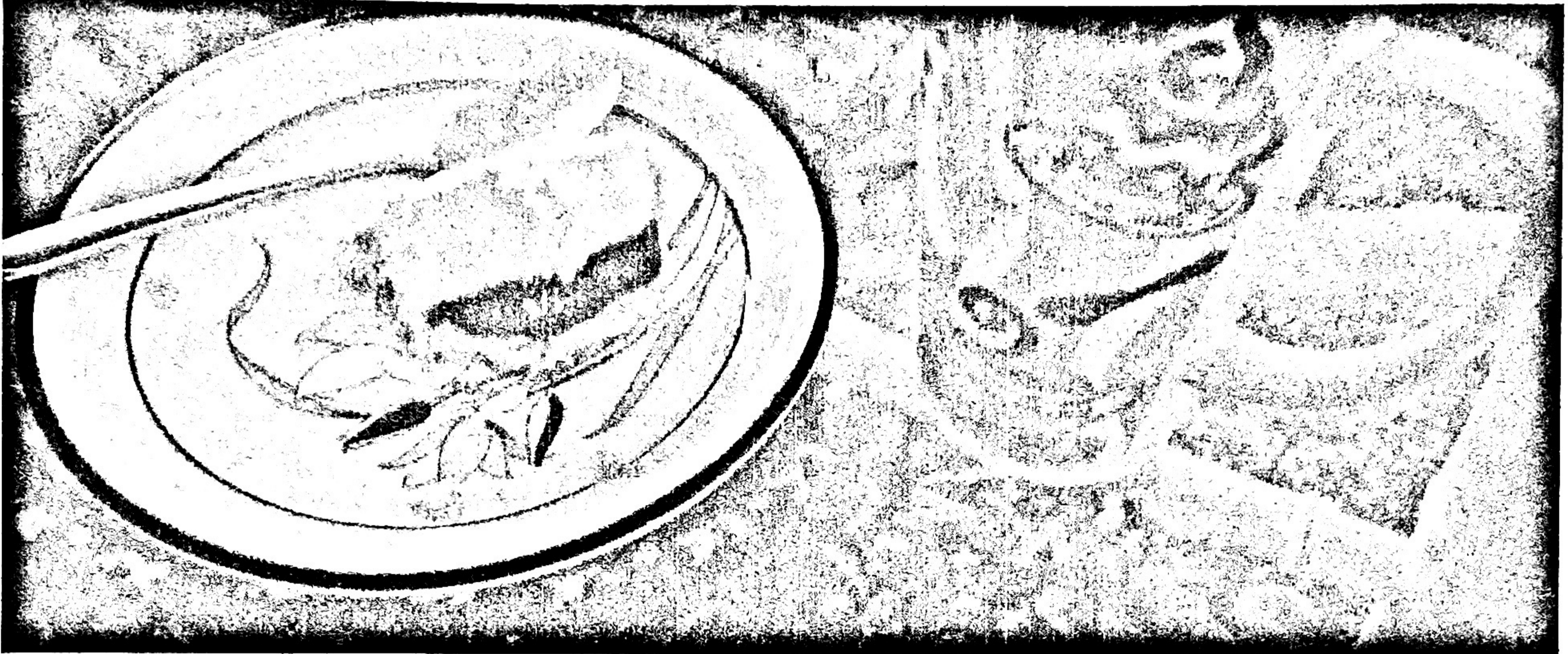


The Truth About Sugar



Courtesy of Maria Napoli

Sugary Sweets, tempting and alluring

I see it

I smell it

I want it

I eat it

What next?

I see it

I smell it

I want it

I think about it

Sometimes I say yes and often I say no

(Napoli)

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“I tried every kind of dieting. They said decrease your calories; increase your exercise; you’re lazy; you’re stressed out. And then I met Dr. Lustig. He said it was none of those things. It was all the sugar and it was a lack of fiber. I changed my food to the things that he told me to do. I’ve lost 100 pounds; I’ve restored my vitality, my health, and I’m happy” (1.)

