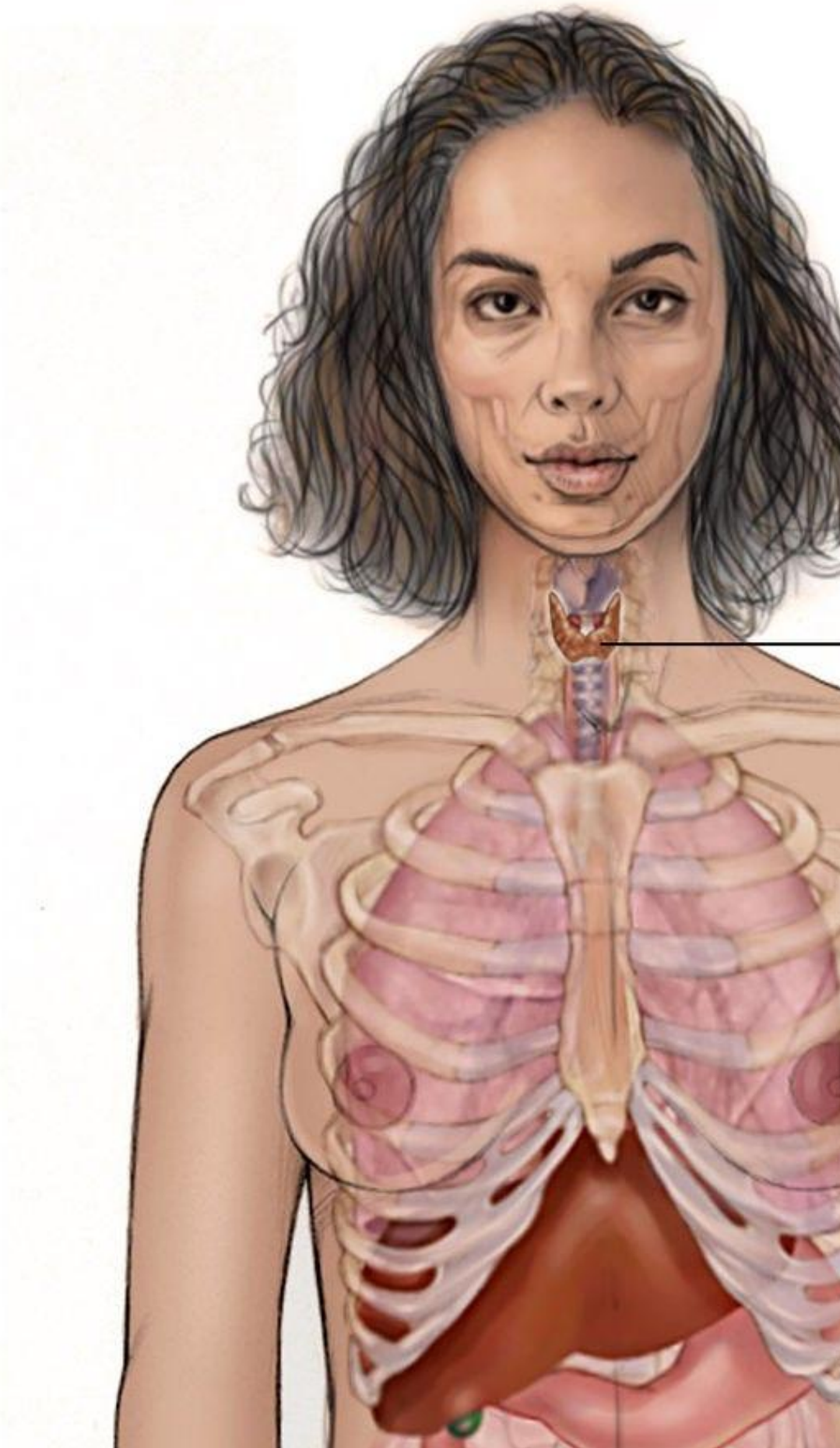
Thyroid Cancer

What Is Thyroid Cancer?

Thyroid cancer is a type of cancer that starts in the **thyroid gland**. The thyroid makes hormones that help regulate your metabolism, heart rate, blood pressure, and body temperature.

Where thyroid cancer starts

The **thyroid gland** is in the front part of the neck, below the thyroid cartilage (Adam's apple). In most people, the thyroid can't be seen or felt. It is shaped like a butterfly, with 2 lobes — the right lobe and the left lobe. These lobes are joined by a narrow piece of gland called the **isthmus** (see picture below).



The thyroid makes hormones that help regulate your metabolism, heart rate, blood pressure, and body temperature. The amount of thyroid hormone released by the thyroid is regulated by the pituitary gland at the base of your brain. This gland makes a substance called **thyroid-stimulating hormone (TSH)**.

Having too much thyroid hormone (**hyperthyroidism**) can cause a fast or irregular heartbeat, trouble sleeping, nervousness, hunger, weight loss, and a feeling of being too warm.

Having too little hormone (**hypothyroidism**) causes you to slow down, feel tired, and gain weight.

The thyroid gland has 2 main types of cells:

- **Follicular cells** use iodine from the blood to make thyroid hormones. These hormones help regulate your metabolism.
- **C cells** (also called **parafollicular cells**) make calcitonin, a hormone that helps control how your body uses calcium.

Other, less common cells in the thyroid gland include immune system cells (lymphocytes) and supportive (stromal) cells.

Different types of thyroid cancer can develop from each kind of cell.

Many types of growths and tumors can develop in the thyroid gland. Most of these are **benign** (non-cancerous), but others are **malignant** (cancerous), which means they can spread into nearby tissues and to other parts of the body

Thyroid conditions that are usually benign
Changes in your thyroid gland’s size or shape can often be felt, or even seen, by you or your doctor. Most often, these changes are benign (not cancer).

Thyroid enlargement
An enlarged thyroid gland is sometimes called a **goiter**. Some goiters are diffuse, meaning that the whole gland is large. Other goiters are nodular, meaning that the gland is large and has one or more nodules (bumps) in it.

There are many reasons the thyroid gland might be larger than usual. Most of the time it isn’t from cancer.

Goiters (both diffuse and nodular) are usually caused by an imbalance in certain hormones. For example, not getting enough iodine in your diet can affect your hormone levels and cause a goiter.

Thyroid nodules

Lumps or bumps in the thyroid gland are called **thyroid nodules**. Most thyroid nodules are benign, but a small percentage are cancer. You can develop thyroid nodules at any age, but it happens most often in older adults.

Some nodules cause the body to make too much thyroid hormone, which can lead to hyperthyroidism. These nodules are almost always benign.

A small portion of adults have thyroid nodules that can be felt by a doctor. But many more people have nodules that are too small to feel. These might only be seen on a test such as an ultrasound.

Most thyroid nodules are cysts filled with fluid or with a stored form of thyroid hormone called **colloid**. Other nodules are solid, with very little fluid or colloid. Solid nodules are more likely to be cancer. Still, most solid nodules are not cancerous.

Some types of solid nodules (such as hyperplastic nodules and adenomas) have too many cells, but the cells are not cancer cells.

Benign thyroid nodules can sometimes just be watched closely, as long as they aren't growing or causing symptoms. Others might need some form of treatment.

Types of thyroid cancer

The main types of thyroid cancer are:

- Differentiated (including papillary, follicular, and oncocytic carcinoma)
- Medullary
- Anaplastic

Differentiated thyroid cancers

Most thyroid cancers are differentiated cancers. The cells in these cancers look a lot like normal thyroid cells when seen in the lab. These cancers develop from thyroid follicular cells.

Papillary thyroid cancer

Papillary thyroid cancer (also called **papillary carcinoma** or **papillary adenocarcinoma**) is the most common type. About 8 out of 10 thyroid cancers are papillary cancers.

