

Why Fasting Is a Powerful Treatment Strategy for Diabetes

Analysis by [Dr. Joseph Mercola](#) ✓ Fact Checked

STORY AT-A-GLANCE

- › An estimated 37 million Americans, or 11% of the population, have Type 2 diabetes. Another 1 in 3 American adults are prediabetic, defined as an elevation in blood glucose over 100 mg/dl
- › Any fasting blood sugar regularly over 90 mg/dl really suggests insulin resistance, and work by the late Dr. Joseph Kraft suggests 80% – 8 out of 10 – Americans are in fact insulin resistant
- › Type 2 diabetes is curable, and the cure is less than inexpensive – it's free. You actually save money, as the remedy is to fast and not eat anything for a number of days on a regular basis
- › Type 2 diabetes should not be treated with insulin, as insulin forces glucose into cells that are already saturated with excess glucose and cannot take in more. Instead, the glucose gets turned into fat, which is why insulin injections result in dramatic weight gain
- › The answer for Type 2 diabetes is to stop feeding your body sugar and burn off the sugar already in your cells, and the most effective way to do this is fasting

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We have an epidemic of diabetes in the United States. An estimated 37 million Americans, or 11% of the population, have Type 2 diabetes.¹ The numbers have become

so grave that diabetes deaths topped 100,000 in both 2020 and 2021— up from 87,000 in 2019, before the pandemic.

Another 1 in 3 American adults are prediabetic, and most are unaware of this fact. Prediabetes² is defined as an elevation in blood glucose over 100 milligrams per deciliter (mg/dl) but lower than 125 mg/dl, at which point it formally becomes Type 2 diabetes.

However, any fasting blood sugar regularly over 90 mg/dl really suggests insulin resistance, and seminal work by the late Dr. Joseph Kraft, author of “Diabetes Epidemic and You: Should Everyone Be Tested?” suggests that 80% — 8 out of 10 — Americans are in fact insulin resistant,³ which means they’re already on their way toward developing diabetes.

That's the bad news. The good news is Type 2 diabetes is curable, and the cure is less than free. It actually saves you loads of time and money. In his book, “[The Diabetes Code: Prevent and Reverse Type 2 Diabetes Naturally](#),” Dr. Jason Fung details how to address this exceptionally common problem.

Fung is a nephrologist (kidney specialist) with a practice in Toronto. A few years ago, I interviewed him about fasting, which is one of the most powerful interventions for Type 2 diabetes and insulin resistance. Fung was also one of the experts who peer reviewed my book, “[Fat for Fuel](#),” which integrates some of his work.

Why Identifying Insulin Resistance Is so Important

There are two types of diabetes, Type 1, or insulin dependent diabetes, and Type 2 diabetes, which is lifestyle related. Type 2 diabetes accounts for 90 to 95% of all diabetes cases and is the topic of this particular discussion. Prevalence of Type 2 diabetes started to rise in the 1980s, at a time when obesity had yet to become a significant trend. However, as obesity became more prevalent, so did Type 2 diabetes.

“But the fundamental underlying problem of Type 2 diabetes, which is insulin resistance, is actually much more widespread than that,” Fung says. “And the

innovative thing Kraft did was that he took a standard glucose tolerance test, and measured blood insulin levels instead of blood glucose.

Because if you think about what's happening, when you ingest 75 grams of glucose [the amount administered prior to the test], your blood glucose may stay normal.

But, your body may be producing a huge amount of insulin to really shove that glucose into the cell. Because one of the functions of insulin is to move the glucose from the blood into the cell. Insulin resistance refers to the fact that blood glucose is simply not getting in there.

So, if your body needs to produce two, three, four, five times the amount of normal insulin to get that glucose in there, you have a problem, which is not detectable if you just measure blood glucose.

Because, yes, you are shoving all that glucose into the cell, but it took you a huge amount of effort to do so. And by [using the] Kraft assay, which looks at how much the insulin goes up, you can detect [insulin resistance] at a much earlier stage. This is important because there are things we can do about reversing ... insulin resistance, and the sooner we get to it, the sooner we can get on the path to wellness."

Ultimately, diabetes is just one symptom. Insulin resistance, which results in mitochondrial dysfunction, is also at the heart of cancer, heart disease, Alzheimer's and other degenerative diseases, and it all starts because your body is unable to burn fat as a primary fuel. When your body relies primarily on sugar instead, more reactive oxygen species (ROS) are generated, which damage the mitochondria in your cells.

