Motivational Corner:

"It does not matter how slowly you go as long as you do not stop."

Objectives:

The student should be able to describe:

1. The histological structure of liver with special emphasis on:
   - Classical hepatic (liver) lobule.
   - Hepatocytes
   - Portal tract (portal areas)
   - Hepatic (liver) Blood sinusoids
   - Space of Disse
   - Bile canaliculi

2. The histological structure of spleen with special emphasis on:
   - White pulp
   - Red pulp

6- Integrated Liver & Spleen.

Extra notes: Gray

Important notes: Red

Revised by

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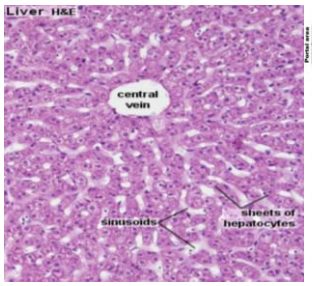
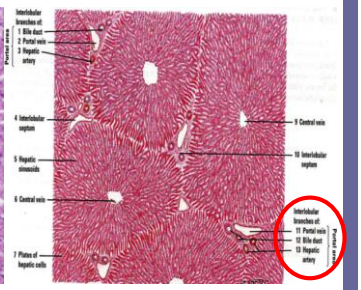
+ Liver

It is important to know that the portal area includes: Portal vein, bile duct and hepatic artery.
And it is called "portal" because portal vein is the largest structure in that area.



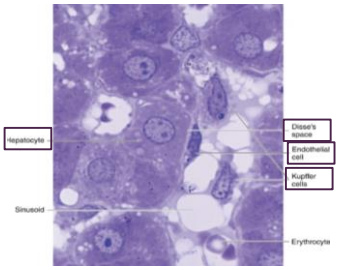


A. Stroma:

1. Capsule: Glisson's Capsule.
2. Septa (absent in human) & Portal areas (portal tracts).
3. Network of reticular fibers.

B. Parenchyma: Classic Liver (Hepatic) Lobule

It is formed of a polygonal mass of liver tissue, bounded by interlobular septa with portal areas at the periphery & central (centrolobular) vein in the center.

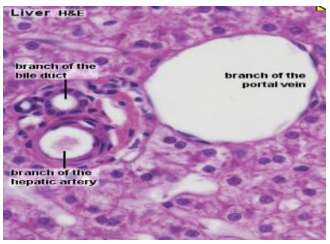


Contents:
(Further details about each one below)

1. Anastomosing plates of hepatocytes.
2. Liver blood sinusoids (hepatic blood sinusoids).
3. Spaces of Disse (perisinusoidal spaces)
4. Central vein.
5. Bile Canaliculi.

Borders:

1. **Septa:** C.T. Septa (e.g. in pigs).
2. **Portal Areas (portal tracts):** located in the corner of the classical hepatic lobule (usually 3 in number):
   Contents of Portal Area:
   1. C.T.
   2. Bile ducts (interlobular bile ducts).
   3. Venule (Branch of portal vein).
   4. Arteriole (Branch of hepatic artery).



Contents of liver lobule

1. Hepatocytes :

- Are grouped in interconnected plates.
- Liver sinusoids are located in the spaces between these plates.
- Polyhedral in shape.
- Nucleus 1 or 2, vesicular with prominent nucleoli.
- Cytoplasm: **Acidophilic**.

1. Organelles

1. Mitochondria: ++++
2. Endoplasmic Reticulum (Smooth, Rough): Abundant.
3. Golgi complex.
4. Lysosomes.
5. Peroxisomes.

2. Inclusions (deposits)

1. Glycogen.
2. Lipid: Few droplets.
3. Lipofuscin: old age.

2. Liver Blood Sinusoids

1. **Endothelial Cells:**
   - Fenestrated & discontinuous → Free passage of plasma.

   - Basal Lamina is absent.
2. **Kupffer Cells:**
   - Are macrophages.
   - Found of the luminal surface of the endothelial cells.

   Function:
   Phagocytosis.

3. Spaces of Disse (Perisinusoidal Space)

Contents:

1. **Fat Storing Cells (Ito cells) (Hepatic Stellate Cells):**
   - Contain vitamin A-rich lipid.
   - Form reticulin.
2. **Reticular Fibers**:
   - Type III Collagen.
3. **Plasma** of blood.
4. **Microvilli** of hepatocytes.

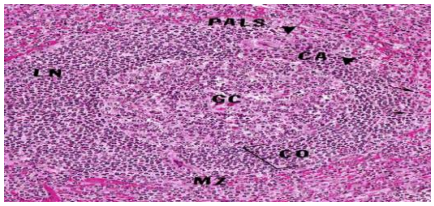
The only cells in the space of disse is Ito cells.

Spleen

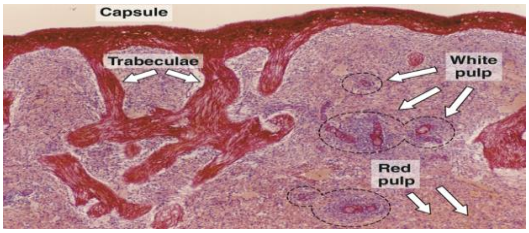
The Spleen is like a bag of blood, when the patient has acute hemorrhage *due to an accident for example*, the smooth muscle cells contract to pump the blood to the body trying to save the patient. So the body **only uses it in need**. This reminds us of Allah's mercy in which He gave us something we don't normally use, but helps save our lives when we need it.

