



INSULIN RESISTANCE OPTIMAL BODY BALANCE

How Does a High Refined Carbohydrate Intake Affect My Body?

- Carbohydrate food is eaten
- Carbohydrate is converted to glucose (simple sugar)
- Pancreas sends out insulin (which brings glucose inside the cells)
- Blood sugar levels remain high because insulin receptor sites on cells have become damaged due to overconsumption of refined carbohydrates
- Insulin resistance
- Blood sugar remains high
- Pancreas produces more insulin
- Result = too much insulin and glucose in the blood stream
- Send glucose to fat cells
- Stored as triglycerides
- Fat cells become resistant to insulin
- Blood sugar remains high
- Type 2 Diabetes

Did you know....?

One teaspoon of sugar has the ability to suppress immune function for 5 hours. There are 10-12 teaspoons of sugar in the average cola.

Use high glycemic foods as condiments (not foods)!

How do I prevent this from happening to me?

- Avoid refined carbohydrates – anything that has sugar, white flour, high fructose corn syrup, ect...
- Eat whole foods (as close to nature as possible) – whole foods contain complex carbohydrates that produce a slow release of glucose into the blood.
- Eat complex carbohydrates with a fat or protein – combining carbs with a protein and/or fat will also help slow down the sugar release into the blood stream.
- Focus on Low Glycemic foods - these foods have the lowest effect on blood sugar.
- Exercise – this will release stored glucose and get it back into circulation. The combination of aerobic, and more importantly, resistance training seems to help cells become more insulin sensitive.



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Fiber... Are You Getting Enough?

The average American consumes 12 grams of fiber per day. In 1850 the average consumption was 25-30 grams, which is the same number that the American Cancer Institute recommends today. (Lipski 58) As the numbers illustrate most we are falling short of reaching optimal levels.

Before addressing how to increase your fiber intake, I want to explain the two different types of fiber and what roles they play in the body. Essentially, dietary fiber is the non-digestible component of carbohydrates naturally found in plant food and is further broken down in the following two categories:

Soluble fiber – is made up of polysaccharides (carbohydrates that contain three or more molecules of simple carbohydrates), and it dissolves in water. Soluble fiber has the ability to bind with fatty acids and also prolong stomach emptying time so sugar can be released more slowly. This type of fiber helps to regulate blood sugar and also aids in lowering the total and LDL cholesterol counts. Soluble fibers are often viscous (gel-like consistency). Some examples are: psyllium husks, flax seed, glucomannan, oat bran, dried beans and peas, fruits (apples, pears, citrus fruits, berries, apricots, prunes), and vegetables (carrots, cabbage, Brussels sprouts, sweet potatoes).

Insoluble fiber – is mainly made up of plant cell walls, and it cannot be dissolved in water. Insoluble fibers move bulk through the intestines and also help to control and balance the pH of the bowel. The bulking action of insoluble fiber aids in alleviating constipation and also helps to sweep toxins out of the body. Insoluble fibers can be found in the following foods: vegetables, such as green beans and dark leafy greens, fruit skins and root vegetable skins, whole wheat products, corn bran, nuts and seeds.

Here are some ways to add more fiber to your diet. (Stick as close to nature as possible)

- Replace white flour products with whole grains.
- Consume at least 5 servings of vegetable and fruits daily.
- Switch from white rice to brown rice.
- Add beans to some of your meals.
- Take supplements, such as psyllium, flax seed or glucomannan.

Fiber even helps a person feel full. It can also aid in weight loss by stimulating the increased production of CCK (the satiety neurotransmitter) and reducing ghrelin (the hunger hormone).



