TEST

Growth hormone test

A growth hormone test measures blood levels before and after a controlled stimulus or glucose drink.

WHAT IT MEASURES
Growth hormone before and after stimulation or glucose

SAMPLE
Blood

FASTING NEEDED?
Sometimes, usually 8 to 12 hours for dynamic testing

HOW LONG IT TAKES
Two to four hours for most dynamic tests

RESULTS IN
Usually several days; timing varies by laboratory

USED FOR
Diagnosing hormone deficiency or excess, and monitoring treatment

MAIN LIMITATION
Natural hormone pulses make a single measurement misleading

Overview

Growth hormone is made by the pituitary gland, a small gland beneath the brain. It supports growth during childhood and helps regulate muscle, bone, fat, and blood sugar throughout life.

Growth hormone is released in short bursts, especially during sleep. Its level can change from very low to high within a few hours. For this reason, one random blood measurement usually cannot show whether your body makes too much or too little.

Most growth hormone testing is dynamic testing . This means several blood samples are taken while your body is deliberately encouraged to release or suppress growth hormone.

The main types are:

An insulin-like growth factor 1, or IGF-1 , test is often done first. IGF-1 is produced mainly by the liver in response to growth hormone. Its level is steadier throughout the day, although age, nutrition, liver function, pregnancy, and other factors can affect it.

- A stimulation test , which checks whether growth hormone rises after a medicine or other stimulus
- A suppression test , which checks whether growth hormone falls after a glucose drink
- Serial measurements used with other tests to monitor a known condition

Why the test is ordered

A stimulation test may be used when growth hormone deficiency is suspected. In children, deficiency can slow growth. In adults, it is usually considered in people with known pituitary or nearby brain disease, previous pituitary surgery or radiation, or deficiencies of other pituitary hormones.

A suppression test is mainly used when tests and physical findings suggest growth hormone excess. In adults, persistent excess can cause acromegaly. In children whose growth plates are still open, it can cause unusually rapid growth.

Growth hormone measurements may also help monitor treatment for a confirmed pituitary condition. Results are usually considered alongside IGF-1 levels, other pituitary hormone tests, growth records, symptoms, and imaging.

Who should have the test

Growth hormone testing is not a routine screening test for people without a specific reason to have it.

A child may be assessed if growth has slowed over time or differs substantially from what is expected for age and family pattern. Many other issues can affect growth, including nutrition, thyroid conditions, long-term illness, genetic factors, and normal differences in the timing of puberty. Growth charts and an initial medical assessment usually come before dynamic testing.

An adult may need testing after pituitary disease, head injury affecting the pituitary, brain radiation, or pituitary surgery. Symptoms such as tiredness or changes in body composition are not specific enough to diagnose growth hormone deficiency on their own.

Testing for excess is generally considered when an age-adjusted IGF-1 result is raised or when there are other reasons to suspect abnormal growth hormone production.

How to prepare

Follow the instructions from the testing centre because preparation differs by test.

Many dynamic tests require no food for 8 to 12 hours. Plain water may be allowed. Coffee, tea, juice, chewing gum, and smoking may interfere with fasting instructions.

Tell the testing team about all prescription medicines, non-prescription medicines, vitamins, and supplements. Some medicines affect growth hormone release, blood sugar, or the laboratory method. Biotin, found in some hair and nail supplements, can interfere with certain hormone tests. Do not stop medicines unless the testing team tells you to.

You may be asked to avoid vigorous exercise before the appointment. Exercise, poor sleep, stress, and acute illness can change growth hormone release. If you are unwell on the day, contact the testing centre to ask whether the test should be rearranged.

Children and adults should wear comfortable clothing and may want to bring something quiet to do because several blood samples are usually needed.

What happens during the test

For a stimulation test, a healthcare professional places a small intravenous line, or IV, into a vein. A baseline blood sample is taken. You then receive a medicine or controlled stimulus that should cause the pituitary gland to release growth hormone.

The exact medicine depends on your age, health, local protocol, and the purpose of the test. Blood samples are collected through the IV at set times, often over two to three hours. Blood pressure, pulse, symptoms, or blood glucose may also be monitored.

Some specialist centres use an insulin tolerance test. Insulin lowers blood sugar, which should stimulate growth hormone release. Because significant low blood sugar can occur, this test requires close supervision and is not suitable for everyone.

For a suppression test, a baseline sample is taken before you drink a measured glucose solution. Further samples are collected to see whether growth hormone falls. The appointment commonly lasts about two hours.

Understanding your results

Your report may list several growth hormone values rather than one result. The pattern and the highest or lowest value may be more important than any single measurement.

During a stimulation test, growth hormone should rise. A response below the laboratory's decision point may support growth hormone deficiency, but it does not prove the diagnosis by

itself.

During a glucose suppression test, growth hormone would normally fall. If it does not fall enough, the result may support growth hormone excess. An IGF-1 measurement and the wider clinical picture are needed for interpretation.

