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Reviewed by
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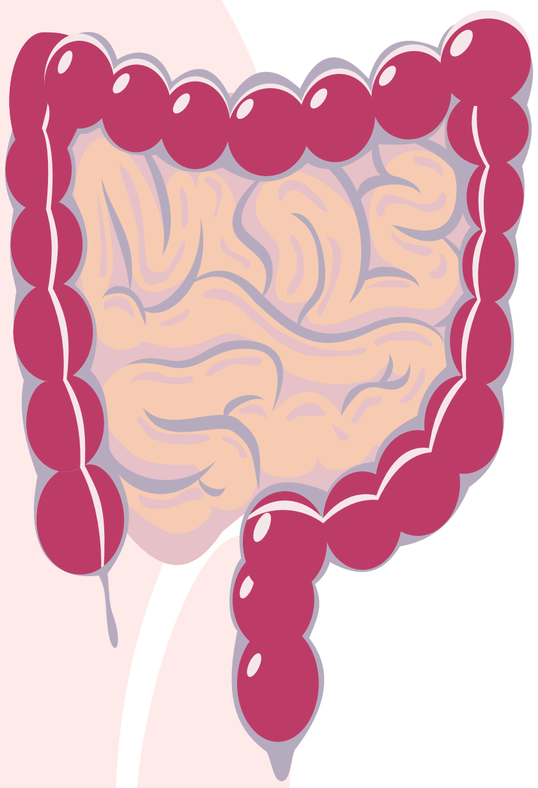
MED 443
King Saud University

HISTOLOGY 443

Liver & spleen



Color index:
-Main text
-important
-female slides
-male slides
-Dr.note
-Extra

Editing File

[Gastrointestinal & Nutrition Block | Histology]

Objectives

At the end of this lecture, you should be able to answer the following (objectives):

- **Describe the histological structure of liver with special emphasis on:**

1. Classical hepatic (liver) lobule
2. Hepatocytes
3. Portal tract (portal area)
4. Hepatic (liver) blood sinusoids
5. Space of Disse (perisinusoidal space of Disse)
6. Bile canaliculi

- **Describe the histological structure of Spleen with special emphasis on:**

1. White pulp
2. Red Pulp

Table of contents:

Liver: stroma & parenchyma

Hepatocytes

Blood sinusoids & Spaces of Disse

Spleen: stroma & parenchyma

This lecture was presented by:

Prof. Aly Mohamed **Prof. Raeesa Abdultawab**

Liver

histology of liver!

I- Stroma:

Stroma absent in human liver

a **Capsule: Glisson's Capsule.**

b **Septa (absent in human) & Portal areas (portal tracts)**

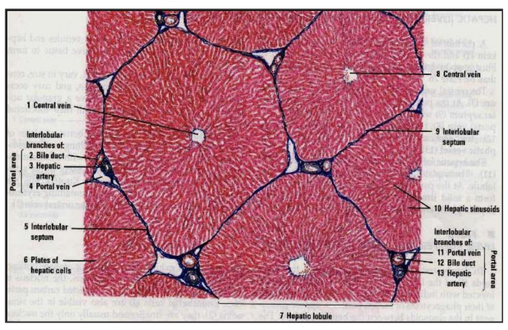
c **Network of reticular fibers.**

2- Parenchyma

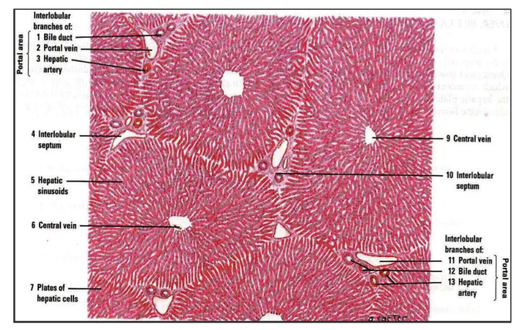
Classical liver (hepatic) lobules:

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.

