TEST

Cortisol blood test

A cortisol blood test measures the amount of the hormone cortisol in your blood.

WHAT IT MEASURES
Cortisol, a hormone involved in stress response and metabolism

SAMPLE
Blood from a vein

FASTING NEEDED?
Sometimes, if paired testing or laboratory instructions require it

HOW LONG IT TAKES
5 to 10 minutes for one blood draw

RESULTS IN
Usually 1 to 3 days, varying by laboratory

USED FOR
Diagnosis and monitoring of adrenal or pituitary disorders

MAIN LIMITATION
Levels change with time, stress, illness, medicines, and sleep

Overview

A cortisol blood test measures cortisol in your blood. Cortisol is a steroid hormone made by the adrenal glands, which sit above the kidneys.

Cortisol helps regulate blood pressure, blood sugar, inflammation, metabolism, and the body's response to stress. Its production is partly controlled by adrenocorticotropic hormone (ACTH) from the pituitary gland.

Levels normally follow a daily rhythm, usually peaking around waking and falling by late evening. Sleep, illness, stress, medicines, and collection time can affect the result. A single result may not give a complete answer, so cortisol is sometimes measured with ACTH or after a medicine that stimulates or suppresses cortisol production.

Why the test is ordered

The test can help investigate whether your body is making too little or too much cortisol. Low cortisol may result from problems with the adrenal glands or reduced pituitary signals. High

cortisol may be caused by excess hormone production, steroid medicines, illness, or stress.

A clinician may order it to:

Random cortisol testing is generally not preferred for screening for Cushing syndrome because levels change throughout the day.

- Investigate adrenal insufficiency, including Addison's disease
- Help assess possible Cushing syndrome
- Check pituitary or adrenal gland function
- Monitor a known condition or assess treatment or surgery
- Perform an ACTH stimulation or dexamethasone suppression test

Who should have the test

You may be offered testing if you have findings that could relate to abnormal cortisol production, such as unexplained low blood pressure, persistent weakness, weight changes, easy bruising, muscle weakness, skin pigmentation changes, or abnormal sodium or potassium levels. Because these findings have many possible causes, the test is interpreted as part of a wider assessment.

Testing may also be appropriate if you have a pituitary or adrenal condition, have had surgery involving these glands, or have used glucocorticoid medicines such as hydrocortisone or prednisolone for a prolonged period. It is not usually a routine screening test for people without relevant symptoms, findings, or treatment history.

How to prepare

Follow the laboratory or clinic's instructions. Preparation depends on why you are being tested and whether other tests are being performed.

Your appointment may be scheduled for the morning because cortisol is usually highest around waking. Evening or late-night testing may be requested for other reasons. Tell the clinic if you work nights or have an unusual sleep schedule.

You may need to avoid food before some combined, stimulation, or suppression tests. Plain water is usually allowed, but confirm your instructions.

Tell the clinic about all medicines, supplements, injections, creams, inhalers, and nasal sprays you use. Steroid medicines, estrogen-containing medicines, anti-seizure medicines, and

high-dose biotin are especially important. Do not stop a prescribed medicine unless the clinician responsible for your care tells you to.

Avoid unusually strenuous exercise shortly before testing. Tell staff if you are acutely unwell, have slept very little, or have recently experienced major physical stress.

What happens during the test

A healthcare professional cleans the skin, usually inside your elbow, and inserts a small needle into a vein. Blood is collected into a tube before the needle is removed and a dressing is applied. A single draw usually takes 5 to 10 minutes.

For an ACTH stimulation test, samples are taken before and after synthetic ACTH is given. A dexamethasone suppression test may require you to take dexamethasone at a set time before a later sample. Follow timing instructions carefully because errors can make the results difficult to interpret.

Understanding your results

Your report will show the cortisol level, unit of measurement, and laboratory reference range. Results from laboratories using different units or methods should not be directly compared.