These cancers tend to grow very slowly and usually develop in only one lobe of the thyroid gland. They sometimes spread to the lymph nodes in the neck. But even when this happens, they can often be treated successfully and are rarely fatal.

There are several subtypes (called **variants**) of papillary thyroid cancer:

- The **follicular variant of papillary thyroid cancer** is the most common. It is treated the same way as the standard type of papillary cancer, and it tends to have the same good outlook (prognosis) when found early.
- Other variants of papillary carcinoma (including **tall cell, columnar, insular, clear cell, trabecular, hobnail,** and **diffuse sclerosing**) are not as common. They tend to grow and spread more quickly and might need more intensive treatment.

Follicular thyroid cancer

Follicular thyroid cancer (also called **follicular carcinoma** or **follicular adenocarcinoma**) is the next most common type, making up about 1 out of 10 thyroid cancers. (It is different from the follicular variant of papillary cancer, described above.)

This type of thyroid cancer is more common in countries where people don't get enough iodine in their diet. These cancers usually do not spread to lymph nodes, but they can spread to other parts of the body, such as the lungs or bones.

The outlook (prognosis) for follicular cancer is not quite as good as that of papillary cancer, although it is still very good in most cases.

Oncocytic carcinoma of the thyroid

About 3% of thyroid cancers are oncocytic carcinoma of the thyroid (previously called **Hürthle (Hurthle) cell cancer**). This type of thyroid cancer tends to be harder to find and to treat.

Medullary thyroid cancer (MTC)

Medullary thyroid cancer (MTC, also known as **medullary thyroid carcinoma**) accounts for less than 5% of all thyroid cancers. It develops from the C cells of the thyroid gland, which normally make calcitonin. (Calcitonin is a hormone that helps control the amount of calcium in blood.)

MTC can be harder to find and treat. Sometimes it can spread to the lymph nodes, lungs, or liver before a thyroid nodule is even discovered.

There are 2 types of MTC:

Sporadic MTC

Sporadic MTC accounts for about 3 out of 4 cases of MTC. It is not inherited (meaning it does not run in families). It occurs mostly in older adults and often affects only one thyroid lobe.

Familial MTC

Familial MTC is inherited (runs in families). It accounts for about 1 in 4 cases of MTC. It often develops during childhood or early adulthood and can spread early.

People with familial MTC usually have cancer in several areas of both lobes. Familial MTC can occur by itself, or it can be part of a syndrome that includes an increased risk of other types of tumors. This is described in more detail in Thyroid Cancer Risk Factors.

Anaplastic (undifferentiated) thyroid cancer

Anaplastic carcinoma (also called **undifferentiated carcinoma**) is rare. It makes up about 2% of all thyroid cancers. Most often, it is thought to develop from an existing papillary or follicular cancer.

Anaplastic cancer cells do not look very much like normal thyroid cells. This cancer often spreads quickly into the neck and to other parts of the body, and it can be hard to treat.

Less common thyroid cancers

Other rare cancers found in the thyroid include:

- Thyroid lymphoma
- Thyroid sarcoma
- Squamous cell carcinoma (SCC) of the thyroid
- Other rare thyroid cancers

Parathyroid cancer

The parathyroids are 4 tiny glands behind, but attached to, the thyroid gland. Your parathyroid glands help regulate your body's calcium levels. Cancers of the parathyroid glands are very rare.

Parathyroid cancers are often found when they cause high blood calcium levels. High blood calcium levels can make you feel tired, weak, and drowsy. They can also make you urinate (pee) a lot, causing dehydration.

Other symptoms of parathyroid cancer can include bone pain and fractures, pain from kidney stones, depression, and constipation.

The main treatment for most parathyroid cancers is surgery to remove the cancer. Sometimes, medicines are used to help control symptoms caused by high blood calcium levels. Parathyroid cancer tends to be harder to cure than thyroid cancer.

Thyroid Cancer Risk Factors

A risk factor is anything that increases your chances of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like your age or family history, can't be changed.

