

Antithrombin (Activity and Antigen)



Does this test have other names?

Functional antithrombin III, functional AT, AT activity

What are these tests?

The antithrombin activity and antigen tests are used to help find out what may be causing abnormal blood clots in your body. A blood clot (thrombus) can be good or bad, depending on the case. Your body needs to be able to form blood clots to stop too much bleeding in case of injury. But it's important to prevent abnormal clots that cut off blood flow.

Normally, you have a healthy balance between chemicals in your body that help clotting and chemicals that stop clotting. One important protein that helps clotting is thrombin. The protein that blocks thrombin is called antithrombin. Antithrombin works to thin the blood slightly so that it doesn't clot too much. A lack of antithrombin (AT) can make it more likely for you to form blood clots.

An example of a dangerous clot is deep vein thrombosis, or DVT. This clot can form in a leg or arm, in your abdomen (belly), or near the brain. Another dangerous clot is a pulmonary embolism, or PE. This can happen when a clot breaks off and travels through the bloodstream and gets stuck in the blood vessels of a lung.

AT deficiencies may be either type 1 or type 2.

In type 1 AT deficiency, your body does not make enough antithrombin. Type 1 AT deficiency may be either inherited or acquired. Inherited means it was passed on from a parent. The three main causes of acquired AT deficiency are:

- Liver failure. This is because antithrombin is made in the liver.
- Kidney disease. This may cause too much antithrombin to be sent out of your body in your urine.
- Spreading cancer (metastatic disease)

Type 2 AT deficiency is always passed down from a parent. In type 2 AT deficiency, your body may make a normal amount of the antithrombin protein. But much of that protein doesn't work the way it should.

The antithrombin activity test measures how well the protein inhibits thrombin. The antithrombin antigen test measures how much antithrombin protein your body has made, regardless of how well it functions. As explained below, the two tests can be used together to find out if you have type 1 or type 2 AT deficiency.

Why do I need this test?

You may need one or both of these tests if you have had a problem with blood clots. Your healthcare provider might especially recommend an antithrombin test if you have had any of the following:

- A venous thromboembolism before you are 50 years old. This is a clot that forms in a vein and then travels (embolizes) to another part of the body.
- A blood clot that becomes stuck in the lung (pulmonary embolism)
- A clot that forms in the belly or near the brain
- A family history of blood-clotting problems

Your healthcare provider usually will not order an antithrombin test for blood clots that form in arteries instead of veins. This is because clots in the arteries usually are not caused by antithrombin deficiency.

What other tests might I have along with this test?

Antithrombin deficiency is one possible cause of a tendency to form unwanted blood clots. Your healthcare provider may want to test for other causes as well. These include:

- **Protein C deficiency.** This is a rare genetic disease that causes people to make abnormal blood clots.
- **Protein S deficiency.** This is another rare disease that causes people to make abnormal blood clots.
- **Factor V Leiden.** This is a more common disorder passed down in families that raises the risk of making abnormal blood clots.
- **Factor II G20210A.** This is an abnormal gene that makes higher levels of the clotting factor prothrombin. Having more clotting factor means clots are more likely to form when they should not.

What do my test results mean?

Test results may vary depending on your age, gender, health history, and other things. Your test results may be different depending on the lab used. They may not mean you have a problem. Ask your healthcare provider what your test results mean for you.

The results for both activity and antigen tests are given as percentages. Different labs use slightly different normal ranges. But in general, 80% to 120% is considered normal for adults. The normal range for newborns is usually about 44% to 76%. Thrombin levels in infants rise to adult levels by about 6 months of age.

People with genetically inherited antithrombin deficiency typically have test results between 40% and 60%.

In both type 1 and type 2 AT deficiency, the antithrombin activity test shows a low result because you don't have as much working antithrombin as you should have. When the AT activity test shows that levels are low, the antithrombin antigen test can then be used to find out whether the deficiency is type 1 or type 2.

If the follow-up antithrombin antigen test shows a lower-than-normal result, you probably have a type 1 deficiency. This means that you do not have enough antithrombin protein. But if the antigen test shows a normal result, the AT deficiency shown by the activity test is likely to be type 2. This means you have enough antithrombin protein, but its quality is poor. This problem is caused by a defect in the antithrombin protein.

No evidence exists that higher-than-normal antithrombin levels cause bleeding problems or have any health significance. Therefore, the main concern is with AT deficiency.

How is this test done?

The test is done with a blood sample. A needle is used to draw blood from a vein in your arm or hand.

Does this test pose any risks?

Having a blood test with a needle carries some risks. These include bleeding, infection, bruising, and feeling lightheaded. When the needle pricks your arm or hand, you may feel a slight sting or pain. Afterward, the site may be sore.

What might affect my test results?

In some cases, your antithrombin levels may be low for a short while. These include:

- Acute blood clots
- Use of the anticoagulating medicine heparin
- Severe trauma
- Severe burns

- Chemotherapy with the medicine asparaginase
- Disseminated intravascular coagulation, or DIC. This is a blood disorder that often happens with an infection of the bloodstream (sepsis) or blood poisoning.

If you have been taking warfarin or heparin, or blood-thinner (anticoagulant) medicines after a severe blood-clotting episode, your antithrombin should be tested again 2 weeks or more after you have stopped taking the medicines to get more accurate results.

How do I get ready for this test?

You don't need to do anything special to prepare for this test. Make sure your healthcare provider knows if you are taking warfarin or heparin or getting chemotherapy with asparaginase. And be sure your healthcare provider also knows about all medicines, herbs, vitamins, and supplements you are taking. This includes medicines that don't need a prescription and any illegal drugs you may use.

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