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Best High Fiber Foods

FOOD	SERVING SIZE	TOTAL FIBER
All Bran Cereal	½ cup	10-13
Psyllium Husks	2 tablespoons	16
Wheat Bran	¼ cup	7
High Fiber Cereals	½ cup	10-14
Flax Meal	1 tablespoon	2.8
Apple	1 medium	3.5
Oat Bran	¼ cup	4
Prunes	3 medium	3
Kidney Beans	½ cup	7.3
Lima Beans	½ cup	4.5
Navy Beans	½ cup	6
Lentils	½ cup	3.7
Peas	½ cup	3.6
Spaghetti (Whole Wheat)	½ cup	2
Apricots (Dried)	5 halves	1.4
Raspberries	½ cup	4
Blueberries	½ cup	2
Grapefruit	half	1.6
Pear	1 medium	3.2
Bread (Whole Wheat)	1 slice	1.4
Figs (Dried)	3 medium	5.3
Chickpeas	½ cup	7
Potatoes (With Skin)	1 medium	2.5
Broccoli	1 cup	4.6
Sweet Potato	½ cup	3
Orange	1 medium	2.6
Spinach	1 cup	4.2
Pita Bread (Whole Wheat)	1 piece	5
Corn	1 ear	5
Barley	½ cup	8

Best Sources of Soluble Fiber Are:

oat bran – kidney beans – lentils – sweet potatoes – raspberries – oranges – broccoli – pears – apples – barley – peas

Best Sources of Insoluble Fiber Are:

wheat bran – legumes – skin of fruit – dark leafy greens – seeds and nuts



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Testing for Insulin Resistance

There is no one test that can directly detect insulin resistance. However, your medical doctor can order the following tests to develop a more complete picture:

Fasting glucose (blood sugar) – this measures your blood sugar after fasting (usually for 12 hours). Fasting glucose testing is a very effective measure of how well your body is currently regulating blood sugar. However, this test is ineffective as a measure to discover insulin resistance before it becomes a full blown disorder.

Glucose Tolerance Test (GTT) – this involves taking a blood glucose (sugar) measurement before and at timed intervals after a glucose challenge (which means you take a set amount of sugar and see how your body responds over time). The goal of testing is to determine whether you have an impaired response to consuming sugar. This test (as well as other post-meal/ challenge tests) is a much better measure of determining insulin resistance in its early stages.

Fasting lipid profile – this measures the HDL, LDL, triglycerides and total cholesterol in the blood after fasting. Elevated triglycerides and/or LDL levels and low HDL levels are markers for insulin resistance.

If one has increased fasting glucose levels, irregular glucose tolerance, increased levels of triglycerides and LDL and/or decreased HDL, insulin resistance should certainly be suspected. Several other laboratory tests can also be ordered to help evaluate insulin resistance and provide additional information including:

Fasting insulin – insulin levels will usually be elevated in those with significant insulin resistance. However, a person can still be in the early stages of insulin resistance and exhibit normal fasting insulin levels.

hs-CRP – high sensitivity C-reactive protein is a very accurate measure of low levels of inflammation; it may be increased with insulin resistance. It can also be elevated with heart disease, cardiovascular disease and other processes involving inflammation.

Lipoprotein sub fractions test – this test provides more information about your risk of cardiovascular disease by breaking down the lipid profile mentioned above into its component parts and can reveal signs of insulin resistance. People with insulin resistant will most often have an elevated triglyceride: HDL-C ratio (suspect insulin resistance when this ratio is above 3.5), elevated small-dense LDL particles, elevated large triglyceride-rich VLDL particles, smaller HDL particles and increased C-reactive protein levels. (69,70)

Insulin tolerance test (ITT) – although this test is not widely used, it is one method for determining insulin resistance, especially in obese individuals and those with polycystic



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ovarian syndrome (PCOS). This test involves an IV infusion of insulin with subsequent measurements of glucose and insulin levels.

These tests can be completed at your physician's office. Alternatively, you can order the **LPP Plus** profile; this test provides an analysis of your fasting lipid profile, fasting insulin, C-reactive protein and lipoprotein sub fractions. In addition, the **LPP PLUS** profile also includes analyses of you lipoprotein particle numbers, homocysteine and Lipoprotein (a) levels, which can be used to provide valuable insights into which therapeutic approaches may be most effective to correct any underlying metabolic or inflammatory imbalances which may be at the heart of insulin resistance, blood sugar dysregulation and/or cardiovascular disease risk.

