TEST

Thyroid scan

A thyroid scan uses a small radioactive tracer to show how different parts of your thyroid are working.

WHAT IT MEASURES
Where a radioactive tracer collects within the thyroid

SAMPLE
None; nuclear medicine imaging

FASTING NEEDED?
Sometimes, around an oral iodine tracer dose

HOW LONG IT TAKES
About 30 minutes; iodine protocols may require a return visit

RESULTS IN
Usually 1-2 days; varies by imaging center and laboratory

USED FOR
Diagnosis of thyroid overactivity and functional thyroid nodules

MAIN LIMITATION
Iodine exposure and medicines can distort tracer uptake

Overview

A thyroid scan is a nuclear medicine imaging test. It shows how actively different areas of your thyroid take up a small amount of radioactive material, called a tracer.

Your thyroid is a butterfly-shaped gland at the front of your neck. It makes hormones that help control energy use, temperature, heart rate, and other body functions.

The tracer is usually radioactive iodine, often iodine-123, or technetium-99m pertechnetate. Iodine-123 is swallowed as a capsule or liquid. Technetium is injected into a vein. A special camera then detects radiation from the tracer and creates pictures of your thyroid.

A thyroid scan is sometimes performed with a radioactive iodine uptake test. The scan shows where tracer collects. The uptake test measures how much radioactive iodine the whole thyroid absorbs over a set period.

This is different from a thyroid ultrasound. Ultrasound shows the gland's structure, including the size and physical features of nodules. A thyroid scan mainly shows activity.

Why the test is ordered

A thyroid scan can help explain why thyroid hormone levels are high or why a thyroid nodule has formed.

It may be used to:

A nodule that takes up more tracer than nearby tissue is often called hot . One that takes up less is called cold . These terms describe activity, not temperature and not whether the nodule is cancerous.

The scan does not diagnose thyroid cancer by itself.

- Find areas that make more or less thyroid hormone than surrounding tissue
- Help identify the cause of an overactive thyroid
- Assess a thyroid nodule when blood tests show a low thyroid-stimulating hormone, or TSH
- Look for thyroid tissue outside its usual position
- Check for functioning thyroid tissue after selected treatments or operations

Who should have the test

You may be offered a thyroid scan if blood tests suggest that your thyroid is overactive. The pattern can help distinguish conditions such as Graves' disease, an overactive nodule, or thyroid inflammation.

You may also have one if you have a thyroid nodule and a low TSH result. If your TSH is normal or high, ultrasound and sometimes a needle biopsy are usually more useful than a functional scan.

Thyroid scans are not routine screening tests for people without relevant symptoms, examination findings, or abnormal blood tests.

Tell the imaging team before the test if you are pregnant, might be pregnant, or are breastfeeding. Radioactive iodine thyroid tests are generally avoided during pregnancy because iodine crosses the placenta and can reach the developing fetal thyroid. Breastfeeding instructions differ according to the tracer, so the department must plan this with you before it is given.

How to prepare

Follow the instructions from your nuclear medicine department. Preparation differs between iodine and technetium protocols.

You may need to avoid food for several hours before and after swallowing an iodine tracer. Water is often allowed, but use the instructions provided for your appointment.

Tell the department about all prescription medicines, non-prescription medicines, vitamins, and supplements. Do not stop thyroid medicine or any other treatment unless the team arranging the scan gives you specific instructions.

Important information includes:

Remove necklaces or other metal objects around your neck if asked. Wear comfortable clothing without metal near the collar.

- Recent CT scans, angiograms, or other tests using iodine contrast
- Amiodarone or other iodine-containing medicines
- Antithyroid medicines
- Thyroid hormone tablets
- Iodine or kelp supplements
- Recent radioactive iodine treatment
- Pregnancy or breastfeeding
- Difficulty swallowing capsules

What happens during the test

The tracer is given either by mouth or through a small needle in a vein. The amount is selected for diagnostic imaging and is much lower than the amount used to treat an overactive thyroid or thyroid cancer.

There is a waiting period while the tracer collects in your thyroid. With technetium, imaging often starts within about 20 minutes. With iodine-123, images may be taken several hours later, and you may need to return the next day. Local protocols differ.

For the scan, you lie on your back with your neck gently extended. A gamma camera is positioned close to your neck. It detects the tracer but does not produce the radiation or touch you.

You need to keep still while the images are taken. Imaging commonly lasts about 20 to 30

minutes. Tell the technologist if lying flat or extending your neck is uncomfortable.

If an uptake measurement is included, a detector may be placed near your neck for a few minutes. The amount of tracer in your thyroid is compared with a standard measurement.

Understanding your results

A nuclear medicine specialist reviews the tracer pattern and, when measured, the percentage uptake. The report is considered alongside your symptoms, examination, thyroid blood tests, medicines, and previous imaging.

