Liver

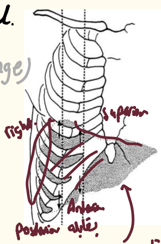
https://youtube.com/shorts/mKJ_hCjAQpc?si=OALOQIJBmFgAyJuZ

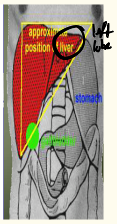
- The largest gland in our body, mixed gland → exocrine (bile + bile salt) / endocrine (albumin, prothrombin, fibrinogen, enzymes, hormones), (1-1,5)kg, W= 50kg → Liver = 1kg (1/50 of body weight in Adult). (1/20 infant) larger ratio because of larger activity.

- All Absorptive material Carried by portal vein from GIT to liver which is function:
  - Secretion of bile & bile salt
  - Metabolism of carbohydrate, fat and protein
  - Formation of heparin & anticoagulant substances (Anticoagulant)
  - Detoxication
  - Storage of glycogen and vitamins
  - Activation of vita .D

- Found in: Occupies right hypochondrium + epigastrium & extends to left hypochondrium

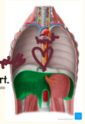
- 5 surfaces for liver → Anterior, right, superior, posterior, visceral (postero-inferior).
  (related to 5th right costal cartilage)
  يا تكي بدخل الـ diaphragm على الـ 5th rib



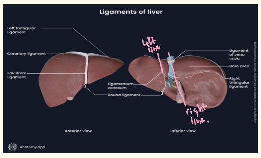


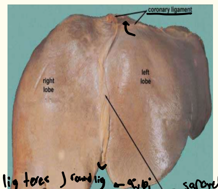
Abdomen الأمامي: visceral

أعلى الكبد في الـ right cupola of diaphragm ← بتحمل شكل القبة وبتغطي كل الأذونه
تلي الـ IVC in Person.
"Diaphragm Covers U liver surfaces" partially except superior Compartment
Diaphragm separates it from the pleura, lungs, pericardium, and heart. (superiorly)

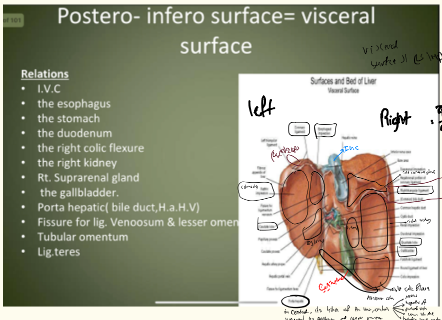


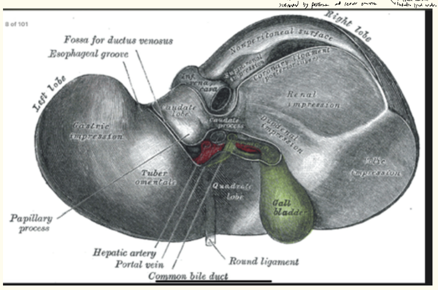
Superior surface contains 2 coronary ligament, between them we have bare area of liver
at superior surface, liver Completely covered by peritoneum except bare area of liver



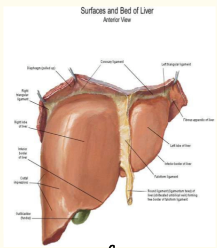


(lig teres) round lig ← umbilical vein ...
falciform ligament separate 2 lobes.
Anterior abd wall ... diaphragm ... = 2 layers of peritoneum



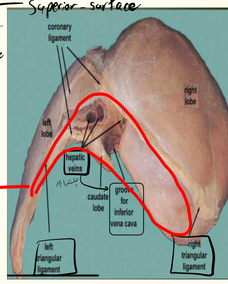


* Anterior + posterior lips of coronary lig, the lips meet at left side form left triangular lig and at right side form right triangular lig.

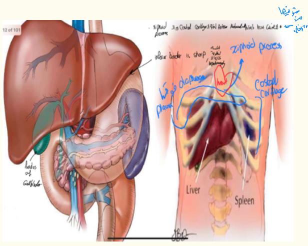


Relation:
Covered by diaphragm which separate it from right Pleura and lung, in the middle there is pericardium and heart. ← Superior surface

bare area of the liver in superior surface.

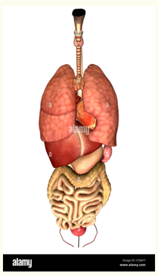


Relations of the liver Anteriorly
- Diaphragm separate it from pleura
- Rt & Lt pleura and lung
- Costal cartilage
- Xiphoid process
- Ant. abdominal wall



relation to Posterior + visceral surface

Posterior relation of the liver
- Diaphragm
- Rt. Kidney
- Supra renal gland
- T.colon(hepatic flexure
- Duodenum
- Gallbladder
- I.V.C
- Esophagus
- Fundus of stomach

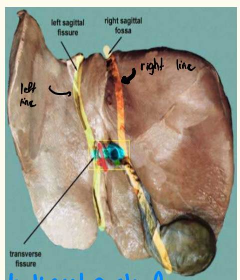


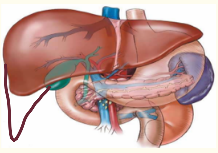
*Lobes of the liver.
- related to Anatomical ⟶ 4 lobes.
- related to functional ⟶ Caudate + Quadrate related to left lobe.

