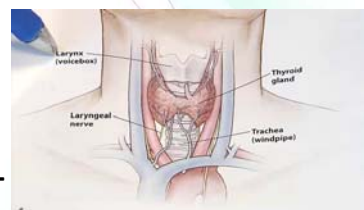


Thyroid Health: Your Metabolic Engine



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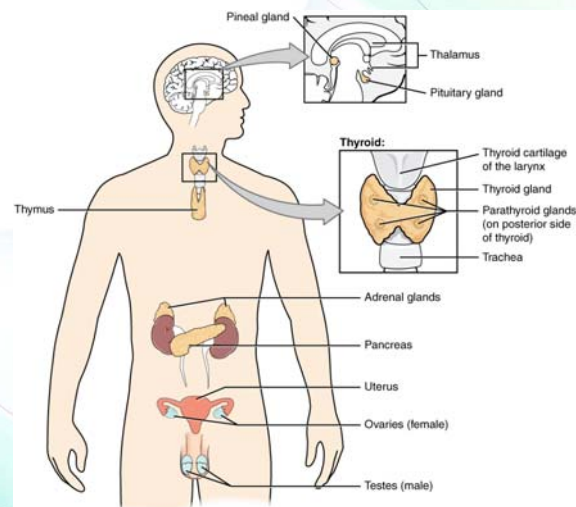
Thyroid Health

- The thyroid gland is a 2-inch, butterfly-shaped organ located in the **middle of the lower neck**
- Although the gland is relatively small, it **produces a hormone that influences every cell, tissue and organ in the body**
- The thyroid regulates the **body's metabolism**—the rate at which the body produces energy from nutrients and oxygen—and affects critical body functions, such as **energy level and heart rate**

Thyroid Health

- Though the thyroid is small, it's a **major gland in the endocrine system** and affects nearly every organ in the body.
- It regulates **fat and carbohydrate metabolism, respiration, body temperature, brain development, cholesterol levels, the heart and nervous system, blood calcium levels, menstrual cycles, skin integrity, and more**

Endocrine System



Thyroid Health

- An estimated **27 million Americans** have some form of thyroid disease.
- Up to 60% of those with thyroid disease are **unaware** of their condition.
- **Women are 5-8 times more likely** than men to have thyroid problems.
- **1 in 8 women** will develop a thyroid disorder during her lifetime.
- Most thyroid cancers **respond to treatment**, although a small percentage can be very aggressive.
- The causes of thyroid problems are **largely unknown**.

Thyroid Health

- **Undiagnosed thyroid disease** may put patients at risk for certain serious conditions, such as **cardiovascular diseases, osteoporosis and infertility**.
- 50-60% of all people with thyroid disease are **undiagnosed**
- Pregnant women with undiagnosed or inadequately treated hypothyroidism have an **increased risk of miscarriage, preterm delivery, and severe developmental problems in their children**.
- Most thyroid diseases are **life-long conditions** and can be managed with medical attention and lifestyle changes

Thyroid Health

- The thyroid has a **profound impact on metabolism**
- **Unintended weight gain and weight loss** are common, and both can be very challenging
- Although weight may be the most common complaint, clients are at an **increased risk of cardiovascular disease and diabetes,** underscoring the need to eat a balanced diet and adopt a healthful lifestyle.

Thyroid Health

- The most common thyroid condition is **hypothyroidism**, or underactive thyroid.
- In the United States, hypothyroidism can often be caused by an **autoimmune response** known as **Hashimoto's disease or autoimmune thyroiditis.**
- As with all autoimmune diseases, the **body mistakenly identifies its own tissues as an invader and attacks them** until the organ is destroyed.
- This chronic attack **eventually prevents the thyroid from releasing adequate levels of the hormones T3 and T4,** which are necessary to keep the body functioning properly.
- The lack of these hormones **can slow down metabolism and cause weight gain, fatigue, dry skin and hair, and difficulty concentrating**
- Hashimoto's is **seven times more prevalent in women** than men, and generally occurs during middle age

Autoimmune and Gluten

- **Wheat and gluten products** can have a relationship to autoimmune thyroid disease, and eliminating gluten entirely can help some thyroid patients **reduce inflammation and lose weight**
- Similarly, other food allergens—some common culprits are **dairy foods, soy, nuts**—can cause inflammation, and make weight loss more difficult.
- Consider an **elimination diet or allergy/food sensitivity testing** to determine food sensitivities

Symptoms of Hypothyroidism

- Fatigue
- Depression and **anxiety**
- **Weight** gain
- Infertility
- Feeling cold
- **Constipation**
- Muscle aches and tenderness
- Stiffness and swelling in the joints
- **Hair loss**
- Rough, cracked skin
- Trouble breathing
- Changes in the menstrual cycle
- More frequent **colds** due to low immune function