But having a risk factor, or even several, doesn't mean you will get the disease. And many people who get the disease may have few or no known risk factors. Even if a person with thyroid cancer has a risk factor, it's hard to know how much that risk factor may have contributed to their cancer.

Scientists have found a few risk factors that make a person more likely to develop thyroid cancer.

Sex
For unclear reasons, thyroid cancer occurs almost 3 times more often in women than in men.

Age
Thyroid cancer can occur at any age, but it's most common in people in their 30s through 60s. The risk of thyroid cancer peaks at an earlier age for women than for men. The reasons for this aren't clear.

Hereditary conditions
Some hereditary (inherited) conditions are linked to an increased risk of certain types of thyroid cancer.

These conditions aren't common, and they likely account for only a small portion of thyroid cancers overall. Some examples are listed here, although there are others as well.

Multiple endocrine neoplasia type 2 (MEN2)
People with this condition have a high risk of medullary thyroid cancer (MTC), as well as tumors of some other endocrine glands.

There are 2 subtypes: MEN2A and MEN2B. These subtypes are caused by different mutations (defects) in the *RET* gene.

MEN2A
MEN2A is much more common, and it has several variants. In the most common variant, medullary thyroid cancer (MTC) occurs along with pheochromocytomas (tumors that make adrenaline) and with parathyroid gland tumors. In another variant of MEN2A, known as **familial MTC (FMTC)**, MTC is the only tumor.

MEN2B
In people with MEN2B, MTC is often seen along with pheochromocytomas but not with parathyroid tumors. MTC also tends to be more aggressive in people who have MEN2B.

Some people with this syndrome also have benign growths of nerve tissue on the tongue and elsewhere called **neuromas**.

In people with these conditions, medullary thyroid cancer or other tumors often develop during childhood or early adulthood. MTC also tends to be more aggressive in people who have MEN2B.

If MEN2 runs in your family, you may be at very high risk of developing medullary thyroid cancer. Ask your health care team about the possibility of genetic testing, and about having regular blood tests or ultrasound exams to look for problems.

Familial adenomatous polyposis (FAP)
People with this syndrome develop many colon polyps at an early age and have a very high risk of colon cancer. They also have a higher risk of some other cancers, including papillary thyroid cancer.

Gardner syndrome is a subtype of FAP in which people also have an increased risk of certain other tumors, including papillary thyroid cancer. Both Gardner syndrome and FAP are caused by defects in the *APC* gene.

Cowden syndrome (multiple hamartoma syndrome)
People with this syndrome have an increased risk of certain benign (non-cancerous) growths, including some called **hamartomas**.

They also have an increased risk of developing cancers of the thyroid, breast, and some other organs. These cancers tend to develop at an earlier age. The thyroid cancers tend to be either the papillary or follicular type.

This syndrome is most often caused by defects in the *PTEN* gene.

Carney complex
People with this rare syndrome typically have pigmented (dark) areas on their skin, as well as an increased risk of certain types of benign (non-cancerous) tumors. They also have an increased risk of papillary and follicular thyroid cancers which tend to occur at a young age.

This syndrome is most often caused by defects in the *PRKAR1A* gene.

If you suspect you have an inherited condition that increases your risk of thyroid cancer, talk with your health care provider. They might recommend genetic counseling and testing, depending on your medical history.

Family history
If you have a first-degree relative (parent, brother, sister, or child) with thyroid cancer, you are at an increased risk of developing it as well. This is true even without a known inherited syndrome in the family. Still, most people with thyroid cancer do not have a family history of the disease.

Radiation

Radiation exposure is a risk factor for thyroid cancer. This includes radiation exposure from certain medical treatments and tests, as well as radiation fallout from power plant accidents or nuclear weapons.

Radiation from medical treatments

Having head or neck radiation treatments in childhood increase the risk of thyroid cancer. This includes radiation therapy to treat cancers such as Hodgkin lymphoma, as well as radiation treatment given before a stem cell transplant (bone marrow transplant).