Interpretation depends on collection time, age, pregnancy, medicines, sleep schedule, current health, symptoms, and other test results. A low morning level may suggest reduced cortisol production but does not always confirm adrenal insufficiency. ACTH measurement or an ACTH stimulation test may be needed.

A high result does not by itself diagnose Cushing syndrome. Stress, pain, pregnancy, estrogen treatment, alcohol use, depression, and acute illness can raise cortisol or affect how it is carried in the blood. Late-night salivary cortisol, 24-hour urine cortisol, or dexamethasone suppression testing may be more suitable.

Most blood tests measure total cortisol, including cortisol attached to proteins and the smaller unbound, or "free," amount. Changes in these proteins can alter total cortisol without producing the same change in free cortisol.

What affects the results

Collection time is especially important. A result taken after waking cannot be interpreted like

one taken late in the day. Shift work, jet lag, disrupted sleep, and hospital stays can disturb the usual pattern.

Physical or emotional stress, pain, fever, surgery, acute illness, low blood sugar, and vigorous exercise may temporarily increase cortisol.

Steroid tablets, injections, inhalers, nasal sprays, creams, and joint injections may suppress your own cortisol production. Some can also interfere with laboratory methods and make the measured level appear higher.

Pregnancy and estrogen-containing medicines can increase cortisol-binding globulin and raise total cortisol. Severe liver disease, kidney protein loss, or critical illness may lower binding proteins. Some anti-seizure medicines and other drugs affect how cortisol or dexamethasone is broken down, while high-dose biotin can interfere with some tests.

Accuracy and limitations

The test measures cortisol accurately in that sample, but levels can change within minutes or hours. A normal result may miss occasional or early excess cortisol, while stress, illness, timing, or medicines can cause a temporary abnormal result.

Random blood cortisol has limited value. Morning testing is more useful when low cortisol is suspected, and an ACTH stimulation test provides better information about whether the adrenal glands respond appropriately.

For suspected excess cortisol, late-night salivary cortisol, 24-hour urine free cortisol, or dexamethasone suppression testing is often more informative. More than one sample may be needed because excess production can be intermittent. Laboratory methods also differ, and some antibody-based tests can mistake similar steroid like prednisone or hydrocortisone compounds for cortisol.

Risks and complications

A blood draw may cause brief discomfort, a small bruise, or light-headedness. These effects are usually mild and settle without treatment.

What happens next

A clinician will interpret your result with the collection time, medicines, health history, and

other tests. Follow-up may include repeating a morning test, measuring ACTH, or arranging stimulation, suppression, saliva, or urine testing.

Do not change steroid treatment based only on a result in an online record. Suddenly stopping long-term steroid medicine can be unsafe; changes should follow a planned medical review.

Seek urgent medical help if you have known or suspected adrenal insufficiency and develop severe vomiting, marked weakness, confusion, fainting, or difficulty staying awake. These symptoms require urgent assessment rather than waiting for a routine result.

Common questions

Can I drink coffee before a cortisol blood test?

If fasting is not required, you may still be asked to avoid coffee because caffeine can affect the stress response. Plain water is the safest choice.

Does the time of day matter?

Yes. Attend at the requested time and mention night work or an unusual sleep schedule.

Can I exercise beforehand?

Avoid vigorous exercise shortly before testing unless told otherwise, as it can temporarily increase cortisol.

Do I need to fast?

Not always. Fasting may be required when cortisol is measured with other blood tests or during stimulation or suppression testing. Follow your appointment instructions.

Should I stop my steroid medicine?

Do not stop it yourself. Ask for specific instructions and report every steroid tablet, injection, inhaler, cream, or nasal spray you use.

What if I am ill or slept badly?

Tell the laboratory or clinician because illness and major sleep disruption can affect cortisol. Testing may still be necessary if adrenal insufficiency is suspected.

Sources

- MedlinePlus Medical Test: Cortisol Test , U.S. National Library of Medicine

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- El-Farhan N, Rees DA, Evans C. "Measuring cortisol in serum, urine and saliva-are our assays good enough?" Annals of Clinical Biochemistry , 2017;54(3):308-322