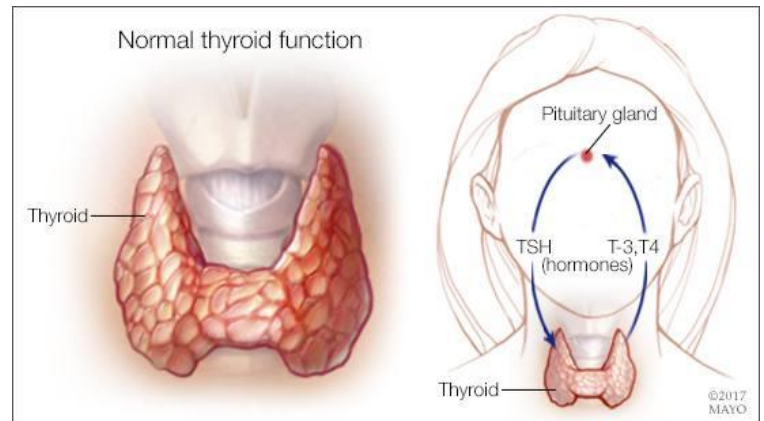


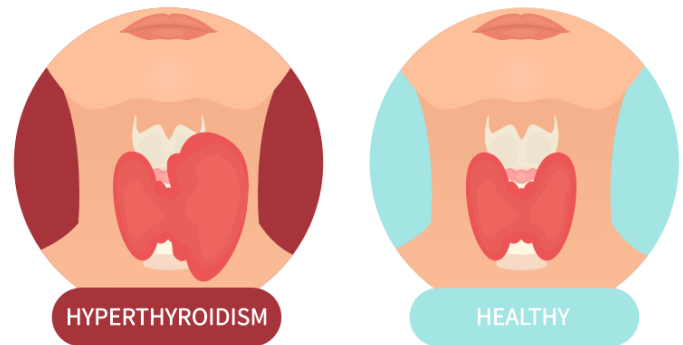
The thyroid is a butterfly-shaped gland in the lower neck that makes thyroid hormones to regulate growth and development, body temperature, heart rate, and body weight. Thyroxine (T4) and triiodothyronine (T3) are the two main thyroid hormones secreted into the bloodstream. The amount of thyroid hormones secreted is controlled by thyroid stimulating hormone (TSH) released from the pituitary gland. TSH stimulates the thyroid gland to secrete T3 and T4. When thyroid hormones are measured, the three most common markers are TSH, free T4, and free T3.



Thyroxine (T4) is the main hormone secreted by the thyroid gland and it accounts for about 94% and the remaining 6% is triiodothyronine (T3). T3 is the most active form the body can use. T4 must be converted to T3 before the body can use it. Most of this conversion happens in the liver, but also take place in cells of the heart, muscle, gut, and nerves. These cells convert T4 to T3 with an enzyme, deiodinase which removes one molecule of iodine from T4. T4 has four iodine molecules and T3 has three iodine molecules. The majority of T4 is converted into T3 in the liver. About 20% of T4 is converted to T3 in the digestive tract. The rest of the T4 is converted into an inactive form, rT3 which the body cannot use. Levels of rT3 can become too high in times of major trauma, surgery, or severe chronic illness.

### Hyperthyroidism

Hyperthyroidism is a condition in which the thyroid gland becomes overactive and produces too much thyroid hormones. An overproduction of thyroid hormones accelerates the body's metabolism, causing unintentional weight loss and a rapid or irregular heartbeat. Causes include Graves' disease, thyroid nodules, and thyroiditis.



### Symptoms

Since the symptoms of hyperthyroidism are common among many other health conditions, diagnoses can be difficult. Symptoms typically include unintentional weight loss, rapid heartbeat, irregular heartbeat, anxiety and irritation, increased appetite, nervousness, anxiety, sweating, increased sensitivity to heat, changes in bowel patterns, fatigue, skin thinning, and fine hair.

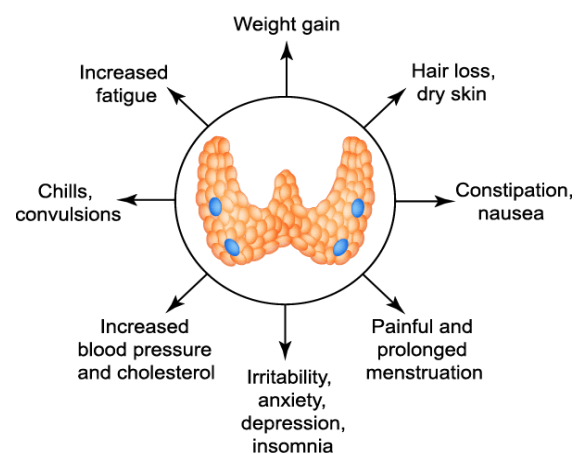
### Hypothyroidism

Hypothyroidism, also called underactive thyroid, is a condition in which the thyroid gland does not make enough thyroid hormones. Causes include Hashimoto's disease, thyroiditis, congenital hypothyroidism, removal of the thyroid, and some medications.