Pig's liver



Human's liver



Contents of the Classic Liver Lobule

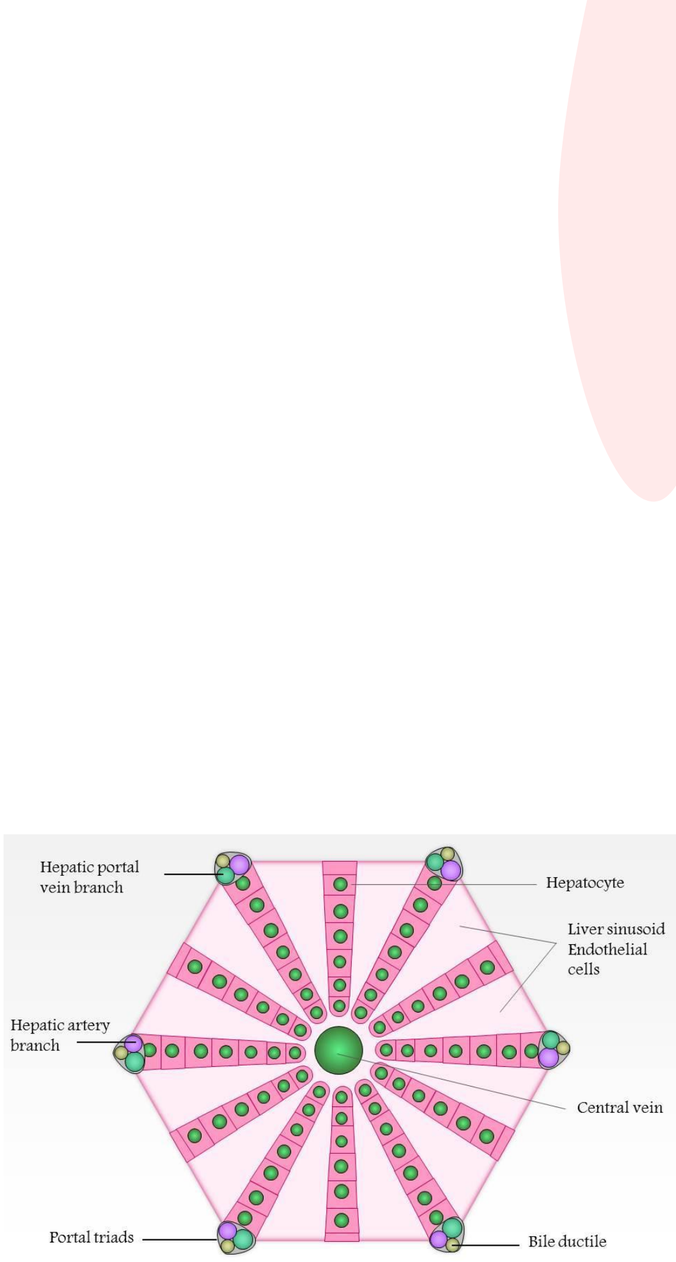
1 - Anastomosing plates of hepatocytes.

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

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

4 - Central vein.

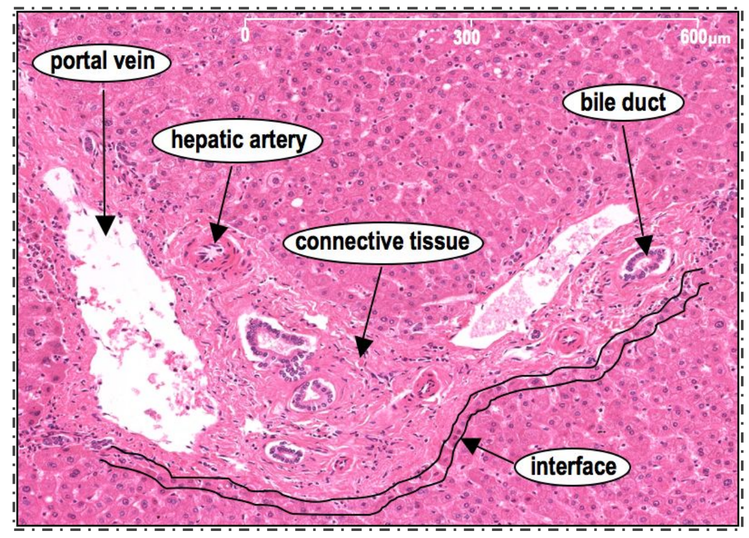
5 - Bile canaliculi.



