



MED437
KING SAUD UNIVERSITY

Liver & Spleen



Red: important.

Black: in male | female slides.

Gray: notes | extra.

Editing file



➤ OBJECTIVES

- 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 canaliculi
- The histological structure of SPLEEN with special emphasis on:
 - White pulp
 - Red Pulp

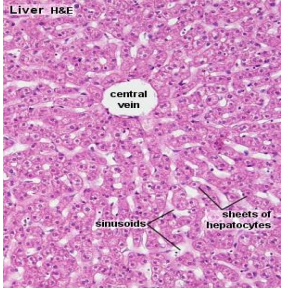
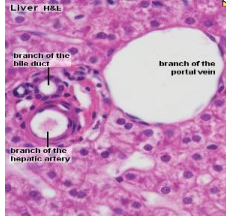


➤ Liver

Stroma	Parenchyma
<ul style="list-style-type: none"> • Capsule: Glisson's Capsule • Septa (absent in human) & Portal areas (Portal tracts). • Network of reticular fibers 	<p>Classical liver (hepatic) lobules</p> 

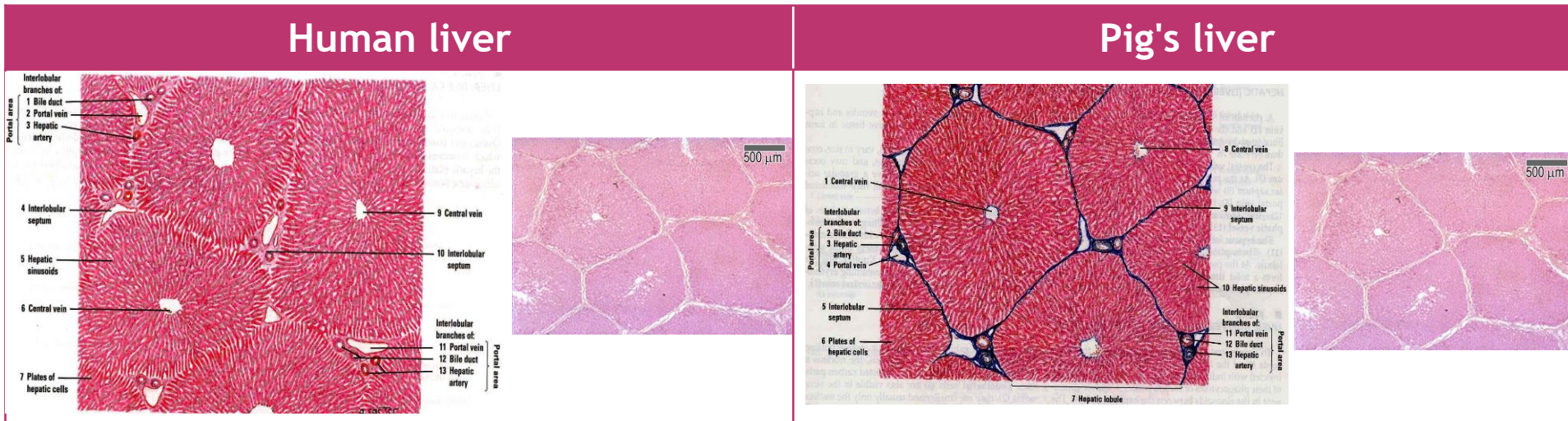
➤ Classical Liver Lobule (Classical Hepatic Lobule)

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.

Contents	Borders
<ul style="list-style-type: none"> • Anastomosing plates of hepatocytes • Liver blood sinusoids (hepatic blood sinusoids): In between the plates • Spaces of Disse (perisinusoidal spaces of Disse) • Central vein • Bile canaliculi 	<ul style="list-style-type: none"> • Septa: C.T. septa (e.g. in pigs) • Portal areas = Portal tracts = Portal triads: Are located in the corners of the classical hepatic lobule (usually 3) Contents of portal area: <ul style="list-style-type: none"> • C.T • Venule (Branch of portal vein) • Bile ducts (interlobular bile ducts) عكس اتجاه الدم • Arteriole (Branch of hepatic artery) 



