

## Division of Laboratory Medicine

### Biochemistry

# Gamma-glutamyl transferase, GGT

**Pseudonyms:** Gamma-glutamyl transpeptidase (EC 2.3.2.2),  $\gamma$ GT

## General information

Gamma glutamyl transferase (GGT) is an enzyme that catalyses the transfer of a glutamyl residue from a donor to an acceptor. It is present within the cell membranes of many tissues including the liver, kidneys, bile ducts, pancreas and heart. GGT is a sensitive marker of hepatobiliary damage, liver neoplasms, viral hepatitis and fatty liver disease. However it lacks specificity and can also be elevated due to alcohol consumption, numerous drugs including barbiturates, phenytoin, NSAIDs and benzodiazepines and other non-liver disease states including pancreatitis, diabetes and obesity. It can be used to help determine the origin of elevated alkaline phosphatase (ALP) activity, and in the management of patients with alcohol-use disorders (NICE Clinical Guideline CG155).

Note this test is NOT included in the standard liver function profile.

### Collection container:

Adults - serum (with gel separator, 4.9mL Sarstedt brown top).

Paediatrics - lithium heparin plasma (1.2mL Sarstedt orange top tube)

### Type and volume of sample:

Serum or lithium heparin plasma, minimum 1ml whole blood required (200  $\mu$ l separated serum/plasma).

## Laboratory information

### Method principle:

Automated enzymatic colorimetric assay (Roche cobas platform)

L- $\gamma$ -glutamyl-3-carboxy-4-nitroanilide + glycylglycine  $\rightarrow$  (GGT)  $\rightarrow$  L- $\gamma$ -glutamyl-glycylglycine + 5-amino-2-nitrobenzoate

The production of 5-amino-2-nitrobenzoate is proportional to GGT activity in the sample and is determined spectrophotometrically by the increase in absorbance at 415 nm.

### Biological reference range or cut off:

Up to 1 month		10-270 IU/L
1-2 months		10-155 IU/L
3-4 months		10-93 IU/L
>5 months	Male	10-71 IU/L
	Female	6-42 IU/L

**Turnaround time:** Results are available within 2 hours (urgent - phone lab in advance of sampling) or 4 hours (routine).

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### Clinical information

Clinical utility of GGT is limited due to its poor specificity for any individual condition. A normal GGT activity can exclude liver as the source of an elevated ALP with a high degree of confidence.

**Factors known to significantly affect the results:** Normal limits are approximately two-fold higher in people of African ancestry. Mild elevations are also observed in smokers and patients on oral contraceptive.

#### References:

- 1) Rifai N, Horvath AR, Wittwer CT. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 6th Edition. Elsevier.
- 2) NICE Clinical Guideline CG155. Alcohol-use disorders: diagnosis, assessment and management of harmful drinking and alcohol dependence
- 3) Livie, C. Gamma-glutamyl transferase. Association of Clinical Biochemistry: Analyte Monographs alongside the National Laboratory Medicine Catalogue.

**(Last updated April 2018)**