liver

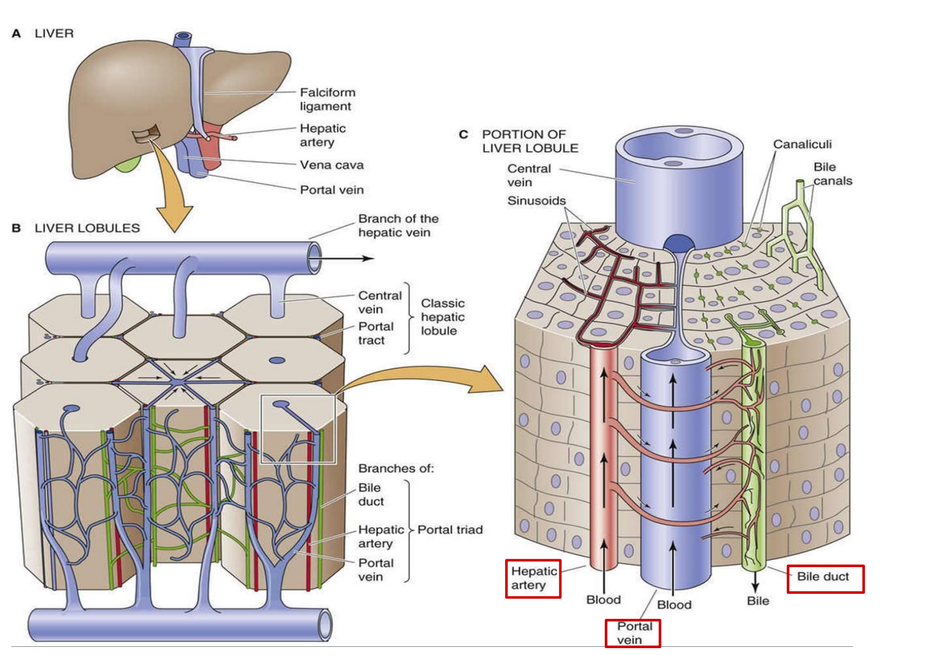
Borders of the Classical Liver Lobule:

1- Septa:	**C.T. septa (e.g. in pigs).**
2- Portal areas:	**Are located in the corners of the classical hepatic lobule (usually 3 in No.).**

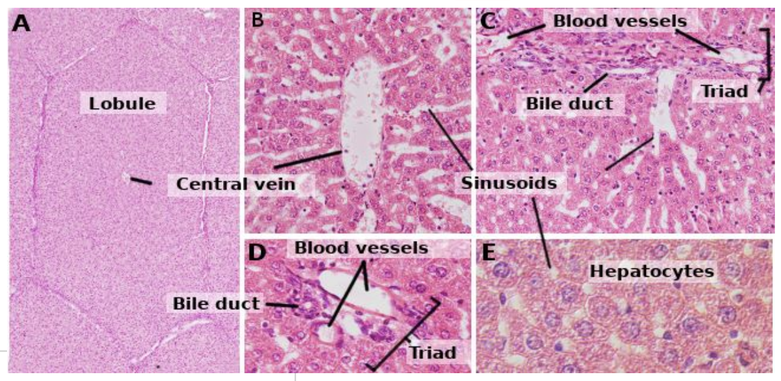


Contents of portal area:

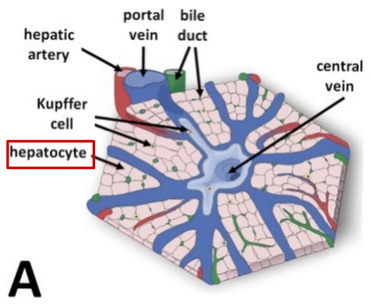
- Connective tissue (C.T)
- Bile ducts (interlobular bile ducts)
- Venule (Branch of portal vein)
- Arteriole (Branch of hepatic artery)



Hepatocytes (LM)