Sugar is an amazing substance. It is pure sensation, pleasure in a crystalline form. We share as humans a desire for its innate sweetness, which begins at mother’s breast. This taste of milk sugar is the fuel that energizes all

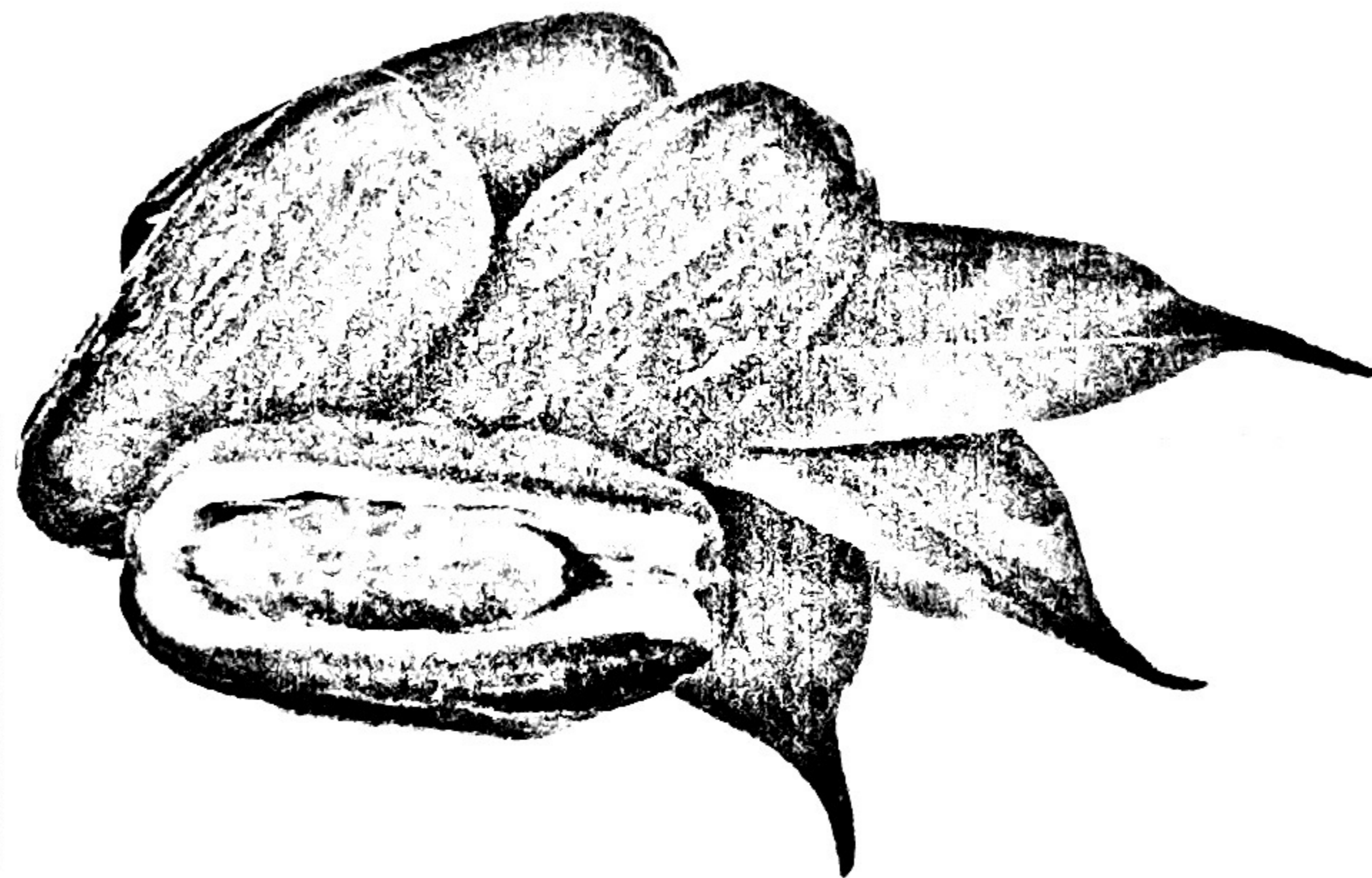
of life—white gold—pure carbohydrate energy that moves our bodies. The calories in a cup of breast milk are nearly 40% from sugar in the form of lactose (2). The deep and primal appeal of sugar is one of the reasons that sugar and sugar-filled foods are now among the most popular and commonly chosen edibles. In the past, sugar was expensive and rare, and consumption was limited to the wealthy and was reserved for the end of a meal. Now sugar is cheap and abundant, with manufactured sugars infused in nearly every packaged product sold in supermarkets. Like most good things in life, it is best in moderation, and easy to over consume without realizing it, especially in a manufactured, processed form.

What We Know About Sugar

Sugar has been around for thousands of years. Its earliest form of consumption other than mother’s milk is most likely fruit(3). Dates are nearly 60% sugar, and other types of fruits become very sweet when dried out. The most concentrated source of natural sweetness is honey, which is the stored food of bees, and it is 80% sugar (3). Honey collection has been represented in ancient cave paintings that are 10,000 years old, and domesticizing bees for honey production may be a 4,000-year-old practice. The drive for sugar is biologically based, with mother’s milk affording exceptional immunity from its consumption, as well as being the stuff of life. No wonder we can’t get enough of it!