Because so many nutrients and a person's nutritional status can play such an important role in one's susceptibility to and recovery from insulin resistance, determining your specific nutritional status is very important. Several tests are available, but we have found two to be particularly useful.

Micronutrient Test – This test provides a functional assessment to identify specific nutritional deficiencies and antioxidant status at a cellular level. Performing this test will allow us to formulate a customized supplementation plan to address your exact needs. This test is also a great way to determine if you are taking too many vitamins or minerals and can cut back on supplementation. This test requires a blood draw and specialized training to interpret. [Click here to learn more or order a Micronutrient Test](#) (including an in-home blood draw if necessary).

If a blood draw is not possible or desirable, a [Metabolic Profile](#) or [Metabolic Profile Plus Fatty Acid Bloodspot](#) can provide useful information to determine not only your nutritional status, but other factors and underlying metabolic imbalances.

Metabolic Profile - This test requires a single urine specimen and provides information about:

Vitamin and mineral insufficiencies	Neurotransmitter imbalances
Amino acid insufficiencies	Energy production
Oxidative damage and antioxidant status	Methylation status
Detoxification	Dysbiosis

This test is especially useful for those that suffer from any of the following:

Fatigue	Muscle/nerve disorders	Chemical/environmental sensitivities
Digestive problems	Memory issues	Headaches/brain fog
Weight loss issues	Mental, emotional or behavior problems	Gastrointestinal issues
Depression/anxiety	Detoxification imbalances	



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Metabolic Profile Plus Fatty Acid Bloodspot - in addition to the markers included in the Metabolic Profile, this profile also includes a comprehensive assessment of key omega-3 and omega-6 fatty acids, as well as trans fatty acids. This test is indicated if **inflammation is one of your Underlying Metabolic Imbalances**, if you take statin medications or fish oil supplements, have decreased immune function, or if more comprehensive testing is desired.

Supplementation for Insulin Resistance

The fact that most people's diets are extremely deficient in many nutrients due to the consumption of refined, fatty foods and the exclusion of fruits, vegetables and whole grains means that almost everyone would benefit from taking a high-potency multivitamin-mineral supplement every day. Even those that consume a healthy diet should think of this as an insurance policy to counterbalance any inadequacies in the diet and to compensate for the added nutritional requirements caused by our modern lifestyle. Believe me, it's the cheapest insurance policy you will every buy.

We recommend several formulas to provide foundational support, including **Wellness Essentials Women** or **Women's Prime (for menopause and beyond)** or **Wellness Essentials Men's Vitality**

In addition, there are a whole host of nutrients and botanicals that have been shown to help maintain normal blood sugar levels naturally.

Nutrients and botanicals to help maintain health blood sugar levels:

Chromium	Vanadium	Myo-inositol	Fenugreek
Magnesium	Biotin	Lipoic Acid	American ginseng
	Vitamin D	Cinnamon	

Chromium

Chromium is a trace mineral that improves the action of insulin and helps move blood sugar and other nutrients into the cells. Chromium is a key constituent in a molecule known as glucose tolerance factor (GTF). This molecule facilitates the uptake of blood sugar into cells in conjunction with insulin. In other words, chromium doesn't cause the body to make more insulin - it just makes insulin work better.

Numerous studies have shown chromium intakes between 200-1000 mcg/day to be both safe and effective in the management of insulin resistance, showing improvements in fasting glucose (blood sugar), HbA1c (glycosylated hemoglobin, which is a measure of blood sugar control over time), fasting insulin and cholesterol levels. In addition, research has concluded



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that non-insulin dependent diabetic patients have compromised chromium status, when compared to healthy controls. The researchers speculate that this is one of the factors leading to insulin resistance in these patients.

