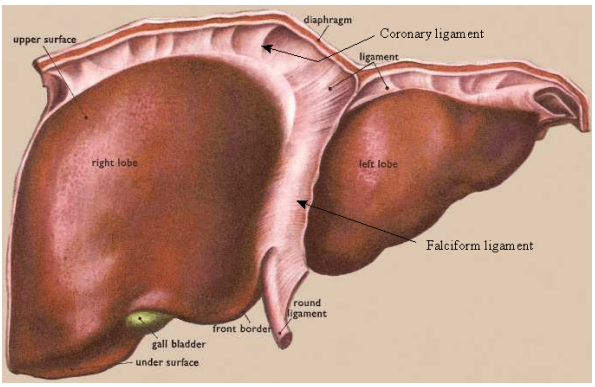
PANCREAS & LIVER

revised 31 March 2016
Martini 5th: pp. 874-880, 6th: 902-907, 7th: 888-895, 8th: 901-910, 9th: 889-894, 10th: 907-914

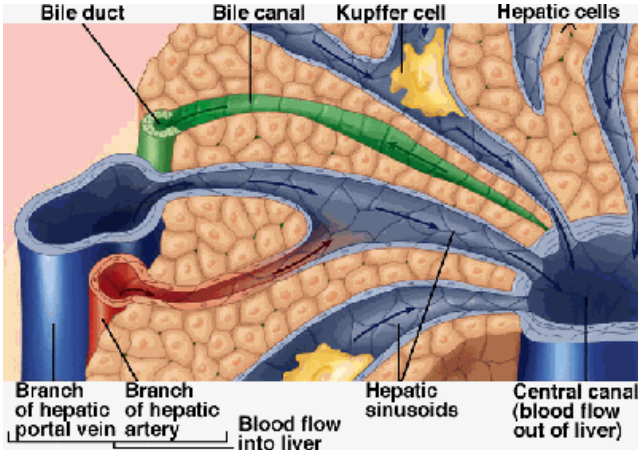
PANCREAS: (908) ("all secrete") Both an endocrine and exocrine gland.
Acinar secretory cells (acinar: "grape or berry cluster") secrete multiple enzymes, HCO_3^-. Islets of Langerhans interspersed.
Pancreatic juice carried by pancreatic duct, joins common bile duct at ampulla of Vater, sphincter of Oddi.

High HCO_3^- to neutralize acid
Wide array of digestive juices
- trypsin cuts btwn lysine & arginine
- lipase hydrolyze 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 Kupfer cells**
Kupfer 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_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^{++} 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)