," Vojdani said.

Harmful bacteria can also directly feed on the mucus layer, which serves as a barrier between bacteria and the gut. The mucus layer is typically thick and healthy, making it challenging for bacteria to breach. However, when there is an imbalance in our gut microbiome—which scientists call "dysbiosis"—the mucus layer thins.

The toxin produced by sugar-feeding harmful bacteria, in addition to sugar itself, also disrupts the distribution of tight junction proteins in the epithelial cells of the gut. This disruption leads to increased intestinal permeability, often referred to as "leaky gut." These alterations in the gut are linked to the development of autoimmune diseases.

"Now that the door is open," as Vojdani put it, undigested food debris, toxic chemicals, and other substances can infiltrate the bloodstream and spread

in the body. When these substances reach the joints, they can induce inflammation there, he noted as an example. Over time, this joint inflammation can progress into autoimmune diseases such as rheumatoid arthritis.

"Inflammation (in the gut) can go all the way to the brain as well," contributing to the development of widespread immune diseases such as multiple sclerosis. Vojdani said that the toxins entering the bloodstream also disrupt the blood-brain barrier, similarly to how they affect the gut barrier.

Furthermore, toxins produced by harmful bacteria can travel through the bloodstream, potentially triggering autoimmune diseases in different parts of the body. This can include conditions such as psoriasis, an autoimmune skin disease.

## Toxin Trail: From Mouth to Brain

Dentists often remind people to consume less sugar to prevent tooth decay and gum disease. However, most people are unaware that sugar intake can also harm the brain and nervous system when it enters the oral cavity, as sugar can disrupt the oral microbiome.

In other words, the risk of autoimmune diseases begins as soon as sugar enters your mouth.

There are both good and bad bacteria in our mouths. Excessive sugar intake can increase the

number of harmful bacteria in the mouth, and the toxins released by these harmful bacteria may travel directly through the tonsils and into the brain, Vojdani said. Animal experiments have confirmed that harmful bacteria in the oral cavity can enter the bloodstream, Thomas said.

Furthermore, certain highly potent toxins produced by bacteria in the mouth can enter the gut along with ingested food, resulting in gut inflammation, Vojdani said.

## A Cascade of Disruption

T cells are widely recognized as having an impact on the autoimmune process. There are different types of T cells, and both excessive activation and underactivation of these immune cells can lead to the development of autoimmune diseases.

Specifically, some T cells can regulate the immune system, maintaining balance among its various components, while others can induce inflammation.

The toxins produced by harmful bacteria in the body can polarize the immune function: The T cells responsible for maintaining immune system stability are downregulated, while the T cells associated with inflammation are upregulated, disrupting the immune balance.

We can regulate our immune system by making

dietary adjustments. A healthy diet helps to control the population of harmful bacteria and reduce their toxin production and preserves the beneficial bacteria in the gut. Beneficial bacteria can produce a range of short-chain fatty acids, which, in turn, enhance the function of regulatory T cells.

In addition to T cell mechanisms, Kharrazian and Norwitz highlighted that excessive sugar consumption can lead to insulin resistance, further contributing to autoimmune diseases. Those with insulin resistance often experience chronic inflammation. Additionally, high sugar intake can lead to obesity, which is inherently pro-inflammatory.

## Reducing Sugar for Autoimmune Health

"I think diet is one of the most powerful things you can control," Thomas said. When people seek help for new-onset diseases, she and her colleagues always discuss diet with patients because "we can only do so much with drugs." However, she also emphasized the preventive role of a healthy diet, saying, "It will be much better [to adjust the diet] in people before they get disease."

When asked, if he would recommend his patients reduce their sugar intake to alleviate autoimmune diseases, Kharrazian's response was, "Yes, always."

"Regardless of how many carbs are appropriate for a person, there is no reason to eat more than about 25 grams max of sugar a day," he said.

Norwitz echoed that advice.

