

Top 8 Tips to Optimize Your Blood Sugar Level

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STORY AT-A-GLANCE

- › If you consistently consume a high-sugar, high-grain diet, your blood glucose level will be correspondingly high and over time your body becomes desensitized to insulin, requiring more and more of it to get the job done. Eventually, you become insulin resistant
- › Insulin resistance is one of the easiest health problems to correct. Eight of my top tips for optimizing and maintaining a healthy blood sugar level are reviewed
- › Intermittent fasting promotes insulin sensitivity and improves blood sugar management by increasing insulin-mediated glucose uptake rates. I recommend starting your intermittent fasting routine and monitoring your blood ketones as you go along. Once your fasting ketones are greater than 0.3 mmol/L, start incorporating partial fasting as described in “KetoFast”
- › If you are healthy, your fasting blood glucose upon waking should be below 90 mg/dL. Before meal time, your glucose level should read between 70 to 99 mg/dL. After meals, the level should be below 140 mg/dL
- › Radically limiting net carbs and increasing healthy fats are also important for blood glucose control, as are drinking plenty of pure water, eating more nuts and seeds, and strength training

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Insulin is essential to staying alive; unfortunately, the vast majority of people have resistance to this essential hormone, speeding up the aging process and contributing to the development of degenerative diseases. Any meal high in grain and sugar carbs typically generates a rapid rise in blood glucose.

To compensate, your pancreas secretes more insulin into your bloodstream to lower your blood sugar. Insulin, however, is also very efficient at lowering blood sugar by turning it into fat. The more you secrete, the more fat your body will accumulate.

If you consistently consume a high-sugar, high-grain diet, your blood glucose level will be correspondingly high and over time your body becomes desensitized to insulin, requiring more and more of it to get the job done. Eventually, you become insulin resistant and prone to weight gain, and then full-blown diabetic.

Prediabetes¹ is defined as an elevation in fasting blood glucose between 100 milligrams per deciliter (mg/dl) and 125 mg/dl. At 126 mg/dl on two separate occasions, it formally becomes Type 2 diabetes. According to the U.S. Centers for Disease Control and Prevention, an estimated 96 million American adults – about 38% of the population – are prediabetic,^{2,3} and 23% are unaware of this fact.

However, any fasting blood sugar regularly over 90 in my book suggests insulin resistance, and findings by the late Dr. Joseph Kraft – former chairman of the department of clinical pathology and nuclear medicine at Presence Saint Joseph's Hospital, Chicago, and author of "Diabetes Epidemic and You: Should Everyone Be Tested?" – suggest a whopping 80% of Americans are insulin resistant, and that's true even if your fasting glucose is normal.^{4,5}

The good news is that insulin resistance is one of the easiest health problems to correct. Below I review eight of my top tips for optimizing and maintaining a healthy blood sugar level.

Tip No. 1 – Proper Meal Timing

Intermittent fasting or compression of your eating window is a powerful approach that facilitates weight loss and helps reduce your risk of chronic diseases like Type 2 diabetes.

In his book "Circadian Code: Lose Weight, Supercharge Your Energy and Sleep Well Every Night," Satchidananda Panda, Ph.D., cites research showing that 90 percent of people eat across a span of 12 hours a day, and many across even longer timespans, which is a clear prescription for metabolic disaster.

Intermittent fasting, i.e., the cycling of feast (feeding) and famine (fasting) mimics the eating habits of our ancestors and restores your body to a more natural state that allows a whole host of metabolic benefits to occur.⁶

With regard to insulin resistance, research shows intermittent fasting promotes insulin sensitivity and improves blood sugar management by increasing insulin-mediated glucose uptake rates.⁷

While there are a number of different intermittent fasting protocols, my preference is fasting daily for 18 hours and eating all meals within a six-hour window. If you're new to the concept of intermittent fasting, consider starting by skipping breakfast and have your lunch and dinner within a six-hour timeframe, for example, between 11 a.m. and 5 p.m., making sure you stop eating three hours before going to bed.

