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# DIAGNOSTIC SIGNIFICANCE OF ALT AND AST ENZYMES IN BIOCHEMICAL ANALYSES

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**Abstract**
This article analyzes the diagnostic significance of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) enzymes in biochemical blood analysis. These enzymes play an important role in amino acid metabolism and are mainly localized in liver, heart, and muscle tissues. Their increased level in blood indicates cell membrane damage and pathological processes. Determination of ALT and AST activity is widely used in the diagnosis of liver diseases, myocardial infarction, and metabolic disorders.

**Keywords**: ALT, AST, aminotransferase, biochemical analysis, liver diseases, enzyme diagnostics.

## Introduction

Biochemical blood analysis is considered one of the important diagnostic methods in modern medicine for assessing the functional state of the body. Determination of enzyme activity, in particular, allows you to detect many diseases at an early stage. The enzymes alaninaaminotransferase (ALT) and aspartataminotransferase (AST), which belong to the group of aminotransferases, are among the most commonly used biomarkers in clinical practice (Nelson, Cox, 2017).

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## Key Section

### Biological role of ALT and AST enzymes

The enzymes ALT and AST are transaminase enzymes that play an important role in amino acid metabolism. ALT is predominantly found in liver cells and catalyzes amino group exchange between alanine and α-ketoglutarate. and AST catalyzes the reaction between aspartate and α-ketoglutarate (Murray et al., 2018).

Because ALT is predominantly found in hepatocytes, its levels in the blood reflect the extent of damage to liver cells. AST, on the other hand, is found not only in the liver, but also in the heart muscles, skeletal muscles, kidneys, and brain tissues (Burtis, Ashwood, 2015).

### Importance of ALT and AST in Clinical Diagnosis

Indicators of ALT and AST are important diagnostic indicators for the diagnosis of many diseases. For example, ALT levels are significantly increased in viral hepatitis, cirrhosis of the liver, toxic hepatopathies, and liver damage caused by alcohol (Sherlock and Dooley, 2016).

And an increase in the enzyme AST can often be attributed to heart muscle damage. A sharp increase in AST levels is observed, especially during the development of myocardial infarction (Henry, 2011).

There is also the diagnostic significance of the ratio of ALT to AST. **The De Ritis coefficient (AST/ALT)** is used to determine the etiology of liver diseases. If this coefficient is less than 1, the likelihood of viral hepatitis is higher, and if greater than 2, the likelihood of alcoholic liver injury increases, (Rifai, Horvath, & Wittwer, 2018).

### Factors that affect the change in the level of enzymes

Indicators of ALT and AST may vary depending on various physiological and pathological factors. For example, intense physical exertion, muscle injury, medication intake, as well as metabolic syndrome affect the activity of these enzymes (Berg, Tymoczko, 2019).

Also, the release of enzymes into the bloodstream due to radiation exposure, oxidative stress, and damage to cell membranes increases. This indicates that pathological processes are developing in the body (Hall, Giaccia, 2019).

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## Conclusion

Enzymes ALT and AST are important diagnostic indicators in biochemical blood analysis. Their blood level allows you to assess the functional state of the liver, heart and muscle tissue. ALT is more an indicator of liver damage, while AST can also increase in cardiac and other tissue pathologies. Also, the determination of the AST/ALT ratio is an important diagnostic criterion in determining the etiology of the disease. Therefore, the identification of these enzymes is important for clinical diagnosis and early detection of diseases.

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