

Alanine aminotransferase test

Also known as: Serum glutamic-pyruvic transaminase, SGPT or ALT

The alanine aminotransferase test, also known as ALT, is one of a group of tests known as liver function tests (or LFTs) and is used to monitor damage to the liver. An alanine aminotransferase (ALT) test measures the amount of this enzyme in the blood. ALT is found mainly in the liver, but also in smaller amounts in the kidneys, heart, muscles, and pancreas. ALT formerly was called serum glutamic pyruvic transaminase (SGPT). ALT is measured to see if the liver is damaged or diseased. Low levels of ALT are normally found in the blood. However, when the liver is damaged or diseased, it releases ALT into the bloodstream, which makes ALT levels go up. Most increases in ALT levels are caused by liver damage. The ALT test is often done along with other tests that check for liver damage, including aspartate aminotransferase (AST), alkaline phosphatase, lactate dehydrogenase (LDH), and bilirubin. Both ALT and AST levels are reliable tests for liver damage.

Purpose

ALT levels are used to detect liver abnormalities. Since the alanine aminotransferase enzyme is also found in muscle, tests indicating elevated AST levels might also indicate muscle damage. However, other tests, such as the levels of the MB fraction of creatine kinase should indicate whether the abnormal test levels are because of muscle or liver damage. The alanine aminotransferase (ALT) test is done to:

- Identify liver disease, especially cirrhosis and hepatitis caused by alcohol, drugs, or viruses.
- Help check for liver damage.
- Find out whether jaundice was caused by a blood disorder or liver disease.

- Keep track of the effects of cholesterol-lowering and other medications that can damage the liver.

Description

The alanine aminotransferase test (ALT) can reveal liver damage. It is probably the most specific test for liver damage. However, the severity of the liver damage is not necessarily shown by the ALT test, since the amount of dead liver tissue does not correspond to higher ALT levels. Also, patients with normal, or declining, ALT levels may experience serious liver damage without an increase in ALT.

Nevertheless, ALT is widely used, and useful, because ALT levels are elevated in most patients with liver disease. Although ALT levels do not necessarily indicate the severity of the damage to the liver, they may indicate how much of the liver has been damaged. ALT levels, when compared to the levels of a similar enzyme, aspartate aminotransferase (AST), may provide important clues to the nature of the liver disease. For example, within a certain range of values, a ratio of 2:1 or greater for AST: ALT might indicate that a patient suffers from alcoholic liver disease. Other diagnostic data may be gleaned from ALT tests to indicate abnormal results.

Normal results

Normal values vary from laboratory to laboratory, and should be available to your physician at the time of the test. An informal survey of some laboratories indicates many laboratories find values from approximately seven to 50 IU/L to be normal.

Abnormal results

Low levels of ALT (generally below 300 IU/L) may indicate any kind of liver disease. Levels above 1,000 IU/L generally indicate extensive liver damage from toxins or drugs, viral hepatitis, or a lack of oxygen

(usually resulting from very low blood pressure or a heart attack). A briefly elevated ALT above 1,000 IU/L that resolves in 24-48 hours may indicate a blockage of the bile duct. More moderate levels of ALT (300-1,000IU/L) may support a diagnosis of acute or chronic hepatitis.

Elevated levels

Significantly elevated levels of ALT often suggest the existence of other medical problems such as alcoholic or viral hepatitis, congestive heart failure, liver damage, biliary duct problems, infectious mononucleosis, or myopathy. For this reason, ALT is commonly used as a way of screening for liver problems. However, elevated levels of ALT do not automatically mean that medical problems exist. Fluctuation of ALT levels is normal over the course of the day, and ALT levels can also increase in response to strenuous physical exercise.

When elevated ALT levels are found in the blood, the possible underlying causes can be further narrowed down by measuring other enzymes. For example, elevated ALT levels due to liver-cell damage can be distinguished from biliary duct problems by measuring alkaline phosphatase. Also, myopathy-related ALT levels can be ruled out by measuring creatine kinase enzymes.

