

Thyroid Health

Many people with hypothyroidism are producing antibodies to their own thyroid tissue (1). This causes the autoimmune system to attack and destroy the thyroid, which over time will cause a decline in thyroid hormone levels. This autoimmune condition, called Hashimoto's, is the most common autoimmune disorder in the United States and affects between 7-8% of the population.

Most doctors know that hypothyroidism is an autoimmune disease. But most doctors don't tell their patients about it. Why? Most doctors don't realize the impact that diet and gut health have on the thyroid. Another reason is because it doesn't affect their treatment plan which is to simply prescribe thyroid hormone. If other symptoms develop, like depression or insulin resistance which is commonly associated with hypothyroidism, then they'll prescribe additional drugs for those problems.

The obvious shortcoming of this approach is that it doesn't address the underlying cause of the problem, which is the immune system attacking the thyroid gland. And if the underlying cause isn't addressed, the treatment plan isn't going to work very well—or at least for very long.

If you're in a leaky rowboat, bailing water will only get you so far. If you want to stop the boat from sinking, you need to plug the leaks. Extending this metaphor to Hashimoto's disease, thyroid hormones are like bailing water. They may be a very necessary part of the treatment, but unless the immune dysregulation is addressed (plugging the leaks), you are fighting a losing battle.

Hashimoto's often manifests as a "polyendocrine autoimmune pattern". This means that in addition to having antibodies to thyroid tissue, it's not uncommon for Hashimoto's patients to have antibodies to other tissues or enzymes as well. The most common are transglutaminase (Celiac disease), the cerebellum (neurological disorders), intrinsic factor (pernicious anemia), glutamic acid decarboxylase (anxiety/panic attacks and late onset or type 1 diabetes).

What the vast majority of hypothyroidism patients need to understand is that they don't have a problem with their thyroid; they have a problem with their immune system attacking the thyroid. This is crucial to understand, because when the immune system is out of control, it's not only the thyroid that will be affected.

We will be addressing many factors related to thyroid health: the gluten to thyroid connection, nutrients that affect thyroid function, the blood sugar-thyroid connection, how gut bacteria affect the thyroid, and how stress affects the thyroid (and some surprising stressors).

The Gluten-Thyroid Connection

Several studies show a strong link between autoimmune thyroid diseases (both Hashimoto's and Graves) and gluten sensitivity. The link is so well established that researchers suggest all people with autoimmune thyroid disorder (AITD) and even other types of autoimmune disease be screened for gluten sensitivity and vice versa.

Why is this? It's a case of mistaken identity. The molecular structure of gliadin (the protein portion of gluten) closely resembles that of the thyroid gland. When gliadin breaches the protective barrier of the gut and enters the bloodstream, the immune system tags it for destruction. These antibodies to gliadin also cause the body to attack the thyroid tissue. This means that if you have AITD and you eat foods containing gluten, your immune system will attack your thyroid.

Even worse, the immune response to gluten can last up to 6 months each time you eat it. This explains why it is critical to eliminate gluten completely from your diet if you have AITD. There's no "80/20 rule" when it comes to gluten. Being "mostly" gluten free isn't going to cut it. If you have a gluten sensitivity, you have to be 100% gluten free to prevent immune destruction of your thyroid.

How do you find out if you have a gluten sensitivity? Unfortunately, standard lab tests are not very accurate. They test for antibodies to gluten in the bloodstream. But antibodies in the blood will only be found in cases where the gut has become so permeable that gluten can pass through. This is a relatively advanced stage of disease. Blood tests will miss the many milder cases of gluten intolerance that haven't yet progressed to that stage.

That's why most experts on gluten sensitivity agree that the only reliable test for gluten sensitivity is a "gluten challenge." This involves removing gluten from the diet completely for at least 30 days (though preferably 3 months), and then adding it back in after that. If symptoms improve during the elimination period and return when gluten is reintroduced, a diagnosis of gluten sensitivity can be made.

However, for many people a gluten free diet isn't enough. Some grains that don't contain gluten, such as corn, oats and rice, contain proteins that are similar enough in structure to gluten to elicit an immune response. Moreover, about 50 percent of celiac patients and 30 percent of those with gluten sensitivity also are sensitive to casein (the protein in milk).

One reason gluten sensitivity goes undetected in so many cases is that both doctors and patients mistakenly believe it only causes digestive problems. But gluten sensitivity can also present with inflammation in the joints, skin, respiratory tract and brain—without any gut symptoms.

Another problem is that, because their immune system is so worn out, some patients with autoimmune disease no longer produce many antibodies.