"If you remove the trigger (sugar, in this example), the immune army has a chance to calm down, and symptoms may resolve," Norwitz said. In clinical practice, he has observed severe autoimmune diseases and inflammatory conditions, including ulcerative colitis, Crohn's disease, lupus, rheumatoid arthritis, and others, enter remission when the patient adopted a sugar-free and/or ketogenic diet.

"For those patients suffering from inflammatory or autoimmune diseases, what is lost by trying eight weeks without any sugar or processed food?" Norwitz asked.

"Worst-case scenario, no benefit. In the best-case scenario, you change your life. That's what happened to me."

While he does recommend people eat less sugar, that doesn't mean replacing natural sugar with artificial sweeteners, he emphasized. Artificial sweeteners aren't healthy—they can harm gut and oral microbiomes, and research suggests that they have carcinogenic properties, Norwitz said.

"So I absolutely do not recommend artificial sweeteners," he said.

CHAPTER 6

# The Ultimate Way to Cut Out Sugar

"Our choices we make influence how we feel, and how we feel influences the choices we make. This is a cycle."

*Steve Anton, professor, University of Florida*

You may have thought of cutting back on or even quitting sugar. But how exactly should you go about it, and, more importantly, how can you achieve the greater goal of overcoming excessive cravings for sweetness?

From 2005 to 2009, at least 74 percent of packaged or processed foods contained added sugars. Even if you don't have the habit of eating sweets, you may unintentionally consume sugar in excess. For instance, added sugars have dozens of names, so you might not even know you are eating them despite reading ingredient labels.

Nevertheless, quitting sugar is not an impos-

sible mission. Many people face challenges not because they cannot quit but because they don't know how or they set overly ambitious goals.

You can break it down into steps: First reduce sugar, then quit altogether, and eventually overcome sugar cravings.

The benefits of this approach are no different from quitting sugar directly. Fung, a nephrologist specializing in reversing Type 2 diabetes and intermittent fasting, likened it to swimming. Some prefer easing into the water to adapt to the temperature, while others dive right in. Both approaches can achieve the same ultimate goal.

"Just like we advise people with any addiction," Russo, a clinical psychologist in Philadelphia with a doctorate in psychology, told The Epoch Times, "every day, just [cut] your sugar down a little bit," Russo said.

"The process of quitting sugar is about retraining the palate," said Cohen. Once people apply this, they will gradually discover that even items with very little sugar taste quite sweet, and unexpected changes will occur in the body.

The Epoch Times interviewed over a dozen experts and reviewed scientific studies to compile the most effective methods for quitting sugar.

# Reduce Sugar Intake

## Avoid High-Sugar Foods

Reading labels is often the first habit many people adopt when quitting sugar or embarking on a diet. When reading labels, there are two key aspects to focus on: the ingredient list and the sugar content per 100 grams or serving.

"There are more than 60 names for sugar," Gonzalez told The Epoch Times.

These include barley malt, dextrose, sucrose, and rice syrup.

Gonzalez stated that among these added sugars, those with high fructose content, such as high-fructose corn syrup and agave nectar, are more detrimental to the body. These may harm the liver and lead to insulin resistance.

"The food industry puts all these forms of sugar in our food and lists their chemical names on the package," Laura Schmidt, professor of health policy at the University of California, San Francisco, wrote in an email to The Epoch Times. "This is confusing for people."

Schmidt shared a simple way to identify sugar: Look for chemical names ending in "ose," such as "lactose" (sugar in milk). They likely indicate sugar.

Another trick: "If a product has more than a few ingredients, and some are unfamiliar sounding,