We look to history to learn how humans for centuries have become slaves to sugar. Has this enslavement to sweetness turned into subjugation? Books have been written about sugar’s presence throughout history, where people found ways around geography, technological difficulties, and even political strife in order to feed their need for sugar. In the early history of the Americas Christopher Columbus brought sugar cane along to the New World where it became cultivated in Spanish Santo Domingo, converted into granulated sugar by African slaves, and then shipped back to Europe beginning in 1516 to meet the insatiable demand (3). In 1807, a British naval blockade of France cut off access to sugar cane crops, and businessmen learned quickly how to extract sugar from beets, in order to meet the demand.

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REMEMBER—UNDERSTAND—DECIDE

Until 1970, cane and beets were the two main sources of sugar, but rising prices moved business to invent a cheaper way to produce sweetness, and high-fructose corn syrup was born. Refined sugar (i.e., sucrose) is made up of a molecule of the carbohydrate glucose, bonded to a molecule of the carbohydrate fructose—a 50–50 mixture of the two. The fructose, which is almost twice as sweet as glucose, is what distinguishes sugar from other carbohydrate-rich foods such as bread or potatoes that break down upon digestion to glucose alone (4). The more fructose in a substance, the sweeter it will be.



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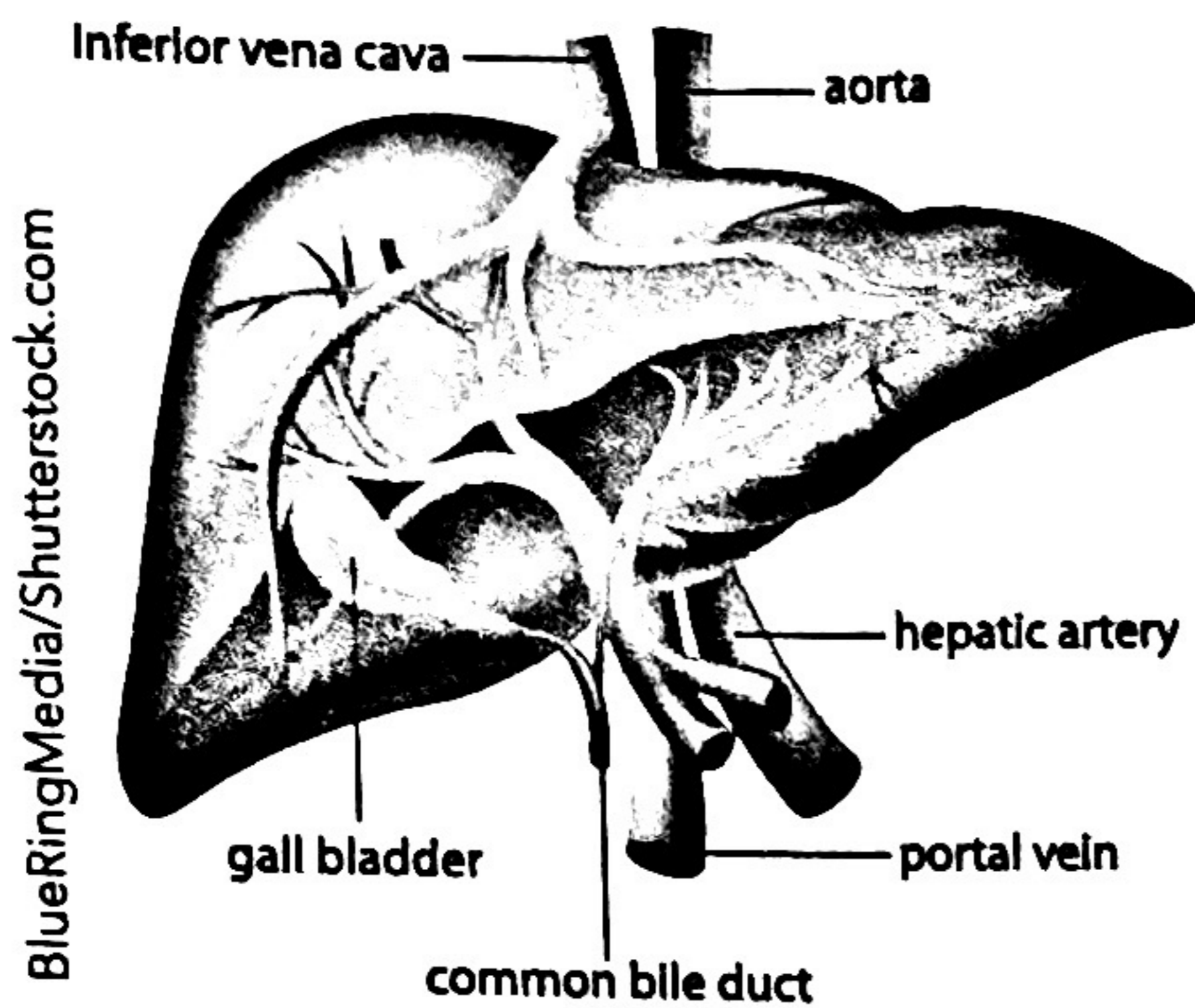


