LIVER & SPLEEN

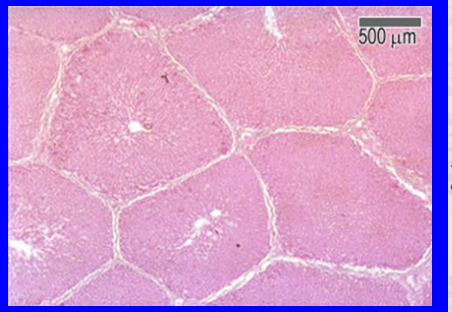
Objectives: By the end of this lecture, the student should be able to describe:

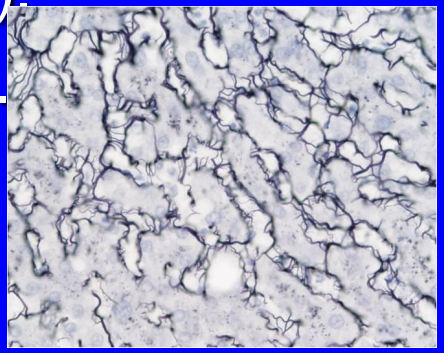
1. The histological structure of liver with special emphasis on:
   - Classical hepatic (liver) lobule.
   - Hepatocytes.
   - Portal tract (portal area).
   - Hepatic (liver) blood sinusoids.
   - Space of Disse (perisinusoidal space of Disse)
   - Bile canalculi.
2. The histological structure of spleen with special emphasis on:
   - White pulp.
   - Red Pulp.

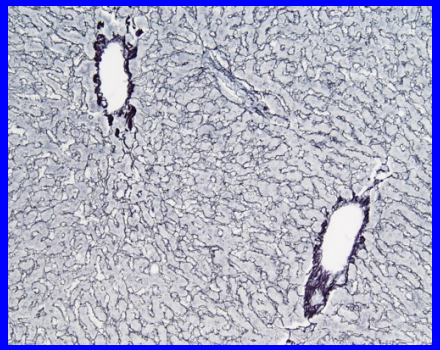
LIVER

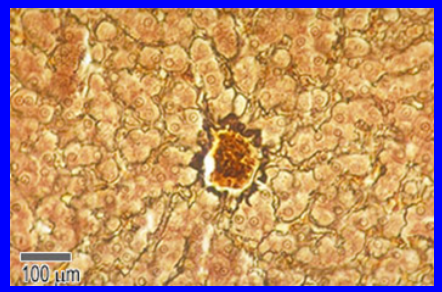
1- Stroma:
   a- Capsule: Glisson's Capsule.
   b- Septa (absent in human) & Portal areas (Portal tracts).
   c- Network of reticular fibers.
2- Parenchyma; Classical liver (hepatic) lobules.