Possible patterns include:

A hot nodule is usually assessed differently from a cold nodule, but neither label gives a complete diagnosis. A cold area may be caused by a cyst, inflammation, a non-functioning nodule, or another change. Ultrasound is better for assessing its structure.

Uptake ranges are not universal. They vary by laboratory, equipment, tracer, timing, age, iodine intake, pregnancy status, medicines, kidney function, and clinical context. Use the reference information printed on your own report.

- Evenly increased activity: the whole gland takes up more tracer than expected
- One or more hot areas: specific nodules are working more actively
- Low or absent activity: the gland takes up little tracer
- Cold areas: parts of the gland take up less tracer than surrounding tissue
- Thyroid tissue elsewhere: functioning tissue appears outside the gland's usual position

What affects the results

Several factors can change tracer uptake even when the equipment and laboratory process are working correctly.

Recent iodine exposure is especially important. Iodine contrast used for a CT scan or angiogram can temporarily reduce radioactive iodine uptake. Iodine-containing supplements, seaweed products, antiseptics, and some cough preparations may also interfere.

Medicines that can alter the result include antithyroid drugs, thyroid hormone, and amiodarone. The timing and size of the effect differ, so give the department a complete medicine list rather than stopping anything yourself.

Other influences include:

Time of day and recent exercise usually have much less effect than iodine exposure or thyroid medicines.

- Recent radioactive iodine treatment or thyroid surgery
- Thyroid inflammation, which may release stored hormone without taking up much tracer
- Pregnancy and breastfeeding
- Kidney function, which can affect tracer clearance
- Movement during imaging
- An iodine dose that was vomited or not fully swallowed
- Leakage of an injected tracer into tissue around the vein
- The interval between receiving the tracer and taking the images

Accuracy and limitations

A thyroid scan is good at showing broad patterns of thyroid activity, but it does not always identify the exact cause. Different conditions can produce similar patterns.

Small nodules may be missed because the camera cannot separate structures below its spatial resolution. A nodule may also be difficult to see if its activity is similar to the surrounding thyroid.

Recent iodine exposure or certain medicines can make uptake look unusually low. This may suggest reduced thyroid activity even when the low uptake is caused by preparation or timing. Movement can blur the images or create an uneven pattern that is not truly present.

A scan cannot reliably confirm or exclude cancer. A cold nodule is not automatically cancerous, and a hot nodule is not an absolute guarantee that cancer is absent. Ultrasound is better for examining a nodule's physical features. A fine-needle biopsy, which removes cells through a thin needle, may be the better test when tissue needs to be examined.

Blood tests are also needed because the scan does not directly measure thyroid hormone or TSH levels.

Risks and complications

The test exposes you to a small amount of ionizing radiation. The tracer loses radioactivity over time and leaves the body mainly through urine.

An injection may cause brief discomfort, a small bruise, or light-headedness. Allergic reactions to these tracers are very uncommon.

Follow any instructions about fluids, toilet hygiene, close contact with children, or breastfeeding. These precautions depend on the tracer and dose.

Seek emergency help for difficulty breathing, fainting, or swelling of the face or throat after an injection. These reactions are exceptionally rare. Increasing pain, redness, or swelling at an injection site can usually be discussed promptly with the imaging department or your usual healthcare service.

What happens next

The report is usually sent to the healthcare professional who requested the test. It may be reviewed with your thyroid blood tests and ultrasound findings.

Routine follow-up may include repeat blood tests, an ultrasound, monitoring, or a discussion of treatment options. A cold or unclear area may need ultrasound assessment and sometimes a biopsy. An overactive area may lead to further discussion about medicines, radioactive iodine treatment, surgery, or observation, depending on the full clinical picture.

Contact the service that arranged the test if you have not received results within the expected timeframe. The scan result alone should not be used to start, stop, or change thyroid medicine.

Common questions

Can I drink coffee before a thyroid scan?

Only if your preparation instructions allow it. Coffee itself is not usually the main concern, but milk, cream, sugar, or food may break a required fasting period.

Does the time of day matter?

The exact clock time matters less than the planned interval after receiving the tracer. Arrive at the stated times, especially if your protocol includes images or uptake measurements on the following day.

Can I exercise beforehand?

Ordinary activity does not usually have an important effect. Avoid activity that makes it difficult to lie still, and follow any specific instructions from the department.

Can I take my thyroid medicine?

Ask the department before the test. Thyroid hormone and antithyroid medicines can change uptake, but whether they should be paused depends on the reason for testing and the tracer used.

Can I drive home afterward?

Usually, yes. The tracer does not normally affect alertness, and sedation is not generally needed. Arrange help if another health condition makes driving difficult.

Will I be radioactive afterward?

A small amount of radiation remains temporarily. Most people can continue ordinary activities, but you may receive short-term precautions about close contact, pregnancy, children, or breastfeeding.

Sources

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