TEST

Factor II (prothrombin) assay

A blood test that measures how well clotting factor II, also called prothrombin, works

WHAT IT MEASURES
Activity of clotting factor II in blood

SAMPLE
Blood

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually less than 10 minutes

RESULTS IN
Usually 1-3 days, varying by laboratory

USED FOR
Investigating abnormal bleeding or clotting test results

MAIN LIMITATION
Anticoagulants and inhibitors can cause falsely low activity

Overview

A factor II assay measures the activity of factor II, also called prothrombin, in your blood. Activity describes how well the protein works, not simply how much is present.

Factor II is made by the liver with the help of vitamin K. During clotting, it is changed into thrombin, an enzyme needed to form a stable blood clot.

The assay is usually part of an investigation into unusual bleeding or abnormal results from broader clotting tests, such as prothrombin time (PT) and activated partial thromboplastin time (aPTT).

It is not the same as genetic testing for the F2 G20210A prothrombin variant , which is associated with an increased tendency to form blood clots. An activity assay cannot reliably confirm or exclude that variant.

Why the test is ordered

Your healthcare professional may order this test when PT or aPTT results show that blood is

taking longer than expected to clot. It may also be used for:

Low activity may occur because the body does not make enough working factor II or because the protein is used up, lost, or blocked. Causes include liver disease, vitamin K deficiency, warfarin treatment, widespread activation of clotting, and inhibitors that interfere with factor II.

The result cannot identify the cause by itself. It must be interpreted with your symptoms, medicines, history, and other test results.

- Unexplained or unusually heavy bleeding
- Excessive bleeding after surgery, dental work, injury, or childbirth
- Suspected inherited factor II deficiency
- Suspected acquired loss of clotting factors
- Monitoring treatment for known factor II deficiency

Who should have the test

The test is mainly used when a person's bleeding history or clotting results suggest a clotting-factor problem. It may also be appropriate when a close relative has confirmed inherited factor II deficiency.

It is not a general screening test or the usual test for the prothrombin genetic variant associated with blood clots. That requires genetic testing.

Babies and children may be tested for unexplained bleeding or a family history of a rare clotting disorder. Their results require age-appropriate interpretation, especially in newborns.

How to prepare

You usually do not need to fast and can eat and drink normally unless other tests ordered at the same time require fasting.

Tell the person arranging the test about all medicines and supplements you take, particularly warfarin, heparin, direct oral anticoagulants such as apixaban or dabigatran, vitamin K, and recent clotting-factor treatment.

Do not stop an anticoagulant or change its dose unless the clinician responsible for prescribing it tells you to. Stopping without guidance may be unsafe.

Also report any recent blood or plasma transfusion, significant bleeding, liver or kidney

problems, pregnancy, or recent surgery because these can affect interpretation.

What happens during the test

A healthcare professional takes blood from a vein, usually in your arm. The skin is cleaned, a small needle is inserted, and blood is collected into a tube containing sodium citrate, which temporarily prevents clotting.

The blood draw usually takes a few minutes. Afterward, pressure and a dressing are applied.

In the laboratory, your plasma is mixed with plasma known to lack factor II. The laboratory measures how quickly the mixture clots and calculates factor II activity.

Understanding your results

Results are commonly reported as a percentage of activity compared with pooled normal plasma. Use the reference interval on your report because ranges vary by laboratory, method, age, pregnancy status, medicines, and clinical circumstances.

A result below the laboratory range means factor II activity was lower than expected in that sample. It does not show whether the cause is inherited or acquired.

Clinicians may compare it with:

When several factors are low, liver dysfunction, vitamin K deficiency, or medicine effects may be more likely than isolated factor II deficiency.

A result within range makes a major factor II deficiency less likely but does not rule out every mild bleeding disorder or the F2 G20210A variant. High activity alone is generally not used to diagnose a tendency to form blood clots.

