

# Blood Sugar

## Blood Sugar Imbalance

When talking about blood sugar imbalance, there are two possibilities:

1. **Insulin resistance**, which is characterized by two things: chronically elevated blood sugar levels, and subsequent elevated insulin levels to help deal with the blood sugar.
2. **Hypoglycemia**, which refers generally to low ("hypo") blood sugar ("glycemia"), but is really characterized by blood sugar *fluctuations* — sometimes it's high and sometimes it's low.

Both, however, have insulin surges.

And while each of these have their separate issues metabolically, both will cause issues with the function of mitochondria because there is not a steady stream of blood sugar available for ATP (energy) production.

## Insulin Resistance

When someone is insulin resistant, glucose cannot effectively enter into the cell — chronically elevated insulin levels create dysfunctional insulin receptor sites on the cell. Since blood sugar is not adequately entering the cells, it stays in general circulation rather than being stored. As a result, the body must produce higher levels of insulin to remove glucose from the blood stream, which causes even greater metabolic dysfunction.

Characteristic symptoms of insulin resistance include: fatigue after meals, craving for sweets that doesn't go away when sweets are eaten, increased thirst, and frequent urination.

## Hypoglycemia

Clinically, reactive hypoglycemia can be viewed as fluctuations in blood sugar. People with hypoglycemia can experience symptoms such as lightheadedness, irritability, shakiness and fatigue between meals, which is often relieved after eating.

Individuals with this pattern of periods of low blood sugar will have surges of insulin, rather than chronically elevated levels. Normally, the body should respond to low blood sugar by producing cortisol to increase blood sugar levels. However, in this case, periodically hypoglycemic people usually have low adrenal function and rely on adrenaline to elevate blood sugar between meals, causing the shakiness and lightheadedness between meals. Symptoms are usually relieved after eating because meals provide a source of glucose that their body could not create itself.

Because their bodies rely on adrenaline to elevate blood sugar, people with some degree of hypoglycemia can have insulin surges between meals, rather than following meals as in insulin resistance.

### Hypoglycemia Tendencies

### Insulin Resistant Tendencies

Feels better after meals

Feels tired after meals

Sugar cravings before meals

Sugar cravings after meals

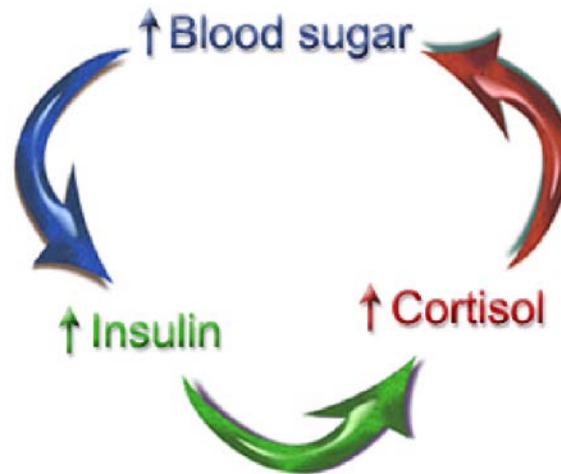
May have difficulty staying asleep at night

May have difficulty getting to sleep at night

# The Cycle

Looking healthy, having a muscular body and exercising regularly, is not an indication that you have normal blood sugar management. In fact, researchers have started using new terms like “non-obese insulin resistance” and “atypical metabolic syndrome” because normal-looking people are having blood sugar management issues.

Below is a common cycle in people today.



Though there are a number of mechanisms involved in this cycle, here is a basic explanation. Elevated blood sugar increases insulin. Insulin causes an increase in cortisol and cortisol increases blood sugar. And round and round it goes.

People can enter into this cycle in one of two ways. The first is through improper eating. Excess sugar or carbohydrates, excessively large meals or glycemic imbalanced meals can excessively elevate blood sugar levels, causing this cycle to begin.