How To Prepare

Avoid strenuous exercise just before having an ALT test.

Tell your doctor if you:

- Are taking any medicines. Many medicines can interfere with test results. Your health professional may instruct you to stop taking certain medicines for several days before having an ALT test. Some herbs and natural products (such as echinacea and valerian) also can affect ALT results.
- Are allergic to any medicines.

- Are or might be pregnant.

Normal results may vary from lab to lab.

Alanine aminotransferase

4–36 units per liter (U/L) or 4–36 international units per liter (IU/L)

High values

Very high levels of ALT may be caused by:

- Recent or severe liver damage, such as viral hepatitis.
- Lead poisoning.
- Drug reactions.
- Exposure to carbon tetrachloride.
- Decay of a large tumor (necrosis).
- Shock.

Mildly or moderately high ALT levels may be caused by:

- Mononucleosis.
- Hepatitis. The ALT level in a person with hepatitis can be 20 times the normal value.
- Alcohol dependence. People who drink excessive amounts of alcohol and take acetaminophen (such as Tylenol) can have high ALT blood levels.
- Mildly elevated levels of ALT may occur in people who are growing quickly, especially young children.

Slightly high levels ALT levels may be caused by:

- Cirrhosis.
- Liver cancer.
- A heart attack.
- Thyroid disease.

- Polymyositis.
- Severe burns.
- Injury to the pancreas, kidneys, or muscles.
- Vigorous exercise.

Many medicines, such as antibiotics, chemotherapy, aspirin, narcotics, and barbiturates.

- It is important to note that persons with normal livers may have slightly elevated levels of ALT, this is a normal finding. In children with acute lymphocytic leukemia (ALL), very high ALT levels may mean that the disease is likely to progress rapidly.
- Many different conditions can raise ALT blood levels. Therefore, other testing is usually needed to interpret an abnormal ALT result.

Non Alcoholic Fatty Liver Disease

Researchers analyzed whether patients with suspected NAFLD who did not have viral hepatitis or consume excessive amounts of alcohol had an elevated risk of heart disease. The basis used to calculate heart disease risk was the Framingham Risk Score, a scale that takes into account age, cholesterol, blood pressure, diabetes, and smoking to predict the 10-year risk of developing heart disease. The presence of NAFLD was determined by measuring levels of alanine aminotransferase (ALT), an enzyme present in liver and heart cells that is elevated when these organs are damaged. Among the study's 7,526 patients without viral hepatitis or excessive alcohol use, 267 patients had elevated ALT activity. Researchers also analyzed 855 patients who had hepatitis or increased alcohol consumption (two potential causes of chronic liver disease) in order to rule out the possibility that liver inflammation (which is also indicated by elevated ALT) and not NAFLD might affect heart disease risk.

The results showed that patients with elevated ALT who did not have hepatitis or excessive alcohol intake had an increased risk of heart disease, particularly among women. Patients who had hepatitis or consumed excessive amounts of alcohol and were not obese did not have this increased risk. "Given that elevated serum ALT in the absence of viral hepatitis or excessive alcohol consumption is most commonly due to NAFLD in the U.S., our results suggest that NAFLD is associated with an increased risk of coronary heart disease," the authors state. They also evaluated whether there was a threshold level of ALT above which the risk of heart disease was elevated and found that it was higher in men than in women.

Although the association between NAFLD (or elevated ALT) and predictors of heart disease has been established and the link between NAFLD and increased risk of heart disease has been suggested, the current study is the first analysis that demonstrates and quantifies this risk in the U.S. population, for men and women separately, and for different thresholds of ALT. "Most of this excess calculated risk of coronary heart disease in persons with elevated ALT appears to be related to the increased prevalence of insulin resistance, obesity, and central fat distribution which are thought to be the predisposing conditions of NAFLD," the authors concluded.