The Turtle Factory/Shutterstock.com

High-fructose corn syrup, as it is most commonly consumed, is 55% fructose, and the remaining 45% is nearly all glucose (5). It was first marketed in the late 1970s and was created to be indistinguishable from refined sugar when used in soft drinks. Because each of these sugars ends up as glucose and fructose in our system, our bodies respond the same way to both, and the physiological effects are identical.

WHAT HAPPENS WHEN FRUCTOSE AND GLUCOSE MOVE THROUGH OUR BODY?

Human Liver Anatomy



This mix of fructose and glucose wreaks havoc on the body's metabolism: glucose is metabolized by cells all through the body (just like the sugars in breast milk); fructose is processed primarily in the liver. Take a breath. Mindfully bring an image of your liver into focus, a key organ to optimal health. Mindfully pay attention to and understand this process. Our liver has a big job to do. It not only is working to break down the sugars, it also shares the job of breaking down fat with the gall bladder as well as eliminating many substances we put in our body that we do not need. If you eat too much sugar in quickly digested forms such as candy and soda, the liver breaks down the fructose and produces fats called triglycerides. Some triglycerides are stored in the liver, but many are pushed out into the bloodstream. This elevates blood pressure, and leads to something called insulin resistance, when our cells become non-responsive

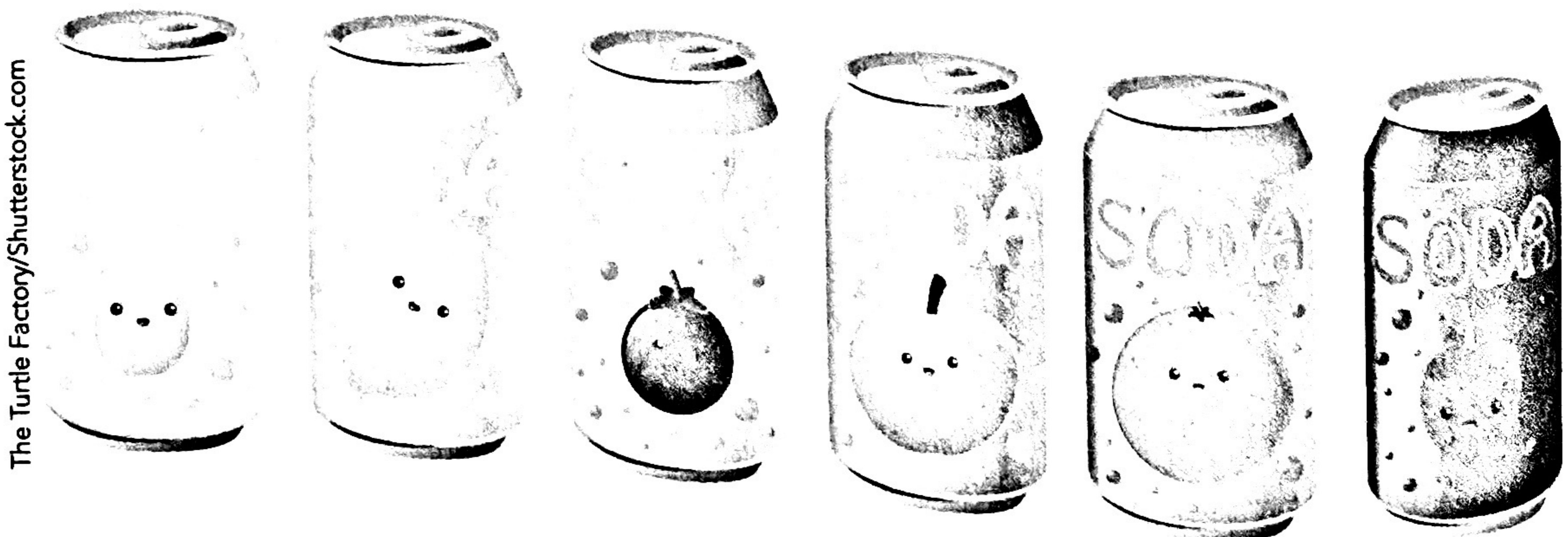
to insulin, so the pancreas pumps more and more insulin into the blood trying to keep things in balance. Metabolic syndrome develops, signaled by abdominal obesity ("belly fat"); high-blood pressure, and other changes that may lead to Type 2 Diabetes increasing the risk of heart attack and stroke. Mindfully decide what your body needs.

