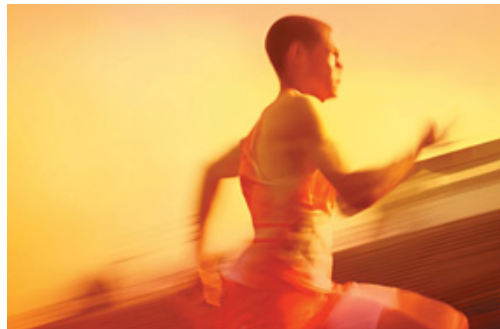


# Maximize Metabolism With a Healthy Thyroid

By Clair Dainard, BSc

So, how much do you know about the thyroid gland? Some people have never even heard of it. Thyroid health should definitely be on your radar because its primary function is to release hormones that control your metabolic rate. In other words, a healthy thyroid helps your body utilize energy quickly for cellular activities. And that's what keeps your body – right down to the individual cells – *in motion*, using energy efficiently throughout the day (and night) to function properly and stay in good health.



## The Basics

The thyroid is a butterfly-shaped gland located in the front part of the neck, just below the voice box (larynx). Thyroid activity is stimulated by the pituitary gland, which secretes *thyroid stimulating hormone* (TSH) to signal the production of thyroxine in the thyroid. There are two main thyroid hormones consisting of two aromatic rings of tyrosine linked together with the addition of iodine at select places: T3 (triiodothyronine) and T4 (tetraiodothyronine). When these hormones are insufficiently produced due to thyroid dysfunction, a condition known as hypothyroidism can occur.

## Hypothyroidism

Weight gain, [fatigue](#), and depression are unfortunately common health complaints among the American public. While there are many reasons why patients may experience these symptoms, one of the most evident causes often goes undiagnosed. *Hypothyroidism* is now believed to affect a growing percentage of American adults.

Any disruption in the chain of events leading to thyroid hormone secretion can result in abnormal thyroid activity. If thyroxine production within the gland itself is impaired, the pituitary gland will continue to secrete TSH in efforts to stimulate thyroid production, a condition known as *primary hypothyroidism*. Blood tests will indicate elevated TSH with lower T3/ T4 levels. *Secondary hypothyroidism*, a less common form accounting for less than 5 percent of cases, is caused by a deficiency in TSH production by the pituitary gland.

The severity of hypothyroidism can vary significantly, from nearly undetectable to extremely debilitating and life-threatening. Patients with severely impaired thyroid function may struggle with simple daily tasks such as doing housework, taking care of their families, and even getting up from bed. Hypothyroidism also appears to interfere with normal [carbohydrate metabolism](#) and correlates with increased insulin demand and insulin resistance. Blood lipids, both LDL cholesterol and triglycerides, are normally elevated in almost all hypothyroid patients, including mild cases.

When assessing for thyroid function, many doctors will first test TSH levels. As discussed, elevated TSH can be indicative of primary hypothyroidism. Most resources cite 0.4-4.0 mIU/L as normal range. However, many patients express symptoms of hypothyroidism with TSH higher than 2.5 mIU/L. This diagnosis is often referred to as subclinical hypothyroidism. Even in these less severe cases, hypothyroidism can cause many classic symptoms including weight gain, sensitivity to cold, constipation, menstrual problems, fatigue, edema, and dry skin, hair, and nails.

Depression is also common in these patients, and many report forgetfulness and difficulty concentrating.

### **Nutritional Factors**

When analyzing thyroid function, three nutrients of concern are iodine, selenium, and the amino acid tyrosine. Remember, thyroxine is synthesized from tyrosine *bound to iodine molecules*. Selenium acts as a co-factor for enzymes known as deiodinases. These enzymes are the catalysts in the reactions involved in thyroid production and conversion. Patients concerned with thyroid health should work with their doctor to carefully monitor their intake of all three of these essential nutrients.

The most common example of [nutrient deficiency](#) causing thyroid disease is iodine deficiency. Prior to the introduction of iodized salt in the 1920s, iodine deficiency was common in the Great Lakes and Appalachian regions of the United States. This region was referred to as the "Goiter Belt" at that time due to the characteristic enlarged thyroid (goiter) seen in people with iodine deficiency.

