

# Body Function Regulator: The Small Butterfly-Shaped Gland in the Neck

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## Abstract

The small butterfly-shaped gland in the neck plays an important role in regulating the functions of the body. It produces hormones that affect the body metabolism. An under-active or overactive thyroid can cause a lot of problems in the body such as cardiovascular, gastrointestinal, muscle, throat and many more diseases. Therefore, it is important to understand main causes of thyroid problems to have a well-functioning body and to generate healthy future.

**Key Words:** thyroid gland; hormones; hypothyroidism; under-active thyroid

## Introduction

In vertebrates, the thyroid gland is an endocrine gland where it is in the neck. It contains two connected lobes in humans. Its location is at the

front neck and below the Adam's apple. The lower two thirds of the lobes are connected by a thin band of tissue. This tissue is called the thyroid isthmus.



**Figure 1:** The Thyroid Gland

**Ref: [1]**

The thyroid is very important for the body's metabolism, growth and development. By releasing sustainable amounts of hormones into the bloodstream, it regulates many functions of the body. The thyroid gland produces two major hormones, triiodothyronine (T3) and thyroxine (T4). The hormones, T3 and T4, have an important impact on every cell in the body. These hormones maintain the usage rate of fat and carbohydrates, help to control the body temperature, make impact on the heart rate and help to regulate the production of the protein in the body.

Hormones released by the small butterfly-shaped gland find their way through the bloodstream and affect nearly every part of the body, from heart and brain, to muscles and skin. The thyroid controls the usage of energy used by cells obtained from food which is called metabolism.

Diseases caused by thyroid gland is hereditary and may develop at any age [2] but it's much more common in women at the ages between 20 and 30. Other risk factors include stress, pregnancy, and smoking as it is for other diseases.

There are mostly seven warning signs of thyroid related diseases [3]:

- i. Fatigue,
- ii. Weight gain,
- iii. Weight loss,
- iv. Increased heart rate,
- v. Decreased heart rate,
- vi. Sensitivity to cold,
- vii. Sensitivity to heat.

In females, the symptoms of thyroid problems are mostly increased sensitivity to cold, dry skin, puffy face, fatigue, weight gain, muscle weakness and hoarseness [4].

**Problems Caused by Malfunctioned Thyroid in the Body**

There are two types of malfunctioned thyroid in the body: i. an underactive thyroid (hypothyroidism) and ii. an overactive thyroid (hyperthyroidism). The signs and symptoms of hypothyroidism can change depending on the severity of the hormone deficiency. As the metabolism of the body decreases, problems develop slowly. Hypothyroidism often affects middle-aged and older women, babies can be affected negatively as well if they born without a thyroid gland or with a malfunctioned one. The expected symptoms are a large tongue, yellowing of the skin and whites of the eyes, constipation, and difficulty in breathing, an umbilical hernia and hoarse crying, poor muscle coordination, mental and growing problems. In children and teenagers, the malfunctioned thyroid can cause poor growth, poor mental health, delayed permanent teeth development and puberty [5]. Hyperthyroidism can increase the metabolism of the body. It leads to weight loss and an irregular heartbeat.

An under-active thyroid can make loss of smell and taste [6]. It also affects gastrointestinal system by leading to dyspepsia, poor absorption, anemia, low stomach acid, constipation, gallstones and small intestine bacterial overgrowth [7]. An overactive thyroid, on the other hand, can change the voice or cause a lump in the throat by causing the goiter [8]. The worse negative impact of the lump in the neck is the thyroid cancer with swollen lymph nodes that gives the signs of difficulty while swallowing/breathing, chronic cough, hoarseness and wheezing. Hypothyroidism can sometimes cause joint and muscle problems. Muscle aches, tenderness and stiffness can especially felt in the shoulders, hips, thighs and knees. Fluid buildup can be the result of untreated hypothyroidism in the arms and legs. The fluid puts pressure on the nerves by leading to numbness, tingling and pain. It is possible that severe hypothyroidism can cause "carpal tunnel syndrome" that affects the

nerves in wrist and hand by putting pressure on the median nerve [9]. Underactive thyroid can lead to slow growing and brittle nails due to a decrease release of the hormones [10]. Hypertrichosis can be caused by thyroid problems by leading to excessive hair growth on the forehead, between the eyes and high on the cheeks with the negative impact on the androgen hormones [11]. Early graying is related with autoimmune disease of thyroid gland [12]. An underactive thyroid can lead to fertility problems in male by leading to decreased testicular function, poor semen quality, low sperm count, erectile dysfunction and a drop in libido [13]. The heart and peripheral vascular system are affected by thyroid hormone. The hormone can rise myocardial inotropy and heart rate. It also forces peripheral arteries to increase cardiac output. An excessive deficiency of thyroid hormone can lead to cardiovascular disease [14].

**Main Causes of Thyroid Problems**

There are several factors affecting thyroid gland in a negative way such as iodine deficiency, autoimmune diseases, inflammation and stress. Stress itself is not a risk factor but it slows the metabolism of the body leading to weight gain, fatigue and some other disorders. Sometimes, immune system attacks the thyroid leading to hypothyroidism or hyperthyroidism caused by Hashimoto's disease (body generates antibodies that attack the thyroid cells causing an enlarged thyroid gland, tiredness, weight gain, and weakness in muscle) [15] and Graves' disease (immune system attacks the thyroid gland by making it to speed up the metabolism rate of the body leading to heart problems, weak and brittle bones and swelling of eyes) [16] respectively.

**Conclusion**

The small butterfly-shaped gland in the neck acts as a body regulator since it produces the hormones necessary for the well-functioning of the body. It has been seen that thyroid gland has also an important role in the metabolic rate of the body, the heart rate and body temperature.

It can be summarized that hypothyroidism creates symptoms such as goiter, fatigue, dry skin, increased cold sensitivity, puffy face, weight gain, hoarseness, pain in the joints, constipation, weakness in the muscle, slowed heart rate, irregular menstrual periods, stiffness in the muscles and joints, high blood cholesterol level, thinning hair, impaired memory and depression. Hyperthyroidism, on the other hand, causes symptoms like an enlarged thyroid gland, fatigue, rapid heartbeat, weight loss, increased appetite, anxiety, trembling in hands and fingers, increased sensitivity to heat, changes in menstrual period, sweating, frequent bowel movements, skin thinning, brittle hair and difficulty in sleeping.

An untreated malfunctioned thyroid gland can cause severe problems in the body. So it is important to know the main causes of the thyroid problems and the necessary treatment to have a good life and to generate healthy futures.

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