Vanadium

Vanadium is another trace mineral that has shown to be extremely effective at lowering blood sugar by mimicking insulin and improving the cells' sensitivity to insulin. Supplementation with vanadyl sulfate and other vanadium compounds markedly lowers fasting glucose and improves other measures of insulin resistance and diabetes. Studies have shown that vanadium is quite safe at doses of 100 mg/day of vanadyl sulfate and other studies have shown it to be successful and safe at doses up to 400 mg/day.

Magnesium

Multiple studies have shown the importance of magnesium supplementation in the management of insulin resistance. One such study published in 2003 in the journal Diabetes Care found that those that supplemented 2.5 grams of magnesium chloride (50 ml of 5% MgCl₂) per day for 16 weeks had statistically significant improvements in insulin sensitivity.

Vitamin D

Research on vitamin D continues to indicate a lack of this nutrient is critical in many disorders and disease processes. In regards to insulin resistance, it has been shown that diabetes is significantly more prevalent in people with low serum levels of vitamin D. A recent study indicated that supplementation with the equivalent of 8500 IU of vitamin D₃ daily significantly increased serum vitamin D levels (25-hydroxy vitamin D) and improved insulin sensitivity. These results are consistent with the results of an earlier study that showed a lower rate of insulin resistance in a group supplemented with calcium and vitamin D compared to the placebo group. We generally recommend **D3-5000** – 1-2 capsules/day or **Bio-D-Mulsion Forte** – 1-5 drops daily with food.

Biotin

Biotin is usually included in the B-complex of vitamins; most of it is produced by healthy gut microbes. Biotin plays a role in a number of relevant activities including stimulation of glucose-induced insulin secretion and enhancing insulin sensitivity. Because biotin can be synthesized by the microbes in the gut, it also highlights the importance of maintain healthy gut flora (microbes) so that adequate biotin can be produced.

Myo-inositol

Myo-inositol is the most prominent form of inositol in nature and is also widely categorized in the B-vitamin complex. Inositol and a number of compounds derived from it affect how



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effectively the body can send and receive messages from messenger molecules called neurotransmitters. In fact, several studies have shown that high-dose inositol supplements show promising results for people suffering from problems associated with neurotransmitter imbalance such as bulimia, panic disorder, obsessive-compulsive disorder, and unipolar and bipolar depression. Once more, a recent study showed that four grams of myo-inositol daily significantly improved insulin resistance, blood pressure, cholesterol and triglyceride levels in postmenopausal women in six months. Thus, inositol may affect insulin resistance not only through direct effects on blood sugar control, but also indirectly through improving neurotransmitter signaling.

Alpha Lipoic acid

Alpha lipoic acid is a powerful antioxidant that is known for its ability to improve insulin sensitivity. Studies have shown significantly improved insulin sensitivity with lipoic acid at doses from 600-1800 mg/day.

Cinnamon

Cinnamon, a common spice used throughout the world, has shown value in managing insulin resistance and type II diabetes in both laboratory and human studies. Cinnamon contains many beneficial chemical compounds, such as flavonoids that act as potent antioxidants. Studies have shown that supplementing cinnamon at doses of 1, 3 or 6 grams daily can significantly improve insulin sensitivity and significantly decrease fasting blood sugar, triglycerides, total cholesterol and low-density lipoproteins (LDL). Not too bad for a great tasting spice! Note that the doses used in these studies is much higher than you would normally use in cooking, but that shouldn't stop you from using cinnamon regularly in your daily recipes!

Here is a protocol that is often used to get the benefits of all these compounds without getting buried by bottles of pills:

Glycemic Foundation:

1-2 scoops daily

Diaxinol: 1 capsule twice daily with meals

The Role of Supplements

What these studies show is that you can use supplements to help control your blood sugar. However, supplements are not a replacement for making dietary and lifestyle changes. No amount of pills can ever make up for a poor diet or an unhealthy lifestyle. What supplementation can do is speed up the healing process and enable you to reach your goals much faster than if you didn't use them. However, in many cases they are not absolutely necessary to achieve your goals.