Fasting Resolves Insulin Resistance, the Cause of Diabetes

Fasting has been used for thousands of years to keep us well. Once you understand what insulin resistance actually is and what Type 2 diabetes is, then you'll understand why something so simple as abstaining from food for a period of time can be such a

powerful intervention. Contrary to infectious diseases, you cannot treat metabolic disease with a pill, because metabolic diseases such as diabetes are predicated on lifestyle, primarily diet. As explained by Fung:

"You have to use metabolic treatments, which is why using fat for fuel is so important. It really gets to the point that you cannot follow this old paradigm [of drug treatment] because you're going to fail ... Remember, the glucose goes into the cell, and insulin resistance is when the glucose doesn't go out of the cell. So, for years we've used this paradigm of lock and key.

That is, the cell is sort of gated off. Outside the cell there's blood, and when insulin comes around it turns the key, opens the gate and glucose goes in. So, if insulin is there, why is the glucose not going in? ... You can measure the insulin and the insulin level is high. You can look at the insulin receptor, the gate is completely normal.

So, [conventional medicine] said something like, 'Well, maybe there's something gumming up the mechanism. It's stuck in the lock so it doesn't open properly, therefore the glucose can't get into the cell.' There's a huge problem with this sort of paradigm, because if that is happening, the cell has no glucose and should be starving.

You should be losing lots of weight; you'd have a very thin liver. All your fat should just melt away, because if you think about untreated Type 1 diabetes, where you don't have enough insulin, that's exactly what happens. The cell literally starves and everything just wastes away ... But that's not what's happening here.

In Type 2 diabetes you see that people are generally obese, they have large abdomens ... What's happening instead is that it's actually an overflow syndrome. The cell can't accept any more glucose because it's jam packed full of glucose already. That's the reason you have insulin resistance. Insulin is trying to move glucose into the cell but the cell is full ... So, it's really an overflow mechanism ...

That's also why your liver is full – it's a big fatty liver. The liver is busy trying to get rid of all this glucose by turning it into fat ... Now, if Type 2 diabetes and insulin resistance are the same sort of thing, it's really about too much sugar. That's the bottom line.

And if you understand that the whole problem is too much sugar, then the solution is not to use more insulin to jam more glucose into an already full cell. The key is to get rid of it all. So, what you want to do is: 1) Don't put more sugar into your system, because you have too much sugar in already, and 2) Burn it off.”

Why Exercise Cannot Replace Fasting

To avoid adding sugar into your body it is important to adopt a cyclical low-carb, high-fat diet, which I detail in “Fat for Fuel.” Then, to burn off the sugar already in your system, intermittent fasting or time-restricted eating is a powerful tool. Exercise is not the solution for diabetes, and cannot replace fasting.

Remember, you can't out-exercise your mouth. The reason for this is because you not only have insulin resistance in your muscles, but in all your tissues and organs, and to eliminate the excess glucose in your organs you need to temporarily “starve” the cells.

Clearly, you should exercise, but that will only burn the glycogen in your muscles. It's not going to address your fatty liver. As noted by Fung, fasting “gets rid of all the sort of excess nutrients. That's why, historically, people called it a cleanse or a detox, because that's really what it is.”

In his practice, Fung has used fasting for many years and can attest to the dramatic turnarounds possible. “We have people coming in with the most severe diabetes; they're taking hundreds of units of insulin a day, and within three to four weeks we have them off everything.” Oftentimes, a severe diabetic can revert back to being nondiabetic within as little as two months.

Taking Insulin Worsens Type 2 Diabetes

This is not to say it's easy. Fasting can be difficult when you're used to eating multiple times a day. But it's a natural way that will allow your body to heal itself. Meanwhile, taking insulin for Type 2 diabetes is about the worst thing you can do. As explained by Fung:

"What happens when you give insulin is that insulin lets your body use all that glucose, and when there's too much glucose, it's just going to [turn it into] fat. So, all these patients gain weight. And they always come back and say, 'Whoa doc, you've told me I need to lose weight, then you give me insulin and I've gained 20 pounds. How is that good?'

And the answer is that it's not. As you gain more weight your diabetes gets worse, which means you need to take more insulin, which means you're going to gain more weight. They can see themselves spiraling down the drain, and the doctors do nothing but give them more insulin.

It doesn't even make any sense because the underlying issue is the hyperinsulinemia and insulin resistance. That is, if you look at Type 2 diabetes, insulin levels are very high.

