

Histology of the liver and spleen

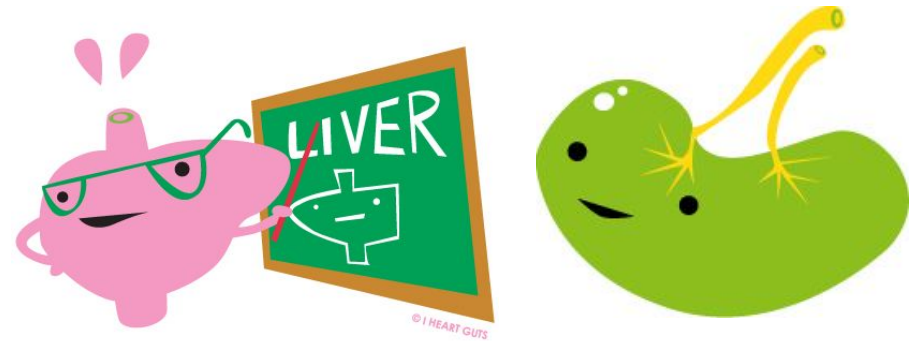
OBJECTIVES:

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 canaculi.**

2. The histological structure of **spleen** with special emphasis on:

- **White pulp.**
- **Red Pulp.**



Please be sure to check [Histology Edits](#) before you start, to know about any additions/changes.

Liver

Stroma

Capsule

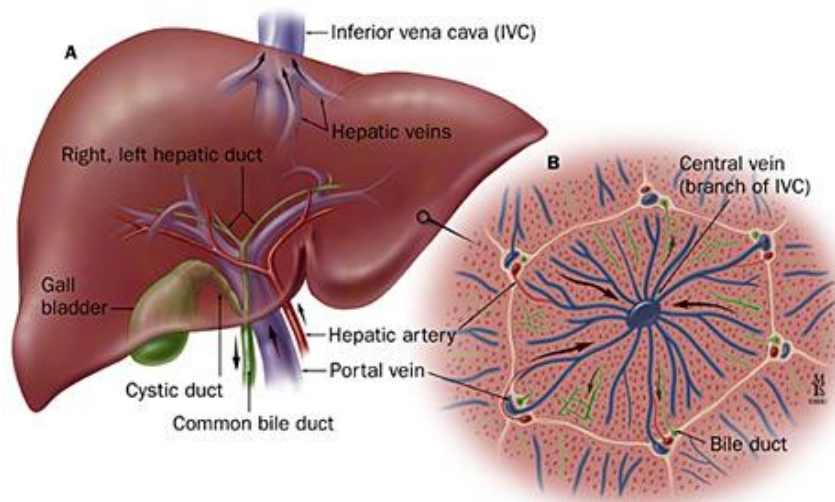
Gilsson's Capsule

Network

Reticular Fibers

Septa

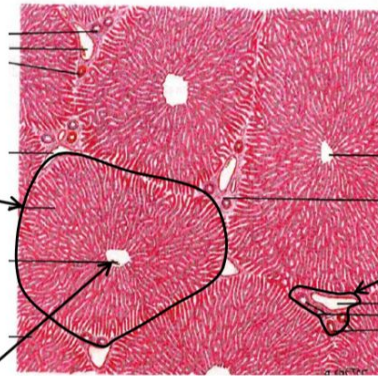
"Absent in Humans"
+ Portal Areas(tracts)



Parenchyma

Classical Liver Hepatic Lobule

Formed of



1) polygonal mass of liver tissue

2) central (centrolobular) vein in the **center**.