G. DeAn Strobel, MD, PA

Hormonal Balance & Wellness

Hashimoto's, the most common AITD, is primarily a TH1 dominant condition. The basic information to understand is that in TH1-dominant conditions, the Th2 is suppressed. The TH-2 is the part of the immune system responsible for producing antibodies. When the Th-2 system is severely depressed, the body's ability to produce antibodies is impaired. The levels may be so low that they won't show up on a test. So, even if you have a gluten sensitivity, your test results may be falsely negative if you have Th-1-dominant Hashimoto's.

In addition, foods that contain gluten often contain substances that inhibit nutrient absorption, damage our intestinal lining, and activate a potentially destructive autoimmune response. Also, there are no nutrients in gluten containing foods that you can't get more easily and efficiently from foods that don't contain gluten.

The good news is that if you have AITD and are sensitive to gluten, removing gluten completely from your diet will dramatically improve your health. It's not easy, but it is worth it.

Nutrients Affecting Thyroid Function

Vitamin D3

Vitamin D deficiency has been associated with numerous autoimmune diseases in scientific literature. Vitamin D plays an important role in balancing the Th1 (cell-mediated) and Th2 (humoral) arms of the immune system. Another role of vitamin D is regulation of insulin secretion and sensitivity and balancing blood sugar. Insulin resistance and dysglycemia (not utilizing blood sugar properly) both adversely affect the thyroid.

Several mechanisms interfere with absorption of vitamin D:

- Since vitamin D is absorbed in the small intestine, a leaky and inflamed GI tract—which is extremely common in people with low thyroid function—reduces the absorption of it.
- High cortisol levels (caused by stress or medications like steroids) are associated with lower vitamin D levels. The synthesis of active vitamin D from sunlight depends on cholesterol. Stress hormones are also made from cholesterol. When the body is in an active stress response, most of the cholesterol is used to make cortisol and not enough is left for vitamin D production.
- Obesity reduces the biologic activity of vitamin D. Obese people have lower serum levels of vitamin D because it gets taken up by the fat cells.
- Not eating enough fat or not digesting fat properly reduces absorption of vitamin D. Vitamin D is fat-soluble, which means it requires fat to be absorbed. People on low fat diets and people with conditions that impair fat absorption (like IBS, IBD, gallbladder or liver disease) are more likely to have low levels of vitamin D.
- A variety of drugs (antacids, oral replacement hormones, corticosteroids, anticoagulants and blood thinners) reduce absorption or biologic activity of vitamin D.
- Aging reduces the conversion of sunlight to vitamin D.

G. DeAn Strobel, MD, PA

Hormonal Balance & Wellness

- Inflammation of any type reduces the utilization of vitamin D.
- Certain inherited conditions.

So, you can see just how many factors influence the absorption and/or utilization of vitamin D. It also works together with other fat-soluble vitamins to be used properly. Both vitamin A and K2 are needed. Great sources of both of these are butter from grass-fed cows and egg yolks from pastured hens. You may also take a supplement containing both vitamins D3 and K2. **The supplement we usually recommend is called ADK 5 or ADK 10.** We carry this in the office. It contains of these essential vitamins.

If you are taking a vitamin D supplement, it is important for your doctor to monitor your blood levels of both vitamin D and calcium. Generally, blood levels of 60-70 ng/mL are desirable, but that will be determined by your doctor.

Iodine and Selenium

Many have heard how important iodine is for thyroid function. But many people do not know that both too much iodine and too little iodine can be harmful. It has now been found that iodine is harmful when the person has a selenium deficiency (6). Iodine and selenium are both needed for healthy thyroid function.

Selenium deficiency is not thought to be common in healthy adults, but is more likely to be found in those with digestive health issues that cause poor absorption of nutrients like Crohn's or celiac disease, or those with serious inflammation due to chronic infection.

Several research studies have demonstrated the benefits of selenium supplementation in treating AITD. However, long term consumption of high doses of selenium is not advised and taking selenium supplements when a person's iodine status is low may aggravate hypothyroidism.

The best option is to consume selenium-rich foods such as Brazil nuts, Crimini mushrooms, cod, shrimp, tuna, halibut, salmon, scallops, chicken, eggs, shitake mushrooms, lamb, and turkey. When supplementation is called for, a safe dose is 150-200 micrograms. Be sure it is balanced with other crucial nutrients for selenium function such as iodine and zinc. **Many of the thyroid supplements suggested by our office contain both selenium AND iodine as well as zinc to avoid these issues (BioTE Iodine+ or Thyrosol).**

Thyroid, Blood Sugar, and Metabolic Syndrome

Studies show both an **increased frequency** of thyroid disorders in diabetics and a **higher prevalence of obesity and metabolic syndrome** in people with thyroid disorders.