Thyroid Health

- **Hyperthyroidism**, or overactive thyroid gland, is another common thyroid condition.
- The most prevalent form is **Graves' disease** in which the body's autoimmune response causes the thyroid gland to **produce too much T3 and T4**
- Symptoms of **hyperthyroidism** can include **weight loss, high blood pressure, diarrhea, and a rapid heartbeat**
- Graves' disease also disproportionately affects women and **typically presents before the age of 40**

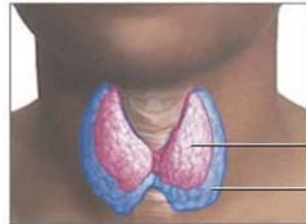
Hyperthyroidism

- **Hyperthyroidism** usually is treated with medications, surgery, or oral radioactive iodine
- However, these treatments are imprecise and may cause the thyroid to secrete inadequate amounts of T3 and T4 and function insufficiently after treatment.
- 70-90% of patients with Graves' or thyroid cancer **eventually need treatment for hypothyroidism as a result of treatment**

Graves' Disease



Exophthalmos (bulging eyes)



Diffuse goiter

Graves' disease is a common cause of hyperthyroidism, an over-production of thyroid hormone, which causes enlargement of the thyroid and other symptoms such as exophthalmos, heat intolerance and anxiety

Normal thyroid

Enlarged thyroid

ADAM.

Thyroid Surgery

- Surgery to remove all or part of the thyroid is used to treat:
- **Hyperthyroidism**, when too much thyroid hormone is produced
- **An enlarged thyroid gland (goiter)** that may cause the neck to appear swollen and can interfere with normal breathing and swallowing
- **Thyroid nodules** (lumps in the thyroid gland)
- **Thyroid cancer**
- After partial removal, the thyroid may produce normal hormone levels.
- But some people still will develop hypothyroidism.
- Complete removal always results in hypothyroidism.

Thyroid Health

- Hashimoto's is more common than Graves' disease, but **both are referred to as autoimmune thyroid disease (ATD)**, which has a strong genetic link and is associated with other autoimmune disorders, such as type 1 diabetes, rheumatoid arthritis, lupus, and celiac disease
- 25% of those with one autoimmune disease are likely to develop other autoimmune diseases

Thyroid Health

- A goiter, or **enlargement of the thyroid gland**, can be caused by hypothyroidism, hyperthyroidism, excessive or inadequate intake of **iodine** in the diet, or thyroid cancer—the **most common endocrine cancer whose incidence studies indicate is increasing**

Radiation

- Radioactive iodine, a common treatment for **hyperthyroidism**, gradually destroys the thyroid
- Almost everyone who receives this treatment eventually develops **hypothyroidism**.
- Radiation for Hodgkin's disease, other lymphomas, and head or neck cancers can also damage the thyroid.

THYROID DYSFUNCTION

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HYPOTHYROIDISM

- DRY HAIR
- PUFFY FACE
- SLOW HEARTBEAT
- WEIGHT GAIN
- CONSTIPATION
- BRITTLE NAILS
- ARTHRITIS
- COLD INTOLERANCE
- DEPRESSION
- DRY SKIN
- FATIGUE
- MEMORY LOSS
- HEAVY MENSTRUAL PERIODS
- MUSCLE ACHES

HYPER THYROIDISM

- HAIR LOSS
- BULGING EYES
- SWEATING
- RAPID HEARTBEAT
- WEIGHT LOSS
- REGULAR GAS
- SOFT NAILS
- SLEEPING DIFFICULTIES
- HEAT INTOLERANCE
- INFERTILITY
- IRRITABILITY
- MUSCLE WEAKNESS
- NERVOUSNESS
- SCANT MENSTRUAL PERIODS

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Thyroid and Heart Disease

- People with **hypothyroidism** have a greater risk of **cardiovascular disease** than the risk associated with weight gain alone.
- **Low levels of thyroid hormones lead to:**
 - a higher blood lipid profile
 - increased blood pressure
 - elevated levels of the amino acid homocysteine
 - elevated levels of inflammatory marker C-reactive protein

Thyroid and Cholesterol

- Thyroid hormones regulate **cholesterol synthesis, cholesterol receptors, and the rate of cholesterol degradation**
- Hypothyroidism **increases LDL levels**, and increased cholesterol levels have been shown to induce hypothyroidism in animal models.
- **Normalization of thyroid hormone levels has a beneficial effect on cholesterol**
- If your lipid labs have increased suddenly, be sure to **have your thyroid checked!**

