TEST

Radioactive iodine uptake

A radioactive iodine uptake test measures how much iodine your thyroid absorbs

WHAT IT MEASURES
How much radioactive iodine your thyroid absorbs

SAMPLE
None; measurements use a detector over your neck

FASTING NEEDED?
Sometimes, usually several hours around the tracer dose

HOW LONG IT TAKES
Two visits, several hours to 24 hours apart

RESULTS IN
Usually 1-2 days; timing varies by laboratory

USED FOR
Diagnosing causes of an overactive thyroid

MAIN LIMITATION
Recent iodine exposure can falsely lower thyroid uptake

Overview

A radioactive iodine uptake test measures how much iodine your thyroid gland absorbs from your bloodstream. Your thyroid is a small gland at the front of your neck. It uses iodine to make thyroid hormones, which help control your energy use, heart rate, and body temperature.

You swallow a small amount of radioactive iodine, called a tracer. A detector placed near your neck later measures how much of the tracer has entered your thyroid. The test does not usually require an injection.

The tracer contains much less radioactive iodine than treatment for an overactive thyroid or thyroid cancer. The test measures thyroid activity; it does not treat the thyroid.

Radioactive iodine uptake is often performed with a thyroid scan. Uptake produces a number, usually reported as a percentage. A thyroid scan creates pictures showing whether iodine is spread evenly through the gland or concentrated in particular areas.

Why the test is ordered

The test is mainly used to investigate thyrotoxicosis, meaning there is too much thyroid hormone in your body. Blood tests such as thyroid-stimulating hormone, or TSH, and free T4 or T3 usually identify the hormone abnormality first. Radioactive iodine uptake can then help explain its cause.

Different conditions produce different uptake patterns:

The test may also help assess thyroid tissue before radioactive iodine treatment. It is not normally used as a general thyroid screening test.

- Graves' disease commonly causes increased, evenly distributed uptake
- Overactive thyroid nodules may cause one or more high-uptake areas
- Thyroid inflammation often causes low uptake because stored hormone is leaking out
- Taking thyroid hormone can produce low uptake because the gland is less active
- Recent exposure to a large amount of iodine can suppress uptake

Who should have the test

Your healthcare professional may suggest this test if blood results show an overactive thyroid and the cause is uncertain. It may also be useful when symptoms, examination findings, antibody tests, and blood tests do not give a clear answer.

Radioactive iodine is generally not used during pregnancy because the tracer can cross the placenta and enter the developing baby's thyroid. Tell the nuclear medicine team if you are pregnant, might be pregnant, or are trying to become pregnant.

Also tell the team if you are breastfeeding. Radioactive iodine can enter breast milk. The appropriate plan depends on the isotope used and may involve postponing the test or stopping breastfeeding for a specified period. Do not rely on general internet instructions because requirements differ between tracers.

How to prepare

Your nuclear medicine department will give you instructions for its specific protocol. You may be asked not to eat for several hours before swallowing the tracer and for a short time afterward. Plain water is often allowed, but confirm this with the department.

Give the team a complete list of medicines, vitamins, supplements, and recent imaging tests. In particular, mention:

Some of these may need to be paused before testing, but stopping them at the wrong time can be harmful or make the test less useful. Only change a medicine when the clinician arranging the test tells you to do so.

You may need a pregnancy test before receiving the tracer. Remove necklaces or other metal objects from around your neck when asked.

- Thyroid hormone, including levothyroxine or liothyronine
- Antithyroid medicines such as carbimazole, methimazole, or propylthiouracil
- Amiodarone, a heart-rhythm medicine containing iodine
- Kelp, seaweed, iodine drops, and iodine-containing multivitamins
- Recent CT scans, angiograms, or other tests using iodinated contrast
- Recent nuclear medicine tests or radioactive iodine treatment

What happens during the test

You swallow the tracer as a capsule or liquid. It has no noticeable radioactive sensation and usually has little or no taste.

You then leave the department while your body absorbs the iodine. You may be asked to return after several hours and again at about 24 hours. Exact timing differs between facilities.

For each measurement, you sit in a chair while a probe is positioned a short distance in front of your neck. A comparison measurement may also be taken over another part of your body. Each reading generally takes only a few minutes and does not hurt.

If a thyroid scan is included, you lie still while a special camera records images of your thyroid. The camera does not touch you or produce radiation itself; it detects radiation from the tracer.

Understanding your results

The result is usually the percentage of the swallowed tracer found in your thyroid at a specified time. It must be interpreted alongside your TSH, free T4 or T3, symptoms, medicines, and any scan images.