### Symptoms

Hypothyroidism and its symptoms develop slowly over time as the condition progresses. The symptoms vary from person to person, but some symptoms are common. Decreased levels of thyroid hormones slow down the body's metabolism causing unintentional weight gain, fatigue, slowed heartbeat, sensitivity to cold, joint and muscle pain, dry skin, fertility problems, depression, constipation, reduced exercise tolerance, swelling of the limbs, facial puffiness, and goiter.

### SYMPTOMS OF HYPOTHYROIDISM



## Hashimoto's Thyroiditis and Graves' Disease

Hashimoto's and Graves' Disease are both autoimmune diseases of the thyroid gland. The cause of the autoimmunity is not fully understood but researchers believe that it is a combination of genetic and environmental triggers such as a virus. Graves' disease is associated with elevated antibodies to the TSH receptor, called thyroid-stimulating immunoglobulin (TSI) that attaches to the thyroid cells and mimics thyroid-stimulating hormone (TSH). This results in activation of the thyroid gland with overproduction of thyroid hormone causing symptoms of hyperthyroidism. Treatment for Graves' disease such as radioactive iodine or thyroidectomy will eventually lead to the development of hypothyroidism.

Hashimoto's thyroiditis is associated with elevated antibodies to the thyroid peroxidase (TPO) and thyroglobulin. Lymphocytes accumulate in the thyroid gland and produce autoantibodies to attack the thyroid gland. This results in chronic inflammation and causes damage to the thyroid gland. The lymphoid infiltration including both B and T cells destroys the cells in the thyroid gland. Once enough cells have been damaged, the thyroid can no longer make enough hormones and patients will develop hypothyroidism. Because Hashimoto's is an inflammatory condition of the thyroid gland, some people also experience bouts of hyperthyroidism.

Symptoms of Hashimoto's come on gradually as the condition progresses. Patients usually have an increased level of thyroid stimulating hormone (TSH) due to the decreased levels of thyroid hormones along with anti-thyroglobulin (TG) and/or anti-thyroid peroxidase (TPO) antibodies present positively in their blood work. One of the first signs of Hashimoto's is the enlargement of the thyroid with a sign of swelling at the front of the throat called a goiter. This occurs due to the slow and chronic cell damage from inflammation that leads to the enlargement of thyroid gland. Patients with Hashimoto's will experience symptoms of hypothyroidism associated with reduced thyroid hormones levels.

### Pathogenesis of Hashimoto's and Graves' Disease

Lymphatic circulation plays a key role in the development of autoimmune conditions. Research results have shown that lymphatic dysfunction and the resulting decreased lymphatic circulation can induce symptoms of autoimmunity. Decreased lymphatic circulation can result in waste accumulation in the lymph fluid including excessive cell debris and protein fragments which can affect B cells and T cells. Both B cells and T cells are produced in bone marrow, but B cells mature in the spleen and T cells mature in the thymus. The spleen and thymus are key organs of the lymphatic system. The accumulated wastes in the lymph fluid can affect the B cells and T cells maturation causing loss of self-tolerance and triggering autoimmunity.

The liver also plays an important role in the development of autoimmune conditions. In both Graves' disease and Hashimoto's, reduced suppressor T cell activity and the resulting reduced inhibition of Th (T helper) cells plays a significant role. Suppressor T cells are produced in the liver, and they control T cell activity. Suppressor T cells are a subpopulation of T cells that modulate the immune system, maintain tolerance to self-antigens, and prevent autoimmune disease. They function by blocking the actions of some other types of lymphocytes to keep the immune system from becoming over-active. Research has found that a healthy liver is important to maintain the suppressor T cell activity. In patients with compromised liver functions such as hepatic cirrhosis, their suppressor T cells activity can be reduced. Research has also found that people with Hashimoto's are at a higher risk of developing fatty liver disease because of the effect of a low thyroid levels on fat metabolism and liver function. Elevated liver enzymes have also been documented in patients with Hashimoto's. Prolonged use of immunosuppressant drugs such as methotrexate can also affect the liver and disrupt liver function. A reduced suppressor T cell activity can also lead to the worsening of the Hashimoto's.