- PT and aPTT
- Other vitamin K-dependent factors, including VII, IX, and X
- Liver function tests
- Fibrinogen and platelet count
- Mixing studies or inhibitor tests
- Genetic testing when inherited deficiency is suspected

What affects the results

Anticoagulants like warfarin or apixaban are an important source of interference. Warfarin genuinely lowers production of working factor II. Heparin and direct oral anticoagulants may alter the assay and make activity appear lower than it is. Reduced kidney function can prolong the effects of some anticoagulants.

Recent plasma or blood transfusion, prothrombin complex concentrate, or factor replacement may temporarily raise activity and hide an underlying deficiency.

Collection and handling problems can also affect results. An underfilled citrate tube, a clotted sample, delayed testing, or contamination with heparin from an intravenous line may make the result unreliable. A high red blood cell concentration may require adjustment of the citrate in the tube.

Lupus anticoagulant or a specific factor inhibitor can make a clot-based assay appear low. Age, pregnancy, serious illness, liver function, and vitamin K intake or absorption also affect interpretation. Routine exercise is not usually a meaningful influence.

Accuracy and limitations

The assay can detect a substantial loss of factor II function, but results may vary between laboratories and methods.

Anticoagulants, inhibitors, collection errors, or poor sample handling can cause falsely low activity. Transfusion or factor replacement may produce an apparently normal result despite an underlying deficiency. The test also cannot determine why factor II is low without additional information.

A normal result can miss the F2 G20210A variant because that condition is defined by a DNA change. If interference or inherited deficiency is suspected, follow-up may include repeat testing, sample dilutions, a mixing study, factor II antigen measurement, or genetic testing.

Risks and complications

The main risks are temporary soreness or a small bruise where the needle entered. Some people feel briefly light-headed or faint.

What happens next

If the result and other tests are normal, no factor II-specific follow-up may be needed. Continued bleeding symptoms may still require investigation for other causes.

An unexpected low result is usually reviewed alongside your medicines, sample quality, PT, aPTT, liver tests, and other factor levels. The assay may be repeated if anticoagulant interference or a collection problem is possible.

Further testing may include a mixing study, inhibitor tests, factor II antigen measurement, or genetic testing. A persistent abnormality or significant bleeding history may lead to referral to a hematologist.

An abnormal result without active bleeding usually requires routine follow-up rather than emergency care. Seek urgent medical help for bleeding that does not stop with firm pressure, vomiting blood, black or heavily bloody stools, fainting, or a sudden severe headache, especially after a head injury. Call emergency services for severe breathing difficulty, chest pain, or sudden weakness on one side of the body.

Common questions

Can I drink coffee before the test?

Usually, yes. The assay does not require fasting, and coffee does not normally affect factor II activity. Follow separate instructions for any other tests being collected.

Does the time of day matter?

Usually not. Timing may matter in relation to an anticoagulant dose, so record when you last took it if asked.

Can I exercise beforehand?

Normal activity is generally fine. Tell the healthcare professional about recent extreme exertion, injury, or significant dehydration.

Should I stop warfarin or another blood thinner?

No, unless the clinician managing it specifically tells you to stop. Anticoagulants may affect the result, but stopping them without a plan can increase the risk of harmful clotting.

Is this the test for the prothrombin gene mutation?

No. This assay measures clotting activity. Testing for the F2 G20210A prothrombin variant examines DNA and must be ordered as a genetic test.

How soon after a transfusion can I be tested?

A recent transfusion, plasma treatment, or prothrombin complex concentrate can temporarily

change the result. Tell your healthcare professional what you received and when. The best testing time depends on the treatment and reason for testing.

Sources

- ARUP Consult: Uncommon Factor Deficiencies
- Mayo Clinic Laboratories: Factor II Activity Assay, Plasma
- MedlinePlus: Coagulation Factor Tests
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- Mackie I, Cooper P, Lawrie A, Kitchen S, Gray E, Laffan M. Guidelines on the laboratory aspects of assays used in haemostasis and thrombosis. International Journal of Laboratory Hematology . 2013;35(1):1-13.
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