Higher uptake means the thyroid is actively drawing in more iodine. In someone with high thyroid hormone levels, evenly increased uptake may support Graves' disease. One or more concentrated areas may suggest overactive nodules.

Low uptake means little tracer entered the gland. This can occur with thyroid inflammation,

recent iodine exposure, certain medicines, or thyroid hormone taken from outside the body. Low uptake does not necessarily mean the thyroid cannot make hormones.

A result within the laboratory's expected range does not rule out thyroid disease. Reference ranges and interpretation vary by laboratory, measurement time, local iodine intake, age, sex, pregnancy status, medicines, kidney function, and clinical context.

What affects the results

Recent iodinated contrast is one of the most important influences. Contrast used for some CT scans and blood-vessel imaging can provide enough iodine to reduce tracer uptake for a prolonged period, even when the laboratory measurement is technically correct.

Amiodarone can also alter uptake because it contains a large amount of iodine and has long-lasting effects on the thyroid. Kelp, seaweed supplements, iodine-containing vitamins, and some antiseptics may interfere as well.

Thyroid medicines change gland activity. Antithyroid medicines can lower uptake, while thyroid hormone replacement can suppress the thyroid's own iodine use. The timing of any pause matters.

Other influences include:

Age and pregnancy can change thyroid physiology, although radioactive iodine testing is normally avoided during pregnancy. Ordinary physical activity is not a major source of error.

- Eating shortly before or after the tracer when fasting was required
- Vomiting or not swallowing the full dose
- Recent radioactive iodine treatment or another nuclear medicine test
- Significant kidney impairment, which can change iodine clearance
- Very high or very low dietary iodine intake
- Differences between the planned and actual measurement times

Accuracy and limitations

There is no single figure for how often this test gives the correct answer. Accuracy depends on the condition being investigated, preparation, isotope, measurement timing, equipment, and whether a thyroid scan is performed at the same time.

The test can appear falsely low after iodine exposure or because of medicines. This may make

an actively functioning thyroid resemble thyroid inflammation. A result can also fall within the expected range despite thyroid disease, particularly when the abnormality is mild or uneven.

Radioactive iodine uptake cannot diagnose thyroid cancer or reliably determine whether a thyroid lump is benign or malignant. Ultrasound is better for examining a lump's structure, and a needle biopsy may be needed to examine cells.

Blood tests are better for measuring hormone levels. Thyroid antibody tests may support a diagnosis of Graves' disease without radiation. Uptake testing is most useful when the main question is whether the thyroid is actively producing excess hormone or releasing hormone for another reason.

Risks and complications

The diagnostic tracer gives a small dose of radiation. Most people have no immediate side effects, and allergic reactions are very uncommon. An allergy to iodinated CT contrast does not usually mean you are allergic to radioactive iodine.

You may receive brief instructions about limiting close contact with pregnant people or young children. Follow the directions from your nuclear medicine department because they depend on the tracer and dose used.

If a separate blood sample is needed, it may cause a small bruise or brief light-headedness.

What happens next

You can usually return to normal activities after each visit unless the department gives you specific radiation-safety instructions. Drink fluids as directed; much of the tracer that is not taken up by the thyroid leaves through urine.

At routine follow-up, the clinician who ordered the test will consider the uptake result together with blood tests, scan images, medicines, and symptoms. Further testing might include thyroid antibodies, ultrasound, or repeat blood work. Treatment is based on the underlying cause, not on the uptake number alone.

Urgent problems from this test are rare. Seek emergency help if you develop trouble breathing, facial or throat swelling, or collapse after receiving the tracer. Contact the testing department promptly if you vomit soon after swallowing it, because the result may no longer be reliable.

Common questions

Can I drink coffee before the test?

Not if your instructions require fasting. Coffee, milk, and creamer may break the fast. Plain water is often permitted, but follow the instructions from your testing department.

Does the time of day matter?

The exact clock time matters less than measuring uptake at the planned interval after the dose. Arrive at the scheduled times so the result can be compared with the laboratory's protocol.

Can I exercise beforehand?

Normal exercise usually does not meaningfully affect thyroid uptake. Avoid changing your routine unless the department gives different instructions.

Can I have this test after a contrast CT scan?

Not always immediately. Iodinated contrast can suppress uptake and make the result misleading. Tell the department when and where the scan was performed so it can decide when testing will be useful.

Is this safe if I have an iodine or shellfish allergy?

Shellfish allergy is caused by proteins, not iodine. Previous reactions to iodinated contrast also do not usually predict a reaction to the radioactive tracer. Still, report every previous reaction before the test.

Can I drive afterward?

The tracer does not normally cause drowsiness, so most people can drive. If you receive an additional sedating medicine, which is unusual for this test, you will need separate instructions.

Sources

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