

# Liver –Functions, Disorders and Diagnostic Tests

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# Other tests for liver disease

- *Alkaline phosphatase*
- Alkaline phosphatase is derived from a number of
- different tissues, including:
  - the liver, the osteoblasts in bone and the placenta.
- Plasma activities rise in cholestatic liver disease because ALP synthesis is increased and the enzyme within the biliary tract is regurgitated into plasma.
- A raised ALP concentration
- in the presence of a raised g-glutamyl transferase
- (GGT) concentration implies that the ALP is of hepatic
- origin.

# Other tests for liver disease

- *$\gamma$ -Glutamyl transferase (GGT):*
- GGT is an enzyme derived from the endoplasmic reticulum of the cells of the hepatobiliary tract. As this reticulum proliferates, for example in response to the prolonged intake of
- **-alcohol and of drugs**
- such as phenobarbital and phenytoin, synthesis of the
- enzyme is induced and plasma GGT activity increases.
- Therefore, raised plasma activities do not necessarily
- indicate hepatocellular damage, but may reflect enzyme
- induction or cholestasis.

### Typical biochemical features of certain hepatic disorders

	Plasma albumin	Bilirubin	ALT	ALP	GGT
Acute alcoholic hepatitis	–	↑	↑	↑	↑↑
Acute viral hepatitis	–	↑↑	↑↑	↑	↑↑
Chronic viral hepatitis	– or ↓	↑ or –	↑	↑ or –	↑
Cirrhosis	↓	↑ or –	↑	↑	↑
Gilbert's syndrome	–	↑	–	–	–
Primary biliary cirrhosis	– or ↓	↑↑	↑	↑↑	↑↑
Tumour secondaries	–	↑ or –	↑	↑↑	↑↑

↑, raised; –, normal; ↓, reduced.

ALT, alanine aminotransferase; ALP, alkaline phosphatase; GGT,  $\gamma$ -glutamyl transferase.

- The liver has an enormous synthetic capacity and is involved in numerous metabolic pathways, including vitamin storage, amino acid deamination, bile salt and cholesterol synthesis, and the production of various proteins such as clotting factors and hormones.
  - Compounds 'released' from the liver into the plasma can be used as markers of liver damage, including
    - bilirubin, ALT, AST, GGT and ALP.

- Hyperbilirubinaemia can be due to raised
- unconjugated or conjugated bilirubin concentration.
- The former may be due to haemolysis and the latter to hepatic or extrahepatic causes.
- Raised plasma aminotransferase activities suggest
- hepatocyte damage and raised hepatic ALP
- concentration is associated with cholestasis.

- Plasma GGT is a sensitive marker of hepatic
- damage but its activity can also be raised as a result of drug enzyme induction, hypertriglyceridaemia and increased alcohol intake.
- A prolonged prothrombin time and low plasma
- albumin concentration may both reflect reduced
- hepatic synthetic capacity.

# Case report

- A 50-year-old known alcoholic man attended the
- general medical clinic because of ascites and the
- following abnormal liver test results:
- *Plasma*
- Bilirubin 52  $\mu\text{mol/L}$  ( $< 20$ )
- Alanine aminotransferase 76 U/L ( $< 42$ )
- Alkaline phosphatase 271 U/L ( $< 250$ )
- Albumin 18 g/L (35–45)
- g-Glutamyl transferase 324 U/L ( $< 55$ )
- **DISCUSSION**
- The abnormal liver test results and
- hypoalbuminaemia together with ascites supported
- the diagnosis of cirrhosis, secondary to his alcohol
- problem. Hypoalbuminaemia may be due to many
- disorders, such as gross proteinuria, but in the
- presence of hepatic disease suggests a reduction in
- hepatic synthetic capacity typical of cirrhosis.



# Reference:

