TEST

TSI test

A TSI test measures antibodies that can overstimulate the thyroid gland.

WHAT IT MEASURES
Antibodies that activate the thyroid's TSH receptor

SAMPLE
Blood

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually less than 10 minutes

RESULTS IN
Usually several days, depending on the laboratory

USED FOR
Diagnosing Graves disease and assessing pregnancy-related thyroid risk

MAIN LIMITATION
A negative result does not fully exclude Graves disease

Overview

A thyroid-stimulating immunoglobulin, or TSI, test is a blood test for antibodies that can activate your thyroid gland. Antibodies are proteins made by the immune system. They normally help protect you from infection, but some mistakenly target your own tissues.

TSI antibodies attach to the thyroid-stimulating hormone receptor, called the TSH receptor. They act like TSH, the hormone that normally tells the thyroid how much hormone to make. This can cause the thyroid to produce too much thyroid hormone.

TSI is strongly associated with Graves disease, an autoimmune cause of an overactive thyroid. The test helps identify the cause of thyroid overactivity; it does not show by itself how overactive your thyroid is.

TSI is one type of TSH receptor antibody, often shortened to TRAb. Laboratories use different methods and names for these antibody tests. A TSI result therefore needs to be interpreted alongside the exact assay used and your other thyroid results.

Why the test is ordered

A clinician may order a TSI test when blood tests show possible hyperthyroidism, meaning an overactive thyroid. These initial tests usually include TSH and the thyroid hormones free T4 and sometimes T3.

TSI testing may help:

The result is only one part of the assessment. Your symptoms, examination, thyroid hormone levels, medical history and sometimes imaging are also important.

- Confirm that Graves disease is causing an overactive thyroid
- Distinguish Graves disease from thyroiditis or other thyroid conditions
- Investigate thyroid-related eye disease when other findings are unclear
- Assess pregnancy-related risk in someone with current or previous Graves disease
- Help estimate the chance that Graves disease will continue or return after treatment

Who should have the test

TSI testing is usually considered when there is a specific reason to suspect Graves disease. It is not generally used as a routine screening test in people without thyroid concerns.

You may be offered the test if you have low TSH and raised thyroid hormone levels, an enlarged thyroid, or eye changes that may be linked to Graves disease.

Testing can also be important during pregnancy if you currently have Graves disease or had it in the past. TSI or other TSH receptor antibodies may remain in the blood even after thyroid surgery or radioactive iodine treatment. These antibodies can cross the placenta and affect the baby's thyroid, so the result may guide pregnancy monitoring.

How to prepare

You usually do not need to fast. You can generally eat, drink water and take your usual medicines unless your healthcare team gives you different instructions.

Tell them about all prescription medicines, non-prescription products and supplements you take. This is especially important for biotin, also called vitamin B7, because high-dose biotin can interfere with some laboratory testing methods. Do not stop prescribed medicine unless the clinician responsible for it tells you to.

Wear clothing that makes it easy to reach a vein in your arm. Drinking water beforehand may

make the blood draw easier.

What happens during the test

A healthcare professional places a band around your upper arm and cleans a small area of skin. A needle is inserted into a vein, usually near the inside of your elbow, and a small amount of blood is collected into a tube.

The needle is then removed and pressure is applied to the area. The blood draw usually takes only a few minutes. The sample is sent to a laboratory for analysis.

Understanding your results

TSI results may be reported as an index, a percentage or a concentration. The laboratory report should show the method and its own reference range or decision point.

A result above the laboratory's cutoff means TSI antibodies were detected. In someone with thyroid hormone results showing hyperthyroidism, this supports Graves disease as the cause. A higher result means more antibody activity was detected, but it does not directly measure how severe your symptoms are.

A result within the laboratory's reference range makes Graves disease less likely, but it does not completely rule it out. Antibody levels may be low early in the condition, after treatment, or when disease activity is mild. Your clinician may consider another TSH receptor antibody test, repeat testing or thyroid imaging if the cause remains unclear.

