TEST

ACTH blood test

An ACTH blood test measures the hormone that signals your adrenal glands to make cortisol.

WHAT IT MEASURES
ACTH, the hormone that signals adrenal cortisol production

SAMPLE
Blood from a vein

FASTING NEEDED?
Sometimes, if the laboratory's morning protocol requires it

HOW LONG IT TAKES
Usually less than 10 minutes

RESULTS IN
Often 1-3 days; turnaround differs by laboratory

USED FOR
Diagnosing and monitoring pituitary and adrenal hormone disorders

MAIN LIMITATION
Time, stress, and sample handling can change the result

Overview

Adrenocorticotropic hormone, or ACTH, is made by the pituitary gland at the base of your brain. It travels through your blood to the adrenal glands above your kidneys. ACTH tells them to make cortisol, a hormone involved in blood pressure, metabolism, inflammation, and the response to stress.

An ACTH blood test is usually interpreted alongside a cortisol test. ACTH alone rarely shows whether a problem is in the pituitary gland, adrenal glands, or elsewhere.

This differs from an ACTH stimulation test, which involves giving manufactured ACTH and measuring how cortisol responds.

Why the test is ordered

The test helps investigate abnormal cortisol production and whether it may be linked to the adrenal glands, pituitary gland, or another source of ACTH.

It may be ordered to investigate:

ACTH is not generally used as a routine screening test without a clinical reason.

- Too little cortisol, including possible adrenal insufficiency
- Too much cortisol, sometimes called Cushing syndrome
- A pituitary or adrenal gland condition
- An unexpected result from another hormone test
- The effect of treatment for a pituitary or adrenal disorder

Who should have the test

You may be offered the test if your symptoms, medical history, medicines, or cortisol results suggest a hormone problem. It may also be used after treatment involving the pituitary or adrenal glands.

Symptoms such as tiredness, weight change, or muscle weakness cannot show whether ACTH is abnormal because they have many possible causes.

How to prepare

Follow the instructions from the healthcare professional or laboratory. ACTH changes through the day, so collection time matters. When adrenal insufficiency is suspected, ACTH and cortisol are often collected early in the morning, when cortisol would normally be highest.

Fasting is not always required for ACTH, but you may need to fast if other tests are being collected or the laboratory uses a specific protocol. If fasting, drink only water unless told otherwise.

Tell the healthcare team about all medicines and supplements you use. Steroids like prednisone or hydrocortisone can strongly affect ACTH and cortisol, including tablets, injections, inhalers, creams, and nasal sprays.

Do not stop a steroid or other prescribed medicine unless the professional overseeing your care gives you a plan. Suddenly stopping some steroids can be unsafe.

Ask whether to avoid strenuous exercise, caffeine, or smoking before the test. Try to sit quietly before the blood draw.

What happens during the test

A healthcare worker places a needle into a vein, usually in your arm, and collects blood into a tube. The needle is removed, then pressure and a dressing are applied. The appointment usually takes less than 10 minutes.

ACTH breaks down after collection, so the sample may need a special tube, cooling, prompt separation, and freezing. The collection service and laboratory handle these steps.

Understanding your results

ACTH should be assessed with a cortisol result collected at the same time whenever possible. Collection time, symptoms, medicines, and other findings also matter.

Patterns may provide clues:

These patterns do not make a diagnosis by themselves. A "normal" ACTH result may still be inappropriate for the cortisol level. For example, it may be within range but too low when cortisol is also low.

Laboratories use different methods and reference ranges. Interpretation can also vary with age, pregnancy, medicines, collection time, and clinical context. Use the range on your report rather than one found online.

- High ACTH with low cortisol can point toward reduced adrenal gland function
- Low or unexpectedly normal ACTH with low cortisol can suggest reduced pituitary or brain signalling
- Low ACTH with high cortisol can suggest cortisol production not driven by ACTH
- High or unexpectedly normal ACTH with high cortisol may require tests for an ACTH-driven cause

What affects the results

ACTH is released in pulses and follows a daily rhythm. Levels are usually higher around waking and lower later in the day. Shift work, disrupted sleep, time-zone travel, and unusual sleep schedules can alter this pattern.