Pig's liver





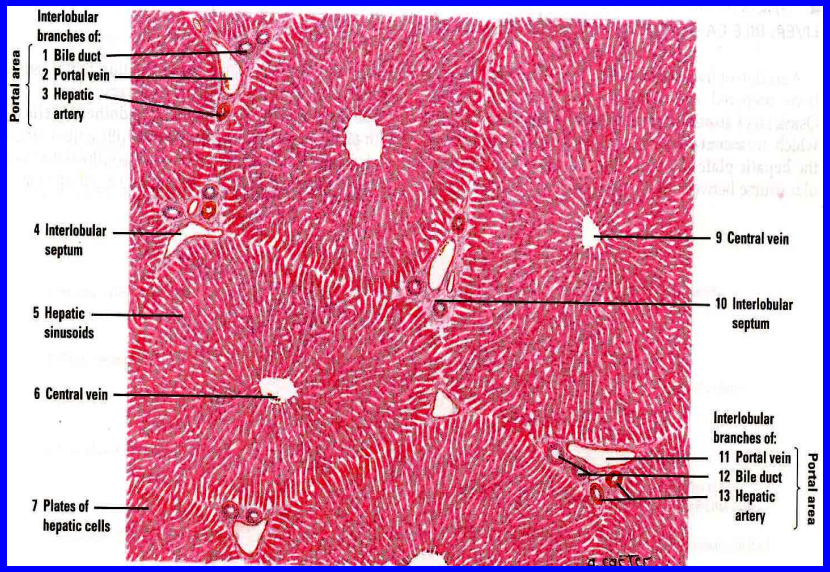


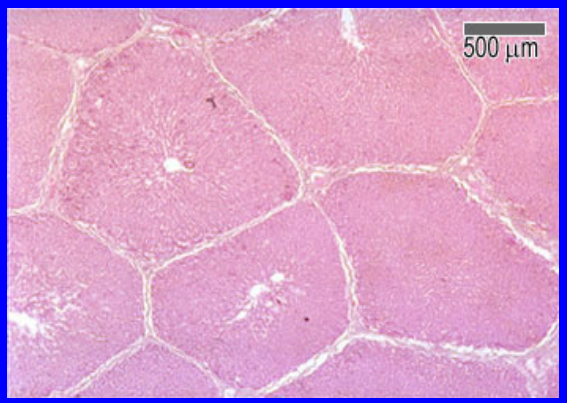


CLASSICAL LIVER LOBULE (classical hepatic lobule)

- 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**.

Human liver





Contents of the Classic Liver Lobule

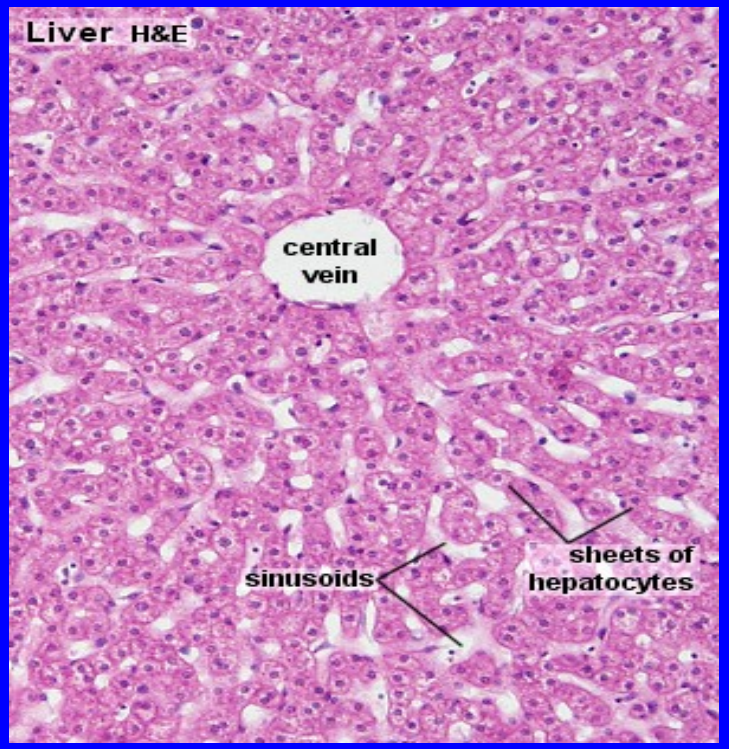
1- Anastomosing **plates of hepatocytes**.

2- Liver blood sinusoids (**hepatic blood sinusoids**): In between the plates.

3- **Spaces of Disse** (perisinusoidal spaces of Disse).

4- **Central vein**.

5- **Bile canaliculi**.