The amount of risk depends on how much and at what age the radiation is given. In general, the risk increases with larger doses and with younger age at treatment.

Learn more in: Second Cancers

Before the 1960s, children were sometimes treated with low doses of radiation for things we wouldn't use radiation for now, like acne, fungal infections of the scalp (ringworm), and enlarged tonsils or adenoids. Years later, the people who had these treatments were found to have a higher risk of thyroid cancer.

Radiation from imaging tests

Imaging tests such as x-rays and CT scans also expose children to radiation, but at much lower doses, so it's not clear how much these tests might raise the risk of thyroid cancer (or other cancers).

If there is an increased risk, it's most likely small. But to be safe, experts advise that children should not have these tests unless absolutely necessary. When this type of imaging test *is* needed, it should be done using the lowest dose of radiation that still provides a clear picture.

Radiation fallout

Thyroid cancer risk is also higher in children exposed to radioactive fallout from nuclear weapons or power plant accidents.

For instance, thyroid cancer risk was many times higher in children who lived near Chernobyl, the site of the 1986 nuclear plant accident. Adults involved with the cleanup after the accident, or who lived near the plant, have also had higher rates of thyroid cancer.

Some radioactive fallout occurred over certain regions of the United States (and other parts of the world) during nuclear weapons testing after World War II. This exposure was generally much lower than the exposure around Chernobyl.

Being exposed to radiation when you are an adult carries much less risk of thyroid cancer compared to exposure that happens when you are a child.

Excess body weight
People with excess body weight have a higher risk of thyroid cancer than those who do not have excess weight. The risk appears to go up as body mass index (BMI) increases.

Iodine in the diet
Follicular thyroid cancers are more common in areas of the world where people's diets are low in iodine. On the other hand, a diet high in iodine may increase the risk of papillary thyroid cancer. In the United States, most people get enough iodine in their diet because it's added to table salt and other foods.

Signs and Symptoms of Thyroid Cancer
Thyroid cancer can cause any of the following signs or symptoms:

- A lump in the front of the neck, sometimes growing quickly
- Swelling in the neck
- Pain in the front of the neck, sometimes going up to the ears
- Hoarseness or other voice changes that do not go away
- Trouble swallowing
- Trouble breathing
- A constant cough that is not due to a cold
- A lump (or lumps) on the side of the neck

Many of these symptoms can also be caused by non-cancerous conditions or even other cancers of the neck area.

Lumps in the thyroid are common and are usually not cancer. Still, if you have any of these symptoms, it's important to see a doctor so the cause can be found and treated, if needed.

Tests for Thyroid Cancer

Sometimes, thyroid cancer is found when a person goes to a doctor because they are having signs or symptoms. It might also be found during a routine physical exam, or during tests done for another reason.

If there is reason to suspect you might have thyroid cancer, your health care team will use one or more tests to confirm your diagnosis. If cancer is found, other tests might be done to find out more about your cancer.

Medical history and physical exam
If you have signs or symptoms that suggest you might have thyroid cancer, your health care provider will ask about your symptoms. They may also ask about your medical history, possible risk factors (including your family history), and any other health problems or concerns you have.

Your doctor will then examine you. During the exam, the doctor will pay special attention to the size and firmness of your thyroid and any enlarged lymph nodes in your neck.

Imaging tests

Imaging tests use x-rays, sound waves, or other ways to look inside your body. These tests might be done for several reasons, including to:

- Help find (or get a better look at) suspicious areas that might be cancer
- Learn how far cancer may have spread
- Help tell if treatment is working

If you have thyroid cancer, or there is reason to believe you might have it, you will likely get one or more of the following imaging tests.

Ultrasound

Ultrasound uses sound waves and their echoes to create images of parts of your body. You are not exposed to radiation during this test.