Other influences include:

Some laboratory methods can be affected by assay interference, when another substance alters the measurement. High-dose biotin may interfere with some hormone testing systems,

although this depends on the method.

- Emotional stress, pain, illness, surgery, or low blood sugar
- Strenuous exercise shortly before collection
- Steroids, including recent injections and some inhaled or topical products
- Medicines that alter cortisol production or pituitary signalling
- Pregnancy and estrogen-containing medicines, particularly when cortisol is measured
- Timing relative to waking and sleep
- Incorrect sample temperature or delayed processing

Accuracy and limitations

An ACTH test can measure the hormone accurately when the sample is collected and handled correctly. However, one measurement is only a snapshot of a hormone that changes throughout the day.

There is no single figure for how often the test misses a disorder or gives an abnormal result when none is present. Accuracy depends on the laboratory method, collection time, suspected condition, and cortisol result.

Testing at an unhelpful time or between hormone pulses may miss a problem. ACTH may also appear abnormal during acute illness, pain, or major stress without a lasting pituitary or adrenal disorder.

Further tests may include an ACTH stimulation test for adrenal function or dexamethasone suppression, late-night salivary cortisol, or 24-hour urine cortisol testing for suspected cortisol excess. Imaging is generally interpreted after hormone testing rather than used as a substitute.

Risks and complications

A blood draw may cause brief discomfort, a small bruise, or light bleeding. Some people feel faint, but serious complications are uncommon.

What happens next

Your result may be reviewed with cortisol, sodium, potassium, glucose, and other hormone

results. Follow-up may include repeating an early-morning test or arranging a stimulation or suppression test.

A mildly abnormal result does not usually require emergency action by itself. The healthcare professional who ordered it can explain whether follow-up is needed and how soon.

Seek emergency medical help for severe weakness with repeated vomiting, intense abdominal pain, confusion, collapse, or fainting, especially if you have known adrenal insufficiency or recently stopped steroid treatment. These symptoms need urgent assessment rather than waiting for a routine ACTH result.

Common questions

Can I drink coffee before an ACTH blood test?

If told to fast, have only water. Even when fasting is not required, coffee may briefly affect stress hormones. Follow the laboratory's instructions.

Does the time of day matter?

Yes. ACTH changes throughout the day and is linked with sleeping and waking. Do not change the requested collection time without checking.

Can I exercise beforehand?

Strenuous exercise can temporarily affect ACTH and cortisol. Avoid a hard workout immediately before the test if possible, and mention any recent heavy exercise.

Can I take my medicines before the test?

Ask for instructions, particularly if you use a steroid. Do not skip or stop prescribed steroids on your own. Bring an up-to-date list of medicines, injections, creams, inhalers, and supplements.

Is this the same as an ACTH stimulation test?

No. A standard test measures ACTH already in your blood. A stimulation test gives manufactured ACTH and checks whether your adrenal glands produce enough cortisol.

Why are ACTH and cortisol tested together?

Their relationship helps identify where hormone signalling may be disrupted. The same ACTH level can mean different things depending on whether cortisol is low, high, or appropriate for the collection time.

Sources

- National Library of Medicine, MedlinePlus. Adrenocorticotropic Hormone (ACTH) Test
- Mayo Clinic Laboratories. Adrenocorticotropic Hormone, Plasma: Test Catalog
- Bornstein SR, Allolio B, Arlt W, et al. Diagnosis and Treatment of Primary Adrenal Insufficiency: An Endocrine Society Clinical Practice Guideline . Journal of Clinical Endocrinology & Metabolism . 2016;101(2):364-389.
- Nieman LK, Biller BMK, Findling JW, et al. The Diagnosis of Cushing's Syndrome: An Endocrine Society Clinical Practice Guideline . Journal of Clinical Endocrinology & Metabolism . 2008;93(5):1526-1540.
- ARUP Consult. Adrenal Insufficiency and Addison Disease