According to TCM, Spleen Damp is associated with the autoantibodies and Liver Yin deficiency is associated with the reduced suppressor T cell activity.

### **Thyroid Nodules, Thyroiditis and Goiter**

Thyroid nodules are benign fluid-filled lumps formed in the thyroid. Although thyroid nodules are very common, the cause of the condition is not well understood. According to the American Thyroid Association, about one-half of all individuals will have a thyroid nodule by the age of 60. Patients often won't know they have a thyroid nodule until it

is discovered during a routine medical exam. In some cases, the tissue in thyroid nodules can produce excess amounts of thyroid hormone, therefore, causing hyperthyroidism.

Thyroiditis is the inflammation of the thyroid gland that can cause stored thyroid hormone to leak out of the thyroid. Initially, thyroiditis causes hyperthyroidism due to the excess thyroid hormone but after about three months the thyroid becomes underactive which leads to hypothyroidism. There are different types of thyroiditis that can cause hyperthyroidism initially and then hypothyroidism. These include subacute thyroiditis, postpartum thyroiditis, and silent thyroiditis. Subacute thyroiditis is a condition in which the thyroid becomes painfully inflamed. Researchers believe this painful condition may be due to a virus or bacteria which preceded by upper respiratory infections. Postpartum thyroiditis can develop after a woman gives birth. Silent thyroiditis is referred to as silent because it typically causes no pain and likely develops due to an autoimmune condition.

Goiter is an abnormal enlargement of the thyroid gland. The thyroid gland may grow larger evenly or develop one or more small lumps (thyroid nodules). The size of a goiter can be very small and barely noticeable or very large. The main symptoms of goiter include a lump in the front of the neck which can cause a feeling of tightness in the throat area, hoarseness or scratch voice, neck vein swelling and dizziness when raising arms above head. In some patients, thyroid hormones are not produced enough (hypothyroidism), and they may experience hypothyroidism related symptoms. In other cases, thyroid hormones are overproduced (hyperthyroidism) and patients may experience hypothyroidism related symptoms. Patients may also have no change in thyroid function. The most common cause of goiters worldwide is a lack of iodine in the diet. To adapt to the less effective thyroid hormone, the cells in the thyroid gland start to grow as a compensation mechanism. Graves disease can also cause goiter due to reduced levels of thyroid hormones. Other causes include thyroid cancer, pregnancy, and thyroiditis. In the United States, sporadic goiter is the most common type of goiter which many have no know cause or may be due to the use of certain drugs.

### **Low T3 Syndrome**

Low T3 Syndrome is characterized by low levels of T3 with normal T4 levels and either low or normal TSH levels. Although T3 levels are low and patients exhibit similar symptoms to hypothyroidism, low T3 Syndrome is not caused by a thyroid gland problem. The problem occurs often in the steps of T4 to T3 and rT3 conversions. Conversion of T4 is carried out by three different deiodinases, D1, D2, and D3 in multiple tissues and organs but primarily in the liver, gut, skeletal muscle, brain and the thyroid gland. D1 and D2 convert T4 to T3 and degrade rT3. It mainly occurs in the liver and gut. D3, however, converts T4 to rT3 which is the inactive form and degrades T3 and T4. In adults, D3 is mainly found in the brain which is the major organ that is clearing the thyroid hormones.<sup>2</sup>

Most studies on low T3 Syndrome have been done on patients with acute life-threatening conditions and have found that the majority of these patients will develop low T3 Syndrome. D3 expression occurs in other organs and tissues but primarily in the liver and gut and is induced by an ischemic condition. A stress-induced blood flow reduction induces the expression of D3 to lower the T3 level. Such a response is a protective mechanism under the ischemic condition to preserve the body's energy.

Recently, more research has been focused on studying low T3 Syndrome in patients with non-critical chronic illness. The prevalence of low T3 Syndrome is found very high among patients with chronic fatigue syndrome. Low T3 Syndrome is also very common in clinical practice especially among patients with emotional, psychological or physical stress. The stress-induced blood flow reduction to the liver and gut might be able to trigger D3 expression causing low T3 Syndrome in these patients.

### **Wellness Recommendation**

#### Thyroid Nodules and Goiter

The wellness recommendation for thyroid nodules and goiter include Soup B. Soup B breaks down Stasis and helps dissolve thyroid nodules and scarring through enhancing the catabolic processes necessary for scar removal. Soup B also helps reduce inflammation and repair tissue damage. Patients can experience symptom improvement in 1 week and 2 - 4 weeks is recommended for significant improvement and sustained results.