Not eating within that time frame is important, as it helps protect your mitochondrial function. Recent research^{8,9} shows men who are at risk of Type 2 diabetes can improve their glucose control, thereby lowering that risk, simply by eating all their meals within a nine-hour timeframe – even if they do not implement any other dietary changes.

Research^{10,11} has also shown men who eat supper at least two hours before bedtime have a 26% lower risk of prostate cancer, and women have a 16% lower risk of breast cancer than those who eat dinner closer to bedtime. For more details on why late-night eating is so detrimental, see "Eating Early Dinner Aids Weight Loss and Lowers Cancer Risk."

When you do eat, focus on healthy protein in moderate amounts and minimize net carbs like pasta and bread, exchanging them for healthy fats like butter, eggs, avocado, coconut oil, olive oil and raw nuts. This will help shift you into fat burning mode.

On a related side note, when eating, relax and take your time! Research shows rushed eating, which typically occurs when you're stressed, has a significant impact on your blood sugar level. When you become stressed your body also secretes cortisol and glucagon, both of which affect your blood sugar levels as well.¹²



Tip No. 2 – Monitor Your Blood Sugar Level

As mentioned, while prediabetes¹³ is clinically defined as having a fasting blood sugar level between 100 and 125 mg/dl, I strongly believe any blood sugar over 90 mg/dl puts you in the danger zone for insulin resistance. Your blood sugar is measured through a glucose test, of which there are four types:

1. Fasting plasma glucose test – When you fast overnight and take your blood sample in the morning
2. Oral glucose tolerance test – Similar to the fasting blood sugar test, overnight fasting is required for this, and the person's fasting blood sugar level is measured. Afterward, a sugary liquid is provided and the levels are then tested for the next two hours
3. Hemoglobin A1C test – This test checks the percentage of blood sugar attached to the hemoglobin and will indicate your average blood sugar level for the past two to

three months

4. Random plasma glucose test – This makes use of a blood sample that is taken at a random time

You could also do 24-hour continuous glucose monitoring, which I've done in the past, although it's pricey and probably not necessary for most people.

At the time, I used a Dexcom monitor, which involves inserting a sensor beneath your skin for a week, which takes continuous glucose readings every few minutes. It really helped me fine-tune and evaluate how different foods impacted my glucose levels, and helped me understand the importance of feast-famine cycling.

All of that said, for most people, a simple at-home glucose test,¹⁴ where you prick your finger and deposit a drop of blood onto a glucose testing strip, will do the job. Ideally, test yourself two to three times a day: first thing in the morning, before your first meal, and a couple of hours after your last meal.

Your blood glucose levels will vary throughout the day. According to conventional recommendations, if you are healthy and do not have diabetes, your fasting blood glucose upon waking should be below 100 mg/dL. I recommend aiming for a fasting (when you wake up) level below 90 mg/dL.

Before meal time, your glucose level should read between 70 to 99 mg/dL. After meals – or what's called "postprandial" and is usually taken two hours after eating – the level should be below 140 mg/dL.

There are two measurements used for blood sugar levels. In the U.S., the measurement is in milligrams of glucose per deciliter of blood (mg/dL). In the U.K. and Canada, the measurement for blood sugar is in millimoles/liter (mmol/L). To convert to mg/dL, multiply the amount by 18. For example, if a person in the U.K. says that their blood glucose result is 7 mmol/L, in the U.S. it's read as 126 mg/dL.

Tip No. 3 – Monitor Your Blood Ketones

Another valuable test is the blood ketone test, which will tell you whether you're in nutritional ketosis or not. I recommend starting your intermittent fasting routine and monitoring your blood ketones as you go along. The KetoCoachX monitor¹⁵ is currently one of the best and least expensive ketone monitors on the market.

You're in nutritional ketosis once your blood ketone level is above 0.3 to 0.5 millimoles per liter (mmol/L).¹⁶ Ideally, perform the test first thing in the morning while still in a fasted state (i.e., before ingesting anything). Having a fasting ketone level above 1 mmol/L is a sign you're in deep ketosis.

