TEST

Erythropoietin test

A blood test that measures the hormone controlling red blood cell production

WHAT IT MEASURES
Erythropoietin, a hormone controlling red blood cell production

SAMPLE
Blood

FASTING NEEDED?
No, unless other blood tests require it

HOW LONG IT TAKES
About 5 to 10 minutes

RESULTS IN
A few days; turnaround varies by laboratory

USED FOR
Investigating anemia or a high red blood cell count

MAIN LIMITATION
A normal result cannot rule out important blood conditions

Overview

An erythropoietin test measures erythropoietin, often shortened to EPO, in your blood. EPO is a hormone made mainly by your kidneys.

When your tissues receive too little oxygen, the kidneys usually release more EPO. This tells the bone marrow to make more red blood cells, which carry oxygen around the body.

The test is interpreted alongside a complete blood count, or CBC, particularly your hemoglobin and hematocrit. An EPO result cannot identify a condition by itself. Its meaning depends on whether your red blood cell count is low, high, or normal and on other information about your health.

Why the test is ordered

The test can help investigate an unexplained low red blood cell count, called anemia. It may show whether the kidneys are increasing EPO as expected or whether the bone marrow is not responding normally.

It can also help investigate erythrocytosis, meaning more red blood cells than expected. Possible causes include a bone marrow condition, low oxygen, medicines, and dehydration.

A low EPO level can support an investigation for polycythemia vera, in which the bone marrow makes too many blood cells. A higher level may suggest a response to low oxygen or, less commonly, excess EPO production elsewhere in the body. Neither result confirms the cause.

EPO may also be measured when planning treatment for some blood or bone marrow conditions, but it is not usually used alone to choose or adjust treatment.

Who should have the test

EPO testing is not a routine screening test for people with a normal blood count. It is generally considered after another test has shown anemia or elevated hemoglobin or hematocrit.

Your clinician may order it if:

Dehydration can reduce the liquid portion of blood and make the red blood cell count appear high. Your clinician may therefore repeat the blood count before ordering EPO testing.

- anemia remains unexplained after initial tests
- kidney-related anemia is being considered
- your hemoglobin or hematocrit remains high on repeat testing
- polycythemia vera or another cause of erythrocytosis is being investigated
- the result could help plan treatment for a bone marrow disorder

How to prepare

Fasting is not normally required. You can usually eat, drink water, and take your usual medicines unless you have different instructions for other tests being collected at the same time.

Tell your healthcare team about all medicines and supplements you use, especially epoetin, darbepoetin, testosterone, or other treatments that affect red blood cell production.

High-dose biotin supplements, sometimes marketed for hair, skin, or nails, can interfere with some laboratory methods. Do not stop prescribed medicine without advice, but ask whether the laboratory has special instructions.

EPO levels vary during the day. If you need repeat testing, having samples collected at a similar time can make comparison easier.

What happens during the test

A healthcare professional places a small needle into a vein, usually in your arm. Blood is collected into a tube and sent to a laboratory.

The blood draw usually takes less than five minutes, and the full appointment may take 5 to 10 minutes. You can normally return to your usual activities immediately. Results often take a few days, particularly if the sample is sent elsewhere.

Understanding your results

Laboratories use different methods, units, and reference ranges. Use the range printed beside your result rather than one found online. Interpretation may also depend on your age, sex, pregnancy status, medicines, and clinical circumstances.

If you have anemia, a high EPO level may show that your kidneys are responding to reduced oxygen-carrying capacity. This can occur with blood loss, red blood cell breakdown, or some bone marrow problems. A low or "inappropriately normal" result means EPO is not as high as expected for the degree of anemia. Reduced kidney function is one possible cause.

If you have erythrocytosis, low EPO may support further testing for polycythemia vera. High EPO may suggest that red blood cell production is being driven by low oxygen, medicine, or another source of EPO.