In animals, or at least in laboratory rats and mice, it's clear that if the fructose hits the liver in sufficient quantity and with sufficient speed, the liver will convert much of it to fat. This apparently induces a condition known as insulin resistance, which is now considered the fundamental problem in obesity, and the underlying defect in heart disease and in the type of diabetes, type 2 that is common to obese and overweight individuals. It might also be the underlying defect in many cancers.

If what happens in laboratory rodents also happens in humans, and if we are eating enough sugar to make it happen, then we are in trouble (6).

OVERDOSING ON HIGH-FRUCTOSE CORN SYRUP: ARE YOU A VICTIM?

Initially embraced by the soda industry, with its cost artificially low due to governmental price subsidies for corn, this liquid sweetener became pumped into nearly every manufactured packaged product. During this same period (1970–2000), our consumption of sugar-sweetened soda doubled to 40 gallons a



year per person at its peak in 2010 (3). Did you know that one can of soda has about 10 teaspoons of sugar! Always diversifying, soda manufacturers found ways to keep up with the creation of new versions of sweet drinks, including teas, exercise drinks, vitamin water, and energy drinks. We now consume nearly 14 gallons a person per year of these “enhanced” beverages. It is ordinary table sugar (sucrose), and our ability to manufacture cheap forms of it has led to problems of excess which some experts believe are responsible for most of today’s health problems.