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



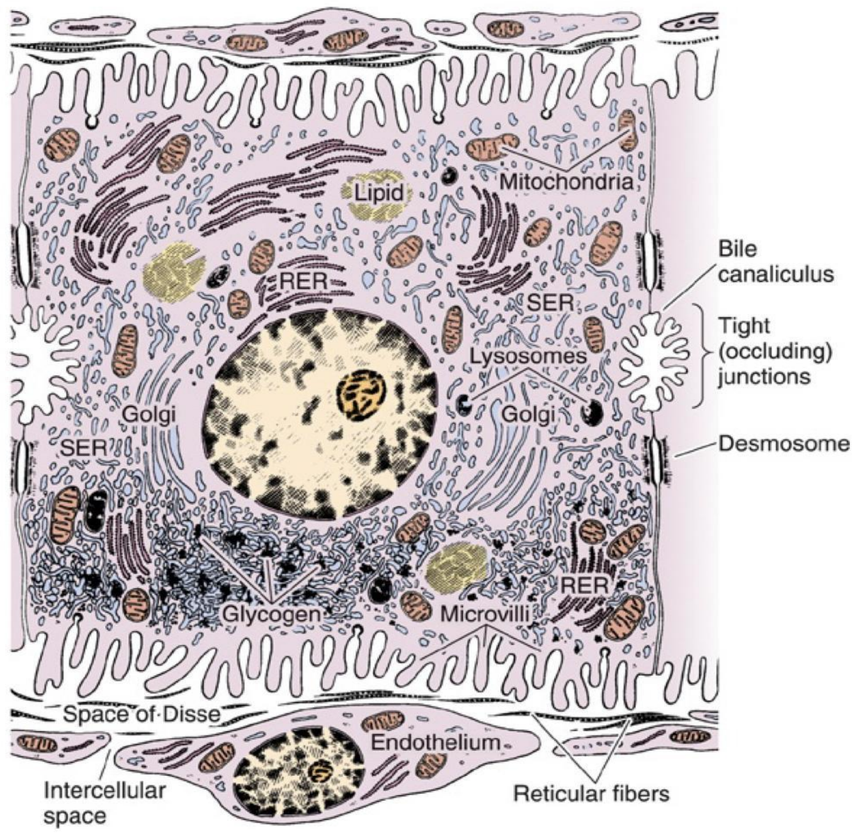
Liver

Organelles of hepatocytes(EM)

- Mitochondria: ++++
- ER (sER & rER): abundant.
- Golgi complex.
- Lysosomes.
- Peroxisomes.

Inclusions (Deposits):

- Glycogen
- Lipid (few droplets)
- Lipofuscin (old age)



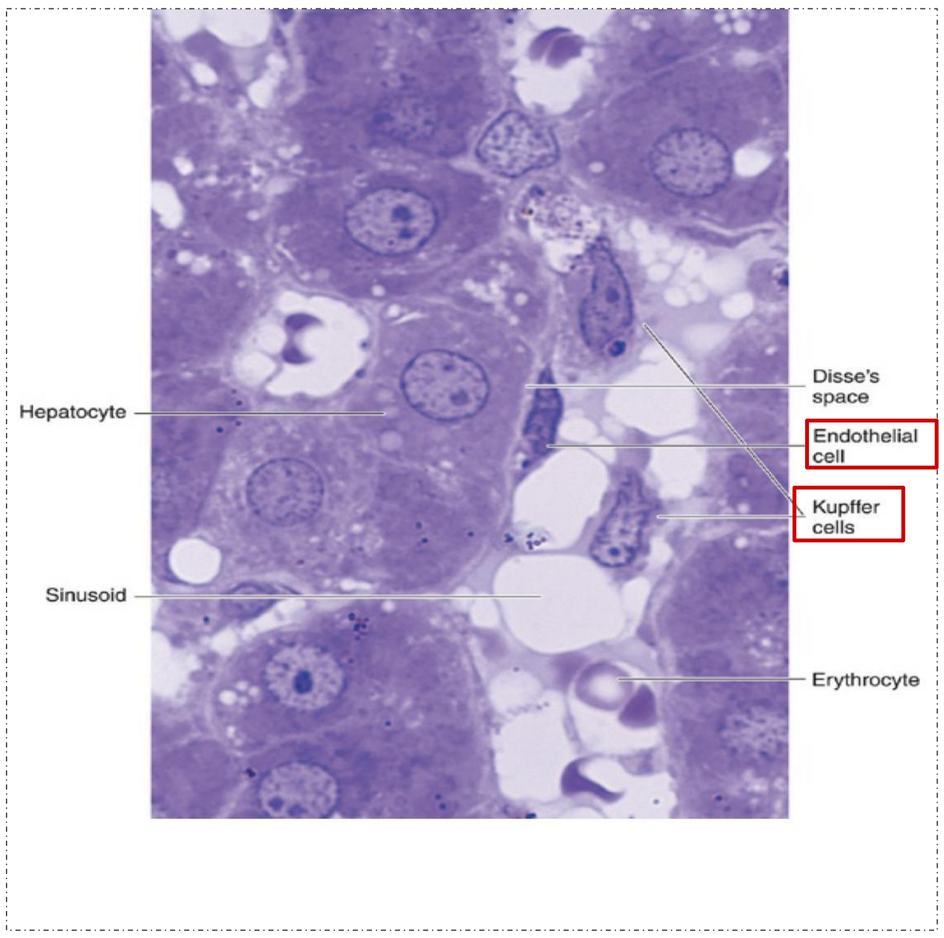
Liver Blood Sinusoids:

(1) Endothelial Cells:

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

(2) Kupffer Cells:

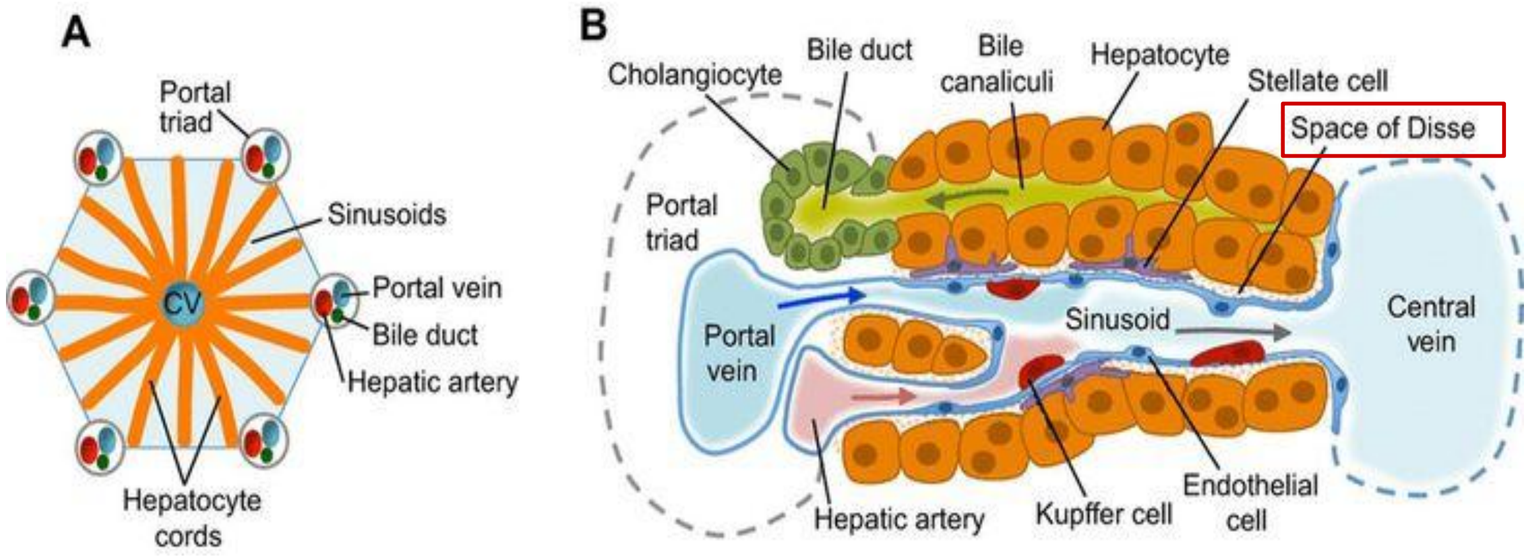
– Are macrophages.
– Are found on the luminal surface of the endothelial cells.
– Function: phagocytosis.