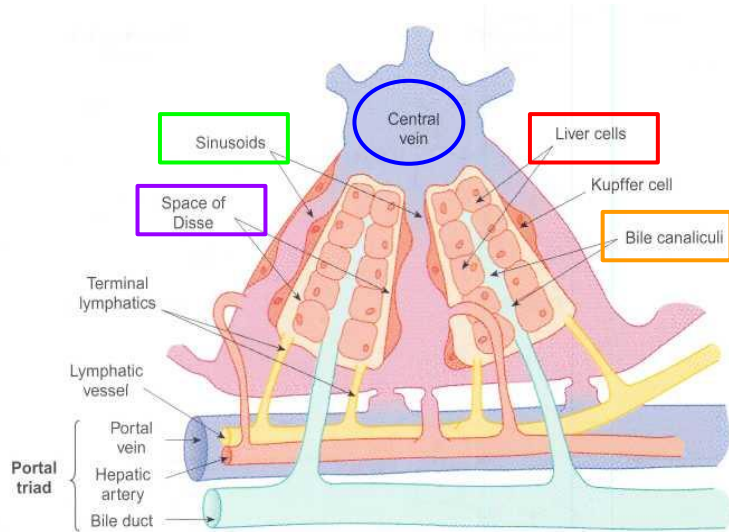
3) portal areas at the **periphery**

Parenchyma: functional unit

Liver is mixed: exocrine and endocrine

Classic Hepatic Lobule

Contents



- 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**

Hepatic lobules are columns

Portal area= portal triad. Between the classic hepatic lobules

Why is it named portal area? Because the largest structure is the portal vein

Center vein: hepatic vein

The radiating from the center vein: "rays" are hepatic cells

Borders

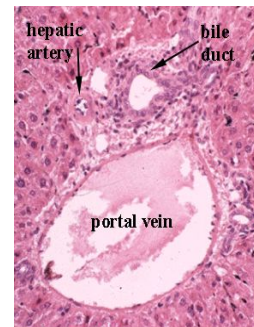
Septa

Connective tissue
Septa e.g in Pigs

Portal Area

Are located in the corners
of the classic hepatic lobule

Contents

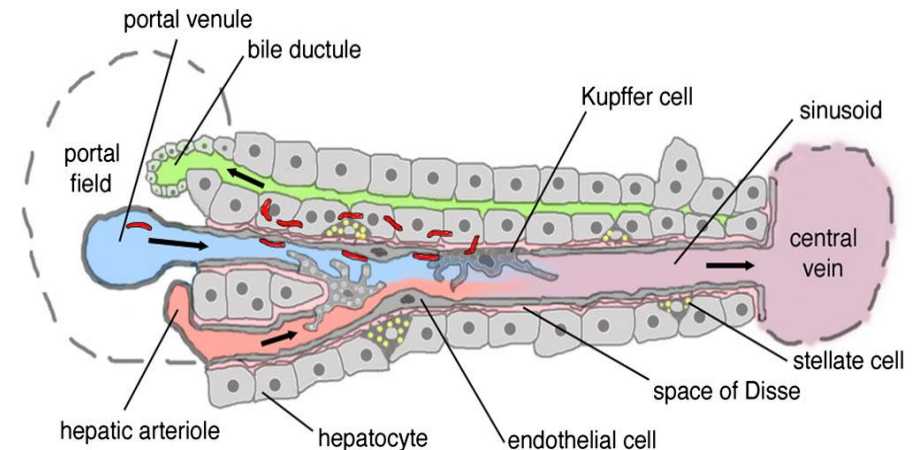


Bile Ducts
"interlobular bile ducts"

Venules
Branch of Portal Vein

Arteriole
Branch of Hepatic Artery

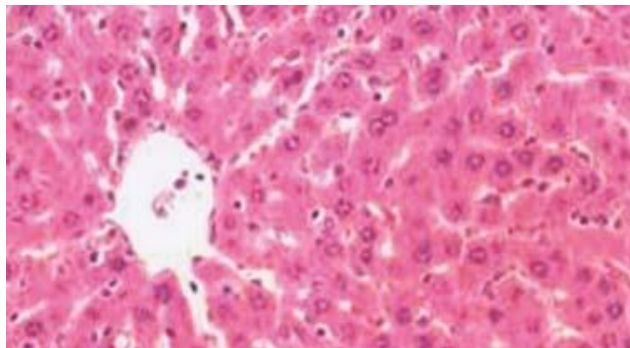
C.T



Hepatocyte

LM “light microscope”

- 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.



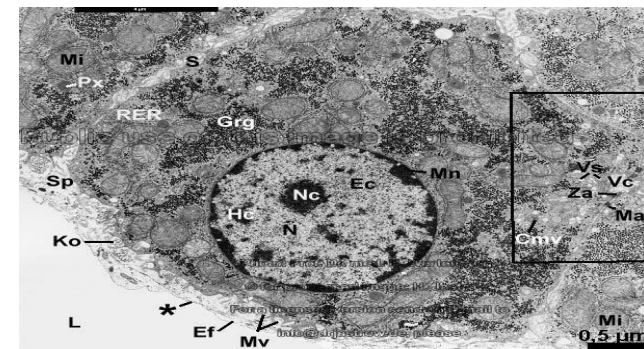
EM “Electron microscope”

Organelles:

- 1- Mitochondria: Numerous
- 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- 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.

