

HYPOGLYCEMIA

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Hypoglycemics are people who experience low levels of glucose in their blood stream. Typical symptoms include: craving sweets, lightheadedness, shakiness, low energy, and headaches. All these occur between meals. Because the body works so hard to maintain stable blood sugar levels and sacrifices other systems when necessary by stealing their required nutrients, a person whose glucose levels are not within normal ranges already has a serious metabolic imbalance underway. For example, hypoglycemics generally have plenty of stored fuel in the form of fat but are no longer able to use their foundational energy reserve. This, as explained below, is the result of the fight-or-flight response and is the reason why many hypoglycemics cannot lose weight even with a yeoman's effort. Other signs are also present when the blood sugar system is strained. In fact, because of its influence over so many bodily systems, any blood sugar problem means that a cluster of functional issues are present simultaneously.

Hypoglycemics are not usually hungry in the morning. That is because they have been under stress all night. Imagine Cynthia on her way to meet friends for a late dinner at a popular restaurant. One block before she arrives, a mother pushing her baby in a stroller walks directly out in front of the car. Luckily, Cynthia sees them in time, slams the brakes, and averts tragedy. However, inside her body everything has changed. The mild hunger pangs and the pleasant thoughts of her favorite meal are now gone. A surge of adrenaline has activated the sympathetic nervous system. Her heart is racing, her pupils are dilated, and her breathing is rapid and shallow. Blood flow is also diverted away from the digestive organs and into the big muscles. Cynthia is experiencing a full-blown fight-or-flight response. The process, once begun, takes time to diminish. With her appetite gone, Cynthia retells the event to her friends while occasionally sipping on some wine. After an hour, she is finally able to have a few bites of her favorite course but is still trembling on the inside. This illustration is a dramatic example of what happens every night in the body of the hypoglycemic.

Only a few hours after dinner, as hypoglycemics curl up in bed to go to sleep, glucose levels begin to drop. With no food in sight, their bodies must find some blood sugar in order to fuel the brain. The glycogen cabinets in the liver and kidneys are either empty or locked. In either case, the normal means of acquiring glucose are not options. So, the body takes an emergency measure. It releases adrenaline, one of the chief fight-or-flight hormones, in order to make glucose from the muscles, a process called gluconeogenesis. Prolonged destruction of muscle for fuel is a highly inflammatory and nutrient-depleting process, worsening an already serious functional problem and creating restless sleep.

All night long, the hypoglycemic tosses and turns as his body tries to find rest in a state of high sympathetic activity. Getting up to go to the bathroom for the second time, he reminds himself not to drink water before bed. This has little to do with the problem. Night time urination is rarely an issue

when the blood sugar system is properly working. The chemicals from the fight-or-flight response are toxic, and the body must eliminate the toxins through the kidneys as soon as possible, even at the expense of sleep. This is why night-time urination in the hypoglycemic is unavoidable. When sleep does occur, vivid dreams, the result of an overactive liver processing the same noxious chemicals as the kidneys, often keep it from being restful. When morning finally arrives, the fight-or-flight response has been at work for many hours, and so appetite, like in Cynthia's case above, is absent.

Even though hypoglycemics have little desire for breakfast, skipping the morning meal is one of the worst things they can do. It allows for the further perpetuation of the body's muscle-stripping emergency measures in order to retrieve glucose. Instead, forcing the body to move in a different direction by changing lifestyle habits is essential. This means eating a protein-based meal even if a person can only tolerate a few bites. Usually, half a hardboiled egg with a piece of toast and a bite of a green vegetable is sufficient. This dietary step is critical because the degenerative disorders linked to high ingestion of refined carbohydrates are many, including the following ones: ⁱ

- Arthritis
- Autoimmune Disorders
- Cancer
- Chronic Fatigue
- Diabetes
- Fibromyalgia
- Heart Disease
- Hypo and hyperthyroidism.

Since the mid 1990's, books, such as *The Adkin's Diet*, *The Zone*, *The Paleo Diet*, *Protein Power*, and the *South Beach Diet* have recommended controlling blood sugar levels by eating higher amounts of protein. Each of these books works to correct the glucose imbalances the fight-or-flight response and the over-consumption of refined foods and sugars create. These diets are not without their problems. Too much protein has concerns of its own. However, if they help people overcome their addiction to sugar while balancing their blood sugar system at the same time, they will have done a great service to the population as a whole.