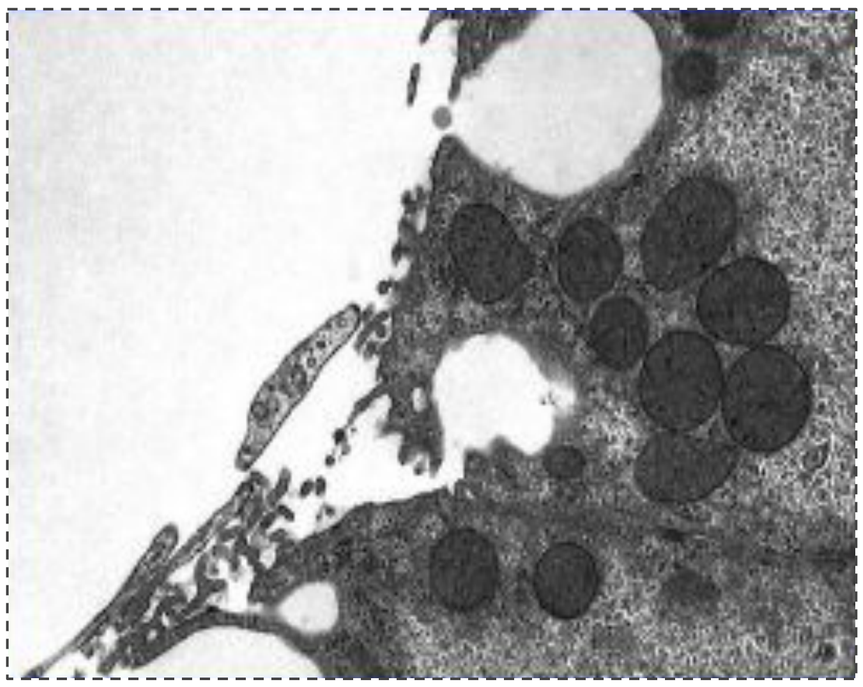


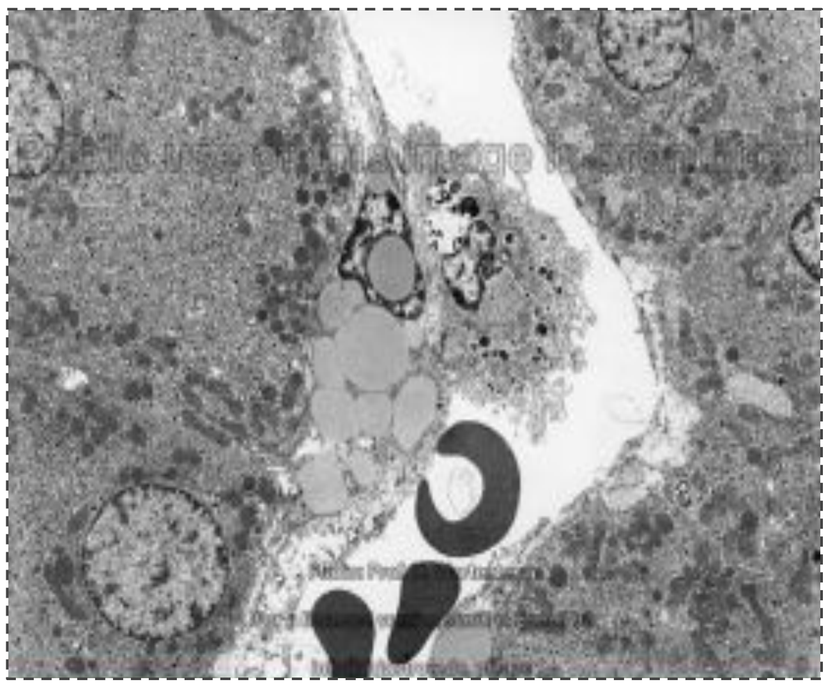
Liver

Space of Disse (Perisinusoidal Space) contents:

- Microvilli of hepatocytes.
- Plasma of blood.
- Hepatic stellate cells (**Ito** cells) (Fat-storing cells):
  – contain vitamin A-rich lipid.
  – form reticulin (reticular fibers).
- Reticular fibers: (type III collagen).
- Natural Killer (NK) cells.







قال النبي ﷺ لأبي موسى الأشعري : ألا أدُلُّكَ على بابٍ من أبوابِ الجنةِ ؟ . قال : وما هو ؟ قال : لا حولَ ولا قوةَ إلَّا باللهِ