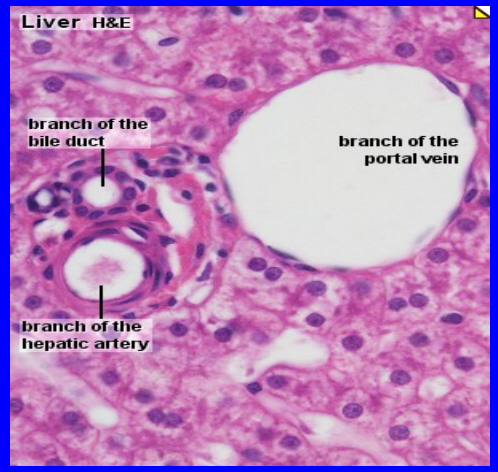


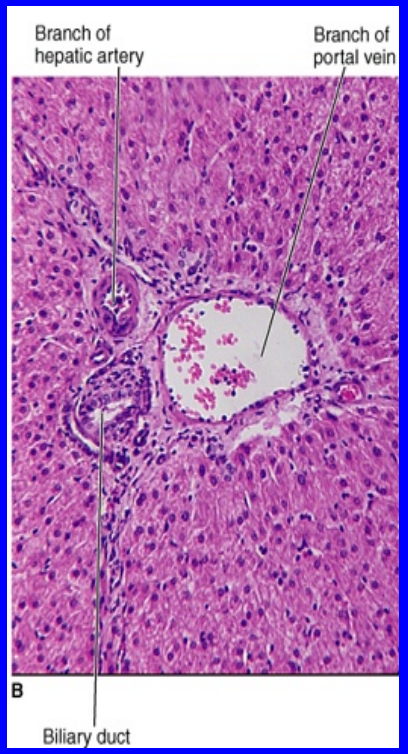
Borders of the Classical Liver Lobule

1- Septa: C.T. septa (e.g. in pigs).

2- Portal areas (Portal tracts) (Portal triads):

Are located in the corners of the classical hepatic lobule (usually 3 in No.).





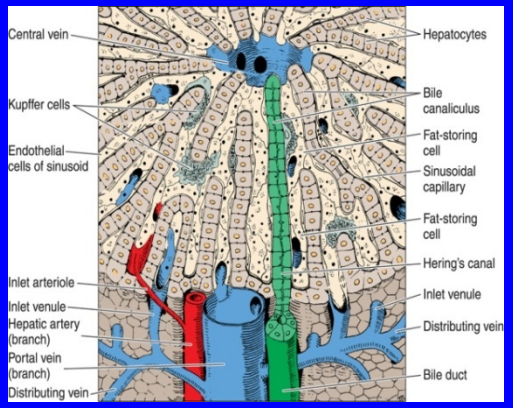
Contents of portal area:

a- C.T.

b- Bile ducts (interlobular bile ducts).

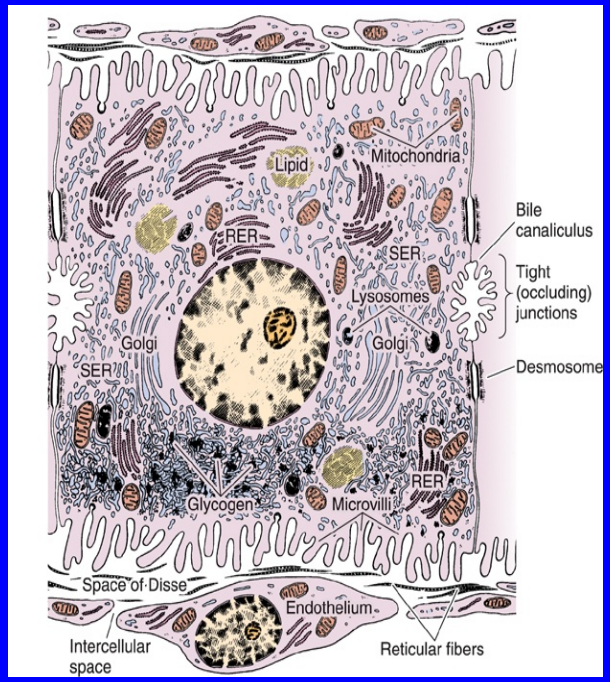
c- Venule (Branch of portal vein).