## Sugar Names on Food Labels

| AC | | DG | | M | RT | |
|---|---|---|---|---|---|---|
| Agave nectar | Cane juice | Date sugar | Glucose | Malt syrup | Raw sugar | Treacle |
| B | Cane juice crystals | Dehydrated cane juice | Glucose solids | Maltodextrin | Refiner's syrup | Turbinado sugar |
| Barbados sugar | Cane sugar | Demerara sugar | Golden sugar | Malto | Rice syrup | Y |
| Barley malt | Caramel Dextrin | Dextrin | Golden syrup | Maltose | S | Yellow sugar |
| Barley malt syrup | Carob syrup | Dextrose | Grape sugar | Mannose | Saccharose | |
| Beet sugar | Castor sugar | EH | | Maple syrup | Sorghum syrup | |
| Brown sugar | Coconut palm sugar | Evaporated cane juice | HFCS (high-fructose corn syrup) | Molasses | Sucrose | |
| Buttered syrup | Coconut sugar | F | Honey | Muscovado | Sugar (granulated) | |
| | Confectioner's sugar | Free-flowing brown sugars | I | P | Sweet sorghum | |
| | Corn sweetener | Fructose | Icing sugar | Palm sugar | Syrup | |
| | Corn syrup | Fruit juice | Invert sugar | Panocha | | |
| | Corn syrup solids | Fruit juice concentrate | | Powdered sugar | | |

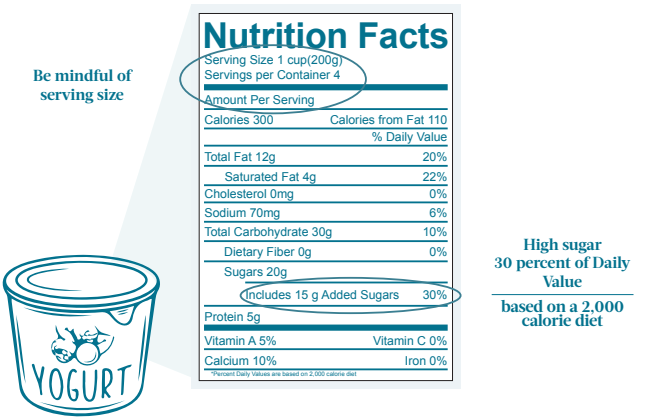

Source: SugarScience, University of California, San Francisco

*Sugar has more than 60 names that could appear on food labels. Illustration by The Epoch Times, Shutterstock*

then just don't eat it," she added.

Even in foods that do not taste sweet, like crackers or salad dressings, you might still find sugar listed in the ingredients.

One tablespoon of Heinz Tomato Ketchup (17 grams) contains 4 grams of added sugar. A Big Mac from McDonald's has 5 grams of added sugar. In a large Big Mac combo meal which includes a large Coca-Cola and a large serving of fries, the total added sugar content reaches 84 grams. Even potato chips and other other savory snacks may contain sugar.




*If added sugar exceeds 20 percent, a product is classified as "high added sugar." Illustration by The Epoch Times, Shutterstock*

According to the FDA, if the added sugar in each serving of food is below 5 percent of the daily value—50 grams per day based on a 2,000-calorie diet—it is considered a product with low added sugar. If it exceeds 20 percent, it is regarded as a high-added sugar product.

According to the UK National Health Service, foods with less than 5 grams of sugar per 100 grams are categorized as low-sugar, those with sugar content ranging from 5 grams to 22.5 grams are classified as medium-sugar, and those exceeding 22.5 grams fall into the high-sugar category.

Gillaspy, a chiropractor and author of "Zero Sugar/One Month," suggests a simpler approach: Avoid purchasing foods where sugar ranks among the top three ingredients on the food label (ingredients are typically listed in descending order of weight).

Compared to using specific numerical criteria, this screening method is quicker and more convenient, effectively filtering out items with high added-sugar content, she said.

However, Gonzalez also emphasized the importance of learning all the names of sugar and reading the ingredient list from start to finish. This is crucial because, many food manufacturers use several different forms of sweeteners, which will move them further down the list.

## Find Alternative Sweeteners

Consuming sugar is, fundamentally, a pursuit of flavor. So why not satisfy that craving with natural sweetness, such as sweeteners like stevia and monk fruit? You can add them to your coffee and tea or use them in cooking.

Unlike refined sugar, stevia and monk fruit have a glycemic index of nearly zero. Many studies indicate their ability to stabilize blood sugar and even suggest potential benefits in managing diabetes. Additionally, stevia offers other benefits, such as reducing blood pressure and blood lipids, and possesses anti-inflammatory and antioxidant properties. Monk fruit has also been found to be beneficial against conditions such as COVID-19 and cancer.