Thyroid and Blood Sugar

- There is a strong relationship between thyroid disorders, **impaired glucose control**, and diabetes.
- 30% of people with type 1 diabetes have autoimmune thyroid disease
- 12.5% of those with type 2 diabetes have thyroid disease compared with a 6.6% prevalence of thyroid disease in the general public.
- Both hypothyroidism and hyperthyroidism **affect carbohydrate metabolism** and have a profound effect on glucose control

How the Thyroid works

- The hypothalamus sends a signal to the pituitary through a hormone called TRH (thyrotropin-releasing hormone).
- When the pituitary gland receives this signal, it releases **TSH (thyroid-stimulating hormone)** to the thyroid gland.
- TSH instructs the thyroid to produce two different thyroid hormones – thyroxine (T4) and triiodothyronine (T3)
- These are necessary to send instructions to every single cell in your body.
- The pituitary gland “monitors” the level of thyroid hormone in the blood and **increases or decreases the amount of TSH released**, which in turn regulates the amount of thyroid hormone produced.

T4 and T3

- In almost all cases hypothyroidism is the result of inadequate T4 production, rather than inadequate T3.
- Conventional diagnosis relies on TSH and T4 blood tests alone
- T4 converts to T3
- T3 is the **ACTIVE** form of thyroid
- Some people **do not convert well**
- Sometimes labs that also check for T3 can be helpful

Free T4 and T3

- There is a difference between Total T4 and Total T3 versus Free T4 and Free T3.
- Thyroid hormones are fat soluble and the blood is mostly water.
- In order for the fat-soluble thyroid hormones to travel through the blood, they need to be bound to protein that act as little taxis to carry the thyroid hormones through the blood vessels to cells all over the body.
- When they reach the cells, the protein needs to be cleaved off because only the unbound “free” hormones can actually enter the cells and perform their necessary functions.
- Therefore **Free T4** and **Free T3** levels are important to check as well

Reverse T3

- T4 must be converted into a **usable form of T3** before the body can use it
- Some of the T4 is converted into a useless inactive form of T3, known as **Reverse T3**
- However in times of extreme stress, such as **major emotional or physical trauma, surgery, extreme dieting, chronic stress or chronic illness**, the body will convert a larger than normal amount of T4 into this inactive Reverse T3.
- **TSH and T4 scores may look 'normal' however hypothyroid symptoms can persist due to the high levels of reverse T3.**
- Doctors may not test for reverse T3, saying a patient's thyroid lab tests are completely 'normal' while their patient suffers hypothyroid symptoms because their reverse T3 was not tested.

Thyroid Panel

- A **full thyroid panel** for hypothyroidism should at least include these 6 key thyroid lab tests:
- **TSH**
- **Free T4**
- **Free T3**
- **Reverse T3**
- **Thyroid Peroxidase Antibodies**
- **Thyroglobulin Antibodies**

Direct to Consumers Labs

- Direct labs
- LabCorp
- Quest diagnostics:
- Wellness FX
- Insurance may NOT cover
- It is important to seek the advice of a doctor for any health concerns.

Medications

- Some drugs that can lead to hypothyroidism include:
- **amiodarone**, a heart medication
- **interferon alpha**, a cancer medication
- **lithium**, a bipolar disorder medication
- **interleukin-2**, another cancer medication
- Less commonly, too much or too little iodine in the diet or abnormalities of the pituitary gland cause hypothyroidism.

Key Nutrients for Thyroid Health

- Many nutritional factors play a role in optimizing thyroid function
- Both **nutrient deficiencies and excesses** can trigger or exacerbate symptoms
- May need to have **nutrient testing done**

Iodine

- **Iodine** is a vital nutrient in the body and essential to thyroid function; **thyroid hormones are comprised of iodine**
- While autoimmune disease is the primary cause of thyroid dysfunction in the United States, **iodine deficiency is the main cause worldwide**
- Iodine deficiency has been considered rare in the United States since the 1920s, largely due to the widespread use of **iodized salt**
- Salt used in processed foods is **not iodized.**
- Given that people are cooking less at home and buying either restaurant or processed foods, **iodine intakes in the U.S. have declined**
- Iodized salt along with fish, dairy, and grains, is a major source of iodine in the standard American diet.