Once your fasting ketones are greater than 0.3 mmol/L, then you can start incorporating partial fasting as described in my book, "[KetoFast: Rejuvenate Your Health With a Step-by-Step Guide to Timing Your Ketogenic Meals](#)."

The partial fasting regimen described in "KetoFast" essentially mimics ancestral eating patterns, allowing your body to work optimally by allowing for periods of breakdown and cleanout, and periods of rebuilding and rejuvenation.

Among the many health benefits of cyclical fasting is improved circulating glucose and lipid levels.¹⁷ For a summary of my KetoFast protocol, see "Avoid the Dark Side of Fasting and Ketosis With KetoFasting."

Tip No. 4 – Adopt a Cyclical Ketogenic Diet

Along with intermittent fasting, you'll also want to adopt a cyclical ketogenic diet, which involves radically limiting carbs (replacing them with healthy fats and moderate amounts of protein) until you're close to or at your ideal weight. As with intermittent fasting, this will allow your body to start using fat as its primary fuel rather than carbohydrates.

Twenty grams of carbs a day is on the low end of what's typically recommended to maintain nutritional ketosis, although some may be able to eat up to 50 grams a day and still maintain a ketogenic state.

The only way you'll know how many total carbs, fiber and net carbs you eat is to keep a food diary. The simplest way of doing this is to use an online nutrition tracker. Also remember you need to measure your ketones to determine if and when you're in nutritional ketosis.

One of the primary reasons you develop insulin resistance is because you're eating too many net carbs (total carbs minus fiber), too much protein and too little healthy fat. For optimal health, your body must be able to burn fat for fuel, and this is an ability that is lost when you consume too many net carbs on a daily basis.

When your body is able to burn fat for fuel, your liver creates ketones (water-soluble fats) that not only improve your glucose metabolism¹⁸ but also burn far more efficiently than carbs, thus lowering inflammation by creating fewer damaging reactive oxygen species and secondary free radicals.

If your ketones are above 0.3 mmol/L, as described in the section above, you can start increasing the amount of healthy carbs back into your diet and start cyclical ketosis.

To get you started, see my previous article, "Ketogenic Diet: A Beginner's Ultimate Guide to Keto." A far more detailed exposition on nutritional ketosis and how to implement a cyclical ketogenic diet can be found in my book, "[Fat for Fuel](#)," which is the prequel to "KetoFast."

Tip No. 5 – Increase Healthy Fats

A key to making nutritional ketosis work is to replace the lost carbs with healthy fats, and knowing which fats are healthy and which ones are not is a crucial distinction here. Most people will need 60 to 85% of daily calories in the form of fat, but not all fats qualify.

Fats to steer clear of are industrially processed vegetable oils, found in most processed foods and restaurant foods. Polyunsaturated fat found in processed vegetable oils is not harmful in and of itself, but becomes so if and when you eat too much of it, and/or when the oils degrade, which occurs during refining, processing and heating (cooking).

Not only can they form trans fats if heated high enough, but they can also form cyclic aldehydes, which are even more harmful. For cooking, healthy alternatives include coconut oil, grass fed raw organic butter, organic ghee, lard, tallow and olive oil. For general eating, foods high in healthy fats include avocado, olives, coconut, raw nuts such as macadamia and pecans, seeds such as black sesame, cumin, pumpkin and hemp seeds, raw cacao butter and organic pastured egg yolks.

Dairy fats found in butter, cheese and yogurt have been shown to lower your diabetes risk specifically. MCT oil is another healthy fat – just be sure to avoid taking it during partial fasting days once you've started KetoFasting, as exogenous ketones will inhibit autophagy.

Tip No. 6 – Drink Plenty of Clean Pure Water

Next, be sure to drink plenty of clean, purified water. Organic black coffee (meaning no milk or sugar) and tea are other healthy choices. Steer clear of all sweetened beverages, including "diet" drinks sweetened with artificial sweeteners and fruit juices.

As for how much water you need, your best bet is to use thirst and the color of your urine as a guide, along with frequency of urination.