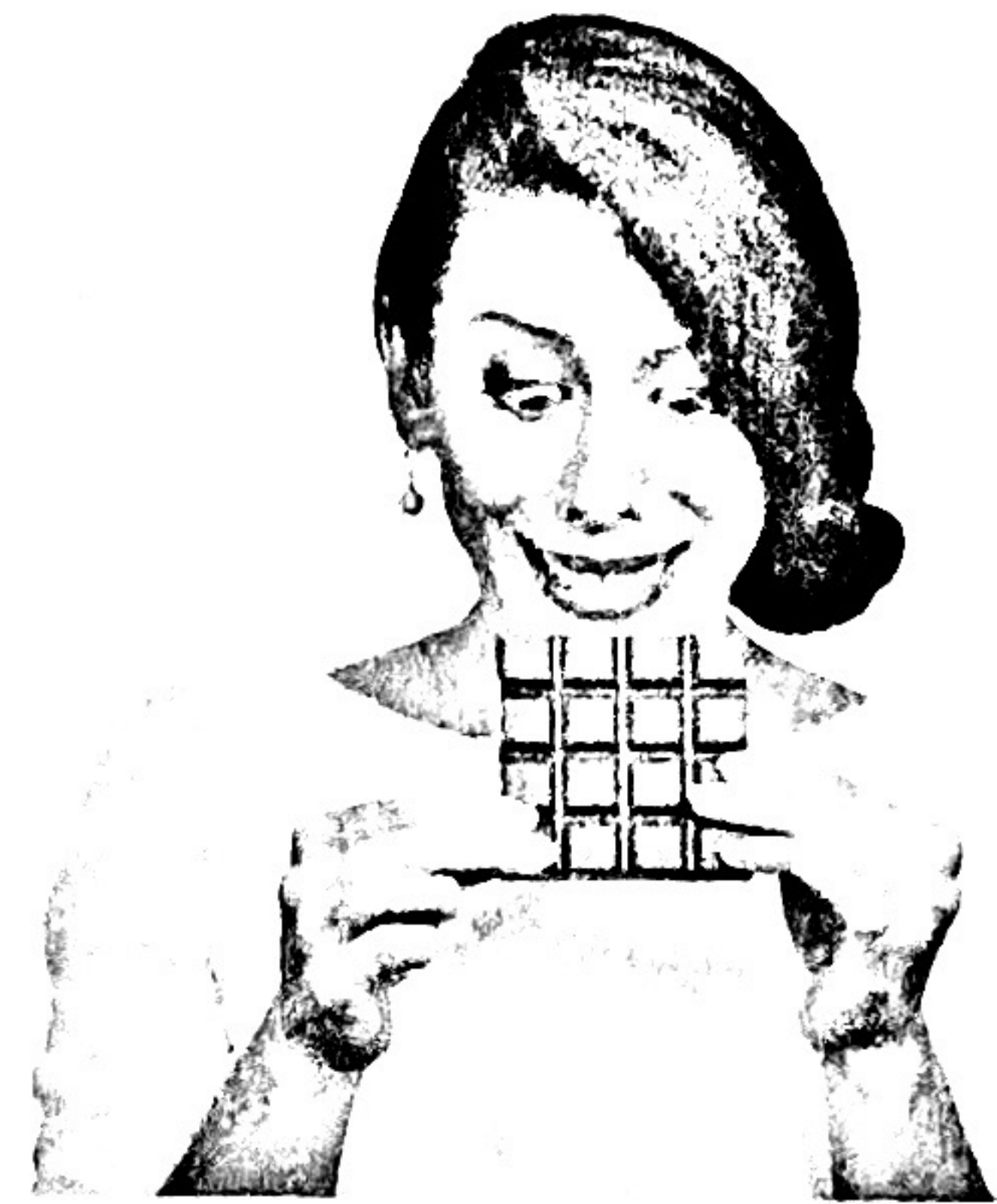
AN ALARMING EPIDEMIC

America is addicted to sugar, with over 100 pounds consumed yearly by every man, woman, and child. It’s throughout our food supply (77% of the foods in the American food supply include added sugar), and plays a huge role in metabolic syndrome, which leads to diseases such as diabetes. One research study showed that while eating an extra 150 calories per day did not increase diabetes prevalence worldwide, if those calories came from soda, diabetes prevalence went up 11-fold for the same number of calories (7).

The Department of Health and Human Services states that increased consumption of added sugars, which are sweeteners added to food and beverages, has been linked to obesity and a decrease in the intake of essential vitamins and minerals. One study revealed that an average U.S. adult consumes 21.4 teaspoons of *added sugar* each and every day, representing 16% of total daily calorie intake (7). This added sugar does not take into account additional sugar in fruit juices, fruits, or other whole foods. Among children, the numbers are similar, with about 16% of daily calories consumed in the form of added sugar. Some surveys suggest teenagers may be eating far more—up to 34 teaspoons a day.

The United States Department of Agriculture (USDA) recommends for women consume no more than 6 teaspoons of added sugars per day, and men no more than 9 teaspoons. Since many foods include a combination of added sugars and naturally occurring sugars from fruit and dairy, we have no easy way to identify the amount of sugars added to products we buy at the supermarket. Nutrition labels do not indicate how much sugar has been added, and food manufacturers don’t voluntarily disclose this information.

How much sugar is too much? The American Heart Association (AHA) recommends that added sugar intake make up no more than half of your daily *discretionary* calories (not *total* calories), which means about 6 teaspoons of sugar for women and 9 teaspoons for men (8). Other experts, like Dr. Robert Lustig, argue that this is too much.



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Calories from Added Sugars in Commonly Purchased Foods	
Food	Calories from Added Sugar per Serving
Carbonated soda (12 oz. can)	132.5
Canned peaches in heavy syrup (1 cup)	115.4
Jelly beans (10 large)	78.4
Non-fat fruit yogurt (6 oz. container)	77.5
Milk chocolate, 1 bar (1.55 oz)	77.4

Calories from Added Sugars in Commonly Purchased Foods	
Food	Calories from Added Sugars per Serving
Cake doughnut (1)	74.2
Sweetened condensed milk (1 fl oz)	73.8
Fruit punch drink (12 oz can)	62.1
Angel food cake (1 piece)	60.4
Chocolate puff cereal (1 cup)	56.4
Vanilla ice cream (1/2 cup)	48.0
Pancake syrup (1 tbsp)	26.5
Chocolate chip cookies (1)	13.6
Cinnamon raisin bagel (4" diameter)	12.8

Dr. Robert Lustig is a pediatric endocrinologist from University of California, San Francisco. He believes that sugar is toxic and should be regulated like tobacco and alcohol in order to protect public health. In a report published in the journal *Nature*, he contends that sugar is contributing to 35 million deaths worldwide each year due to obesity and diseases such as diabetes, heart disease, and cancer (7).

Dr. Lustig believes it is more than just the empty calories of sugar that are dangerous. He believes that sugar is toxic to the body, and calories are not the issue. Health risks from excess sugar include changes in metabolism, increased blood pressure, liver damage, and interference with hormone signaling. Lustig argues that eating too much sugar, in fact, also causes many of the health effects caused by drinking too much alcohol (6).

For example, too much sugar is associated with high cholesterol, which is known to increase heart disease risk. One study found that those who got 25% or more of their daily calories from sugar had double the risk of having low HDL (good) cholesterol compared to those who consumed less than 5% of their calories as sugar (3). Those who ate the most sugar also had the highest triglyceride levels (low HDL and high triglycerides are two of the primary risk factors for heart disease).