It is worth noting, however, that animal studies suggest eating stevia long-term may potentially

have adverse effects on the liver and kidneys or alter the gut microbiome. These findings are contentious, as other research indicates stevia may benefit patients with chronic kidney disease and ameliorate liver and kidney damage. Researchers have suggested the effects of stevia may depend on how much you eat and what it is eaten with.

The sweetness of pure stevia and monk fruit is several hundred times that of regular sugar. The powdered forms commonly found in supermarkets are typically blended with base ingredients. For example, you might find a composition of 1 percent steviol glycosides mixed with 99 percent erythritol. This means that the usage and quantities of these products are similar to regular sugar. Nevertheless, reading the usage instructions on the packaging is advisable so you understand serving sizes. The same applies to liquid stevia and monk fruit products, where the recommended amounts may vary. For some, one drop might be equivalent to the sweetness of a teaspoon of sugar, while others may require 10 drops or a few milliliters.

Artificial sweeteners, such as aspartame, sucralose, and saccharin, are commonly used as sugar substitutes in processed food and drinks labeled zero-sugar. However, numerous studies have found that these sweeteners can lead to metabolic syndromes, harm gut health, and may even be potentially carcinogenic.

Natural sugars are another excellent alternative.

Honey, for example, while often equated with sugar, can actually help stabilize blood sugar when consumed in moderation. Moreover, honey has been used for thousands of years for its medicinal properties, particularly its antibacterial and antiviral effects. Certain types of honey, like Manuka, have a higher level of antibacterial properties compared to others. Collected from maple trees, maple syrup has a unique taste that captivates many and contains a rich array of nutrients. Coconut sugar is both anti-inflammatory and antioxidative, contributing to heart health.

A common practice is to use ½ to ⅔ cup of honey or ¾ cup of maple syrup to replace 1 cup (240 milliliters) of sugar.

Other ingredients also naturally carry a sweet taste. For example, Russo mentioned that licorice root has a natural sweetness and offers health benefits when used to make tea. Additionally, naturally sweet ingredients such as red dates and dried goji berries can be used to brew tea or soup that is both sweet and fragrant.

During interviews, many experts supported the idea of cooking at home as the safest and best way to avoid excess sugar. Choose natural, sugar-free ingredients like unsweetened yogurt and plain oats, and then sweeten with an appropriate amount of natural sweeteners.

## Satisfy Your Sweet Tooth With Fruits

Those with strong cravings for desserts and snacks can replace such treats with fresh fruits, said Dr. Luc Tappy, professor emeritus in the Department of Physiology at the University of Lausanne, Switzerland, in an email to The Epoch Times. The choice of fruits is generally not restricted.

Fruits come in abundant varieties, from blueberries and bananas to more exotic options like durian and mangosteen. Even the same type of fruit will come in different varieties in some tropical and temperate regions. The many kinds of desserts that can be made from these fruits are just as diverse. As you explore options, you will find that using these fruits can yield unexpectedly delightful flavors while satisfying your sweet tooth.

"The good things in fruit are far more important than the fruit sugar ... in fruit," Kampman told The Epoch Times. "So I'm not afraid that people might overeat [them]."

However, Tappy pointed out the importance of being mindful of portion sizes. Initially, when reducing sugar intake, eating up to three servings of fresh fruits per day is recommended, which can later be reduced to two servings. A comprehensive study published in 2021 suggests that consuming two servings of fruits per day is ideal and healthy. One serving typically corresponds to one medium-sized piece of fruit or approximately 80 grams.

Fung waid that the fruits we eat today are generally much sweeter than 50 years ago, indicating increased sugar content. Individuals, especially those with blood sugar problems or a strong sugar addiction, should opt for low-GI fruits and avoid high-sugar fruits like grapes and bananas—the intense sweetness of such fruits may also trigger sugar cravings.