- Thirst – Simply using thirst as a guide to how much water you need to drink is a simple way to help ensure your individual needs are met, day by day
- Color – If your urine is a deep, dark yellow, then you are likely not drinking enough water. Light straw-colored urine is typically a sign of sufficient water intake
- Frequency of urination – If your urine is scant or if you haven't urinated in many hours, that too is an indication that you're not drinking enough. Based on the results from a few different studies, a healthy person urinates on average about seven or eight times a day

Tip No. 7 – Eat More Nuts and Seeds

In addition to being a good source of healthy fats, nuts and seeds are also an excellent source of magnesium, which many are deficient in. Lack of magnesium may raise your risk of insulin resistance as it plays an important role in carbohydrate and glucose metabolism. Magnesium helps your body metabolize carbs and glucose properly. As noted by Today's Dietician:¹⁹

"Epidemiologic data^{20,21} suggest that for every 100 mg/day increase in dietary magnesium, the risk of developing type 2 diabetes decreases by approximately 15%. The few clinical studies^{22,23} showing efficacy in improving insulin sensitivity with magnesium supplementation have used doses between 300 and 365 mg/day."

Some of the most magnesium-rich seeds include sunflower, black sesame, black cumin, pumpkin and chia seeds. Among these, black cumin (*nigella sativa*) deserves special mention, as studies have shown it can help prevent both Type 1 and Type 2 diabetes.

In one study, black cumin improved glucose tolerance as efficiently as metformin.²⁴ As a source of healthy fats, my preferences go to macadamias, pecans and walnuts, as they are high in fat while being lower in protein.

Tip No. 8 – Properly Prescribed Exercise

Last but not least, you need exercise, focusing more on strength/resistance training than cardio. Research²⁵ published in *Medicine & Science in Sports & Exercise* found even a single session of moderate exercise can improve the way your body regulates glucose and reduces postprandial glucose spikes, and several studies have demonstrated the benefits of strength training for diabetes specifically.

Among them is a 2017 study,²⁶ which found strength training lowered women's risk of Type 2 diabetes by 30%. Adding aerobic exercise on top of it reduced the risk even further. Participants who performed at least 120 minutes of aerobic exercise per week, along with some form of strength training, had a 65% lower risk for Type 2 diabetes than those who did neither.

Research²⁷ published in April 2019 found a link between muscular strength and Type 2 diabetes incidence. People with mid-level muscular strength, measured using leg and bench press tests, had a 32% lower risk of Type 2 diabetes compared to weaker cohorts, irrespective of cardiorespiratory fitness. No significant association between diabetes and upper level muscle strength was observed, however.

A third example of this kind of research was published in BioMed Research International in 2013.²⁸ This review also investigated the mechanisms of how exercise lowers your risk of diabetes. One way by which strength training improves your glucose metabolism is by increasing glucose transporter type 4 (GLUT4) translocation in skeletal muscle.

GLUT4 translocation occurs as a result of muscle contraction,²⁹ and is required for proper regulation of glucose uptake in your muscles. Strength training increases your insulin sensitivity, as lean muscle is highly sensitive to insulin,³⁰ which helps restore metabolic flexibility.

By using insulin more efficiently, your body also ends up using more glucose, leaving less to circulate in your bloodstream — hence the improvements in glucose control.^{31,32} "Increased energy expenditure and excess postexercise oxygen consumption in response to resistance training may be other beneficial effects," the review paper³³ notes.

High-intensity interval training (HIIT) has also been shown to effectively reduce your risk for diabetes. In one such study,³⁴ older overweight Type 2 diabetics improved their glucose regulation in just six HIIT sessions done over the course of two weeks.

Participants performed 10 bouts of 60-second cycling at 90% of their maximum heart rate, interspersed with 60 seconds of rest (total time spent exercising was one hour per week). Overall, the average 24-hour blood glucose concentration was reduced from 7.6 mmol/L (\pm 1.0) to 6.6 mmol/L (\pm 0.7) following the exercise.

According to the authors, "Our findings indicate that low-volume HIIT can rapidly improve glucose control and induce adaptations in skeletal muscle that are linked to improved metabolic health in patients with Type 2 diabetes."

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