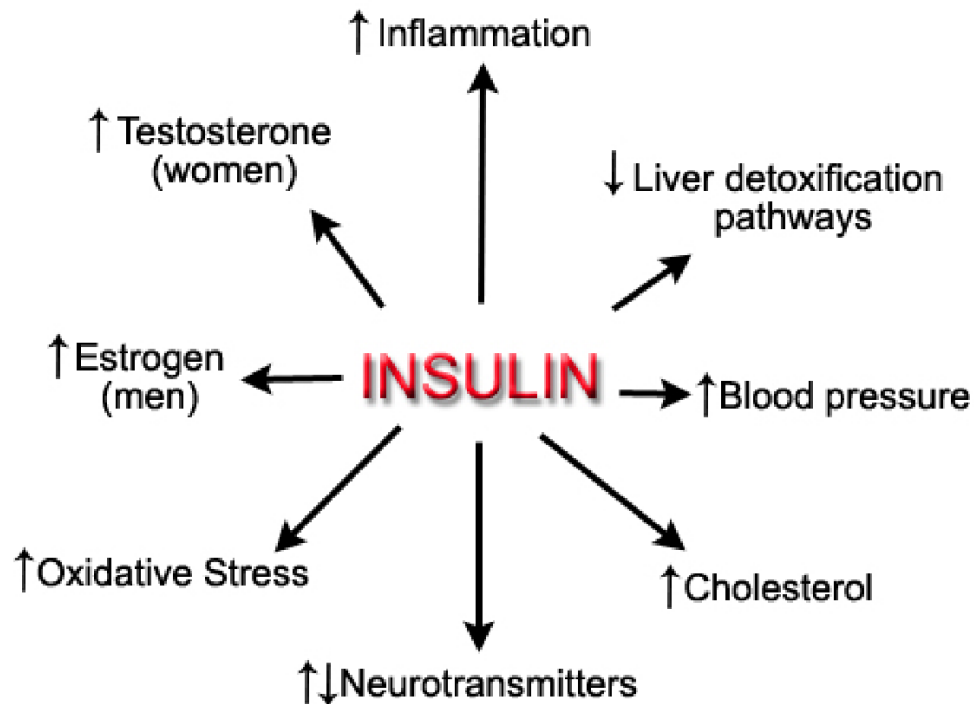
The second way the cycle can be started is via cortisol. Anything that elevates cortisol (i.e. stress, parasitic infection, food allergies, inflammation, etc.) will also elevate blood sugar and therefore insulin levels. In other words, you could have a perfect diet and exercise program, but if you have elevated cortisol levels, you may also be increasing your blood sugar from the inside.

Blood sugar dysregulation and elevated insulin levels have negative impacts on numerous physiological systems in the body. If adequate glucose cannot enter a cell, the mitochondria will not be able to produce optimal amounts of ATP to run the cells, organs and systems of the body.

The mitochondria use two primary sources of fuel to produce the energy required to run your body effectively: oxygen and glucose. Clinically, these are “high priority” situations because if either one of these processes are not working correctly, nothing will. It doesn’t matter if it is a hormonal issue, thyroid issue, cardiovascular issue, neurological issue, or weight loss issue — if you cannot get oxygen and/or glucose into the cell for energy, nothing will work as well as it should. These are basic fundamentals to health and fitness that must be addressed before deciding which supplement works better or whose workout program is the best for fat loss.

## Too Much Of A Good Thing

Insulin is necessary for life. Without it, you would not be alive. But as with most hormones, insulin should be balanced. In excess, elevated insulin levels have a host of negative consequences on the body. Here are some reasons you want to take insulin seriously.



## What To Do

The best way to determine whether you have blood sugar issues is to get blood work done. A good blood chemistry screen will contain enough markers to adequately identify patterns of blood sugar mismanagement. Here is a very general guideline of patterns to look for in blood work.

### Hypoglycemic patterns

Fasting blood sugar below 85 mg/dL  
LDH (lactate dehydrogenase) below 140 U/L

### Insulin resistant patterns

Fasting blood sugar above 100 md/dL  
Triglycerides above 100 mg/dL\*  
HDL cholesterol below 55 mg/dL  
Cholesterol above 200 mg/dL  
LDL cholesterol above 120 mg/dL

\*The closer the triglycerides are to the cholesterol, the worse the problem. Ideally they will be a 2:1 ratio or more (i.e. Total cholesterol=180, triglycerides=90).

Understand that these are merely patterns and there are many more issues to consider. These are very general guidelines to help you get started. Please see a qualified licensed healthcare provider for an accurate diagnosis.