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**THYROID GLAND**

The thyroid is a butterfly-shaped gland that sits low on the front of the neck. Your thyroid lies below your Adam’s apple, along the front of the windpipe. The thyroid has two side lobes, connected by a bridge (isthmus) in the middle. When the thyroid is its normal size, you can’t feel it. Brownish-red in color, the thyroid is rich with blood vessels. Nerves important for voice quality also pass through the thyroid.



The thyroid gland is about 2-inches long and lies in front of your throat below the prominence of thyroid cartilage sometimes called the Adam's apple. The thyroid has two sides called lobes that lie on either side of your windpipe, and is usually connected by a strip of thyroid tissue known as an isthmus. Some people do not have an isthmus, and instead have two separate thyroid lobes.



The thyroid secretes several hormones, collectively called thyroid hormones. The main hormone is thyroxine, also called T4. Thyroid hormones act throughout the body, influencing metabolism, growth and development, and body temperature. During infancy and childhood, adequate thyroid hormone is crucial for brain development.

The thyroid's hormones regulate vital body functions, including:

* **Breathing**
* **Heart rate**
* **Central and peripheral nervous systems**
* **Body weight**
* **Muscle strength**
* **Menstrual cycles›**
* **Body temperature**
* **Cholesterol levels**

It is important that T3 and T4 levels are neither too high nor too low. Two glands in the brain—the hypothalamus and the pituitary communicate to maintain T3 and T4 balance.

The hypothalamus produces **TSH Releasing Hormone (TRH)** that signals the pituitary to tell the thyroid gland to produce more or less of T3 and T4 by either increasing or decreasing the release of a hormone called **thyroid stimulating hormone (TSH).**

* When **T3 and T4** levels are low in the blood, the pituitary gland releases more TSH to tell the thyroid gland to produce more thyroid hormones.
* If **T3 and T4** levels are high, the pituitary gland releases less TSH to the thyroid gland to slow production of these hormones.



**Thyroid problems include**

* **Goiter** - enlargement of the thyroid gland
* [**Hyperthyroidism**](https://medlineplus.gov/hyperthyroidism.html) - when your thyroid gland makes more thyroid hormones than your body needs
* [**Hypothyroidism**](https://medlineplus.gov/hypothyroidism.html) - when your thyroid gland does not make enough thyroid hormones
* [**Thyroid cancer**](https://medlineplus.gov/thyroidcancer.html)
* **Thyroid nodules** - lumps in the thyroid gland
* **Thyroiditis** - swelling of the thyroid

**HYPOTHYROIDISM**

Hypothyroidism, also called underactive thyroid disease, is a common disorder. With hypothyroidism, Thyroid gland does not make enough thyroid hormone.

**CAUSES**

The most common cause of hypothyroidism is Hashimoto's thyroiditis. "Thyroiditis" is an inflammation of the thyroid gland. Hashimoto's thyroiditis is an autoimmune disorder. With Hashimoto’s, your body produces antibodies that attack and destroy the thyroid gland. Thyroiditis may also be caused by a viral infection.

Other causes of hypothyroidism include:

* **Radiation therapy to the neck area**. Treating certain cancers, such as lymphoma, requires radiation to the neck. Radiation damages the cells in the thyroid. This makes it more difficult for the gland to produce hormone.
* **Radioactive iodine treatment.** This treatment is commonly prescribed to people who have an overactive thyroid gland, a condition known as hyperthyroidism. However, radiation destroys the cells in the thyroid gland. This usually leads to hypothyroidism.
* **Use of certain medications**. Certain medicines to treat heart problems, psychiatric conditions, and cancer can sometimes affect the production of thyroid hormone. These include amiodarone (Cordarone, Pacerone), , interferon alpha, and interleukin-2.
* **Thyroid surgery**. Surgery to remove the thyroid will lead to hypothyroidism. If only part of the thyroid is removed, the remaining gland may still be able to produce enough hormones for the body's needs.
* **Too little iodine in the diet**. The thyroid needs iodine to produce thyroid hormone. Your body doesn't make iodine, so you need to get it through your diet. Iodized table salt is rich in iodine. Other food sources of iodine include shellfish, saltwater fish, eggs, dairy products, and seaweed.
* **Pregnancy***.* The reason isn’t clear, but sometimes, inflammation of the thyroid occurs after pregnancy. This is called postpartum thyroiditis. Women with this condition usually have a severe increase in thyroid hormone levels followed by a sharp drop in thyroid hormone production. Most women with postpartum thyroiditis will regain their normal thyroid function.
* **Problems with the thyroid at birth**. Some babies may be born with a thyroid gland that did not develop correctly or does not work properly. This type of hypothyroidism is called congenital hypothyroidism. Most hospitals in the U.S. screen babies at birth for this disease.
* **Pituitary gland damage or disorder**. Rarely, a problem with the pituitary gland can interfere with the production of thyroid hormone. The pituitary gland makes a hormone, called thyroid-stimulating hormone (TSH), which tells your thyroid how much hormone it should make and release**.**
* **Disorder of the hypothalamus**. An extremely rare form of hypothyroidism can occur if the hypothalamus in the brain does not produce enough of a hormone called TRH. TRH affects the release of TSH from the pituitary gland.

