



Blood Sugar

Part 1

"In the US, 14.3 percent of adults have type 2 diabetes and 38 percent of the population has prediabetes, totaling 52.3 percent. This means that, for the first time in history, more people have the disease than not."

-Jason Fung, MD
author of *the Diabetes Code*

We have all heard that eating too much sugar could eventually result in a diagnosis of type II diabetes. However, just because you have not been diagnosed with diabetes, does not mean your body is tolerating the amount of sugar in your diet well. In 2015, 84.1 million Americans over the age of 18 had pre-diabetes. Pre-diabetes is a condition in which blood glucose levels are higher than normal, but not high enough for a diagnosis of diabetes. People with pre-diabetes are at an increased risk for developing type II diabetes and for heart disease and stroke¹. Some of the symptoms associated with pre-diabetes are: increased thirst, frequent urination, extreme hunger, fatigue, irritability, blurred vision, slow healing and frequent infections.

Armed with the education you receive in this program, your personalized whole food diet, and tools you can utilize at home, you can manage your own levels of blood glucose and keep them within a healthy range. With healthy blood glucose levels you are increasing your odds of longevity.

BASIC PHYSIOLOGY

The body prioritizes blood sugar regulation over other bodily functions to ensure that the brain and other organs have the necessary energy to operate. Our body was designed to use a variety of macronutrients (protein, carbohydrates and fat) for energy sources. Each human body has its own specific formula for how much of each of these macronutrients it needs to maintain optimal health and wellness. If the specific formula is off, you become susceptible to disease. There are many factors that play a role in your own specific nutrition formula, such as genetics, stress and activity levels.

Carbohydrates are the fastest burning of the 3 macronutrients. When properly digested, all carbohydrates turn into sugar in the body. Once these sugars are absorbed into the blood stream, a healthy body will release insulin (a hormone) into the blood to help store these sugars away in the liver and muscles. The liver and muscles have limited storage for these sugars. If the consumption of carbohydrate (or sugar) is higher than our body's storage in the liver and muscles, the body will convert the excess sugar into fat and store it in fat cells, in which we have an unlimited storage.

Since carbohydrates burn faster than fat and protein, a diet that is high in carbohydrates will require frequent consumption of carbohydrate to keep energy levels up. If this cycle of frequent consumption of carbohydrates is repeated day after day, month after month, year after year, the body can become less effective at producing and/or using insulin to store away digested carbohydrates. Once this process begins, we see levels of sugar in the blood begin to rise. This is the very early stages of Type II diabetes (pre-diabetes) and typically

there are little to no symptoms associated with the early stages of pre-diabetes and the rise in blood sugar levels.

How Blood Sugar Should Work

When you wake up in the morning after a 12 hour fast, your blood sugar should be at a healthy level, around 85 mg/dL. After consuming a well-balanced meal, the body digests the macronutrients from your meal and they are absorbed into your blood stream. This causes a healthy rise in blood sugar over the next 2 hours (to around 115 mg/dL) and a signal to the body to release the hormone insulin from the pancreas. Insulin's job is to remove any excess sugar from the blood and store it in the liver and/or muscles for later use. After a few hours without a meal, the blood sugar levels begin to drop back toward the fasting levels (85 mg/dL) and the brain sends a signal to the pancreas to release the hormone glucagon. Glucagon's job is to release stored glucose from the liver back into the blood stream to be used as energy until the next meal is consumed.

NORMAL BLOOD SUGAR LEVELS should range between 85-115 mg/dL throughout the day.