It is estimated that nearly 40 percent of the world's population is at risk for iodine deficiency, and outside of the United States, this remains the leading cause of impaired thyroid activity and mental retardation. Even here in the U.S., despite the prevalent use of iodized salt in our food supply, undiagnosed iodine deficiency remains a cause of hypothyroidism. While the first National Health and Nutrition Examination Survey (NHANES I), conducted from 1971-1974, found that 2.6 percent of U.S. citizens suffered from iodine deficiency, NHANES III [conducted from 1988-1994] saw that percentage rise considerably, up to 11.7 percent suffering from deficiency.

### **Autoimmunity and Food Sensitivities**

Autoimmunity is another leading cause of hypothyroidism. Autoimmune destruction of thyroid tissue, known as *Hashimoto's thyroiditis*, occurs primarily in women and older adults between the ages of 45-65. These patients express antibodies to the enzyme thyroid peroxidase. Hashimoto's, much like other autoimmune diseases, appears to correlate highly with [food intolerances](#) such as celiac disease.

### **Other Dietary Influences on Thyroid Health**

In addition to gluten, other foods known as *goitrogens* have been shown to be damaging to thyroid function. There are two main classes of food goitrogens: [cruciferous vegetables](#) (broccoli, cauliflower, cabbage) and soybean-related foods. Both isothiocyanates from cruciferous vegetables and soy isoflavones have an inhibitory effect on thyroid peroxidase and interfere with iodine uptake by the thyroid gland. In a metabolic experiment, rats fed a daily diet of moderate iodine intake and 25 mg of thiocyanate (a known goitrogen), showed significant reduction in circulating thyroxine after 60 days. If you have a diagnosed iodine deficiency, you should talk to your doctor about whether reducing your intake of uncooked cruciferous vegetables, particularly while taking iodine supplements, is a wise course of action.

Concerns also continue to grow about the excessive consumption of genetically modified soy-based foods by thyroid patients. While moderate intake of traditional soy foods (tempeh, edamame, etc.) has been shown to provide some health benefits, it is argued that the negative effects on the thyroid may be enhanced by the genetic modification process. In addition to these foods, certain xenobiotic toxins including phthalate esters (substances added to plastics to increase their flexibility, transparency, durability and longevity), polychlorinated bisphenyls (PCBs, which were banned in 1979 but still may be present in older paints, plastics, floor finishes,

adhesives, tapes and other items), and polycyclic aromatic hydrocarbons (pollutants present in oil, coal and tar deposits, among other items) have all been shown to produce goitrogenic effects.

### Keep Your Body in Motion

Undiagnosed hypothyroidism is a common and clinically significant health problem that affects millions of Americans. Could you be one? If you find yourself expressing symptoms of low thyroid activity, talk to your doctor, who may run tests to check your TSH and T3/T4 levels. And keep in mind that while less common than hypothyroidism, you can also experience *hyperthyroidism*: an overactive thyroid that releases *too much* hormones instead of too little. Symptoms of hyperthyroidism can include weight loss, increased appetite, nervousness, restlessness, weakness, itching, nausea and vomiting, among other unpleasantnesses. Talk to your doctor about thyroid health and learn more about how to [keep your body in motion](#).

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### Thyroid 101

**What It Is:** A butterfly-shaped gland located in the front part of the neck just below the voice box (larynx).

**What It Does:** The thyroid gland's major function is to modulate the metabolic rate - the speed at which your body utilizes energy. Thyroid hormones regulate metabolism and affect the growth and rate of function various systems throughout the body.

**How It Does It:** Thyroid activity is stimulated by the pituitary gland, which secretes *thyroid stimulating hormone* (TSH) to signal the production of thyroxine in the thyroid. There are two many thyroid hormones: T3 (triiodothyronine) and T4 (tetraiodothyronine).

**What Can Happen If It Doesn't Function Properly (commonly hypothyroidism):\***

#### Early Symptoms

- Sensitivity to cold
- Constipation
- Depression
- Fatigue or lethargy
- Heavier menstrual periods
- Joint or muscle pain
- Pale or dry skin
- Thin, brittle hair or fingernails
- Weight gain

#### Late Symptoms (if left untreated)

- Decreased taste and smell
- Hoarseness
- Puffy face, hands, and feet
- Slow speech
- Thickening of the skin
- Thinning of eyebrows

