

# Gastro-Intestinal Labs

## PANCREATIC TESTS

- **Lipase** - NI depends on the lab (highly specific)
  - Secreted by the pancreas almost exclusively
    - Digests starches/sugars in mouth and GI tract
  - Elevated in pancreatitis, pancreatic injury
  
- **Amylase** - NI 0-100
  - Secreted by the pancreas and other organs
  - Secreted by both the pancreas and salivary glands
    - Digests starches/sugars in mouth and GI tract
  - Also found in tonsils, small bowel, fallopian tubes, thyroid, lung, muscles
  - Elevated in pancreatic injury, small bowel injury
  - Elevated in pancreatitis: Idiopathic, Stones, Drugs, Metabolic problems
  - Elevated in mumps, ectopic pregnancy, thyroid disease, vigorous exercise

(Lipase is a better test if you're thinking about pancreas injury or pancreatitis; it rises at the same rate of amylase, is more specific to the pancreas, and lasts longer in the serum; SO you can have a normal amylase and elevated lipase if the injury occurred 3-4 days ago)

## LIVER FUNCTION TESTS

- **Aminotransferases – AST/ALT previously known as SGOT/SGPT**
  - Elevated levels indicate hepatocyte injury or necrosis
    - Infectious hepatitis, toxin/drug induced hepatotoxicity, ischemic injury, biliary obstruction
  - **ALT** – enzyme localized to liver cells only thus good indicator of liver cellular damage
  - **AST** – enzyme in the liver as well as many other extrahepatic sites such as heart, skeletal muscle, kidney- less specific to liver pathology
  - Degree of elevation can help with diagnosis

Enzyme	Mild	Moderate	Marked
AST/ALT	2-3x	4-20x	>20x
	Chronic dsx, Fatty liver, Alcohol Hepatotoxic drugs Biliary obstruction	Hepatitis	Ischemia/shock liver <b>Tylenol overdose</b> Severe hepatitis

- **ALK-PHOS** – Alk Phos- NL 45-115.
  - Due to bone growth in children it is difficult to track so often it is ignored
  - 2-3x elevation most often indicates biliary obstruction
  
- **GGT**- gamma glutamyl transpeptidase- NL 0-30
  - Enzyme that transfers amino acids across membranes; present in hepatocytes and biliary epithelium
  - Elevated levels indicate biliary obstruction or hepatocyte injury
    - Elevated GGT + nl to mildly elevated AST/ALT= biliary obstruction
    - Elevated AST/ALT + nl to mildly elevated GGT =hepatocyte injury
  
- **Total Bilirubin**- Bilirubin is the byproduct of hemoglobin metabolism.
  - **Indirect / unconjugated** (attached to albumin to be transported to liver where it is conjugated, transformed into bile, and excreted) - NI <1
    - 90% of total bilirubin
    - Reflects balance between rate of production and excretion- In increased breakdown of red blood cells, liver cannot conjugated quick enough so have elevated levels. In liver disease, liver cells can't conjugate for excretions so have elevated levels).
  
  - **Direct bilirubin/conjugated** (S/P conjugation in liver, awaiting transport to biliary tree for excretion) - NI <0.2
    - <10% total bili
    - Reflects excreting capacity of liver/biliary tree (In liver disease, liver cells can't excrete bilirubin that has been conjugated to have elevated levels. In post-hepatic blockage of the bile passages (obstructive jaundice), bile is excreted but doesn't pass down biliary tree for removal in the stool resulting in reblux of bilirubin into the blood and increased direct bilirubin levels

	Normal Total Bili	Elevated Total Bili
Normal Direct Bili	No disease	Hemolysis Liver dsx
Elevated Direct Bili	Obstruction	Liver dsx Obstruction

- **Albumin** - NL 3.5-5 produced by the liver and is decreased in liver dysfunction, malnutrition, bowel disease, renal disease/nephrotic syndrome, heart failure
  - Hepatocytes produce and secrete 10g albumin/day
  - ½ life of albumin is 20 days (*can be normal in acute liver disease*)
  - Decreased in chronic liver dysfunction
  - Also decreased in malnutrition, bowel disease, renal disease/nephrotic syndrome
- **PT/INR** - NL 10-12.5/0.8-1.2
  - Lab measurement of how well the clotting cascade is working
  - If elevated, most often indicates liver disease
    - R/O anticoagulation
    - R/O Vit K deficiency
- **Glucose**
  - In profound liver disease there is not glucogenesis and glycogenolysis thus patient need frequent blood sugar tests and continuous administration of glucose

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