BLOOD TEST	OPTIMAL	FUNCTIONAL	PRE-DIABETIC	DIABETIC
Fast Blood Glucose Test	85 mg/dL	86-99 mg/dL	100-199 mg/dL	>199 mg/dl
Oral Glucose Tolerance Test	<120 mg/dL	120-139 mg/dL	140-199 mg/dL	>199 mg/dL
Hemoglobin A1c Test	<5.4%	5.4-5.9%	6-6.4%	>6.4%

Complications from Blood Sugar Dysregulation

Blood sugar dysregulation disrupts all aspects of human physiology, including:

- energy
- the integrity of the tissues of every organ and blood vessel
- hormonal balance
- brain health

People can begin to experience anxiety, agitation, depression, fatigue or high levels of stress when blood sugar is out of normal ranges (either too high or too low). This is because the hormones regulating fuel distribution affect your mood.

Diabetic nerve damage (neuropathy) can also occur and affects approximately 60-70 percent of patients with diabetes². The longer a person has diabetes and the greater the degree of severity, the greater the risk of neuropathy. Neuropathy affects the nerves in the lower extremities first: the feet, hands and also the arms. Symptoms include tingling, numbness, burning and pain. The constant pain of diabetic neuropathy can be debilitating and worse for some people at night.

Heart attacks are a known complication of diabetes. When the blood vessels supplying the heart are damaged, the body responds by depositing plaques of fatty material, known as cholesterol, within the inner walls of the blood vessels. As the body works to repair the damage, the blood vessels narrow and harden with this plaque. The blood is not able to supply oxygen through the narrowed vessels, resulting in the death of part of the heart muscle. 68% of diabetics aged sixty-five or older will die of heart disease, and a further 16% will die of stroke³.

Identifying Sugar

When many people think of sugar, they think of foods like cookies, cakes or cereal. Yet sugar is hidden in over 80% of other foods like catsup, relish, mayonnaise, crackers, bread, canned fruit and even low-fat yogurt! Food manufactures have different names for sugar, making it very confusing for people to identify sugar as an ingredient. Some of the other names listed for sugar are: dextrose, barley malt, disaccharides, fruit juice concentrate, lactose, malt and sucrose, to name a few.

Types of sweeteners (from best to worst...)

NATURAL SUGARS such as unrefined raw honey, raw cane sugar, and fruit, that when unprocessed, maintain some nutrient value to the body.

NATURAL SWEETENERS such as stevia. Usually an herb. It tastes sweet but is not a sugar. The more they are processed, the less healthy they are.

REFINED SUGARS such as white cane sugar, processed honey, agave and corn syrup. Natural in origin, but the refining process generally makes them unhealthy.

SUGAR ALCOHOLS such as xylitol, erythritol, sorbitol and mannitol. Real food but highly processed. These sugar alcohols are incompletely structured and are likely to cause digestive upset.

ARTIFICIAL SWEETENERS such as splenda and aspartame. These are manmade chemicals that are made to taste sweet. Artificial sweeteners, such as aspartame, Nutrisweet and Equal, which carry no caloric value, have been shown to increase your risk of a metabolic syndrome by more than 34%⁴. Additionally, there is a 43% increase of a vascular event (such as stroke and heart attacks) in those that consume artificial sweeteners regularly⁶.

Reading Labels

The American Diabetic Association recommends a daily sugar consumption below 20g for women, 36g for men, and less than 12g for children. The average American consumes 71.14g of sugar every day⁶, well over the recommended amount. One of the simplest ways to reduce the intake of added sugar is by learning to read food labels.

Look for foods with 5g of sugar or less per serving

Keep in mind that:

- As of July 2018, added sugars are listed separately on food labels in America, but not in all countries.
- Naturally occurring sugars from whole foods are not considered added sugars.
- Lactose is the naturally occurring sugar from dairy. The amount of sugar from dairy can vary from product to product. Generally speaking, there are approximately 5g of sugar per 100g of dairy with no added sweeteners.

Check the ingredient list for any added sugars

There are currently 61 different names for added sugar in the US, which makes them challenging to identify.

The main things to keep in mind are:

- Words ending in “-ose” are added sugars.
- Words ending in “-tol” are added sugars.
- Words such as “syrup,” “juice,” “concentrate,” and “crystals” are sugars.

Just because the label lists “zero” sugar, does not mean that there are no added sugars in the ingredients. You must check both!

