

Gamma-Glutamyl Transferase (GGT)

WHAT IS GAMMA-GLUTAMYL TRANSFERASE?

The analysis of gamma-glutamyl transferase (GGT) levels is the most sensitive method for detecting liver disease. It is also a necessary analysis of samples with elevated alkaline phosphatase (ALP) to determine if the ALP abnormalities are due to skeletal disease (normal GGT) or hepatobiliary disease (elevated GGT).

GGT is predominantly present in liver, kidney, and pancreatic cells, as well as the spleen, heart, brain, and seminal vesicles (1). It is involved in the transfer of amino acids across cellular membranes, and it plays a key role in the gamma-glutamyl cycle for the synthesis and degradation of glutathione and the detoxification of drugs and xenobiotics (2).

PURPOSE OF A GGT TEST

The analysis of gamma-glutamyl transferase (GGT) levels is the most sensitive method for detecting liver disease, as levels increase in all forms of liver disease and at an earlier time point than other liver enzymes that are commonly measured. GGT tests are also a necessary analysis of samples with elevated alkaline phosphatase (ALP) to determine if the ALP abnormalities are due to skeletal disease (normal GGT) or hepatobiliary disease (elevated GGT).

ELEVATED GGT

GGT levels are elevated in liver disease. Elevated levels (5-30 times normal) are detected in cases of obstructive jaundice and metastatic neoplasms, usually more pronounced, at an earlier stage, and for longer periods than other liver enzymes. Moderate increases (2-5 times normal) are also observed with infectious hepatitis, but transaminase determinations are usually a more effective diagnostic tool for hepatitis.

Individuals who consume large quantities of alcohol generally have elevated GGT, particularly those with alcoholic cirrhosis (3; 4). Specific drugs (e.g. phenytoin and phenobarbital) can also cause an increase in GGT levels (5).

Elevated GGT is also linked to an increased risk of other diseases and conditions, including atherosclerosis, heart failure, diabetes, metabolic syndrome, and several life-threatening cancers (6).

TEST PROCEDURE

Correct specimen collection and handling is required for optimal assay performance.

This test requires a blood sample from a finger prick. All supplies for sample collection are provided in this kit. First wash and dry hands. Warm hands aid in blood collection. Clean the finger prick site with the alcohol swab and allow to air dry. Use the provided lancet to puncture the skin in one quick, continuous and deliberate stroke. Wipe away the first drop of blood (as it may be contaminated with tissue fluid or skin debris). Massage finger to increase blood flow at the puncture site and hold in a position that gravity facilitates the collection of blood on the fingertip. Transfer the blood to the blood collection card or blood collection tube (microtainer).

Avoid squeezing or 'milking' the finger excessively. If blood flow stops, perform a second skin puncture on another finger if more blood is required.

Dispose of all sharps safely and return sample to the laboratory in the provided prepaid return shipping envelope.

Upon receipt at the laboratory, the blood sample is analyzed by the fully automated Alinity c Gamma-Glutamyl Transferase assay on the Alinity ci series analyzer. This assay determines GGT levels using the L-gamma-glutamyl-3-carboxy-4-nitroanilide substrate methodology, which is a modification of the method described by Theodorsen et al. (7). The GGT present in the blood specimen catalyzes the transfer of the gamma-glutamyl group from the donor substrate to the glycylglycine acceptor to yield 3-carboxy-4-nitroaniline. This results in an absorbance increase at 416 nm, which is directly proportional to the amount of GGT in the specimen.

SPECIAL INSTRUCTIONS

Alcohol consumption can increase GGT levels, and should be avoided prior to collecting the blood sample for this test.

TEST INTERPRETATION

This assay will provide an accurate GGT level for the tested blood specimen. Typical GGT levels in serum are 2–30 U/L for adult males and 1–24 U/L for adult females (8). Additional testing may be required to determine the cause of abnormal GGT levels.

DISCLAIMERS/LIMITATIONS

These results should be interpreted in conjunction with other laboratory and clinical information. Additional testing is recommended if GGT levels are inconsistent with clinical evidence.

Correct specimen collection and handling is required for optimal assay performance.

Medications that can increase GGT levels include Dilantin™, carbamazepine and phenobarbital, non-steroidal anti-inflammatory drugs (NSAIDs), and cholesterol medications.

Elevated GGT levels occur in various health issues, and are not limited to just liver disease. Elevated GGT results must be interpreted in conjunction with other laboratory and clinical data.

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