So [why give] more insulin in a situation where you have too much insulin already? If you have hyperthyroidism, if you have too much thyroid hormone, you don't give more thyroid hormone. If you have an alcoholic, you don't give more alcohol. It's the exact wrong thing to do. In fact, if your levels of insulin are too high and that's your disease, you need to lower insulin. By giving insulin, you're actually making the fundamental problem much worse."

How Fasting Benefits Your Mitochondria

Fasting is the most profoundly effective metabolic intervention I'm aware of. It's like getting a free stem cell transplant, and it massively upregulates autophagy and

mitophagy. It also stimulates mitochondrial biosynthesis during the refeeding phase, which allows your body to naturally regenerate. For these reasons, fasting is not only beneficial for Type 2 diabetes and obesity but also for health in general, and likely even longevity.

There's even evidence to suggest fasting can help prevent or even reverse dementia, as it helps your body clean out toxic debris. As noted by Fung, "It's fundamentally one of the keys of wellness." By lowering insulin, you also increase other important hormones, including growth hormone (aka the fitness hormone), which is important for muscle development and general vitality.

Other ailments that can benefit from fasting include polycystic ovaries, polycystic kidneys and fast growing cancer cells. The reason for this is because when autophagy increases, your body starts breaking down old protein, including fast growing cells. Then, during the refeeding phase, growth hormone increases, boosting the rebuilding of new proteins and cells. In other words, it reactivates and speeds up your body's natural renewal cycle.

Getting Started

Most people fear being hungry and avoid it like the plague. Here, intermittent fasting can make the process a lot easier. Before I tried my first five-day water fast, I increased my intermittent daily fasting to the point that I was fasting for 20 hours a day for a few months, but one month is likely sufficient.

At that point, going several days without food was easy, since my body had had gained metabolic flexibility and was able to burn fat as my primary fuel. Most people get really hungry by Day 3 on a water fast, yet I had no hunger at all. Fung agrees, saying:

"That's a great point. If you are fueling yourself primarily with carbohydrates, then you can't use fat very well ... So, when you transition from a predominantly carbohydrate diet to a predominantly fat-based diet, your body can't store

glycogen, because those are chains of glucose, it needs to burn body fat (or dietary fat). To your body it's sort of the same thing, they're just triglycerides.

When you biopsy muscle over a period of several weeks, you can actually see that the machinery necessary to burn triglycerides for fuel increase. You see expression of genes increasing that are able to use the fat. So, if you go from a standard 50 or 60 percent carbohydrate diet to fasting ... your muscles are going to be weaker, because they're used to glucose. They're like, 'Where's my glucose?'

You have triglycerides [but] you can't use it at first. Some people call it keto flu. But, over a period of about two weeks or so, your body gets used to it. So, an easy transition is to switch over to a very low-carbohydrate, high-fat diet, so that your body is used to using fat.

You're not fasting per se, but your body gets used to burning fat for fuel. The other thing is you can start lengthening your period of fast. You should be fasting every day ... Whether it's 12 hours or 14 hours.

There should be a period in there that you're fasting. Then you extend it, so that you gradually go to 16 hours, 18 hours, 20 hours and then 24 hours, and then kind of go into it from there. Those are two ways to ease the transition and make the fasting easier ...

Even shorter periods of fasting of 24 to 36 hours have a lot of benefits. You start to get into that period where you're depleting your glycogen and you're getting into fat burning. You start to see autophagy start around 24 to 30 hours as well. One of the other benefits people talk about nowadays is this sort of bio-hacking.

People, especially in Silicon Valley, are fasting because it gives them more mental capacity. Their brain works better; they find they're clearer and they can think better. So, this is a free way to boost your brain power. So yeah, there's all

different regimens, and there's all different ways to ease into it. But the key is to just get started."

How to Minimize Side Effects

Gradually easing into longer fasts will naturally minimize most side effects associated with fasting, as will transitioning over to a high-fat, low-carb diet, to help your body to adjust to using fat as a primary fuel. The so-called "keto flu" is often related to sodium deficiency, so it's recommended to take a high-quality unprocessed salt each day.

I typically pour salt in my hand and lick it throughout the day when fasting, as I obviously can't put it on food. This will also help reduce the likelihood of intractable muscle cramps at night.