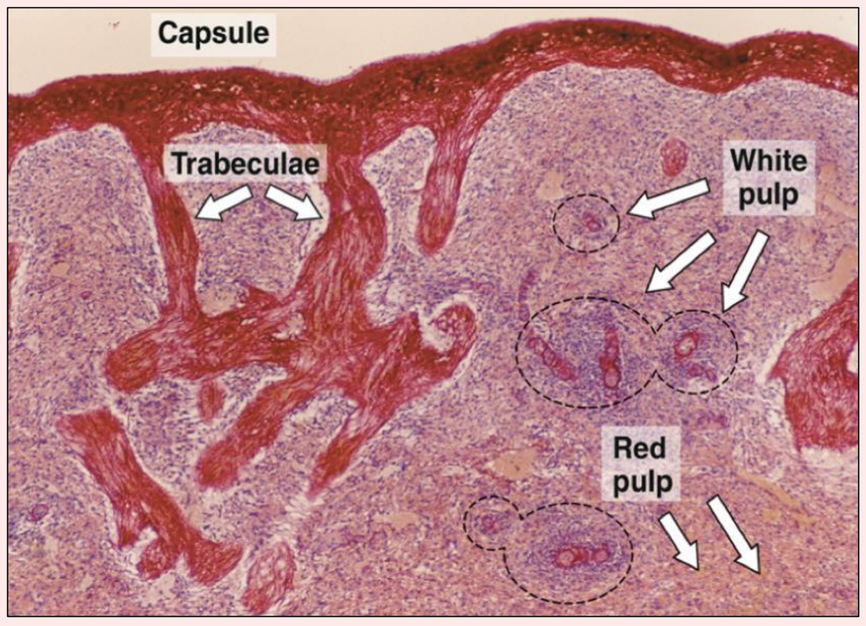
Spleen

Stroma:

• **Capsule :**
– covered by visceral layer of peritoneum ; mesothelium .
- formed of fibromuscular C.T.
(Dense fibrous C.T. + smooth muscle cells)
So, when there's blood lose,the spleen contracts to empty the blood into the circulation in case of emergency.

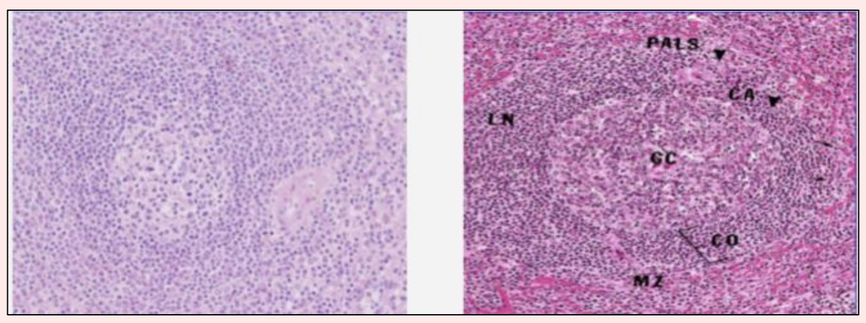
• **Trabeculae :**
– Irregular , incomplete & divide the spleen into Intercommunicating compartments (lobules.).

• **Reticular C.T black in colour**



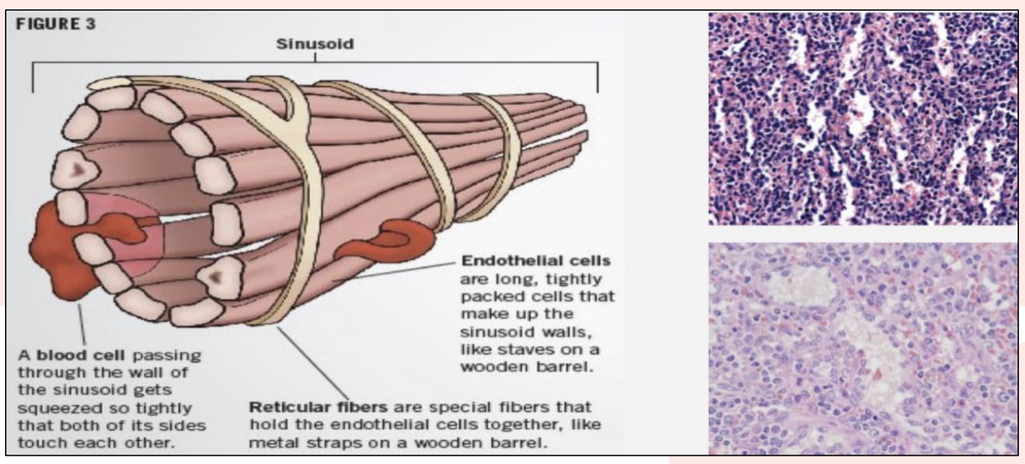
Parenchyma:

• **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).

• **Red pulp :**
• **1 Splenic (pulp) cords:**
Extravasated blood cells, plasma cells, macrophages & reticular cells and fibers .
• **2 Splenic blood sinusoids:**
lined with elongated fusiform endothelial cells with large intercellular spaces & supported by <u>discontinuous,circular basement</u> membrane.
allowing the passages of cells , circular basement membrane to maintain the wall of sinusoids .