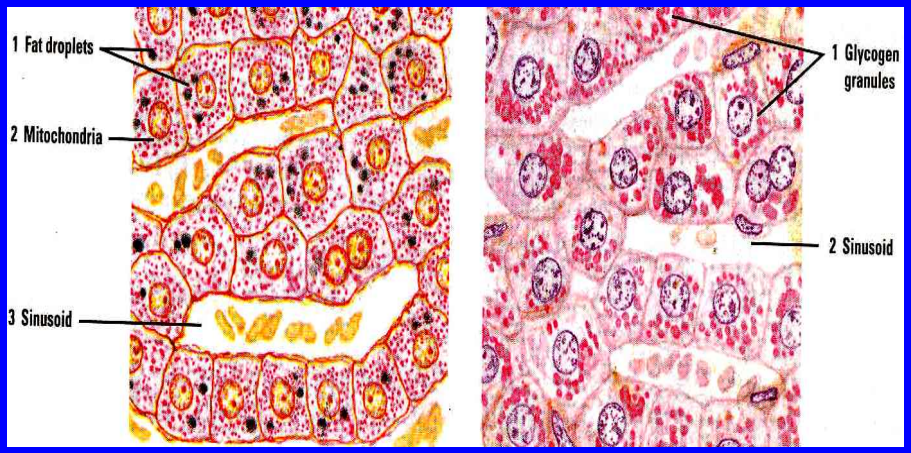
d- Arteriole (Branch of hepatic artery)



Hepatocytes (LM)

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





Hepatocytes (EM)

Organelles:

1- Mitochondria: ++++

2- ER (sER & rER): abundant.

3- Golgi complex.

4- Lysosomes.

5- Peroxisomes.

Inclusions (Deposits):

1- Glycogen 2- Lipid (few droplets).

3- Lipofuscin (old age)

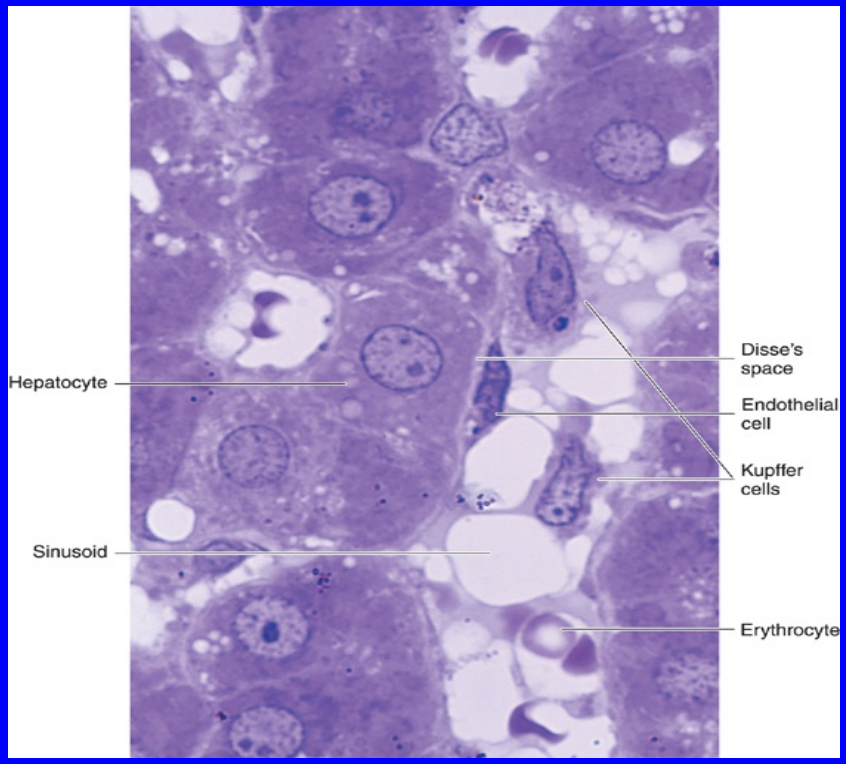
Liver Blood Sinusoids

(1) Endothelial Cells:

- Fenestrated & discontinuous → free passage of plasma.
- Basal lamina is absent.

(2) Kupffer Cells:

- Are macrophages.
- Are found on the luminal surface of the endothelial cells.
- Function: phagocytosis.



Space of Disse (Perisinusoidal Space)

Contents:

1- Microvilli of hepatocytes.

2- Plasma of blood.