Nutrition Facts	
Serving Size 5 oz. (144g)	
Servings Per Container 4	
Amount Per Serving	
Calories 310	Calories from Fat 100
% Daily Value*	
Total Fat 15g	21%
Saturated Fat 2.6g	17%
Trans Fat 1g	
Cholesterol 118mg	39%
Sodium 560mg	28%
Total Carbohydrate 12g	4%
Dietary Fiber 1g	4%
Sugars 1g	
Protein 24g	
Vitamin A 1%	Vitamin C 2%
Calcium 2%	Iron 5%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
	Calories 2,000 2,500
Total Fat	Less Than 65g 80g
Saturated Fat	Less Than 20g 25g
Cholesterol	Less Than 300mg 300mg
Sodium	Less Than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram:	
Fat 9 • Carbohydrate 4 • Protein 4	

Ingredients: water, chicken breast, carrots, onions, red lentils, olive oil, cauliflower, leeks, peas, wheat flour, cornstarch, yeast extract, concentrated tomato paste, garlic, sugar, celery seed, parsley

Monitoring Your Blood Sugar

One of the best ways to prevent (or reverse) this disease and discover exactly how your specific body tolerates different types of carbohydrates/sugars (the type, load and frequency) is to monitor your own blood sugar levels. This can be easily done with an at home blood glucose monitor. These monitors are sold over the counter at many drug stores and range from \$20-\$50. If there is one single thing you can do to discover your own personalized diet and monitor your own health over time, it is to use a blood sugar meter regularly.

To test, always start with your FASTING blood sugar in the morning before you do anything like eat, drink, or brush your teeth. Follow the instructions included with your specific kit to get an accurate test result.

Healthy fasting blood sugar readings should be around 85mg/dL. Consistent fasted readings below 80mg/dL may indicate hypoglycemia, and consistent fasted readings above 99mg/dL may indicate pre-diabetes. Keep in mind that there are other factors that can affect your blood sugar, such as sleep and stress (more on this in later modules)

The most important part of blood sugar testing is to be consistent. Timing is everything. It is highly advised that you set an alarm to make sure you stay consistent with testing for 7 days. This will allow you to start seeing a pattern. It is important to note that there is a degree of error with all blood sugar meters. The goal is not to become fixated on each and every number, but to see all the numbers together and the pattern they create. To get the most out of testing, you should also be keeping a food and lifestyle journal and be noting things that effect your blood sugar, like: sleep, stress, macronutrients, and hormone cycles.

HOMEWORK

Part 1: Blood Sugar Monitoring

Using a blood glucometer, track your fasting blood sugar for 7+ days. A glucometer is a small electronic device that requires a very small amount of blood to measure your blood sugar levels. To take your blood sugar, you will need the following items:

- Glucometer
- Lancer
- Lancets
- Disposable glucose strips that go with your meter

To test your blood sugar, follow these instructions:

1. Read the instructions that come with your glucometer to set up your device.
2. Wash your hands with warm water and dry them well.
3. Prick the side of your fingertip with the lancet.
4. Gently squeeze or massage your finger until a small drop of blood forms. If you have a hard time producing a large enough spot of blood for testing, try holding your hand down toward the floor while you massage your finger downward toward your fingertip.
5. Touch the tip of the glucose strip to the drop of blood, allowing the blood to flow onto the test strip.
6. After a few seconds, the meter will display your blood glucose level on a screen.

Remember, it is important to test your fasting blood sugar before consuming any calories or brushing your teeth.

Part 2: Label Reading

Set aside a block of time to look at all the condiments in your refrigerator. Inspect the labels for both the amount of sugar per serving AND the ingredient lists. Pay close attention for added sugars in the ingredient list that have no caloric value. Only put back the condiments that have <5g of sugar per serving and use natural sugars or sweeteners. Make a list of the other condiments that should be removed and replace them with a brand that is more natural and/or contains less sugar per serving.

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