Ultrasound can help determine if a thyroid nodule is solid or filled with fluid. (Solid nodules are more likely to be cancer.) It can also be used to check the number and size of thyroid nodules, as well as help determine if any nearby lymph nodes in your neck are enlarged, which might be a sign that thyroid cancer has spread.

For thyroid nodules that are too small to feel, ultrasound can be used to guide a biopsy needle into the nodule to get a sample. (See below for more on biopsies.) Even when a nodule is large enough to feel, doctors often prefer to use ultrasound to help guide the needle.

Radioiodine scan

A radioiodine scan can help determine if a lump in your neck is thyroid tissue (which may or may not be cancer). It can also be used in people who have already been diagnosed with differentiated thyroid cancer (papillary, follicular, or oncocytic/Hürthle cell) to help see if it has spread.

Because medullary thyroid cancer (MTC) cells do not absorb iodine, radioiodine scans are not used for this cancer.

How a radioiodine scan works

For this test, a small amount of radioactive iodine (called *I-131*) is swallowed (usually as a pill) or injected into a vein. Over time, the iodine is absorbed by the thyroid gland (or thyroid cells anywhere in the body). A special camera is used several hours later to see where the radioactivity is located.

During the scan

You might have a thyroid scan or a whole-body radioiodine scan, depending on your situation.

Thyroid scan: During a thyroid scan, the camera is placed in front of your neck to measure the amount of radiation in your thyroid gland.

Areas that take up more radiation are called *hot nodules*. Hot nodules are usually not cancer. Abnormal areas of the thyroid that have less radioactivity than the surrounding tissue are called *cold nodules*. Cold nodules can be benign (non-cancerous) or they can be cancerous.

Because both benign and cancerous nodules can appear cold, this test by itself can't diagnose thyroid cancer.

Whole-body radioiodine scan: After surgery for thyroid cancer, whole-body radioiodine scans can be useful to look for possible cancer spread throughout the body. These scans become even more sensitive if the entire thyroid gland has been removed by surgery, because more of the radioactive iodine is picked up by any remaining thyroid cancer cells.

Increasing TSH levels before the scan

Radioiodine scans work best in people who have high blood levels of thyroid-stimulating hormone (TSH, or thyrotropin).

For people whose thyroid has been removed, TSH levels can be increased by stopping thyroid hormone pills for a few weeks before the test. This leads to low thyroid hormone levels (hypothyroidism) and causes the pituitary gland to release more TSH, which in turn stimulates any thyroid cancer cells to take up the radioactive iodine.

A downside of this is that it can cause the symptoms of hypothyroidism, including tiredness, depression, weight gain, sleepiness, constipation, muscle aches, and reduced concentration. One way to raise TSH levels without withholding thyroid hormone is to give an injectable form of thyrotropin (Thyrogen) before the scan.

Because any iodine already in the body can affect this test, people are usually told to avoid foods or medicines that contain iodine for a few days before the scan.

Using radioactive iodine to treat differentiated thyroid cancer

Radioactive iodine can also be used to treat differentiated thyroid cancer, but it is given in much higher doses. This type of treatment is described in Radioactive Iodine (Radioiodine) Therapy.

Computed tomography (CT) scan

A CT scan uses x-rays to make detailed cross-sectional images of your body. It can help determine the location and size of thyroid cancers and whether they have spread to nearby areas, although an ultrasound of the neck is usually done first. A CT scan can also be used to look for spread into distant organs such as the lungs.

One problem with using CT scans is that the CT contrast dye contains iodine, which can interfere with radioiodine scans. For this reason, many providers prefer to use MRI for differentiated thyroid cancer.

Magnetic resonance imaging (MRI)
MRIs use radio waves and strong magnets instead of radiation to create detailed cross-sectional images of your body. MRI can provide very detailed images of soft tissues such as the thyroid gland and nearby lymph nodes. However, an ultrasound of the neck is usually the first test done to look at the thyroid.

MRI might also be used to look for cancer spread to other parts of the body, although this is less common.

