Functions of the Liver

- Receives blood directly from the gut to regulate nutrient levels (dual blood supply)

**Dual Blood Supply to Liver**
- Hepatic artery supplies _________ blood (25%)
- Portal vein supplies _________ blood from the stomach and _________ (75%)
- Hepatic vein takes blood _________ from the liver

**Hepatic Lobule**
- Hepatic lobules have a _________ shape
- At each corner is a _________ _________ which consists of a hepatic artery, portal vein and bile duct
- Liver _________ join the triads to the central vein (hepatic vein)

**Sinusoids and Kupffer cells**
- Sinusoids are like _________ but are _________ and the blood is in direct _________ with the _________
- Kupffer cells are _________ that help to _________ red blood cells (RBC)
- Hepatocytes secrete many important _________ into the hepatic vein and _________ into the bile ducts
Some excess nutrients can be stored in the liver

**CARBOHYDRATES**
- Excess glucose can be stored as ______________ (insulin)
- Glycogen can be broken down to glucose (______________)

**LIPIDS**
- Processes lipids & distributes them in ____________ forms (very low density lipoproteins)
- Surplus cholesterol is converted into ______________

**PROTEINS**
- The body ______________ store excess protein or amino acid
- ______________ in the liver, excreted by kidneys (NH₃, urea)

**VITAMINS & MINERALS**
- Excess ___________, retinal (______________) & calciferol (______________) are stored in the liver until needed

Surplus cholesterol is converted into bile salts
- Hepatocytes ______________ cholesterol (vitamin D & steroids)
- The amount of cholesterol synthesized varies with ____________
- Excess cholesterol & phospholipids are converted to ____________

Removes toxins from the blood & detoxifies them
- Liver ______________ aid in this function
- Ethanol dehydrogenase breaks down ______________
- ______________ breaks down hydrogen peroxide

Recycles components of red blood cells (RBC)
- RBC have a lifespan of about ____________ days
- When old or damaged they are engulfed by ______________ (Kupffer cells)
- Their breakdown products are ______________

Phagocytosis by Kupffer cells starts the breakdown of RBC
- Hemoglobin is split into ______________ chains and a ____________ group
- Heme group broken down to ______________ and ______________
- Iron stored in ______________ and spleen or used to make more ______________
- Bilirubin is a component of ______________. Excess is excreted in _____ and ________.
  ______________ results if concentrations are too ____________
Iron is carried to the bone marrow to produce hemoglobin for new RBC
- Iron is needed for RBC function but high levels are __________
- It is transported __________ to a protein called __________
- In the ____________ it forms new heme groups for RBC

Endoplasmic reticulum and Golgi Apparatus in hepatocytes produce plasma proteins
- Responsible for ______ of proteins in blood plasma
- Fibrinogen is a protein essential for __________
- Albumin is a ___________ protein and helps in ____________ balance
- Hepatocytes have ____________ rough E.R. networks (indicating a high level
  protein ____________ in the cells)

Electron Micrograph of a Liver Cell

Read pgs. 587-591 Do Q# 5-8a pg. 592