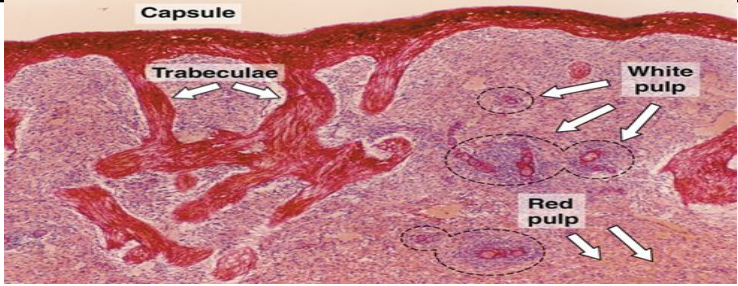
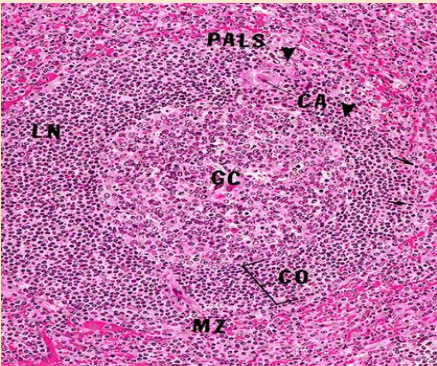
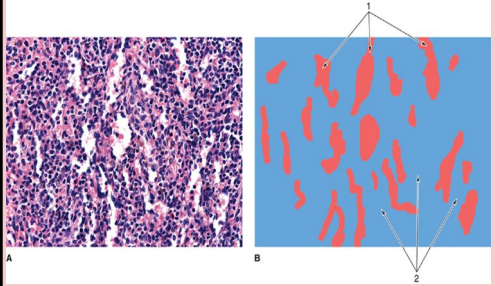
4- Microvilli of hepatocytes