A result within the laboratory range does not settle the question. In anemia, a normal value may still be too low for your body's needs. In erythrocytosis, some people with an important underlying condition have EPO within the reference range.

What affects the results

Factors that can affect EPO or its interpretation include:

Biotin and unusual antibodies can interfere with some immunoassays. If a result does not fit your other tests, the laboratory may repeat it or use another method.

- Kidney function: Kidney disease may limit the expected EPO increase during anemia.
- Oxygen availability: High altitude, smoking, sleep apnea, and some lung or heart conditions can increase EPO.
- Blood loss or red blood cell breakdown: Both can increase the body's demand for EPO.

- Iron deficiency: This can limit red blood cell production despite an EPO signal.
- Recent transfusion: Donated cells can change the blood count and EPO feedback.
- Pregnancy, age, and sex: These affect blood counts and interpretation.
- Medicines: Prescription EPO, testosterone, some cancer treatments, and certain diabetes medicines may affect red blood cell production.
- Time of day: Samples taken at different times may not be directly comparable.
- Strenuous exercise or dehydration: These can temporarily change plasma volume, oxygen demand, hemoglobin, or hematocrit.

Accuracy and limitations

EPO testing can narrow down possible causes, but it cannot diagnose or exclude a condition by itself.

A normal EPO result does not rule out polycythemia vera, and a low result does not prove it. Testing for a change in the JAK2 gene is more directly related to this condition and is often part of the investigation.

A high EPO level does not reveal why it is high or where it came from. Some causes release EPO intermittently, and some people with oxygen-related erythrocytosis have values within the laboratory range.

Different assays may give different numbers. Follow-up can include another blood count, kidney and iron tests, oxygen measurements, JAK2 testing, or bone marrow testing. Imaging is usually used only when the history, examination, and laboratory results suggest it may help.

Risks and complications

The risks are those of an ordinary blood draw. You may have brief discomfort, a small bruise, or feel lightheaded.

Serious complications are uncommon. Applying pressure to the site for a few minutes can reduce bruising.

What happens next

Your result will usually be reviewed with your complete blood count and any tests of kidney

function, iron stores, or oxygen levels.

A mildly abnormal result often leads to routine follow-up rather than urgent treatment. The next step may be repeating the blood count, reviewing medicines, or arranging more specific tests.

Do not wait for an EPO result if you develop sudden chest pain, severe difficulty breathing, fainting, coughing up blood, or signs of a stroke such as facial drooping, arm weakness, or trouble speaking. Seek emergency care for these symptoms, regardless of any planned blood tests.

Common questions

Can I drink coffee before an erythropoietin test?

Usually, yes. Fasting is not normally required, but follow any instructions for other tests collected at the same appointment.

Does the time of day matter?

It can. EPO follows a daily rhythm. Repeat samples are easier to compare when collected at a similar time.

Can I exercise beforehand?

Light activity is unlikely to matter. Avoiding an unusually strenuous workout may make the result easier to interpret.

Should I take my medicines as usual?

Usually, but tell your clinician about prescription EPO, testosterone, cancer treatment, diabetes medicines, and biotin supplements. Do not stop prescribed treatment unless instructed.

Does a high EPO result mean cancer?

No. Possible explanations include anemia and low oxygen. Rare tumors can produce EPO, but the result alone cannot identify the cause.

Why might I need the test repeated?

EPO varies with time of day, illness, oxygen levels, transfusion, and treatment. Repeating it can help confirm an unexpected result or allow comparison under similar conditions.

Sources

- MedlinePlus: Erythropoietin Tests , US National Library of Medicine
- Mayo Clinic Laboratories: Erythropoietin, Serum , test interpretation and assay cautions
- ARUP Consult: Polycythemia Vera , diagnostic testing guidance
- Investigation and management of erythrocytosis , Canadian Medical Association Journal , 2020
- A guideline for the diagnosis and management of polycythaemia vera , British Society for Haematology, British Journal of Haematology , 2019