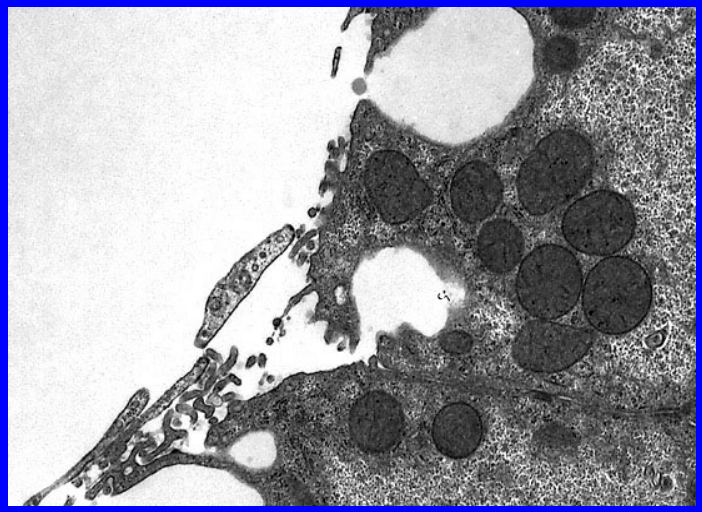
3- Hepatic stellate cells (Ito cells) (Fat-storing cells):

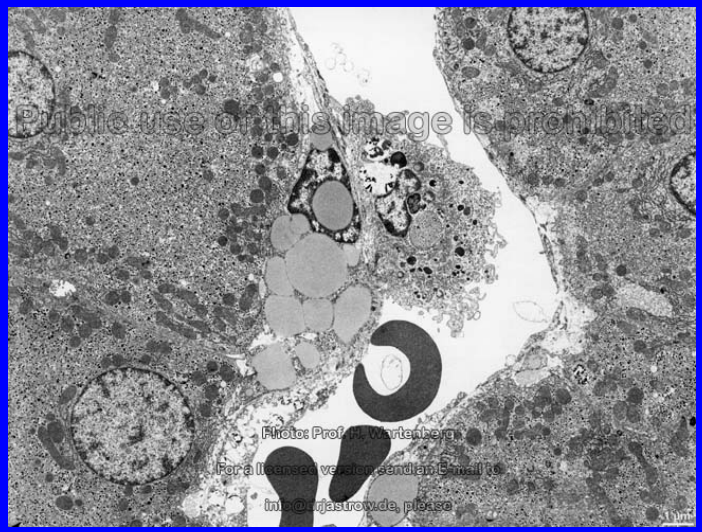
- contain vitamin A-rich lipid.
- form reticulin (reticular fibers).

4- Reticular fibers:

(type III collagen).

5-Natural Killer (NK) cells.





SPLEEN

Stroma of Spleen

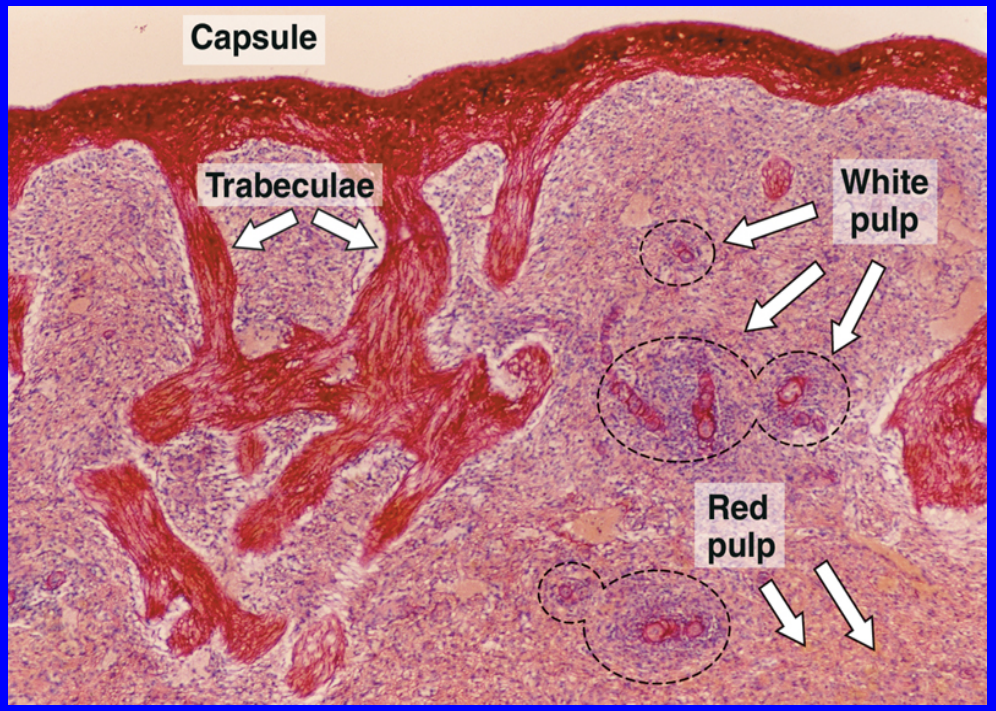
1- Capsule:

- is covered by visceral layer of peritoneum; mesothelium
- Is formed of fibromuscular C.T. (Dense fibrous C.T. + SMCs (smooth muscle cells).

2- Trabeculae:

Are irregular, incomplete, divide the spleen into intercommunicating compartments (lobules).

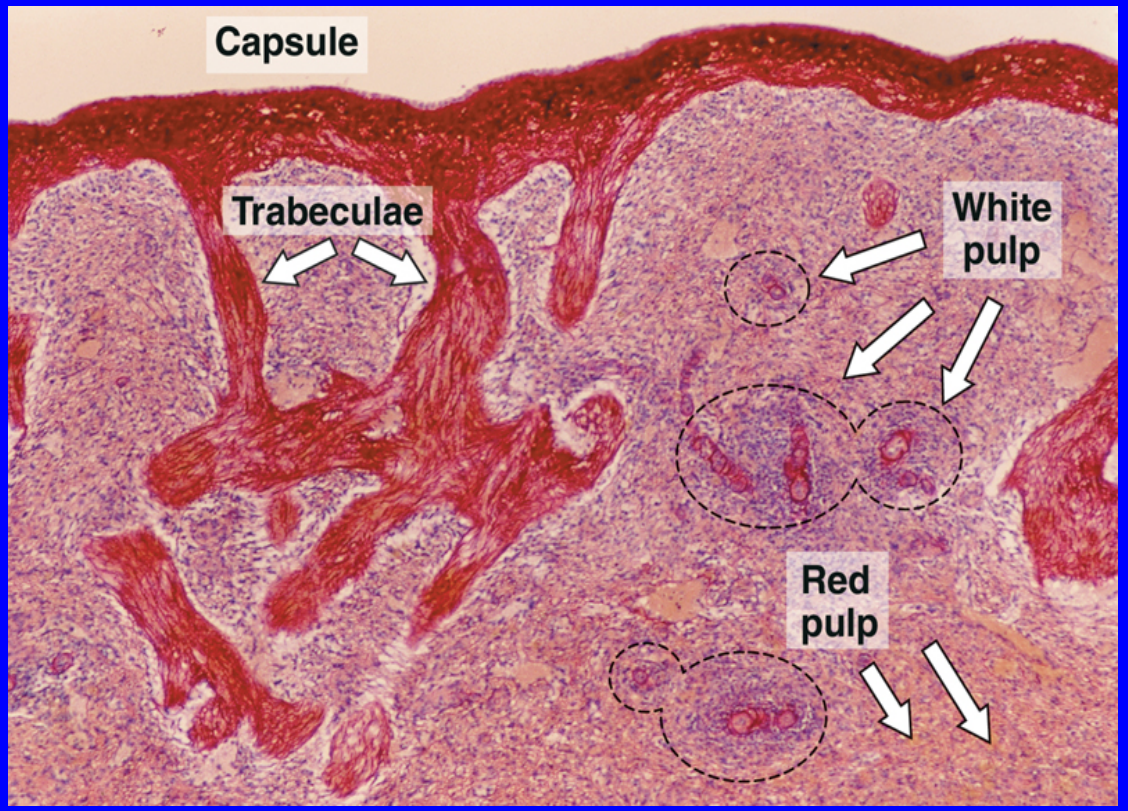
3- Reticular C.T.