## Thyroiditis

The wellness recommendation for thyroiditis includes Thyrocin and Soup B. Thyrocin helps reduce inflammation and clear infection of the thyroid gland by mycobacterium. Soup B helps dissolve and break down thyroid nodules, as well as repair tissue damage. Patients can experience symptom improvement in 1 week and 2-4 weeks is recommended for significant improvement and sustained results.

## Autoimmune Related Thyroid Disorders: Hashimoto's and Graves' Disease

The wellness recommendation for Graves' disease and Hashimoto's includes Java, Brown, and LC Balancer. Java helps remove the Spleen Damp and improve lymphatic circulation to help clear cellular debris and metabolic wastes in the lymphatic system. Through improved lymphatic circulation, symptoms such as fatigue, body heaviness and depression can be reduced. Brown nurtures the Liver Yin to improve liver function and structure. Through improved liver function, regulation and activation of T cells can improve. LC Balancer opens the smallest blood vessels to improve microcirculation to enhance nutrient absorption. It is recommended to start with Java/LC Balancer for 2 weeks followed by Brown/LC Balancer for 2 weeks. Then alternating Java/LC Balancer and Brown/LC Balancer every 2 weeks. Patients can experience symptom improvement within 4 weeks and 3 months is recommended for significant improvement and sustained results.

If the patient is still experiencing a goiter or enlargement of the thyroid gland, then Soup B is also required. Two to four weeks of Soup B is recommended for significant improvement and sustained results.

## Low T3 Syndrome

Liver Stress: If the condition is caused by liver stress, a Liver Yin deficiency condition in TCM, Brown and LC Balancer are recommended to nurture Liver Yin and enhance blood flow to the liver to relieve liver stress. Patients should experience improvement in their hypothyroidism symptoms and liver-related symptoms in 2 weeks. 3-4 weeks of treatment is required for significant improvement with sustained results.

GI Stress: If the condition is caused by GI stress, a Cold Stomach condition in TCM, Spring Capsule, SJ, and Formula B are recommended to warm up the stomach and enhance blood flow to the stomach to relieve GI stress. Patients should experience improvement in their hypothyroidism symptoms and GI-related symptoms with 2 weeks of treatment. 3-4 weeks of treatment is required for significant improvement with sustained results.

Chronic Kidney Disease (CKD): CKD patients usually have low thyroid levels. The kidney takes care of the clearance of free iodide in the blood that is from the breakdown of thyroid hormone. In CKD patients, iodide excretion is decreased or diminished leading to an elevated plasma inorganic iodide level which inhibits thyroid hormone production (the Wolff-Chaikoff effect). The recommendation includes LC Balancer, Xcel, KS, Formula C and Anemic to improve kidney function and thyroid production. Please see our Chronic Kidney Disease Protocol to learn more.

## **Selected Case Study:**

### **Case: Successful Resolution for Hashimoto's Disease**

*Dr. Russel Sher, DC, NC*

A patient complaining of symptoms of chronic fatigue, depression, deafness, and poor memory came in for assessment and treatment. These symptoms had been present for 30 years and he had not responded to any of the medical or alternative interventions. Blood testing revealed positive antibodies for thyroid and hypothyroidism, as well as reactive hypoglycemia. He also tested positive for gluten. His immune system showed an imbalance relating to the T helper cells.

He was put on a gluten-free diet and Wei Laboratories herbal formulas (Brown, LC Balancer and Java) to modulate his immune system. Within 3 weeks all of his symptoms resolved, his energy increased, memory and cognitive function improved, and he had no thyroid symptoms even though he was not taking thyroid medication. Most notably his hearing improved which was verified by an audiologist.

References:

1. Kresser C. Low T3 Syndrome I: It's Not about the Thyroid! Chris Kresser. <https://chriskresser.com/low-t3-syndrome-i-its-not-about-the-thyroid/>. Published September 2011. Accessed May 17, 2019.
2. Peeters RP, Visser TJ. Metabolism of Thyroid Hormone. Nih.gov. <https://www.ncbi.nlm.nih.gov/books/NBK285545/>. Published 2017. Accessed May 17, 2019.
3. Tomino, S., Fujiwara, H., Kagimoto, T., Mitsuya, H., Nishimura, H., & Kishimoto, S. (1982). Decreased suppressor T cell activity in patients with hepatic cirrhosis (HC). *Clinical and experimental immunology*, 48(3), 625–632.
4. Rydzewska, M., Jaromin, M., Pasierowska, I. E., Stożek, K., & Bossowski, A. (2018). Role of the T and B lymphocytes in pathogenesis of autoimmune thyroid diseases. *Thyroid research*, 11, 2. <https://doi.org/10.1186/s13044-018-0046-9>