Iodine

- Both iodine deficiency and excess have significant risks; therefore, **supplementation should be approached with caution.**
- Supplemental iodine may cause symptom flare-ups in people with Hashimoto's disease because it stimulates autoimmune antibodies
- A diet rich in whole foods that contain iodine — including fish, sea vegetables, eggs, and seaweed — can help prevent deficiency.
- **Seaweed is one of the best sources of natural iodine**
- Dried kelp, nori and dulse
- Add to soups, stews, water to cook grains

Vitamin D

- **Vitamin D deficiency is linked to Hashimoto's**, according to one study showing that more than 90% of patients studied were deficient.
- It's not known whether the low vitamin D levels were the direct cause of Hashimoto's or the result of the disease process itself
- Hyperthyroidism, particularly Graves' disease, is known to cause **bone loss**, which is compounded by the vitamin D deficiency commonly found in people with hyperthyroidism.
- This bone mass can be regained with treatment for hyperthyroidism, and experts suggest that adequate bone-building nutrients, such as vitamin D, are particularly important during and after treatment

Vitamin D

- Foods that contain some vitamin D include **fatty fish, milk, dairy, eggs, and mushrooms.**
- **Sunlight** also is a potential source, but the amount of vitamin production depends on the season and latitude.
- Supplements may be needed and Vitamin D status should be monitored by blood tests

Selenium

- **The highest concentration of selenium is found in the thyroid gland,** and it's been shown to be a necessary component of enzymes **integral to thyroid function**
- Selenium is an essential trace mineral and has been shown to have a profound effect on **the immune system, cognitive function, fertility in both men and women, and mortality rate**
- A meta-analysis of randomized, placebo-controlled studies has shown benefits of selenium on both thyroid antibodies and mood in patients with Hashimoto's, but this effect seems more pronounced in people with a **selenium deficiency** or insufficiency at the outset
- Can be tested with a nutrient test
- Spectracell

Selenium

- An excessive intake of selenium can cause gastrointestinal distress or even raise the risk of type 2 diabetes and cancer
- Selenium-rich foods include **Brazil nuts, tuna, crab, and lobster**

Vitamin B 12

- Studies have shown that about 30% of people with ATD experience a vitamin B12 deficiency.
- Blood levels can be tested
- Food sources of B12 include **mollusks, sardines, salmon, organ meats such as liver, muscle meat, and dairy.**
- Vegan sources include **fortified cereals and nutritional yeast.**
- Sublingual forms are sometimes better

Sprouted Seeds

- Flax, hemp and chia seeds provide ALA, a type of omega-3 fat that is **critical for proper hormone balance and thyroid function**
- Add to oatmeal, yogurt, protein shakes

Wild Caught Fish

- Balancing the levels of omega-3 to omega-6 fatty acids can **reduce inflammation and support healthy thyroid function**
- Also supports neurological function
- Wild fish like salmon, mackerel and sardines are some of the best sources

Fruits and Vegetables

- Fruits and vegetables are high in vitamins, minerals and antioxidants that are **necessary for combating free-radical damage and lowering inflammation**
- Keeps the thyroid healthy

Goitrogens

- Cruciferous vegetables such as broccoli, cauliflower, and cabbage naturally release a compound called goitrin when they're hydrolyzed, or broken down.
- Goitrin **can interfere with the synthesis of thyroid hormones**
- However, this is usually a concern only when coupled with an **iodine deficiency**
- Heating cruciferous vegetables **denatures** much or all of this potential goitrogenic effect

Goitrogens

- Soy is another potential goitrogen.
- The isoflavones in soy can lower thyroid hormone synthesis, but numerous studies have found that **consuming soy doesn't cause hypothyroidism in people with adequate iodine stores**
- Be careful with millet, a nutritious gluten-free grain, which may suppress thyroid function even in people with adequate iodine intake
- Vary your grains

Supplements

- Calcium and calcium supplements have the potential to interfere with proper absorption of thyroid medications, so patients must consider the timing when taking both.
- Studies recommend spacing calcium foods like milk and calcium supplements and thyroid medications **by at least four hours**
- Coffee and fiber supplements lower the absorption of thyroid medication
- Take **at least one hour apart**

Avoid taking your thyroid hormone at the same time as:

- Walnuts
- Soy
- Cottonseed meal
- Iron supplements or multivitamins containing iron
- Calcium in dairy foods or supplements
- Antacids that contain aluminum or magnesium
- Some ulcer medications, such as sucralfate (Carafate)
- Some cholesterol-lowering drugs, such as those containing cholestyramine (Prevalite) and colestipol (Colestid)
- To avoid potential interactions, eat these foods or use these products **several hours before or after you take your thyroid medication.**

Other Interactions

- Chromium picolinate
- Coffee
- Aloe
- Alpha Lipoic Acid
- Cascara
- Flaxseed
- Glucomannan – a type of fiber
- Iron

Exercise

- Exercise is critical for thyroid health
- In addition to the obvious impact exercise has on weight and metabolism, a study of patients with Graves' disease found that **a structured exercise program showed dramatic improvements in fatigue levels**, and significantly more people were able to successfully stop taking antithyroid medications without a relapse
- Since fatigue can be a barrier to exercise, start with walking and keep a pedometer for motivation
- Also try gentle yoga class as a start to exercising.

Resources