Remember, blood sugar problems are part of most functional illnesses. Without their correction, the body cannot fix certain significant illnesses. To make matters worse, prolonged hypoglycemia leads to even more serious blood sugar problems, such as insulin resistance and diabetes.

Correcting Hypoglycemia with FBA

There are four main substances to consider when evaluating hypoglycemia: insulin, glycogen, glucose, and glucagon. Samples of these substances, called biomarkers, are evaluated by the FBA practitioner through manual muscle testing.

The chart shows the three primary blood sugar imbalances—hypoglycemia, insulin resistance, and diabetes—and the relationship of the four main biomarkers, whether they are too high, too low, or normal. Testing the biomarkers with FBA will reveal a patient’s current blood sugar category.

Condition	Glucose	Insulin	Glycogen	Cortisol
Hypoglycemia	↓	↑ or normal	↓ or ↑	↑ then ↓
Insulin Resistance	↑	↑	↓ or ↑	↑ then ↓
Diabetes	↑	↓	↓	↓

In the case of hypoglycemia, the answer is almost always glycogen. As in the chart above, glycogen will either be high or low. This is because the body either has a manufacturing problem and consequently glycogen output is low, or the body already has plenty of glycogen but needs to make better use of what it already has. The more common of these two problems is low levels of glycogen. To make this important glucose-storing molecule, the body requires plenty of usable calcium and a hormone from the adrenal glands called cortisol.

Since glycogen is something the body would like to have, simply placing a sample of it on the body temporarily excites the nervous system. This facilitating response is enough to cause a weak test-muscle to become strong. Next, the practitioner can check for calcium in its various forms and/or cortisol. One of the two will also excite the nervous system. When one does, the practitioner has found a large piece of the hypoglycemia puzzle. The person should take the needed nutrient in supplement form while correcting lifestyle choices contributing to the problem. For some, just one of these two nutrients is sufficient. For others, the metabolic issues are far more complex.

A second problem that can cause hypoglycemia has to do with the inefficient use of glycogen. There is plenty of it in the storage cabinets, but the cabinets are locked and no one can find the key. When glycogen is stuck in storage, the key that lets it out is vitamin B6, called pyridoxine. In some cases (usually cases involving genetic issues) only the activated form of B6 will do. Most activated forms of vitamins have a phosphorous molecule attached to them. Thus pyridoxine in its activated form would be called pyridoxal-5-phosphate. People with this particular low-glucose problem have plenty of calcium and cortisol from their adrenal glands but have somewhere along the way been stripped of B-vitamins. B6 is more than just a key for glycogen cabinets. In the nervous system it is used to relax tingling and trapped nerves;ⁱⁱ in the brain it helps process neurotransmitters and aids in seizure reduction;ⁱⁱⁱ in the mitochondria, it helps promote energy creation; and in the spleen, it is essential to metabolize histamine, the chemical found in high amounts during allergic reactions.

A final form of hypoglycemia has to do with the inability of the cells themselves to absorb glucose. This occurs when there is a shortage of either chromium or vanadium—the doorman and the butler. It is the job of insulin to escort glucose to the cell. Once it arrives, insulin knocks on the cell door and waits for the doorman. The doorman is chromium.^{iv} Without this important trace mineral, the door stays closed. In other words, there could be plenty of glucose available for energy but if it can't get into the cell, it is for all practical purposes useless. If the doorman does open the door, the body needs to take another step. The butler must welcome glucose into the cellular mansion. The butler is vanadium, another important trace mineral. A quick check of these biomarkers with FBA will ensure the body is making and releasing glycogen, and that glucose will be able to get into, and be used by, the cells.

ⁱ Brownstein, David. *Overcoming Thyroid Disorders*. Medical Alternative Press, West Bloomfield MI, 2004. P. 196

ⁱⁱ Keniston RC, Nathan PA, Leklem JE, Lockwood RS. Vitamin B6, Vitamin C, and Carpal Tunnel Syndrome. A Cross-Sectional Study of 441 Adults. *J Occup Environ Med*. 1997 Oct;39(10):949-59.

ⁱⁱⁱ Wang HS, Kuo MF et al. Pyridoxal Phosphate is Better than Pyridoxine for Controlling Idiopathic Intractable Epilepsy. *Arch Dis Child*. 2005 May;90(5):512-5.

^{iv} Wang YQ, Yao MH. *J Nutr Biochem*. Effects of Chromium Picolinate on Glucose Uptake in Insulin-Resistant 3T3-L1 Adipocytes Involve Activation of P38 MAPK. 2009 Dec;20(12):982-91.