Headaches are also common when you first start water fasting. These too can often be minimized by taking salt. An alternative to eating salt straight, or putting it in water, is to add it to a bit of bone broth. Another important mineral is magnesium. It's particularly important if you are diabetic, as magnesium deficiency is very common among Type 2 diabetics. This is another possible culprit if you're getting muscle cramps.

There are several types of magnesium, some of which are more poorly absorbed than others. During water fasting, your best bet is to use Epsom salt baths, as this allows your body to absorb the magnesium through your skin rather than your digestive tract.

Magnesium has a laxative effect in high doses, and when you're not eating anything, oral magnesium can easily result in "disaster pants." Multivitamins can also be useful during extended fasts, especially if you're doing them regularly.

It is also important to understand that if you are on a multiday water fast you will liberate many toxins from your fat stores, so using an infrared sauna and taking effective binders, like chlorella, modified citrus pectin, cilantro or even activated charcoal can help eliminate these liberated toxins from your body and prevent their reabsorption.

Work With a Knowledgeable Physician if You're on Medications

While fasting is a profoundly effective intervention for Type 2 diabetes, you do need to use caution if you're diabetic. If you are taking medication, especially for your blood sugar, you have to make sure you talk to your doctor, because there's a risk your blood sugar may end up dipping too low. If you're taking insulin, and keep taking insulin while fasting, you could get into trouble.

"Some people say that for that reason, Type 2 diabetics should never fast. But that's not true," Fung says. "What's true is that you need to adjust the medication in anticipation of [your blood] sugar going down ... So, if you're on these medications for diabetes, you need to make sure you monitor very closely and make sure that your blood sugar doesn't go too low.

Remember, the fasting is going to drive your blood sugars down, and your insulin or your medications will drive your blood sugars down, so you've got kind of two things driving your blood sugars down. All of a sudden you go low, you can have seizures, you can wind up in the emergency room and you could absolutely die.

And that's one of the things you have to be very careful of. So yes, you can do it, but you have to make sure you do it in a supervised setting with somebody who knows what they're doing."

Why You Need Not Fear Starvation

Last but not least, one of the greatest fears people have about fasting is the concept of starvation and the loss of lean muscle mass. In his book, Fung explains why such fears are overblown. Your metabolic rate is the energy your body uses to generate body heat and keep your organs working. Your body basically needs a certain number of calories a day. People have a tendency to think that skipping a meal means your metabolic rate will decrease.

In reality, the exact opposite occurs. In studies looking at basal metabolic rate, people's metabolic rate is actually 10% higher at the end of a four-day fast than at the beginning. So, your body is not shutting down, it's actually ramping itself up. The reason for this has to do with counterregulatory hormones. As insulin drops, counter-regulatory hormones go up.

Some of these activate your sympathetic nervous system (the so-called fight or flight response). "So, as you fast, all these hormones are going up, your sympathetic nervous system is going up, your adrenaline is going up, your growth hormone's going up," Fung says.

"Obviously, if you're pumping your body full of adrenaline, your basal metabolic rate is not going down. In fact, it maintains itself, which is in distinction to calorie restriction diets where, if you just try and cut a few calories a day, your metabolic rate will go down. The growth hormone is also important because of [its] protein sparing effect ...

When you study people fasting, you don't see an increase in burning of protein. There is a normal turnover. But at the end of it, because your growth hormone is so high, when you eat again, you will make up these new proteins. So, it's actually much healthier for you because you're getting rid of all protein and you're bringing new protein."

More Information

If you're among the 80% of people who are insulin resistant, get yourself a copy of Fung's book, "[The Diabetes Code: Prevent and Reverse Type 2 Diabetes Naturally](#)." Another of Fung's books, "[The Complete Guide to Fasting](#)," is another excellent resource. As Fung says, we've known that fasting is beneficial for thousands of years. We just strayed away from it, and we need to re-embrace this foundational aspect of health.

"[A few years ago] somebody was telling me about fasting and I thought, 'Well that's the dumbest thing I've ever heard of.' And then I thought, why? Why was

this so silly? I dug into the research and then I just started doing it.

I probably have more clinical experience, truthfully, than anybody in the world, and that's not hard because nobody was doing it a few years ago. And now it seems so obvious that [fasting is] the solution ... You don't eat, then your blood sugar comes down, you lose weight and your diabetes gets better. There's the solution right there."

Sources and References

- ¹ [US News and World Report. Diabetes Deaths Top 100,000. January 31, 2022](#)
- ² [Mayo Clinic, Prediabetes Overview](#)
- ³ [The Fat Emperor May 10, 2015](#)