Digestive System 2 - Liver, Gallbladder and Pancreas

A. Liver

major fxs: biochemical processing
glycogen storage
detoxification
* bile * production
  - bile pigments - excretory products
  - bile salts - digestive function: emulsify lipids

1. Anatomy
   4 lobes: right lobe, left lobe, caudate lobe, quadrate lobe
   peritoneal folds: coronary ligaments
     - falciform ligament
     - lesser omentum
   round ligament (remnant of umbilical vein)
   blood inflow: *proper hepatic artery* (HA) delivers oxygenated blood
     *hepatic portal vein* (HPV) delivers nutrient rich blood from GI tract
   blood outflow: *hepatic veins* drain into inferior vena cava

2. Histology
   hepatocytes - main functional liver cells (specialized epithelium)
   lobules - functional units of the liver
     branches of HA and HPV - at corners of the lobules supply blood
     *sinusoids* - open capillaries, lined with hepatocytes
     *central vein* - drains lobule, connects to hepatic vein
     *bile canaliculi* - tiny bile ducts between rows of hepatocytes
   **portal triad:** bile duct
     - branch of HA
     - branch of HPV

B. Gallbladder

fxn: bile storage, concentration and release
3 layers: mucosa, muscularis, serosa

C. Duct System of the Liver, Gallbladder and Pancreas

common hepatic duct (from liver)
cystic duct (from gallbladder)
common bile duct
pancreatic duct (from pancreas)
  hepatopancreatic ampulla - common bile duct merges with pancreatic duct;
  sphincter of Oddi - controls release of bile and pancreatic juice into the duodenum at the
  major duodenal papilla

D. Pancreas

fxns: *exocrine* - secretes digestive enzymes and bicarbonate-rich fluid
  *endocrine* - pancreatic islets secrete insulin & glucagon

1. Anatomy
   head, body, tail
   pancreatic duct, accessory duct

2. Histology
   **acini** - secretory units; clusters of glandular epithelium, lead into branching ducts
     acinar cells secrete digestive enzymes; duct cells secrete bicarbonate and mucus
   pancreatic islets are interspersed among groups of acini
Study Questions
1. Summarize the major functions of the liver.
2. What structures connect the liver to the diaphragm, the stomach, and the anterior body wall? What structure lies between the right and left lobes of the liver?
3. Summarize the blood supply of the liver, identifying the major blood vessels that supply and drain the liver, and explain how this relates to the function of the liver.
4. Diagram and describe the structure of a liver lobule. What is the dominant cell type in the liver? Identify the vessel branches that supply a liver lobule, the type of capillaries in the lobule, and the vessel that drains the lobule. What is a portal triad?
5. What substance is secreted by the liver into the GI tract? What is the function of the gallbladder?
6. Distinguish between the exocrine pancreas and the endocrine pancreas in terms of structure and function. What substances are secreted by the exocrine pancreas?
7. Diagram and name the major secretory ducts of the liver, gallbladder, and pancreas; show how they are connected and where they deliver their secretory products.