Cooking methods also impact fruit sugar content. Dried fruits shrink during the sun-drying or dehydration process. While eating one apple might fill you up, eating apple chips might lead you to easily eat two or three dehydrated apples without even realizing it. When eating dried fruit, we must calculate based on the original size of the fruit. Fruit juice also concentrates sugars from multiple fruits while filtering out the dietary fiber. In an 8-ounce cup of orange juice, you are essentially getting the sugar and calories equivalent to three oranges.

In addition to fruits, Russo also mentioned that one can replace traditional desserts with a small piece of low-sugar dark chocolate after dinner. This provides satisfaction and a sense of ritual. Furthermore, dark chocolate is rich in magnesium, and the lack of the mineral is often why many women crave chocolate before their menstrual periods.

# Crush Sugar Cravings

Completely quitting sugar takes more than just following a method—you must first delve into the underlying cause of your cravings.

"Our choices ... influence how we feel, and how we feel influences the choices we make. This is a cycle," said Anton. "If you can find healthy ways to help yourself feel good, you're going to be less likely to [have] cravings."

## A Sign of Unmet Nutritional Needs

People crave sugar partly due to an imbalance in food choices.

Anton said that the combination of healthy fats, proteins, and complex carbohydrates—like vegetables, whole grains, and root vegetables—in our diet helps maintain healthy blood sugar levels after meals, contributing to overall well-being. Macronutrients slow digestion, reducing the speed at which glucose is released into the bloodstream. When there is an imbalance in the food the body struggles to maintain optimal energy levels, resulting in a rapid drop in blood sugar. In response, the brain quickly sends out signals for cravings, attempting to raise blood sugar by encouraging us to eat sweet foods.

Which type of nutrient is best at thwarting sug-

ar cravings? "If I had to pick one, I would probably take the protein," said Anton. Protein helps us maintain a feeling of fullness for an extended period. It increases satiety hormones, reduces hunger hormones, and promotes glucagon secretion, thus stabilizing insulin levels.

Many experts suggest opting for protein-rich foods if you really feel like snacking. These can sometimes be "the magic key" to reducing the desire for sweetness, said Gonzalez.

Overall, proteins play a vital role in our bodies and life processes. They break down into amino acids, which our body uses as neurotransmitters to produce enzymes and antibodies and aid in constructing the body's tissues.

It is also important to distribute protein evenly across three meals.

A small-scale study at the University of Texas revealed that eating the same amount of protein at every meal—in this case, 30 grams (roughly equivalent to the size of an adult's palm)—is more beneficial than eating different amounts and skewing the intake more heavily at lunch and dinner. However, data from the National Health and Nutrition Examination Survey suggest that American adults tend to get most of their protein at dinnertime.

Studies have also found that a diet high in fat reduces sugar cravings. In a clinical trial published in Nutrients, overweight or obese participants, after following a high-fat, low-carbohydrate diet for four

## Protein Snacks That Reduce Sugar Cravings

### Dairy and Meat


*6 ounces*
Plain Greek yogurt


*½ cup*
Cottage cheese


*2 strips*
Beef jerky


*3 teaspoons + 3 pieces*
Canned tuna and whole-grain cracker


*1 egg*
Hard-boiled egg


*1 string*
String cheese

### Vegetables


*4 sticks + 1 teaspoon*
Celery and peanut butter


*3 pieces + 2 teaspoons*
Whole-grain cracker and hummus


*½ cup*
Roasted chickpeas

### Nuts


*3 pieces + 1 teaspoon*
Whole-grain cracker and peanut butter

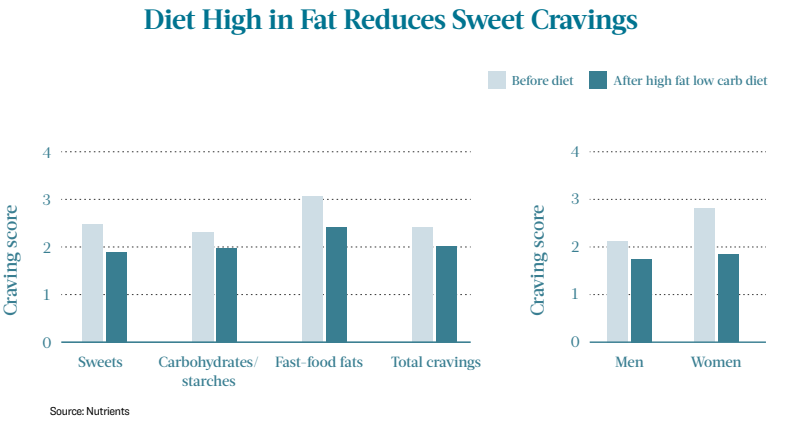

*22 almonds*
Almonds

Source: Cindy Chan Phillips, registered dietitian

*Protein content in grams

*Experts suggest opting for protein-rich foods if you feel like snacking. Illustration by The Epoch Times, Shutterstock*

weeks—where carbohydrates constituted only 14 percent of total energy, with most of the energy coming from fat, then protein—experienced a decrease in cravings for sweets. Notably, women exhibited a more pronounced reduction in cravings than men.




*Overweight or obese participants, after following a high-fat, low-carbohydrate diet for four weeks, experienced a decrease in cravings for sweets.*

Gonzalez believes many people eat the wrong types of fats—often an excess of vegetable oils. Contrastingly, healthy fats like olive, avocado, and coconut oils can help us feel satiated. She also highlighted the nutritional benefits of grass-fed butter, emphasizing its abundance of vitamin K and omega-3 fatty acids.

"Metabolism is our ability to convert food into energy. The better you maintain your metabolism—the more you feel energy in the body—the less you crave sugar," said Phillips. A high-sugar diet nega-

tively impacts metabolism, resulting in insufficient energy for cells.

After eliminating foods with high added sugar, the body shifts from primarily relying on sugar for energy to obtaining energy from protein and healthy fats, leading to a more flexible metabolism, Gillaspy added.

## A Sign of Mental Distress

Another reason we eat sugar is to fill emotional gaps or find a release. “I think you have to find other ways,” said Russo.

It is crucial not only to overcome physical addiction but also to address psychological habits or emotional cravings.

“What we are chasing is not so much a cookie— we are chasing the feeling,” said Phillips. She mentioned that many people from a young age, never learn how to deal with negative emotions. When uncomfortable feelings arise, they often choose to avoid confronting them and, therefore, turn to sugar as a temporary relief.

In an observational, transversal study, more than 77 percent of women experiencing higher levels of stress showed a craving for sweets. They also behaved differently compared to women who weren’t stressed. A seven-day experiment involv-

ing 142 university students showed individuals experienced a 5 percent to 26 percent increase in their craving for sweets on days marked by higher emotional tension.

During the COVID-19 pandemic, the consumption of high-sugar foods increased by 28 percent to 45 percent. Those who reported an increase in food cravings under stress were more than 11 times likelier to increase their consumption of high-sugar foods and six times likelier to eat more processed food.

This is not entirely our fault—the moment sugar touches our taste buds, receptors on the tongue send signals to the brain that trigger the release of dopamine, which can induce feelings of satisfaction and happiness. This reward sensation makes it difficult for people to resist sweets.

## Trigger Dopamine Release Without Sugar

Fortunately, consuming sugar is not the only activity that generates dopamine.

Over the past few decades, an increasing number of neuroimaging studies have indicated that engaging in activities that bring pleasure stimulates the brain to produce dopamine. These diverse yet positive activities share remarkable overlap in the brain regions they impact. The events covered

in these studies are vast, encompassing delightful foods, relationships with partners, friends, and family, and engagement with music, art, meditation, and other sources of happiness in life, such as helping others.

In an earlier study, researchers conducted brain scans on participants and found a 65 percent increase in dopamine release in the brain during meditation compared to the control group.

When we view a photograph of someone with whom we are in love, the areas in our brain closely associated with dopamine activity immediately activate.