There is no single reference range or decision point that applies to every laboratory and every test method. Results vary with the assay used, the stimulation medicine, age, sex, puberty, pregnancy status, body size, medicines, and clinical context.

A result close to a laboratory's decision point is not automatically normal or abnormal. Your healthcare team may compare it with earlier tests, repeat it, or use another validated test.

What affects the results

The largest issue is the body's natural pattern of growth hormone release. A random result can be low between pulses even when production is normal. It can also be temporarily high during a pulse.

Other factors include:

Tell the testing team about these factors before the test. They do not always mean testing must be cancelled, but they can change how the result is interpreted.

- Sleep and time of day: the strongest natural pulses often happen during sleep
- Recent exercise: vigorous activity can temporarily raise growth hormone
- Stress or acute illness: both can alter hormone release
- Age: growth hormone responses generally change across childhood and adulthood
- Puberty and sex hormones: responses may be stronger during puberty
- Body weight: obesity can reduce the response to stimulation without proving pituitary disease
- Pregnancy: placental hormones and assay differences can complicate interpretation
- Nutrition: fasting, undernutrition, and eating disorders can affect growth hormone and IGF-1 differently
- Liver or kidney disease: these can change IGF-1 production or hormone handling
- Diabetes and high blood sugar: these may complicate glucose suppression testing
- Medicines: estrogen, glucocorticoids, and medicines affecting dopamine or blood sugar may alter results

- Laboratory interference: biotin and certain antibodies can make some immunoassay results inaccurate

Accuracy and limitations

No growth hormone test is correct in every person. Accuracy depends on the stimulus, laboratory method, chosen decision point, and population being tested.

A stimulation test can miss true deficiency if the response happens to cross the laboratory's threshold. It can also suggest deficiency when pituitary function is normal, particularly when obesity, age, puberty, illness, or inadequate preparation reduces the response.

A suppression test can suggest excess when growth hormone does not fall as expected for reasons other than acromegaly. Poorly controlled diabetes and differences between laboratory assays are important examples. Conversely, mild or early disease may be harder to identify.

Because of these limitations, random growth hormone measurement is rarely the best test for diagnosing deficiency or excess. Age-adjusted IGF-1 is generally a better initial test when excess is suspected. Dynamic testing is more useful when deficiency must be assessed or when an IGF-1 result needs confirmation.

Pituitary imaging cannot show whether growth hormone production is normal. It may be used after biochemical tests indicate a hormone problem or when there is another reason to examine the pituitary.

Risks and complications

An IV or blood draw may cause brief pain, bruising, or light-headedness. Infection or ongoing bleeding is uncommon.

Dynamic-test medicines may cause temporary nausea, flushing, headache, sleepiness, dizziness, or changes in blood pressure. A glucose drink can cause nausea and temporarily raise blood sugar.

An insulin tolerance test can cause marked low blood sugar, with sweating, shaking, confusion, or weakness. Staff monitor you closely and treat low blood sugar promptly.

Mild bruising can usually be managed routinely. Tell staff immediately during the test if you feel faint, confused, very weak, short of breath, or otherwise seriously unwell. After leaving, seek urgent medical help for severe or worsening symptoms rather than waiting for the result.

What happens next

Results are reviewed with your symptoms, medical history, growth pattern, medicines, IGF-1 level, and other pituitary tests.

A clearly reassuring result may need no further testing. A borderline or unexpected result may lead to repeat testing or a different dynamic test. Children may also have continued height measurements because growth over time provides important information.

If testing supports a hormone disorder, further assessment may include other pituitary hormone tests or an MRI scan. Treatment is not started or changed from a growth hormone number alone.

Receiving results and arranging follow-up are usually routine rather than urgent. Ask when and how you will receive the report before leaving the testing centre.

Common questions

Can I drink coffee before a growth hormone test?

Usually not if you have been told to fast. Even black coffee may affect the test or break the centre's fasting rules. Plain water is commonly allowed, but follow your appointment instructions.

Does the time of day matter?

Yes. Growth hormone is released in pulses linked partly to sleep. Dynamic tests use a timed protocol to reduce this problem, so arrive at the scheduled time.

Can I exercise beforehand?

Avoid vigorous exercise if the testing centre advises it. Exercise can temporarily raise growth hormone and make a baseline measurement harder to interpret.

Can I take my usual medicines?

Some medicines should be continued and others may need special timing. Do not stop prescription medicine on your own. Give the testing team a complete list before the appointment.

Is an IGF-1 test the same thing?

No. A growth hormone test measures growth hormone directly, often several times. IGF-1 is a related hormone with a steadier level and is often used as an initial or companion test.

Will one abnormal result confirm a condition?

Not always. Results near a decision point or results affected by illness, body weight, medicines, or laboratory interference may need confirmation with another test.

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