A. Stroma:

1. **Capsule:**
   - Covered by visceral layer of peritoneum, mesothelium.
   - Is formed of fibromuscular C.T. (Dense fibrous C.T. + smooth muscle cells.
2. **Trabeculae:**
   Are irregular, incomplete, divide the spleen into intercommunicating compartments (lobules).
3. **Reticular C.T.**



White Pulp



B. Parenchyma of the Spleen

N.B.
- No cortex.
- No medulla.
- No afferent lymphatic vessels.

Cells of Parenchyma of spleen:
1. Lymphocytes (B & T).
2. Plasma Cells.
3. Macrophages.
4. Blood elements (RBCs, Leucocytes & Platelets).

White Pulp

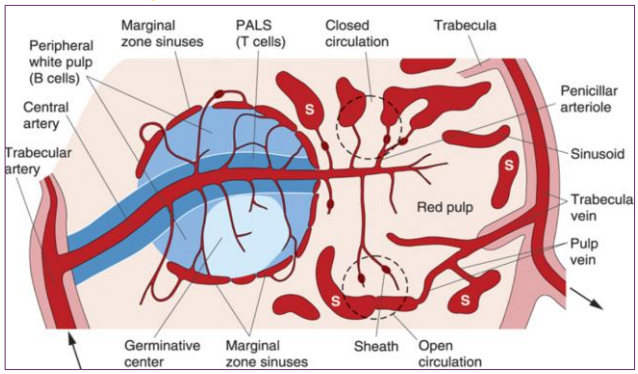
1. **Periarterial lymphatic sheaths (PALS):**
   - Housing T lymphocytes.
2. **Lymphoid follicles (with germinal centers):**
   - Housing B lymphocytes.

   N.B.
   - Both 1&2 have acentrically located central artery (Central Arteriole) (Follicular arteriole).

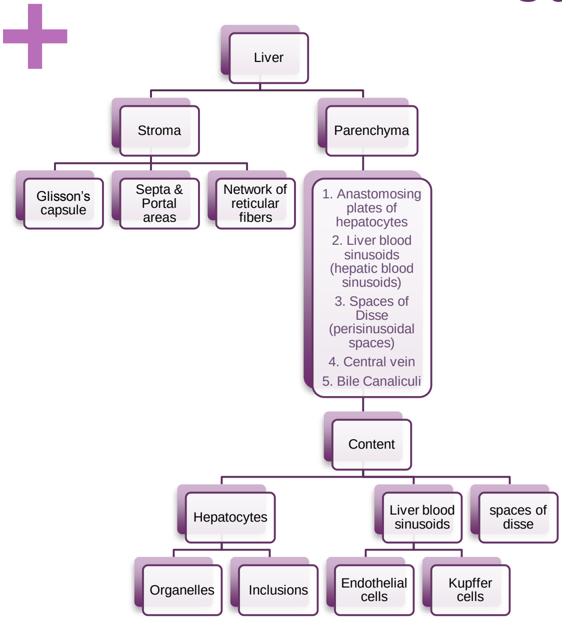
Red Pulp

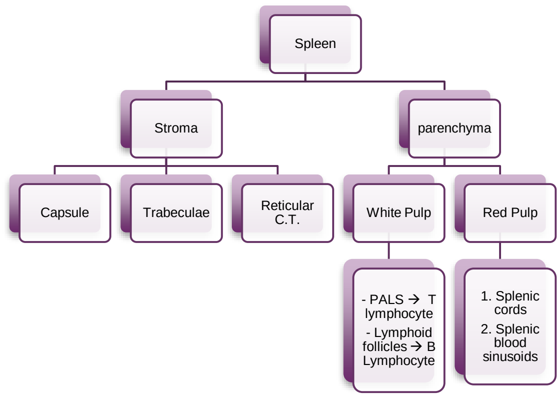
1. **Splenic (Pulp) cords:**
   - Extravasated blood cells, plasma cells, macrophages & reticular cells and fibers.
2. **Splenic blood sinusoids:**
   - Are lined with elongated fusiform endothelial cells with large intercellular spaces & supported by discontinuous, circular basement membrane.

Splenic Microcirculation



Summary





1 c
2 a
3 e
4 e
5 a
6 b

MCQs

1) What structure is in the middle of the of the hepatic lobule?
a. Hepatic artery
b. Portal triad
c. Central Vein
d. Portal vein
e. Sinusoids

2) What is the space between the liver sinusoids and the hepatocytes called?
a. Space of Disse
b. Space of Mall
c. Vacuole
d. Lacuna
e. Howship's lacuna

3) What structures are part of the portal triad?
a. Portal Vein
b. Hepatic Artery
c. Central Vein
d. Sinusoids
e. Both a & b

4) Which of the following is NOT a function of the liver?
a. Metabolism of bilirubin
b. Deamination of amino acids
c. Storage of iron
d. Storage of copper
e. Storage of calcium

5) What is the functional unit of the liver ?
a. Lobule
b. Portal triad
c. Central Vein
d. Hepatocyte
e. Sinusoids

6) Which of the following is part of the spleen's Parenchyma?
a. Cortex
b. Red Pulp
c. Medulla
d. Trabeculae
e. Reticular C.T.

Thanks you for checking our work, Good luck.
-Team histology.

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HISTOLOGY 435

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