During pregnancy, interpretation focuses on whether antibodies could affect the developing baby. The relevant threshold and timing depend on the assay, the stage of pregnancy and your history.

Ranges and interpretation vary by laboratory, testing method, age, sex, pregnancy status, medicines and clinical context. Do not compare a number from one laboratory directly with a cutoff from another.

What affects the results

TSI reflects antibody activity, which can change over time. Treatment for Graves disease may lower the level, although the pattern is not identical for everyone. Antibodies may also remain detectable after thyroid surgery or radioactive iodine treatment. Radioactive iodine can

sometimes cause a temporary rise.

Pregnancy changes immune activity. TSI levels may fall during pregnancy and rise again after birth. The timing of testing therefore matters.

Some issues can make the measured number misleading without indicating a laboratory mistake:

A recent blood transfusion is not usually a major influence on TSI, unlike tests based on red blood cells, but tell your healthcare team about it. Food, coffee, exercise and the time of day generally have little direct effect on this antibody measurement.

- Biotin may interfere with certain test platforms
- Other antibodies in the blood can occasionally interfere with immunoassays
- A damaged, very fatty or otherwise poor-quality blood sample may be unsuitable
- Different TSI and TRAb methods may produce results that are not interchangeable

Accuracy and limitations

In the right clinical setting, modern TSI and TRAb tests are good at identifying Graves disease. A positive result alongside clear biochemical hyperthyroidism often provides strong evidence for the diagnosis.

The test can still miss Graves disease. This is more likely when antibody levels are low, the condition is mild or early, or treatment has already changed immune activity.

A positive result does not prove that every thyroid symptom is caused by Graves disease. TSH receptor antibodies may occasionally occur in other autoimmune thyroid conditions, and assay interference can produce an incorrect positive result.

TSI also cannot show your current thyroid hormone level. TSH, free T4 and T3 are better for that purpose. When antibody results do not fit the clinical picture, radioactive iodine uptake testing or thyroid ultrasound may provide different information. Radioactive iodine uptake is generally avoided during pregnancy and breastfeeding.

Risks and complications

The main risks are a small bruise or brief soreness where the needle entered. Some people feel faint during or shortly after a blood draw.

What happens next

Your result will usually be reviewed with your thyroid hormone tests. A positive result may support a plan for treating or monitoring Graves disease. A negative result may need no further action if other findings point to a different cause, or it may lead to repeat antibody testing or imaging.

During pregnancy, an elevated result may lead to additional thyroid blood tests and closer monitoring of the pregnancy. This is planned follow-up rather than an emergency.

Arrange routine follow-up if you have questions about the result or notice ongoing symptoms such as tremor, heat intolerance or an unexplained change in weight.

Seek urgent medical care for a very fast or irregular heartbeat accompanied by chest pain, trouble breathing, fainting, severe weakness or confusion. These symptoms cannot be interpreted from a TSI result alone.

Common questions

Can I drink coffee before a TSI test?

Usually, yes. Fasting is not normally required, and coffee does not directly change TSI antibodies. If other fasting blood tests are being collected at the same appointment, follow the instructions for those tests.

Does the time of day matter?

Usually not. TSI does not have the same strong daily pattern as some hormones. Attend at the time arranged by the laboratory or clinic.

Can I exercise beforehand?

Normal activity is unlikely to affect the result. Unlike some heart or muscle blood tests, TSI is not usually raised by recent exercise. Rest first if exercise makes blood collection difficult or leaves you dehydrated.

Should I stop biotin before the test?

Biotin can interfere with some laboratory methods. Tell the person ordering the test how much you take and when you last took it. Follow their instructions rather than stopping a prescribed supplement on your own.

Is TSI the same as TSH?

No. TSH is a hormone made by the pituitary gland that regulates the thyroid. TSI is an immune antibody that can imitate TSH and overstimulate the thyroid.

How long will my result stay positive?

There is no fixed period. Levels may fall with treatment but can remain detectable for months or years, including after surgery or radioactive iodine. Trends should be compared using the same laboratory method when possible.

Sources

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