TEST

Factor X assay

A factor X assay measures the activity of a protein your blood needs to form clots.

WHAT IT MEASURES
Activity of factor X, a blood-clotting protein

SAMPLE
Blood from a vein

FASTING NEEDED?
No

HOW LONG IT TAKES
About 5 to 10 minutes

RESULTS IN
One to several days, varying by laboratory

USED FOR
Diagnosis and treatment monitoring

MAIN LIMITATION
Anticoagulants can falsely lower measured factor X activity

Overview

A factor X assay is a blood test that measures how well factor X works. Factor X, pronounced "factor ten," is one of several proteins that help blood form a stable clot after an injury.

The usual test is a factor X activity assay . It compares the clotting activity in your plasma, the liquid part of blood, with normal pooled plasma.

Factor X is part of the "common pathway" of clotting. Low activity can therefore prolong both the prothrombin time (PT) and activated partial thromboplastin time (aPTT), which are broader clotting tests.

This assay is not the same as a test measuring the level of a factor Xa inhibitor such as apixaban or rivaroxaban.

Why the test is ordered

The test may be ordered when other clotting tests suggest a factor X problem or to investigate unexplained bleeding, particularly when both PT and aPTT are prolonged.

Reasons include:

Acquired low factor X activity may be caused by liver disease, vitamin K deficiency, certain medicines, severe illness affecting clotting, amyloidosis or, rarely, an antibody that interferes with factor X.

- Investigating frequent or unusual bleeding
- Following up an abnormal PT or aPTT
- Checking for inherited or acquired factor X deficiency
- Monitoring factor X replacement
- Monitoring warfarin in selected situations where the INR is unreliable

Who should have the test

This is not a routine screening test for people without bleeding concerns. It is usually considered when symptoms, medical history or initial clotting tests suggest a clotting-factor problem.

Testing may be appropriate for unexplained easy bruising, repeated nosebleeds, heavy menstrual bleeding, prolonged bleeding after dental work or a family history of a rare clotting disorder. Because these symptoms have many causes, the assay cannot diagnose the reason by itself.

People with known factor X deficiency may have repeat tests to guide replacement treatment. A chromogenic factor X assay may sometimes be used to monitor warfarin when another condition or medicine makes the INR unreliable.

How to prepare

You normally do not need to fast. Unless you have instructions for other tests, you can eat and drink as usual.

Tell the healthcare professional about:

Do not stop an anticoagulant or change its timing unless the clinician managing it tells you to. Stopping without a plan can be harmful.

- Warfarin, heparin, apixaban, rivaroxaban or other anticoagulants
- Recent factor concentrate, plasma, vitamin K or blood transfusion

- Pregnancy
- Liver or kidney disease
- All prescription, over-the-counter and herbal products

What happens during the test

A healthcare professional inserts a needle into a vein, usually in your arm, and collects blood into a tube containing sodium citrate. The draw usually takes a few minutes.

The laboratory separates the plasma and measures its effect on clot formation. Most laboratories use a one-stage clot-based assay; some use a chromogenic assay involving a colour-producing reaction.

Correct tube filling and prompt handling are important. Too little blood changes the balance between blood and citrate and can produce a misleading result.

Understanding your results

Factor X activity is commonly reported as a percentage of the activity in normal pooled plasma. Reference ranges vary by laboratory, method, age, pregnancy status, medicines and clinical context. Newborns and young infants naturally have lower levels of several clotting factors than adults.

A low result means the sample showed less factor X activity than expected, but it does not identify the cause. Possibilities include inherited deficiency, liver disease, vitamin K deficiency, warfarin or another anticoagulant, severe illness that consumes clotting factors, amyloidosis or an interfering antibody.

Other results help with interpretation. If several vitamin K-dependent factors are low, isolated inherited factor X deficiency is less likely. A mixing study, which combines your plasma with normal plasma, may help distinguish a missing factor from an inhibitor.

A normal result makes major factor X deficiency less likely but does not rule out other bleeding disorders. A high result usually has limited meaning by itself.

What affects the results

Factors that can alter measured activity include:

Reduced kidney function can allow some anticoagulants like warfarin or apixaban to remain in the blood longer, increasing their effect on the assay.

- Anticoagulants: Warfarin intentionally lowers factor X. Heparin and direct oral anticoagulants can interfere with some methods and cause falsely low results.
- Recent treatment: Factor concentrate, plasma, vitamin K or transfusion can temporarily raise activity.
- Sample collection: An underfilled or clotted tube, or heparin contamination from an intravenous line, can distort the result.
- High hematocrit: A very high red blood cell concentration changes the plasma-to-citrate balance unless the tube is adjusted.
- Liver function and vitamin K: The liver makes factor X, and factor X requires vitamin K.
- Pregnancy and age: Clotting-protein levels vary with age and pregnancy.
- Timing: Interference may be greater soon after an anticoagulant dose.

Accuracy and limitations

Factor X assays can detect a clear reduction when the sample is collected correctly and interfering medicines are absent. Performance varies by reagent, method, activity level and patient group, so there is no single accuracy rate.

Lupus anticoagulants, heparin and direct oral anticoagulants can cause falsely low activity in clot-based assays. Clot-based and chromogenic methods may also give different results. Mild or unusual abnormalities may remain within the laboratory's reference interval.

A low result cannot reliably distinguish inherited deficiency from an acquired problem. Repeat testing, a factor X antigen test, mixing studies or genetic testing may be needed.

To measure apixaban or rivaroxaban, a drug-calibrated anti-Xa test is generally more appropriate. PT/INR remains the usual test for warfarin; chromogenic factor X testing is reserved for situations where INR is unreliable.

Risks and complications

A blood draw may cause brief discomfort, a small bruise or light-headedness. Serious complications are uncommon.

What happens next

Your result is interpreted alongside your bleeding history, medicines, PT, aPTT, blood count, liver tests and other clotting-factor results. An unexpected low result may be repeated if an anticoagulant, recent treatment or collection problem could have affected it.

Follow-up may include further blood tests or referral to a haematologist. If inherited deficiency is suspected, testing relatives or genetic counselling may be discussed.

Seek urgent medical help for bleeding that will not stop, blood in vomit, a large amount of blood in stool or urine, or a rapidly enlarging painful swelling. Call emergency services for heavy bleeding, fainting, severe weakness, breathing difficulty or a sudden severe headache-particularly after a head injury. Do not wait for an assay result before seeking help.

Common questions

Can I drink coffee before a factor X assay?

Usually, yes. Fasting is not normally required unless another scheduled test requires it.

Does the time of day matter?

Not usually. Timing may matter if you take an anticoagulant because its concentration changes after each dose. Follow the collection instructions you receive.

Can I exercise beforehand?

Ordinary activity is unlikely to affect factor X activity. Avoiding unusually strenuous exercise may make the blood draw more comfortable.

Should I take my medicines before the test?

Take them as prescribed unless you receive specific instructions. Tell the laboratory when you last took any anticoagulant.

Why might I need the test repeated?

Repeating it can confirm an unexpected result, replace a poor-quality sample or allow testing at a more useful time relative to treatment.

How long will I wait for the result?

A hospital laboratory may report it within a day, while a specialist laboratory may take several days.

Sources

- ARUP Consult. Uncommon Factor Deficiencies . Laboratory guidance on factor deficiency evaluation and interpretation.
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