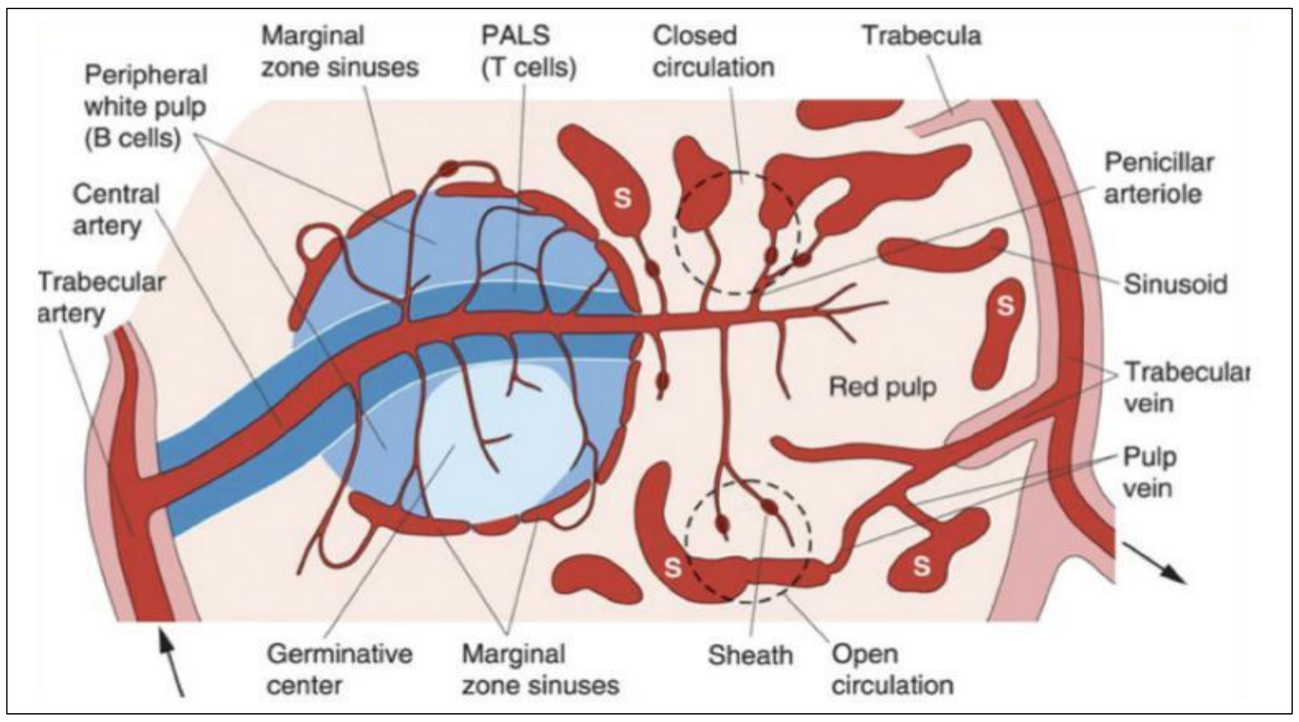
Spleen

Cells of parenchyma of spleen:

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

Splenic Microcirculation:

open circulation → free blood in space of red pulp large divided into small venules to maintain the spleen vein that carry the portal blood and remove the pathogens then to liver to IVC close circulation → sinusoid (team 439)



MCQs

01	Which of the following is part of liver border?		
A- Portal area	B- Blood sinusoid	C- Bile canaliculi	D- Kupffer cell

02	The vein in the portal area, comes from which tributary?		
A- superior mesenteric V.	B- splenic vein	C- Portal vein	D- celiac vein

03	Hepatocyte are?		
A- Deeply basophilic	B- Acidophilic	C- partially basophilic	D- base basophilic apics acidophilic

04	Kupffer cells is located in?		
A- bile canaliculi	B- space of Disse	C- Blood sinusoid	D- hepatocyte

05	Stallet cell (Ito cell) found in?		
A- bile canaliculi	B- space of Disse	C- Blood sinusoid	D- hepatocyte

Answer key:

1. A
2. C
3. B
4. C
5. B

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