PANCREAS & LIVER

PANCREAS: (908) (“all secrete”) Both an endocrine and exocrine gland.
Acinar secretory cells (acinar: “grape or berry cluster”) secrete multiple enzymes, HCO\textsubscript{3}\textsuperscript{-}. Islets of Langerhans interspersed.
Pancreatic juice carried by pancreatic duct, joins common bile duct at ampulla of Vater, sphincter of Oddi.

- High HCO\textsubscript{3}\textsuperscript{-} to neutralize acid
- Wide array of digestive juices: trypsin cuts between lysine & arginine, lipase hydrolyzes fat’s ester bond, nucleases

LIVER: Largest visceral organ, Anatomy: (p. 910)

- R and L lobes
- falciform ligament divides left and right lobes.
- round ligament remains of umbilical vein in falciform ligament
- coronary ligament fold of peritoneum, parietal to visceral, ties it to the diaphragm
- bare area not covered by peritoneum, against diaphragm
- hepatic artery delivers oxygenated blood
- hepatic portal vein delivers nutrient rich blood from small intestine
- lesser omentum suspends liver from bottom of stomach

Lobule: (functional unit): (911)

- Hepatic triad: hepatic artery, hepatic portal vein, bile duct
- bile canaliculus collects bile, empty into bile duct
- Sinusoids flow past cords of hepatocytes and Kupffer cells
- Kupffer cells engulf pathogens, debris, store Fe. (part of RES)
- central vein processed blood drains into hepatic vein

FUNCTIONS: (p 911-914)

I. METABOLIC REGULATION
- Regulates blood glucose: insulin induces synthesis, storage of glycogen. Glucagon causes it to break down to glucose.
- lipid metabolism: synthesizes, stores, releases fats (insulin stimulates lipid synthesis.)
- amino acid metabolism: interconversion, transamination, deamination - yielding NH\textsubscript{3} (toxic)
- detoxification: urea synthesized from ammonia, etc toxins: poisons, drugs, alcohol (storage of lipid soluble toxins (DDT)) activate carcinogens...

II. HEMATOLOGICAL REGULATION
- plasma protein synthesis: albumins, transport proteins, clotting proteins, complement proteins
- hormone inactivation: especially steroid hormones
- vitamin storage: A and D stored here

III. SYNTHESIS OF BILE
- bile salts: synthesis from steroids
- excretion of bilirubin: (liver failure leads to accumulation of this yellow material = jaundice)

Bile stored in gall bladder where it is concentrated, excreted when fat rich meal taken.

Cholelithiasis (“bile stone”) gall stones: crystals from concentrated bile, mostly cholesterol with Ca\textsuperscript{2+} salts.

Lithotripter: focused ultrasound may break into small enough pieces to be excreted.

Pathology: cirrhosis accumulation of scar tissue (makes it yellow), loss of function jaundice bilirubin accumulated in body, turns patient yellow (esp conjunct)