Positron emission tomography (PET) scan
A PET scan can be useful if your thyroid cancer doesn't take up radioactive iodine. In this situation, the PET scan may be able to tell whether the cancer has spread.

Vocal cord exam (laryngoscopy)
Thyroid cancers can sometimes affect the vocal cords. If you have voice changes, or if you're going to have surgery to treat thyroid cancer, a procedure called a laryngoscopy may be done to see if your vocal cords are moving normally.

For this exam, the doctor looks down your throat at your larynx (voice box) using either special mirrors or a laryngoscope, a thin tube with a light and a lens on the end for viewing.

Biopsy
The actual diagnosis of thyroid cancer is made with a **biopsy**. During a biopsy, small pieces from the suspicious area are removed. These pieces are looked at in the lab to see if cancer cells are present.

Doctors usually decide whether a biopsy is needed based on how a thyroid nodule looks during an ultrasound. Some features make it more likely that the nodule is cancer.

Fine needle aspiration (FNA) biopsy
If your doctor thinks a biopsy is needed, the simplest way to find out if a thyroid nodule is cancer is with a fine needle aspiration (FNA). This type of biopsy can sometimes be done in your doctor's office or clinic.

Before the biopsy, local anesthesia (numbing medicine) might be injected into the skin over the nodule, but in most cases it isn't needed. The doctor will put a thin, hollow needle directly into the nodule to aspirate (remove) some cells and a few drops of fluid into a syringe. The doctor usually repeats this a few times, taking samples from several areas of the nodule. The biopsy samples are then sent to a lab, where they are looked at to see if they contain cancer cells.

Doctors often use ultrasound to see the thyroid during the biopsy. This helps make sure they are getting samples from the right areas. It is especially helpful for smaller nodules.

FNA biopsies can also be used to get samples of swollen lymph nodes in the neck to see if they contain cancer. Sometimes an FNA will need to be repeated if the samples didn't contain enough cells.

Other biopsies

Sometimes the test results might come back as "suspicious" or "of undetermined significance" when the FNA findings don't show for sure if the nodule is cancer or not. If this happens, the doctor may order lab tests on the sample (see below).

If the diagnosis isn't clear after an FNA, you might need a different type of biopsy to get a larger sample, especially if the doctor has reason to think the nodule may be cancer. This might be done with a core biopsy using a larger needle, a surgical "open" biopsy to remove the nodule, or a lobectomy (removal of half of the thyroid gland).

Surgical biopsies and lobectomies are done in an operating room while you are under general anesthesia (in a deep sleep).

A lobectomy can also be the main treatment for some early cancers, although for many cancers the rest of the thyroid will need to be removed as well (during an operation called a completion thyroidectomy).

Lab tests of biopsy (or other) samples

Your doctor might order **molecular tests** to look for specific gene changes in the cancer cells. This might be done for a few different reasons:

- **For diagnosis:** If FNA biopsy results aren't clear, the doctor might order lab tests on the samples to see if there are changes in the *BRAF* or *RET/PTC* genes. Finding one of these changes makes thyroid cancer much more likely.
- **For making treatment decisions:** For some types of thyroid cancer, molecular tests (sometimes called biomarker tests) might be done to see if the cancer cells have changes in certain genes (such as the *BRAF*, *RET/PTC*, or *NTRK* genes). This could mean that certain targeted drugs might be helpful in treating the cancer, especially if it is advanced.

These tests can be done on samples taken during a biopsy or during surgery for thyroid cancer. If the biopsy sample is too small to do the needed molecular tests, some molecular tests may also be done on blood that is taken from a vein, just like a regular blood draw. This is known as a liquid biopsy. The results of this testing can then be compared with what is already known about the cancer.

Blood tests

Different types of blood tests may be done to see if your thyroid is working normally. The results of these blood tests can help your doctor decide what other tests might be needed.

Blood tests can also be used to monitor certain thyroid cancers.

Thyroid-stimulating hormone (TSH)

To check the overall activity of your thyroid gland, your doctor might test the levels of thyroid-stimulating hormone (TSH or thyrotropin) in your blood. TSH is made by the pituitary gland. Your TSH level might be high if your thyroid isn't making enough hormones.

This information can be helpful when choosing which imaging tests (such as ultrasound or radioiodine scans) to use to look at a thyroid nodule.

The TSH level is usually normal in people with thyroid cancer.

T3 and T4 (thyroid hormones)

T3 and T4 are the main hormones made by the thyroid gland. Levels of these hormones may be measured to get a sense of thyroid gland function.

The T3 and T4 levels are usually normal in people with thyroid cancer.

Thyroglobulin

Thyroglobulin is a protein made by your thyroid gland. Measuring the thyroglobulin level in the blood can't be used to diagnose thyroid cancer, but it can often be helpful after treatment.

A common way to treat thyroid cancer is to remove most of the thyroid with surgery and then use radioactive iodine to destroy any remaining thyroid cells. These treatments should lead to a very low level of thyroglobulin in the blood within several weeks.

If this doesn't happen, it might mean that there are still thyroid cancer cells in the body. If the level rises again after being low, it could be a sign that the cancer has come back.

Calcitonin

Calcitonin is a hormone that helps control how your body uses calcium. It is made by C cells in the thyroid. C cells are the cells that can develop into medullary thyroid cancer (MTC).

If MTC is suspected, or if you have a family history of the disease, blood tests of calcitonin levels can help look for MTC. This test is also used to look for the possible recurrence of MTC after treatment. Calcitonin can affect blood calcium levels, so this might be checked as well.

Carcinoembryonic antigen (CEA)
People with MTC often have high blood levels of a protein called carcinoembryonic antigen (CEA). Tests for CEA can help monitor this type of thyroid cancer.

Other blood tests
You might have other blood tests as well. For example, if you are scheduled to have surgery, tests will be done to check your blood cell counts, to look for bleeding disorders, and to check your liver and kidney function.

If you have medullary thyroid carcinoma (MTC) and are scheduled to have surgery, you might need additional blood tests to check for tumors called **pheochromocytomas**. MTC is sometimes caused by a genetic syndrome that can also result in this type of tumor. Pheochromocytomas can release hormones that might cause problems during surgery while you are under anesthesia (in a deep sleep).

Tests to check for pheochromocytomas can include blood tests for **epinephrine** (adrenaline) and a related hormone called **norepinephrine**, and/or urine tests for their breakdown products (called **metanephrines**).

Can Thyroid Cancer Be Prevented?

Most people with thyroid cancer have no known risk factors that can be changed, so it isn't possible to prevent most of these cancers.

Avoiding or limiting radiation exposure
Radiation exposure, especially in childhood, is a known thyroid cancer risk factor. Because of this, doctors try to avoid giving radiation to the head and neck area unless it's absolutely needed (such as when it's a necessary part of treating another type of cancer).

Imaging tests such as x-rays, CT scans, and PET scans also expose children to radiation, but at much lower doses, so it's not clear how much this might raise the risk of thyroid cancer (or other cancers).

If there is an increased risk, it's most likely small. But to be safe, doctors try to avoid using these tests in children unless absolutely necessary. When these types of imaging tests *are* needed, they should be done using the lowest dose of radiation that still provides a clear picture.

For people at increased risk of thyroid cancer
Some people are born with a very high risk of getting thyroid cancer because of a gene change they inherited from a parent.

One example is people with the familial (inherited) form of medullary thyroid cancer (MTC). This form of thyroid cancer is often the result of having multiple endocrine neoplasia type 2 (MEN2). If a person has MEN2, they are at a very high risk of getting MTC, starting at an early age.

Most of these cancers can be prevented or treated early by removing the thyroid gland. If MTC is known to run in a family, family members can be tested at a very early age for the mutated gene that causes it.

If you have a family history of MTC, it’s important to see a doctor who is familiar with the latest advances in genetic counseling and genetic testing for this disease.