Disse: found between the hepatocytes and sinusoids

Bile cana: formed by the cells membrane of the hepatocytes

The contents will be poured in the sinusoids then go to the hepatocytes

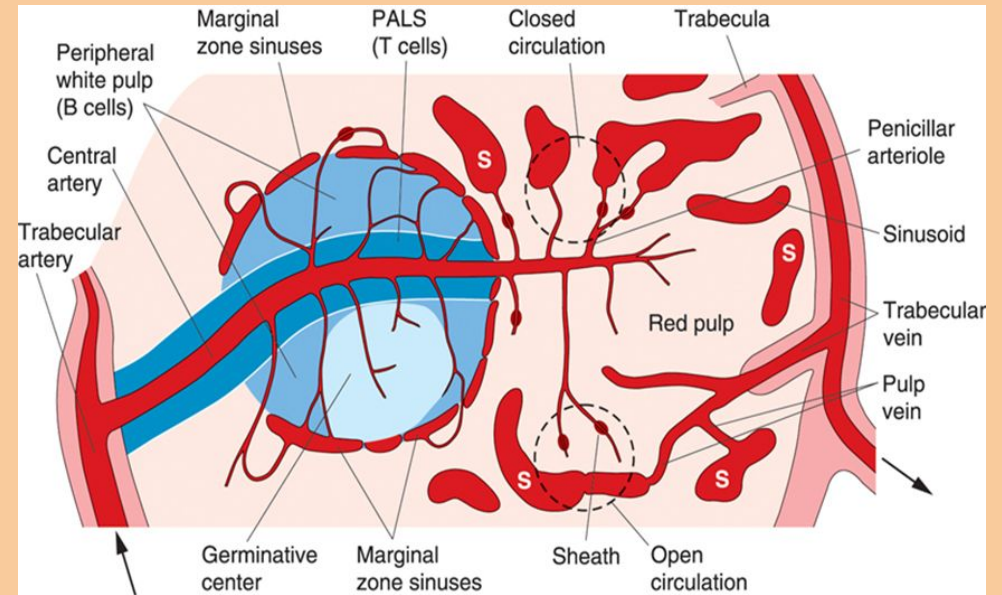
Spleen

Stroma			Parenchyma	
<p>Capsule</p>	<p>Trabeculae</p>	<p>Reticular C.T</p>	<p>White pulp.</p>	<p>Red pulp</p>
<ul style="list-style-type: none"> is covered by visceral layer of peritoneum; mesothelium Is formed of fibromuscular C. T. (Dense fibrous C.T. + SMCs (smooth muscle cells)). 	<ul style="list-style-type: none"> Are irregular, incomplete, divide the spleen into intercommunicating compartments (lobules). 		<ol style="list-style-type: none"> Periarterial lymphatic sheaths (PALS): housing T lymphocytes Lymphoid follicles (with germinal centers): housing B lymphocytes. <ul style="list-style-type: none"> Both 1&2 have the acentrically located central artery (central arteriole). 	<ol style="list-style-type: none"> Splenic (pulp) cords: Extravasated <u>blood cells</u>, plasma cells, <u>macrophages</u> & reticular cells and fibers. Splenic blood sinusoids: Are lined with elongated fusiform <u>endothelial cells</u> with large intercellular spaces & supported by discontinuous, circular basement membrane.
 <p>This low-magnification histological section shows the overall structure of the spleen. The outer capsule is visible, with trabeculae extending inward. The white pulp is seen as darker, nodular areas, and the red pulp is the lighter, more diffuse tissue.</p>			 <p>This high-magnification view shows a lymphoid follicle. The central artery (CA) is located eccentrically within the follicle, surrounded by the periarterial lymphatic sheath (PALS). The germinal center (GC) is the central part of the follicle, and the marginal zone (MZ) is the outermost part.</p>	 <p>Section A shows a splenic cord, which is a collection of extravasated blood cells, plasma cells, macrophages, and reticular cells. Section B shows splenic blood sinusoids, which are lined with elongated fusiform endothelial cells and have large intercellular spaces supported by a discontinuous, circular basement membrane.</p>

cells of parenchyma of spleen

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

splenic microcirculation



Summary

LIVER

1- Stroma:

a- **Capsule:**

b- **Septa:**

(absent in human)

c- **Network** of reticular fibers.

Glisson's Capsule.

& Portal areas (Portal tracts).

2- Parenchyma; Classical liver (hepatic) lobules.

Formed of:

Contents

Borders

- **polygonal mass**

1- Anastomosing **plates of hepatocytes.**

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

- portal areas at the **periphery**

2- Liver blood sinusoids: In between the plates.
content:
1) Endothelial Cells.
2) Kupffer Cells.

2- Portal areas:
Content:
a- C.T.
b- Bile ducts
c- Venule "portal"
d- Arteriole "hepatic"

-central (centrolobular) vein in the **center.**

3- **Spaces of Disse** (perisinusoidal spaces of Disse).**Contents:**
1- Fat-storing cells (Ito cells)
2- Reticular fibers.
3- Plasma of blood.
4- Microvilli of hepatocytes.

4- **Central vein.**

5- **Bile canaliculi.**

Summary

SPLEEN

1- Stroma:

2- Parenchyma:

cells:(Lymphocytes, Plasma cells, Macrophages, Blood elements)

a- <u>Capsule</u> :	b- Trabeculae:	c- Reticular C.T	<i>White Pulp</i>	<i>Red Pulp</i>
-visceral layer of peritoneum; mesothelium	Are irregular, incomplete,		1- <u>Periarterial lymphatic sheaths (PALS)</u> : housing T lymphocytes.	1- Splenic (pulp) cords:
Is formed of fibromuscular C.T.	divide the spleen into intercommunicating compartments (lobules).		2- <u>Lymphoid follicles</u> (with germinal centers): housing B lymphocytes.	2- Splenic blood sinusoids:



MCQs

1) It is formed of a polygonal mass of liver tissue, with portal areas at the periphery & central vein in the center?

A-Septa.

B-Network of reticular fibers

C-Classical liver lobules.

D-Capsule

2) All of the following are contents of the Classical liver lobules EXCEPT?

A-Spaces of Disse

B-Septa

C-Bile canaliculi.

D-plates of hepatocytes.

3) Which of the following isn't a cell of the parenchyma of spleen?

A-Langhans cells.

B-Macrophages.

C-Lymphocytes.

D-Plasma cells.



1-C 2-B 3-A

SAQs

The parenchyma of spleen doesn't have what?

- 1-No cortex.
- 2-No medulla.
- 3-No afferent lymphatic vessel.

The liver Blood Sinusoids contain?

- 1-Endothelial cells.
- 2-Kupffer cells.

Mention the Space of Disse (Perisinusoidal Space) contents?

- 1- Fat-storing cells (Ito cells) (Hepatic stellate cells)
- 2- Reticular fibers: (type III collagen).
- 3- Plasma of blood.
- 4- Microvilli of hepatocytes.

Motivational Corner

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Thank you for checking our work
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