➤ Liver



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

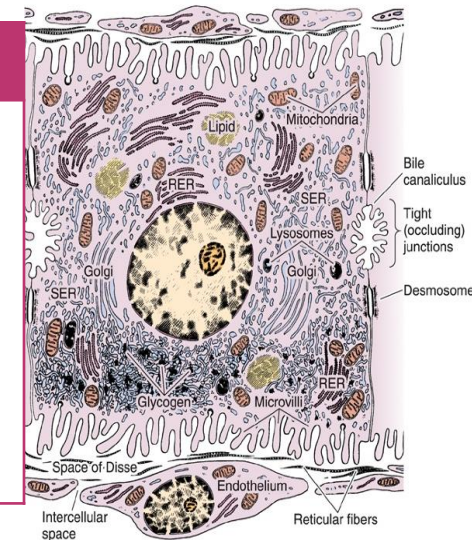
Hepatocytes (EM)

Organelles

- **Mitochondria**: alot
- **ER (sER & rER)**: abundant
- **Golgi complex**
- **Lysosomes**
- **Peroxisomes**

Inclusions*

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



*One side of hepatocyte come contact with blood sinusoid & the other side come with other hepatocyte to form bile canaliculi



➤ Liver Blood Sinusoids = = Hepatic Sinusoids

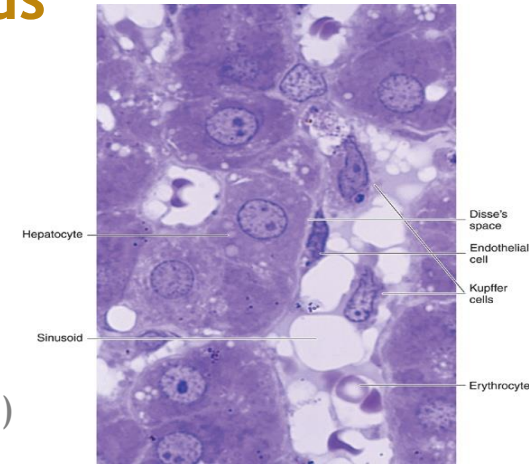
(1) Endothelial Cells:

- **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**

*Blood sinusoid have mixed blood (70-75% Deoxygenated & 25-30% oxygenated)



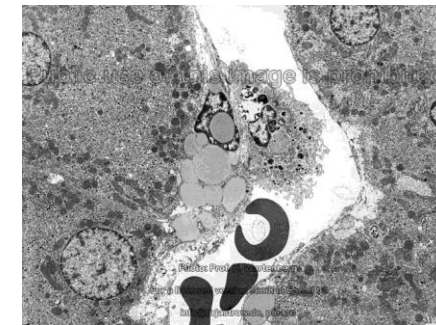
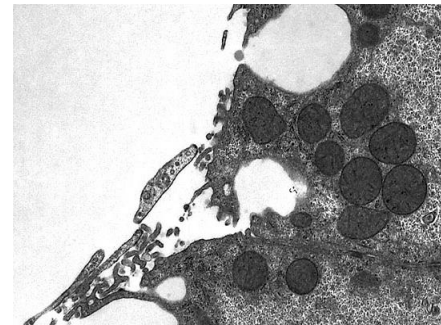
➤ Space of Disse (Perisinusoidal Space)

Contents:

- Microvilli of hepatocytes
- Plasma of blood
- **Hepatic stellate cells (Ito cells) = Fat-storing cells:**
 - Contain **vitamin A-rich lipid** (storage of fat)
 - Form **reticulin** (reticular fibers)
- **Reticular fibers** (Type III collagen)
- **5-Natural Killer (NK) cells** As immune cells

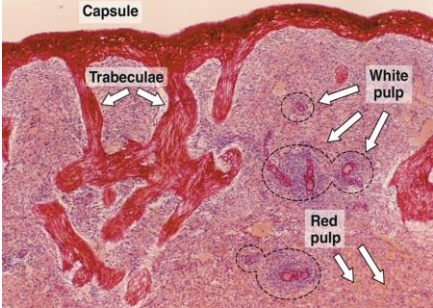
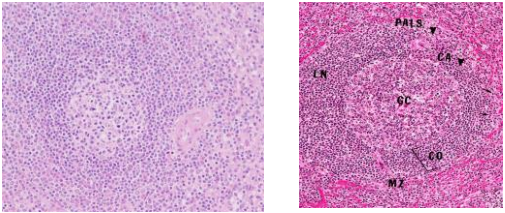
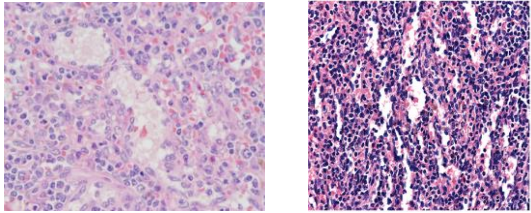
*REMEMBER!

