

LFT

Classification	Markers	Description
Group I: Markers of liver dysfunction	Serum bilirubin (total & conjugated).	A byproduct of RBC breakdown. Yellowish pigment observed in jaundice . ↑ bilirubin lvls → Gallstones , acute & chronic hepatitis . Jaundice when its above 2 mg/dL.
	Bile salts (urine)	Normally bile salts are NOT present in urine. Obstruction in the biliary passages → Leakage of bile salts into circulation , & excreted in urine .
	Urobilinogen (urine)	Most UBG is metabolized in large intestine but a fraction is excreted in urine (less than 4 mg/day).
	Serum albumin	Normal serum lvls: 3.5 -5 g/dL Synthesis depends on the extent of functioning liver cell mass. T _{1/2} → 20 days . Its lvls ↓ in all chronic liver diseases.
	Serum Globulin	Normal serum lvls: 2.5 -3.5g/dL . A & b-globulins mainly synthesized by the liver. They constitute immunoglobulins (antibodies) High serum g-globulins are observed in chronic hepatitis & cirrhosis : IgG → autoimmune hepatitis. IgA → alcoholic liver disease.
	Prothrombin Time	Synthesized by the liver. T _{1/2} → 6 hrs . PT is ↑ when liver loses more than 80% of its reserve capacity. Vitamin K deficiency → ↑ PT. Dosage of vitamin K does not affect PT in liver disease.
Albumin/globulin ratio Normal A/G ratio: 1.2/1 -1.5/1 Globulin levels ↑ in hypoalbuminemia as a compensation.		
Group II: Markers of hepatocellular injury	Aspartate aminotransferase (AST).	Normal range: 8 -20 U/L . High serum lvls are observed in: Chronic hepatitis, cirrhosis & liver cancer .
	Alanine aminotransferase (ALT). ✓ More liver-specific than AST	Normal range (U/L): Male: 13-35 , Female: 10-30 . High serum lvls in acute hepatitis (300-1000U/L). Moderate elevation in alcoholic hepatitis (100-300U/L). Minor elevation in cirrhosis , hepatitis C & non-alcoholic steatohepatitis (NASH) (50-100U/L). Appears in plasma many days before clinical signs appear. A normal value does not always indicate absence of liver damage. Obese but otherwise normal individuals may have elevated ALT lvls.
Group III: Markers of cholestasis	Alkaline phosphatase (ALP).	A non-specific marker of liver disease. Produced by bone osteoblasts (for bone calcification). Present on hepatocyte membrane . Normal range: 40 -125 U/L . Moderate elevation → Infective hepatitis, alcoholic hepatitis & hepatocellular carcinoma . High lvls → Extrahepatic obstruction (obstructive jaundice) & intrahepatic cholestasis . Very high lvls → Bone diseases.
	γ-glutamyltransferase (GGT).	Used for glutathione synthesis. Normal range: 10 -30U/L . Moderate elevation → Infective hepatitis & prostate cancers . GGT ↑ in alcoholics despite normal liver function tests (highly sensitive to detecting alcohol abuse).