That's because healthy thyroid function depends on keeping your blood sugar in a normal range, and keeping your blood sugar in a normal range depends on healthy thyroid function.

G. DeAn Strobel, MD, PA

Hormonal Balance & Wellness

How High Blood Sugar Affects the Thyroid

Metabolic syndrome is defined as a group of metabolic risk factors appearing together, including:

- Abdominal obesity
- High cholesterol and triglycerides
- High blood pressure
- Insulin resistance
- Tendency to form blood clots
- Inflammation

Metabolic syndrome is caused by chronic hyperglycemia (high blood sugar), which is caused by eating too many carbohydrates. Therefore, metabolic syndrome could more simply be called “excess carbohydrate disease”. In fact, some researchers have defined metabolic syndrome as “those physiologic markers that respond to reduction in dietary carbohydrate.”

When you eat too many carbs, the pancreas secretes insulin to move excess glucose from the blood into the cells where glucose is used to produce energy. But over time, the cells lose the ability to respond to insulin. It's as if insulin is knocking on the door, but the cells can't hear it. The pancreas responds by pumping out even more insulin (knocking louder) in an effort to get glucose into the cells, and this eventually causes insulin resistance.

Studies have shown that repeated insulin surges (the pancreas knocking louder) increase the destruction of the thyroid gland in people with AITD. As the thyroid gland is destroyed, thyroid hormone production falls (10).

How Low Blood Sugar Affects the Thyroid

Just as high blood sugar can weaken thyroid function, chronically low blood sugar can also cause problems. Your body is programmed to recognize low blood sugar as a threat to survival. Severe or prolonged low blood sugar can cause seizures, coma, and death. When blood sugar levels drop below normal, your adrenal glands respond by producing cortisol. Cortisol then tells the liver to produce more glucose, which will bring blood sugar levels back to normal.

The problem is that cortisol is a sympathetic nervous system hormone involved in the “fight or flight” response. This increases glucose to the brain and tissues, but curbs functions like digestion, growth, and reproduction. Repeated cortisol release caused by episodes of low blood sugar suppresses pituitary function. Without proper pituitary function, your thyroid can't function properly.

Together, high blood sugar and low blood sugar are referred to as dysglycemia. Dysglycemia weakens and inflames the gut, lungs and brain, causes hormonal imbalances, exhausts the adrenal glands, disrupts

G. DeAn Strobel, MD, PA

Hormonal Balance & Wellness

detoxification pathways, and impairs overall metabolism. Each of these significantly weakens thyroid function.

How Low Thyroid Function Affects Blood Sugar

Yes, you read that right! Just as dysglycemia can affect the thyroid, your thyroid also can cause dysglycemia. There are several ways it can do this:

- It slows the rate of glucose uptake by the cells
- It decreases the rate of glucose absorption in the gut
- It slows response of insulin to elevated blood sugar
- It slows the clearance of insulin from the blood

Altogether, these symptoms seem like hypoglycemia. When you're hypothyroid, your cells aren't very sensitive to glucose. So, although you may have normal levels of glucose in your blood, you'll have the symptoms of hypoglycemia (fatigue, headache, hunger, irritability, etc.). And since your cells aren't getting the glucose they need, your adrenals will release cortisol to increase the amount of glucose available to them. This causes a chronic stress response, which suppresses thyroid function.

Talk to your dietitian or health care provider about how to keep your blood sugar in a normal range. Some simple dietary modifications may be all that is needed, or it may take more specialized modification, depending on your unique metabolism.

The Thyroid-Gut Connection

Hippocrates said: "All disease begins in the gut". 2,500 years later we are just beginning to understand how right he was! In addition to many other things, poor gut health can suppress thyroid function and trigger Hashimoto's disease (11). Conversely, low thyroid function can lead to an inflamed and leaky gut. How does this happen?

- Thyroid hormones strongly influence the tightness of the junctions in the wall, or lining, of the stomach and small intestine. If these junctions are not tight, the gut will become permeable (i.e. "leaky gut syndrome").
- T3 and T4 have been shown to protect gut mucosal lining from stress-induced ulcer formation (12,13).
- This intestinal barrier permeability allows large molecules (foods and toxins) into the bloodstream. Since these molecules don't belong there, the body mounts an immune attack, resulting in the production of inflammatory cytokines. Studies show that inflammation plays a role in the development of autoimmune diseases like Hashimoto's. If intestinal permeability is suspected, a good food sensitivity test is recommended.

G. DeAn Strobel, MD, PA

Hormonal Balance & Wellness

- About 20% of inactive T4 is converted into the active T3 in the gut. Intestinal sulfatase, an enzyme which is produced by healthy gut bacteria, is required for that conversion. This is one reason why people with poor gut function may have thyroid symptoms but normal lab results (14).
- Cortisol is raised by inflammation in the gut. Cortisol decreases active T3 levels while increasing levels of inactive T4 (15).
- Gram negative bacteria, called lipopolysaccharides (LPS), that are not dealt with effectively by healthy gut bacteria can escape through a permeable intestinal barrier. Lipopolysaccharides reduce thyroid hormone levels, dull thyroid hormone receptor sites, increase amounts of inactive T3, and decrease TSH (16).
- Hypochlorhydria, or low stomach acid, increases intestinal permeability, inflammation and infection. Studies have shown a strong association between atrophic body gastritis, a condition related to hypochlorhydria, and AITD (17).
- Constipation can impair hormone clearance and cause elevations in estrogen, which in turn raises thyroid-binding globulin (TBG) levels and decreases the amount of free thyroid hormones available to the body. On the other hand, low thyroid function slows transit time, causing constipation and increasing inflammation, infections, and malabsorption.

Healing the gut is a huge topic and needs to be discussed with your dietitian or health care provider. The influence of thyroid hormones on the gut is why thyroid hormone replacement is often necessary. Low thyroid hormones make it difficult to heal the gut, and an inflamed and leaky gut contributes to just about every disease there is, including hypothyroidism. Fixing the gut is often the most important step to take.

How Stress Affects the Thyroid

The adrenal glands are two walnut shaped glands that sit on top of the kidneys. They secrete hormones, such as cortisol, epinephrine and norepinephrine, which regulate the stress response. These hormones have other crucial roles, many of which are directly related to thyroid health. Proper thyroid function depends on healthy adrenal glands.

The adrenal glands are affected by stress. Most people are aware of the obvious forms of stress: shift work, inadequate sleep, impossibly full schedules, driving in traffic, financial problems, arguments with a spouse, losing a job, and the many other emotional and psychological challenges of modern life.

But other things, which many don't think of as "stress" actually place just as much of a burden on the adrenal glands. These include blood sugar swings, gut dysfunction, food sensitivities or intolerances (such as to gluten), chronic infections, environmental toxins, autoimmune problems, and inflammation. All of these conditions cause the adrenals to pump out more stress hormones.

Symptoms of adrenal stress are very diverse and nonspecific because the adrenals affect every system in the body. Some of the most common symptoms include:

G. DeAn Strobel, MD, PA

Hormonal Balance & Wellness

- Fatigue
- Headaches
- Decreased immunity
- Difficulty falling asleep, staying asleep, or waking up
- Mood swings
- Sugar (or carb) and caffeine cravings
- Irritability or lightheadedness between meals
- Eating to relieve fatigue
- Dizziness when moving from sitting or lying to standing
- Gastric ulcers

Weak adrenals can cause hypothyroid symptoms without any problem in the thyroid gland itself (18). The adrenals produce cortisol. High or low cortisol, caused by any of the stressors listed above, can cause high or low blood sugar and this imbalance can cause hypothyroid symptoms.

The adrenals directly affect thyroid function by

- Disruption of the HPA axis (19).
- Reducing the conversion of T4 to T3 (20).
- Weakening immune barriers (GI tract, lungs, blood-brain barrier), which makes one more prone to autoimmune diseases such as Hashimoto's (21).
- Causing thyroid hormone resistance (as might the "ides"—chloride, fluoride, and bromide).
- Causing hormonal imbalances by decreasing the liver's ability to clear excess estrogens from the blood which leads to increased levels of thyroid binding globulin (TBG) (22). (When thyroid hormone is bound to TBG, it is in the inactive form.)

Addressing the stressors is of primary importance in supporting the adrenal gland. Without that, any attempt to support the adrenals directly will either fail or be only partially successful. With that in mind, here are some general guidelines for adrenal health:

- Avoid, or at least greatly reduce, stimulants
- Stabilize blood sugar
- Practice stress management and relaxation techniques
- Have fun, laugh, and make pleasure a regular part of your life
- Avoid dietary causes of inflammation (refined flours, high-fructose corn syrup, industrial seed oils)
- Ensure adequate intake of EPA:DHA

Specific nutrients such as phosphatidyl serine and adaptogenic botanicals like Panax ginseng, Siberian ginseng, Ashwagandha and Holy basil leaf extract are also helpful in modulating the stress response and supporting the adrenals. However, these are potent medicines and should be taken under the supervision of a trained practitioner. Some specific herbal supplements are available for this in our office as well as for thyroid.