**Primary hypothyroidism** is caused by a problem with the thyroid gland itself.

**Secondary hypothyroidism** occurs when another problem interferes with the thyroid's ability to produce hormones. For example, the pituitary gland or hypothalamus produce hormones that trigger the release of thyroid hormone. A problem with one of these glands can make your thyroid underactive.

Sometimes, an underactive thyroid that results from a problem with the hypothalamus is called tertiary hypothyroidism.

**SYMPTOMS**

Symptoms of hypothyroidism may be vague and can often mimic other conditions. They may include:

* **Changes in the menstrual cycle**
* **Constipation**
* **Depression**
* **Dry hair and hair loss**
* **Dry skin**
* **Fatigue**
* **Greater sensitivity to cold**
* **Slow heart rate**
* **Swelling of the thyroid gland (goiter)**
* **Unexplained weight gain or difficulty losing weight**
* **Carpal tunnel syndrome**

Babies with hypothyroidism may have no symptoms. If symptoms do occur, they can include:

* **Cold hands and feet**
* **Constipation**
* **Extreme sleepiness**
* **Hoarse cry**
* **Little or no growth**
* **Low muscle tone (floppy infant)**
* **Persistent jaundice (yellowing of the skin and whites of the eyes)**
* **Poor feeding habits**
* **Puffy face**
* **Stomach bloating**
* **Swollen tongue**

**RISK FACTORS**

Women, particularly older women, are more likely to develop hypothyroidism than men. You are also more likely to develop hypothyroidism if you have a close family member with an [autoimmune disease](https://www.webmd.com/a-to-z-guides/autoimmune-diseases). Other risk factors include:

* **Race (being white or Asian)**
* **Age (growing older)**
* **Prematurely graying hair**
* **Autoimmune disorders such as** [**type 1 diabetes**](https://www.webmd.com/diabetes/type-1-diabetes)**,** [**multiple sclerosis**](https://www.webmd.com/multiple-sclerosis/what-is-multiple-sclerosis)**,** [**rheumatoid arthritis**](https://www.webmd.com/rheumatoid-arthritis/default.htm)**,** [**celiac disease**](https://www.webmd.com/digestive-disorders/celiac-disease/celiac-disease)**,** [**Addison's disease**](https://www.webmd.com/a-to-z-guides/understanding-addisons-disease-basics)**, pernicious anemia, or vitiligo**
* [**Bipolar disorder**](https://www.webmd.com/bipolar-disorder/default.htm)
* **Down syndrome**
* **Turner syndrome**

**DIAGNOSIS**

If you have symptoms of hypothyroidism, your doctor will order blood tests to check hormone levels. These may include:

* Thyroid-stimulating hormone (TSH)
* T4 (thyroxine)

Lower-than-normal T4 levels usually mean you have hypothyroidism. However, some people may have increased TSH levels while having normal T4 levels. This is called subclinical (mild) hypothyroidism. It is believed to be an early stage of hypothyroidism.

If the test results or physical exam of the thyroid are abnormal, your doctor may order a [thyroid ultrasound](https://www.webmd.com/www/a-to-z-guides/Thyroid-and-Parathyroid-Ultrasound), or thyroid scan, to check for nodules or inflammation.

**TREATMENT**

If you have hypothyroidism, doctor will prescribe a synthetic (man-made) thyroid hormone T4. Take this pill every day. Certain other medications can interfere with how body absorbs synthetic thyroid hormone. Make sure doctor knows about all the medicines, herbs, and supplements take, including over-the-counter products. Will need regular blood tests to check thyroid hormone levels. Doctor may need to adjust your medication dose from time to time.

**COMPLICATIONS**

**Untreated, hypothyroidism may cause:**

* Heart problems
* [Infertility](https://www.webmd.com/infertility-and-reproduction/default.htm)
* [Joint pain](https://www.webmd.com/pain-management/guide/joint-pain)
* [Obesity](https://www.webmd.com/diet/obesity/what-obesity-is)

[**HYPERTHYROIDISM**](https://www.webmd.com/a-to-z-guides/overactive-thyroid-hyperthyroidism)

[Hyperthyroidism](https://www.webmd.com/a-to-z-guides/overactive-thyroid-hyperthyroidism) is when [thyroid](https://www.webmd.com/women/picture-of-the-thyroid) -- the butterfly-shaped gland at the bottom of your neck, just above your collarbone -- makes too much of a hormone called thyroxine. [Thyroid](https://www.webmd.com/women/guide/understanding-thyroid-problems-basics) controls things like how fast the [heart](https://www.webmd.com/heart/picture-of-the-heart) beats and how quickly burn calories. It releases hormones to control your [metabolism](https://www.webmd.com/fitness-exercise/how-to-boost-your-metabolism) (all the things your body does to turn food into energy and keep going). Hyperthyroidism, also known as overactive thyroid, can speed up [metabolism](https://www.webmd.com/diet/ss/slideshow-boost-your-metabolism) and cause unpleasant symptoms.