Parenchyma of Spleen

(A) White pulp.

(B) Red pulp.



N.B. No cortex,
No medulla,
No afferent lymphatic vessel.

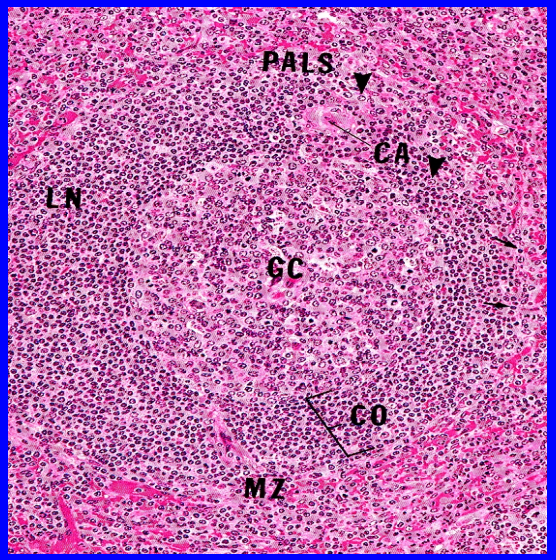
Parenchyma of Spleen

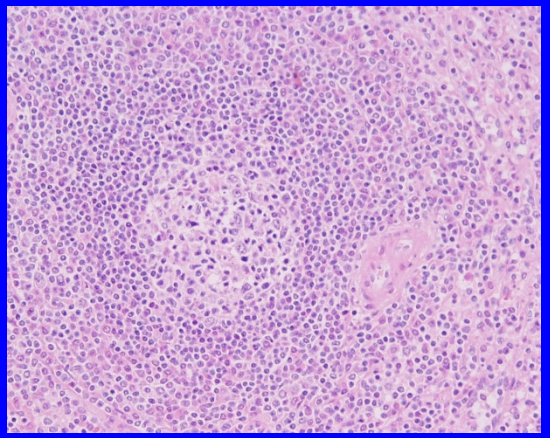
White Pulp:

1- Periarterial lymphatic sheaths (PALS): housing T lymphocytes.

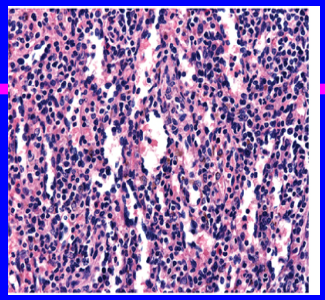
2- Lymphoid follicles (with germinal centers): housing B lymphocytes.

N.B. Both 1&2 have the acentrically located central artery (central arteriole) (follicular arteriole).



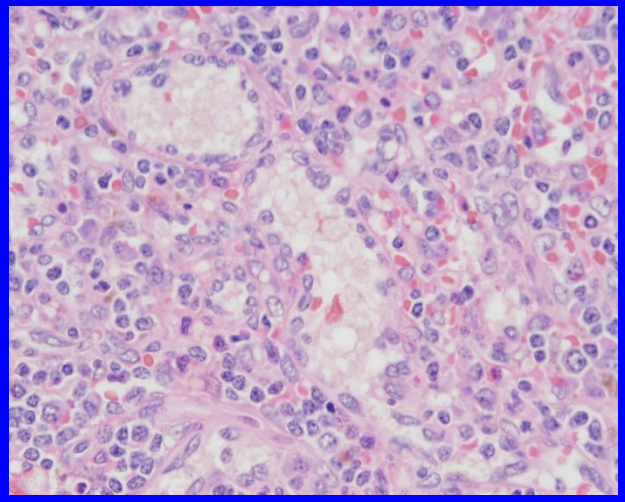


Parenchyma of Spleen

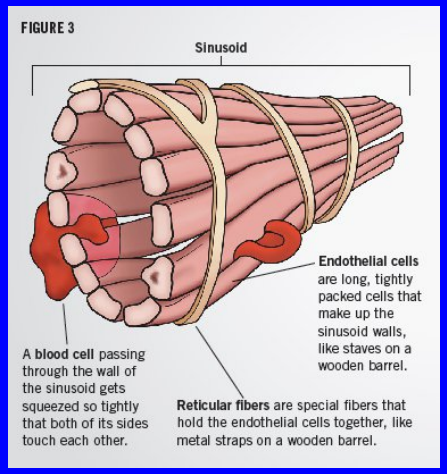


(B) Red pulp:

1- Splenic (pulp) cords:
Extravasated blood cells, plasma cells, macrophages & reticular cells and fibers.



