

EXAMPLES OF LABORATORY TESTS USED IN THE DIAGNOSIS OF GASTROINTESTINAL DISORDERS

Laboratory Test	Normal Values in Blood Plasma or Serum	Significance of Abnormal Values
UPPER AND LOWER GI		
Serum electrolytes Potassium Sodium Magnesium Serum gastrin level	Adults: 3.5-5.0 mEq/l 135-145 mEq/l 1.5-2.5 mEq/l Adults: 45-200 pg/ml	Vomiting, diarrhea, and nasogastric intubation can cause electrolyte losses and create imbalances Elevated levels occur with pernicious anemia and some gastric ulcers; very high levels in Zollinger-Ellison syndrome (pancreatic tumor that produces excessive gastrin).
Lactose tolerance test	Fasting patient receives 50 mg of lactose. The hydrogen gas content of exhaled air is measured, or blood is tested at periodic intervals up to 2 hours to show plasma glucose increasing to >20 mg/dl.	Unabsorbed lactose is metabolized by bacteria, producing hydrogen gas that is exhaled at the lungs. Blood glucose levels do not rise to normal levels after lactose ingestion if patient lacks lactase.
Carcinoembryonic antigen (CEA) (in plasma)	Adults: Nonsmokers <2.5 ng/ml Smokers <3.5 ng/ml	Colorectal cancer is a possibility with elevated levels. This antigen is not specific for colorectal cancer; elevated levels may occur in other types of carcinomas and in ulcerative colitis.
Stool culture Culture and sensitivity (C&S). Stool sample is cultured for bacterial content.	Only normal intestinal microbial inhabitants should be isolated.	Bacteria such as <i>Shigella</i> , <i>Campylobacter</i> , enterotoxigenic <i>Escherichia coli</i> , <i>Vibrio cholera</i> , and <i>Salmonella</i> can cause acute diarrhea.
Ova and parasites (O&P) A stool sample is microscopically examined for parasite eggs or adults.	None found	Typical parasites found in feces that cause intestinal disturbances are tapeworms, entamoeba, and some protozoans, such as <i>Giardia</i>
Fecal analysis Occult blood	None found	Hidden (occult) blood in feces can occur when bleeding from GI tract is minimal due to inflammation, ulceration, or with a tumor that is causing small amounts of bleeding.
Fat content	Adults: <6 g/24 hours	Fat content >6 g/24 hours, a condition called steatorrhea, often indicates malabsorption syndrome; also occurs in cystic fibrosis and pancreatic diseases.
LIVER AND GALLBLADDER		
Serum bilirubin (total)	Total serum bilirubin: 0.1-1.2 mg/dl	Can be elevated with hepatitis (infectious or toxic) and biliary obstruction
	Indirect bilirubin: 0.2-1.0 mg/dl (unconjugated)	Excessive hemolysis as in transfusion reactions or erythroblastosis fetalis; elevation also occurs with hepatitis.
	Direct bilirubin: 0.1-0.3 mg/dl (conjugated)	Elevated levels occur with obstructions of bile duct system, hepatitis, cirrhosis of liver and liver cancer.
	Infant (newborn) total serum bilirubin: 1-12 mg/dl	Bilirubin >15 mg/dl can result in serious neurological problems.
Urine bilirubin	None	Detectable bilirubin is present when direct bilirubin is elevated, as in obstruction of bile duct system, hepatitis, cirrhosis of liver and liver cancer.
Liver enzyme tests		
Aspartate aminotransferase (AST or SGOT)	Adults: 0-35 U/I	Elevated levels occur with hepatitis, acute pancreatitis, and cirrhosis.
Alanine aminotransferase (ALT or SGPT)	Adults: 0-35 IU/I	Elevated levels occur with hepatitis and other liver diseases.
Alkaline phosphatase (isoenzyme ALP _I)	Adults: 30-120 mU/ml	Elevated levels occur in biliary obstructions, hepatitis, and liver cancer.
5'-nucleotidase	Adults: 0-1.6 units	Elevated levels are useful for early detection of liver disease.
Gamma-glutamyl transferase/transpeptidase (GGT or GGTP)	Adults: 8-38 U/I	Elevated levels occur with liver disease; levels also become elevated after ingestion of alcohol.
Serum protein	Adults: Albumin 3.5-5.5 g/dl (or 52-68% of the total protein) Adults: Globulin 2.0-3.0 g/dl (or 32-48% of the total protein)	Decreased levels of albumin and increased levels of globulin occurs in chronic liver disease.

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Ammonia (plasma)	Adults: 15-45 μ g/dl	Elevated level occurs with liver failure and hepatic encephalopathy
Hepatitis virus studies	None	Antibodies can be detected against virus that causes hepatitis A (HAV); hepatitis B (HBV) can be detected by testing for both viral antigen and antibodies; hepatitis C (HCV) can be detected by testing for antibodies against the virus. Quantitative viral counts are done for hepatitis B and C.
Prothrombin time (PT) test	Adults: 11-15 seconds	Prolonged time occurs with liver disease, vitamin K deficiency and warfarin (coumadin) administration.
PANCREAS		
Amylase		
Urine	Adults 35-260 U/l	Elevated levels occur for 7-10 days after pancreatic disease begins.
Serum	Adults: 60-180 U/l	Elevated levels occur with pancreatic disease and with obstruction of pancreatic duct.
Lipase (serum)	Adults: 0-110 U/l	Elevated levels most commonly occur in acute pancreatitis.
Sweat electrolytes test		
Sodium	Children: <70 mEq/l	Elevated levels of both sodium and chloride occur in cystic fibrosis; does not reflect severity of disorder
Chloride	Children: <50 mEq/l	

Adapted from: Fundamentals of Anatomy & Physiology.