**CAUSES**

Several conditions can cause hyperthyroidism.

* **Graves’ disease.** This immune system disorder is the most common cause of hyperthyroidism. It’s more likely to affect women under the age of 40.
* [**Thyroid nodules**](https://www.webmd.com/a-to-z-guides/what-are-thyroid-nodules)**.** These lumps of tissue in thyroid can become overactive, creating too much thyroid hormone.
* [**Thyroiditis**](https://www.webmd.com/a-to-z-guides/what-is-thyroiditis)**.** An infection or an immune system problem can cause thyroid to swell and leak hormones. This is often followed by hypothyroidism, in which thyroid doesn’t make enough hormones. These conditions are usually temporary.

**SIGNS AND SYMPTOMS**

Common signs include:

* **Nervousness, anxiety, or crankiness**
* **Mood swings**
* **Fatigue or weakness**
* **Sensitivity to heat**
* **A swollen** [**thyroid**](https://www.webmd.com/women/ss/slideshow-thyroid-symptoms-and-solutions)**(called a** [**goiter**](https://www.webmd.com/women/understanding-goiter-basics)**).**
* [**Losing weight**](https://www.webmd.com/diet/default.htm)**suddenly, without trying**
* **Fast or**[**uneven heartbeat**](https://www.webmd.com/heart-disease/guide/what-causes-heart-palpitations)**or**[**palpitations**](https://www.webmd.com/heart-disease/guide/what-causes-heart-palpitations)
* **Having more**[**bowel movements**](https://www.webmd.com/digestive-disorders/rm-quiz-poop)
* **Shaking in your hands and fingers (tremor)**
* [**Sleep**](https://www.webmd.com/sleep-disorders/default.htm)**problems**
* **Thinning**[**skin**](https://www.webmd.com/skin-problems-and-treatments/picture-of-the-skin)
* **Fine, brittle**[**hair**](https://www.webmd.com/skin-problems-and-treatments/picture-of-the-hair)
* **Changes in your menstrual cycle**

**GRAVES’ OPHTHALMOPATHY**

About 30% of people with Graves’ disease get a condition called Graves’ ophthalmopathy. It involves vision and [eyes](https://www.webmd.com/eye-health/picture-of-the-eyes), including the muscles and tissues around them. Symptoms include:

* **Bulging** [**eyes**](https://www.webmd.com/eye-health/ss/slideshow-eye-conditions-overview)
* **A gritty feeling, pain, or pressure in**[**eyes**](https://www.webmd.com/eye-health/eye-assessment/default.htm)
* **Redness or**[**inflammation**](https://www.webmd.com/arthritis/about-inflammation)**in or around eyes**
* **Eyelids that are puffy or pulled back**
* **Sensitivity to light**
* [**Double vision**](https://www.webmd.com/eye-health/double-vision-diplopia-causes-symptoms-diagnosis-treatment)**or loss of**[**vision**](https://www.webmd.com/eye-health/ss/slideshow-healthier-eyes)

People with Graves’ disease may also get a rare condition called Graves’ dermopathy. It can cause redness and thickening of your skin, usually on the tops of your feet or your shins.

**DIAGNOSIS**

* **Thyroid panel.** This blood test measures levels of thyroid hormones and thyroid-stimulating hormone (TSH).
* **Thyroid scan.** A technician injects a small amount of radioactive iodine into your bloodstream. Your thyroid absorbs it, and a special camera takes pictures of the gland to look for nodules or other signs of problems.
* **Ultrasound.** A technician runs a device called a transducer over your neck. It uses sound waves to create images of your thyroid.
* **Radioactive iodine uptake test**. You swallow a small amount of radioactive iodine. A device called a gamma probe measures how much of the iodine collects in your thyroid. If this uptake is high, you probably have Graves’ disease or thyroid nodules.

**TREATMENT**

* **Antithyroid drugs.** Methimazole (Tapazole) and propylthiouracil (PTU) block thyroid from making too many hormones. Side effects include allergic reactions like rash or itching. It’s rare, but these drugs can also cause body to make fewer white blood cells. This makes more likely to get infections. Rarely, these medicines can damage the liver, have symptoms like yellow skin or eyes, fatigue, or pain in belly.
* **Beta-blockers.** These medications don’t treat levels of thyroid hormone but can help with symptoms like anxiety, shaking, or a fast heartbeat.
* **Radioactive iodine.** Swallow a small amount of radioactive iodine. Overactive thyroid cells absorb it, and it destroys them. This makes thyroid shrink and the levels of thyroid hormone go down.
* **Surgery.** If medications aren’t a good option, doctor may remove all or part of thyroid. This is called thyroidectomy. Need to take antithyroid medicines before the surgery to prevent complications.