Sugar is also linked to cancer (9–14). High blood sugar levels, caused by health conditions such as diabetes along with eating too many sugary foods, have been linked to cancers of the pancreas, skin, uterus, urinary tract, and breast. Women with the highest blood sugar levels were found to have a 26% higher risk of developing cancer than those with the lowest (15), whereas women with the highest carbohydrate intake (62% of their diet or more) were more than twice as likely to develop breast cancer than those with a lower carb intake (52% or less) (16).

Nutrition Labeling: Why It Matters

Your body doesn't need to get any carbohydrate from added sugar. That's why the Healthy Eating Pyramid says sugary drinks and sweets should be used sparingly, if at all, and the Healthy Eating Plate does not include foods with added sugars.



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4 grams of sugar = 1 teaspoon—an important fact to keep in mind when reading nutrition labels

The average American consumes 22 teaspoons of added sugar a day, which amounts to an extra 350 calories (17). While we sometimes add sugar to food ourselves, most added sugar comes from processed and prepared foods. Sugar-sweetened beverages and breakfast cereals are two of the most serious offenders.

The AHA has recommended that Americans drastically cut back on added sugar to help slow the obesity and heart disease epidemics (8).

- The AHA suggests an added-sugar limit of no more than 100 calories per day (about 6 teaspoons or 24 grams of sugar) for most women and no more than 150 calories per day (about 9 teaspoons or 36 grams of sugar) for most men.
- There's no nutritional need or benefit that comes from eating added sugar. A good rule of thumb is to avoid products that have a lot of added sugar, including skipping foods that list "sugar" as the first or second ingredient. However, the growing use of alternative sweeteners can make it difficult to determine which ingredients count as sugar, because there are multiple sources of sugar with different names.

Type of Sugar: Does It Matter?

The bottom line is sugar is sugar no matter what form it comes in. Our bodies identify sugar whether it is processed, fruit, raw, organic, or otherwise. White versus brown? Raw versus refined? Organic or not? When it comes to sugar, there are a lot of options but choosing raw or organic sugar will not change the health risks (with the exception of perhaps lowering pesticide and chemical exposure for organic brands). There are some slight differences—for instance, unrefined raw sugar is made from the juice of the sugar cane plant, and as it is not fully refined, it will have trace minerals and nutrients, although not in any significant amounts—but they are negligible in terms of your health.



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FIGURE 1. By law, The Nutrition Facts Label must list the grams of sugar in each product. But some foods naturally contain sugar, while others get theirs from added sweeteners, and food labeling laws don't require companies to differentiate how much sugar is added sugar.

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How do you know the amount of what is in the food you are eating? When reading the nutrition facts label, ingredients are listed in order of predominance by weight. This means that the product contains more of the first ingredient than any other *single* ingredient. So if the ingredients are “oats, honey, peanut butter, water, salt”, you know that there are more oats than honey in the product, even if only by a tiny margin. However, it’s possible that if you combine the honey and peanut butter, they outweigh the oats.

Remember that sugar can be listed under various names (since, strictly speaking, they’re different foods), so manufacturers will frequently use more than one type of sugar so they can move them further down the list. For example, if the manufacturer decides to use honey and maple syrup as the sweeteners instead of just honey, the ingredients list might look more like this: “oats, peanut butter, honey, maple syrup, water, salt.” It can be the same amount of sugar as the first example, but now they’ve gotten peanut butter moved up on the list (and sugar moved down).

SUGAR: MAC YOUR EXPERIENCE . . .



It can be overwhelming to think about all of the types of sugar that exists in our food. You might consider yourself to be a healthy eater, and now you’re confused. You’ve tried hard, you’ve made mistakes, and now you’re sitting with blame and judgment as you read this section. Right now, in this moment, breathe into your experience and have a mindful MAC moment (18) as you

1. Acknowledge the feelings you have about this new information regarding sugar
2. pay attention to the feelings that arise
3. accept your feelings (whether they be disappointment, confusion, anger, sadness) without judgment, and
4. make a choice to take skillful action.

Remember, once you notice, then you have an opportunity to change.

It can be really hard to spot those added sugars. Below is a list of the most common types of sugars. Do not let some of their healthy-sounding names fool you: *refined sugar is refined sugar!*

This is not a complete list, but it covers the vast majority of names for sugar.

1. Fruit juice concentrate
2. Fruit juice

3. Sugar
4. Invert sugar
5. Cane sugar
6. Cane juice
7. Evaporated cane juice
8. Raw cane sugar
9. Brown sugar
10. Beet sugar
11. Palm sugar
12. Date sugar
13. Coconut sugar
14. Barley malt (Manufacturers love this one because it doesn't have the words "syrup" or "sugar" in the name)
15. Malt syrup
16. Rice bran syrup
17. Corn syrup
18. Corn syrup solids
19. High fructose corn syrup
20. Dextrose
21. Maltodextrin
22. Glucose
23. Glucose solids
24. Fructose
25. Sucrose
26. Maltose
27. Lactose
28. Galactose
29. Honey
30. Maple syrup
31. Agave
32. Sorghum syrup
33. Diastatic malt
34. Molasses
35. Caramel
36. Treacle
37. Golden syrup
38. Panocha
39. Muscovado sugar
40. Turbinado sugar
41. Demerara sugar
42. Sucanat
43. Rapadura
44. Jaggery
45. Panela
46. Monk fruit/Luo Han Guo

Added Sugars: Why It Matters?

"71% of the added sugars in Americans' diets come from grocery bought foods," said Dr. Adam Drewnowski, Director of the Nutritional Sciences Program at the University of Washington. According to Dr. Drewnowski, it is essential to find tools to implement that help us move toward healthier diets (19).

One such tool you might want to explore to help you become better educated in assessing how much sugar is in the food you are eating is called Tracking Added Sugars by Fooducate (www.fooducate.com). Analyzing over 250,000 grocery products in Fooducate's database developed this tracking tool. A series of sophisticated algorithms were used to evaluate nutrients and ingredients in products, resulting in an accurate estimate of added sugar content.

It can be surprising to learn how much sugar has been added to processed food. With awareness comes choice—once we know, we have the opportunity to change and move to a more healthful diet. By pinpointing the foods that contain excessive amounts of added sugars and swapping them with healthier choices, we can help ourselves through technology tools to take a simple and significant step toward improving our diets.

5 Healthy Sugar Substitutes That Won't Sabotage Your Health

The next time you're wanting a sweet treat, one of the healthiest options may be to make your own at home, using the healthier options below. You'll notice that artificial sweeteners are not on this list, as many have some concerning health issues in their own right. These natural substances can add a little healthy sweetness to your everyday meals and baked treats without sacrificing your health:

- **Stevia:** A sweet Central and South American herb
- **Raw honey(sparingly):** Although still a high source of sugar, raw honey contains antioxidants, minerals, enzymes, vitamins, and phytonutrients
- **Applesauce:** Look for an unsweetened brand, as apples are naturally sweet (or make your own)
- **Raisins or dates:** Chop them up finely to add sweetness to cereal, cookies, and other baked goods
- **Pureed ripe bananas:** A natural way to add sweetness to baked goods

Dr. Lustig has some recommendations, too. His Do's and Don'ts apply to nutritional intake overall, and avoids excess sugars.

Do

- Shop the edges of the store, not aisles for real food
- Eat more omega-3 fatty acids, found in wild fish and flax
- Eat fruit as dessert, and if you're craving cookies or cake, make your own
- Increase consumption of micronutrients, the vitamins and minerals found in fruits and vegetables
- Up your fiber intake. Fiber protects your liver from sugar, says Lustig, and keeps you from overeating
- Eat more whole grains such as farro, quinoa, steel-cut oats, hulled barley, or brown rice

Don't

- Drink your calories. Avoid soda, sports drinks, and juice
 - Shop hungry—it leads to poor food choices
 - Eat anything with "partially hydrogenated" in the ingredient list. That means it contains trans-fat, which our bodies can't metabolize and ends up lining our arteries
 - Buy anything that has sugar as one of the first three ingredients
 - Eat corn-fed beef or farmed fish. Corn oil contains omega-6 fatty acids, which lead to inflammation
 - Buy processed food. "If it comes with a label," says Lustig, "think of it as a warning label" (1).
- Enjoy this healthy treat the next time you're in the mood for a sweet food. Filled with antioxidants, micronutrients, calcium, and fiber, it will neutralize your craving and provide valuable nutrition.

Cantaloupe Smoothie

This easy and delicious dessert in a glass is sweetened with dates. Dates provide 50% more potassium than bananas and are a wonderful source of fiber. Molasses, an old-fashioned sweetener, provides many essential micronutrients including calcium and iron.

Serves 1

1½ cups unsweetened plant-based milk

1 teaspoon unsulfured molasses

6 Medjool dates, pitted and chopped

2 cups chopped cantaloupe

2 to 3 ice cubes

Combine all ingredients in a blender and process until smooth and creamy.

Garnish with fresh mint.



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