What Is the Thyroid?
The thyroid is a gland in the neck just below the Adam’s apple. It is shaped like a butterfly with two lobes connected in the center. The thyroid makes important hormones that help control many processes in the body, such as body temperature and healthy hair and skin.

How Does the Thyroid Function?
The main thyroid hormone is called T4. Another important hormone is called thyroid stimulating hormone (TSH), which is produced in the pituitary gland at the base of the brain.

To understand how the thyroid functions, think of your body like a house, the pituitary gland like a thermostat, and the thyroid like a furnace. When it’s too cold, the thermostat kicks in and sends a message to the furnace (in the form of TSH) that the house needs more heat (or T4). When the heat reaches an appropriate level, the thermostat (or pituitary gland) senses this and sends a message to the heater (the thyroid) that it’s time to turn off.

Thyroid Conditions
When messages between the thyroid and pituitary gland go awry, it can lead to thyroid conditions.

- **Hyperthyroidism** occurs when the thyroid gland makes too much T4.
- **Primary hypothyroidism** occurs when the thyroid gland itself does not make enough T4.
- **Secondary hypothyroidism** occurs when the pituitary gland does not send enough TSH to the thyroid gland. This leads to the thyroid not making enough T4.

Thyroid Function Tests
These tests are used to check thyroid function:

- TSH test
- T4 test
- T3 test
- Thyroid antibody test
- Radioactive iodine uptake (RAIU) test

TSH Test
This test measures the levels of TSH in a blood sample. In most healthy people, a normal TSH value means the thyroid is working as it should. Other results may indicate the following:

- High TSH = primary hypothyroid
- Low TSH = secondary hypothyroid
- Low TSH = hyperthyroid

T4 Tests
There are two types of T4 tests: *Free T4* (FT4) and *Free T4 Index* (FT4I or FTI). These tests measure T4 levels in a blood sample. Results may indicate the following:

- Low FT4 or FTI = hypothyroid
- High FT4 or FTI = hyperthyroid

The TSH test is often combined with the FT4 or FTI test to best determine thyroid function and pinpoint the cause of issues. Results may indicate the following:

- High TSH and Low FT4 or FTI = primary hypothyroid due to disease in the thyroid gland
- Low TSH and Low FT4 or FTI = secondary hypothyroid due to a problem with pituitary gland
- Low TSH and High FT4 or FTI = hyperthyroid where the thyroid is overactive

T3 Tests
In some people with hyperthyroidism, FT4 or FTI levels are normal. The T3 test is a blood test used to diagnose hyperthyroidism or find out how severe it is. T3 tests are not used for hypothyroidism, as people with this condition generally have normal T3 levels.
Thyroid Antibody Test

The body’s immune system helps protect against foreign bacteria and viruses by making antibodies. These antibodies are produced by blood cells called lymphocytes.

In many people with hypothyroidism or hyperthyroidism, lymphocytes make antibodies against their own thyroid that either stimulate or damage it. The thyroid antibody test uses a blood sample to measure the levels of antibodies, which may help determine the cause of thyroid problems. Results may indicate the following:

• Positive antibodies in a person with hypothyroidism = Hashimoto’s disease
• Positive antibodies in a person with hyperthyroidism = autoimmune thyroid disease

Radioactive Iodine Uptake (RAIU) Test

To create the T4 hormone, the thyroid takes large amounts of iodine from the bloodstream. This process can be measured to check thyroid function using the RAIU test. For the test, a person swallows a small amount of radioactive iodine. The physician tracks where the iodine goes and how much goes to the thyroid gland. Results may indicate the following:

• Low RAIU indicating an underactive thyroid = hypothyroidism
• Very high RAIU indicating an overactive thyroid = hypothyroidism