The dopamine concentration and turnover in the brain also increase when we view paintings and listen to music.

Additionally, exercise can generate dopamine, helping people overcome aversion to activities they'd rather avoid. For many, going for a run when under high stress helps them get through the day.

In one study, 78 regular chocolate eaters were divided into two groups: one engaged in a 15-minute brisk walk, and the other rested sitting down. Though participants were allowed to eat chocolate freely, there was a significant reduction in the brisk-walking group's desire for and consumption of chocolate. The resting group experienced only half a reduction.

Blum shared the following "true dopamine" checklist:

## 'True Dopamine' Checklist That Replaces Sugar


Source: Kenneth Blum, Ph.D. in neuropharmacology, full professor at the Graduate School of Biomedical Science, Western University of Health Sciences in California

*"True dopamine" checklist. Illustration by The Epoch Times, Shutterstock*

You can prepare a range of simple and effective "true dopamine" strategies in advance "because the urge happens so fast," said Phillips. Often, to cope with negative emotions, easily accessible sweets or snacks rich in refined carbohydrates become the fastest solution. Having a plan for such situations puts better coping mechanisms in place when the urge to eat sweets arises.

Phillips also encourages people to write down their troubles. Upon doing so, the temptation "reduces in intensity, [and] it does not live in your head as much anymore."

Consider incorporating journaling as a stress-relief tool, too. You can place a diary and pen on the bedside table, dedicating a few minutes each night to pouring your thoughts into it, like talking to a best friend. Journaling offers an opportunity for self-reflection with no right or wrong, no specific structure, and no need for content filtering, said Russo.

Additionally, she suggests balancing the mind and body through meditation. "When your distracting thoughts come in, just gently push them to the side and let them go," she said. Russo said to start by meditating for five minutes twice a day, gradually extending the meditation time to 20 minutes per session.

## Break the Sugar Cycle With Stop Objects

Humans have experienced food scarcity throughout history, leading to an adaptation that allows us to eat even when full. Gillaspy talked about using "stop objects" to resist the urge to continue eating or consuming sugar.

Stop objects can be chewing gum that alters the taste in your mouth; a cup of hot tea, where the gradual sipping process gives your stomach some time to signal to the brain that you are full; or brushing your teeth, as the freshness in your mouth helps prevent the desire to consume anything else.

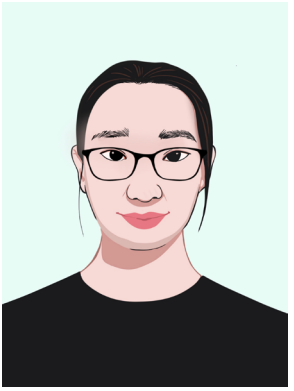
Sometimes, simply leaving the space where the craving was triggered helps, said Phillips. Moving from the dining room to the bedroom may help you overcome the desire for emotional eating.

## Out of Sight, Out of Mind

Strategically placing cookies at the back of the cupboard and ice cream beneath other foods can be beneficial. Even though you know exactly where they are, keeping them out of sight can help manage sugar cravings. Research indicates that visual food cues increase physiological responses and cravings, potentially leading to increased eating.

"If the sugary foods are not in your home, then you don't have to muster up willpower to avoid them," Gillaspy said.

While natural sweeteners can serve as a crutch to reduce added-sugar intake, several experts stressed that their sweetness can still stimulate the part of the brain that craves sugar. Therefore, gradually distancing oneself from them may be worthwhile when aiming to quit sugar entirely. This involves slowly letting go of support and, obtaining your sweetness and satisfaction from natural foods alone. Quitting sugar will serve as a reset for both the brain and the taste buds.



## About the Author

Flora Zhao is a health writer for The Epoch Times, specializing in chronic diseases and cancer. She holds a master's degree in demography and served as editor of an influential social sciences journal for seven years. Shifting her focus from macro issues like population changes and economic development to personal health, Zhao finds great joy and satisfaction in her work. She bases her articles on thorough literature reviews and in-depth interviews with experts, aiming to provide content that genuinely helps people.