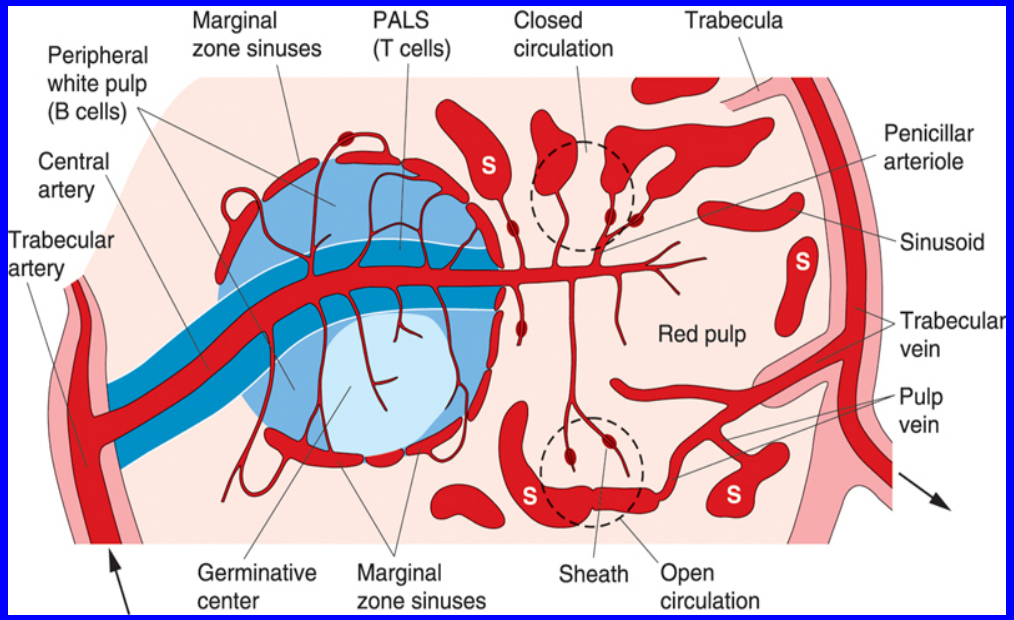
2- Splenic blood sinusoids:
Are lined with elongated fusiform endothelial cells with large intercellular spaces & supported by discontinuous, circular basement membrane.

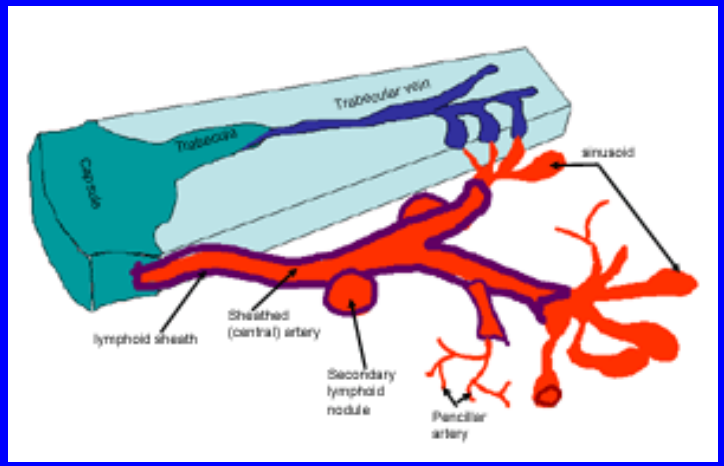


Cells of parenchyma of spleen

- 1. Lymphocytes.
- 2. Plasma cells.
- 3. Macrophages.
- 4. Blood elements (RBCs, leucocytes and blood platelets).

Splenic Microcirculation





BEST WISHES