Ito cells located in space of disse | Kupffer cells located in blood sinusoids



➤ **Spleen** *Function of spleen: storage & filtration of blood

Parenchyma: **No cortex, No medulla**
No afferent lymphatic vessel

Stroma	Parenchyma
<ul style="list-style-type: none"> ○ Capsule: <ul style="list-style-type: none"> • Is <u>covered</u> by visceral layer of peritoneum (mesothelium) • Is formed of fibromuscular C.T. (Dense fibrous C.T. + SMCs=contract to supply body) ○ Trabeculae: irregular incomplete divide it into intercommunicating compartments (lobules) ○ Reticular C.T. 	<ul style="list-style-type: none"> (A) White pulp = lymphatic nodules (collection of lymphocyte) • Periarterial lymphatic sheaths (PALS): housing T lymphocytes 10% • Lymphoid follicles (with germinal centers): housing B lymphocytes 90% + macrophage (B) Red pulp: • Splenic (pulp) cords <u>Extravasated</u> blood cells, plasma cells, macrophages & reticular cells & fibers • Splenic blood sinusoids (fenestrated capillaries) <u>lined</u> with elongated fusiform endothelial cells with large intercellular spaces & <u>supported</u> by discontinuous, circular basement membrane
	

Cells of parenchyma of spleen

Lymphocytes | Plasma cells | Macrophages
 Blood elements (RBCs, leucocytes and blood platelets)

*Both PALS & Lymphoid follicles have the acentrically located central artery (central arteriole = follicular arteriole)



➤ **QUESTIONS:**

Q1: Which component of Stroma of liver ABSENT in human?

- a) Glisson's Capsule b) Septa c) Portal areas d) Network of reticular fibers

Q2: Liver blood sinusoids (hepatic blood sinusoids) located In?

- a) Perisinusoidal spaces of Disse b) Portal areas c) Between the plates d) All of them

Q3: Describe Trabeculae of the stroma of spleen?

- a) Irregular & incomplete c) Irregular & complete
b) Regular & incomplete d) Regular & incomplete

5 - A
4 - D
3 - A
2 - C
1 - B

Q4: Contents of portal area?

- a) C.T. b) Bile ducts c) Venule & Arteriole d) All of them

Q5: Describe nucleus of Hepatocytes?

- a) 1 or 2, vesicular with prominent nucleoli b) 4 or 5, vesicular with prominent nucleoli
c) 1 or 2, vesicular with non prominent nucleoli d) 4 or 5, vesicular with non prominent nucleoli



Q6: Organelles of Hepatocyte?

- a) Mitochondria b) Lysosomes c) Peroxisomes d) All of them

Q7: Why Endothelial Cells Fenestrated & discontinuous?

- a) Free passage of fat b) Free passage of plasma
c) Free passage of carbohydrate d) Both B & C

Q8: Function of Kupffer Cells?

- a) Produce the energy b) Transport c) Phagocytosis d) Nutrients

Q9: What type of reticular fiber located in Perisinusoidal Space?

- a) Type III collagen b) Type II collagen c) Type I collagen d) Both A & B

Q10: What type of lymphocyte found in white pulp?

- a) Housing T lymphocytes in PALS | Housing B lymphocytes in Lymphoid follicles
b) Housing B lymphocytes in PALS | Housing T lymphocytes in Lymphoid follicles
c) Housing B lymphocytes in Splenic cord | Housing T lymphocytes in Lymphoid follicles
d) Housing T lymphocytes in PALS | Housing B lymphocytes in Splenic blood sinusoids

A -01
A -6
C -8
B -7
D -9



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