- Right sagittal fossa - groove for inferior vena cava and gall bladder
- left sagittal fissure - contains the Ligamentum Venoosum and round ligament of liver
- Transverse fissure (also porta hepatis) - bile ducts, portal vein, hepatic arteries

divided in porta hepatis to → right.b → right lobe + gallbladder through cystic.d / → left.b → 3 lobes.

secretions → right lobe give right hepatic duct / 3 lobes (left + ...) give left hepatic duct





Rt. Lobe
-Largest lobe
- Occupies the right hypochondrium
- Divided into anterior and posterior sections by the right hepatic vein
- Reidel's Lobe extend as far caudally as the iliac crest

Reidel's lobe اسمه يصل الى الـ iliac crest (Cilia Crest)

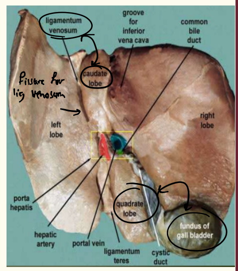
Left lobe :

- Varied in size
- Lies in the epigastric and left hypochondriac regions
- Divided into lateral and medial segments by the left hepatic vein

Caudate + Quadrate lobe : 3 hepatic veins → IVC → right Atrium

- central hepatic vein

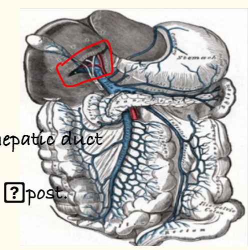
Rt. & Lt lobe separated by
- Falciform ligament
- Ligamentum venoosum ~ portal vein + IVC ال بين ductus venosum كان (in embryo) بوصل then it will be obliterated after delivery
- Ligamentum teres



Two processes for caudate lobe
1- c- process
2- papillary process
For quadrate lobe it lies on one side of gall bladder

Porta hepatis
- It is the hilum (بوابة) of the liver
- It is found on the posteroinferior surface
- lies between the caudate and quadrate lobes

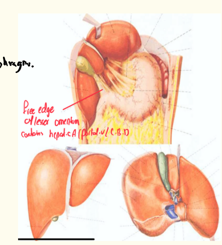
Contents
- common bile duct which is formed from cystic and hepatic duct
- Hepatic. Art + nerve+
lymphatic node ? middle. - Portal vein right and left ? post.



liver is completly covered by peritoneum except bare area
covered by peritoneum

بكون ملتصقة اذا بأي اشي بالجسم بالكبد عن طريق between coronary lig (below diaphragm)

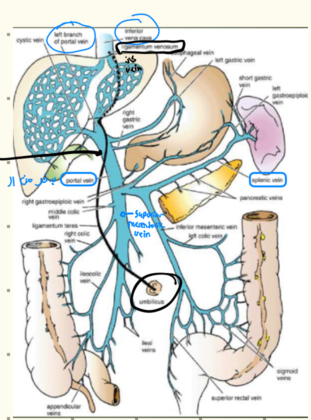
The ligaments of the liver:
The Falciform ligament of liver Sickle in shaped, anterior abd wall + diaphragm. ال بتربط
The Ligamentum teres hepatis
The coronary ligament (Anterior + poster lig)
The right triangular ligament
The left triangular ligament
The Hepatogastric ligament } = lesser omentum
7- The hepatoduodenal ligament
8- The Ligamentum venoosum .



- اشي بالصورة

ligamentum teres (round lig) بتحول ال (between umbilical + left portal) umbilical vein

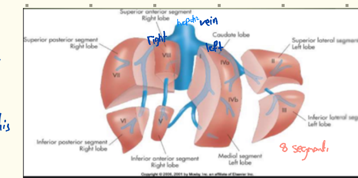
right / left > ال بتتفرع ال porta hepatis



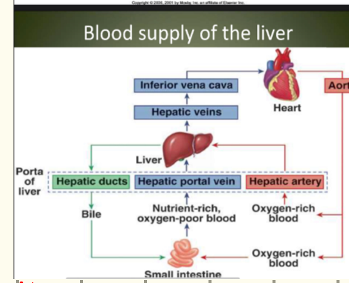
Segmental anatomy of liver

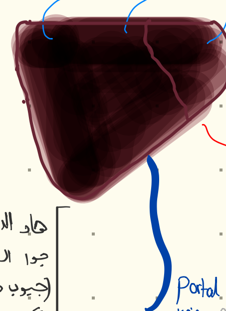
- 1/8 of liver is enough for function, but if disease occur rapid spread of infection / fibrosis will occur.

- liver transplantation depends on 8 segments. each segment has its own blood supply, venous drainage, lymphatic, innervation.
بالتالي segment وحدة كافية للزراعة



- nowadays they use stem cells, using type of protein to let it differentiate into hepatocyte, inside live, mitosis for this hepatocyte occurs.





جاي الدم بتجمع بالكبد
جوا ال liver sinusoid
(جيوب دموية داخل الكبد)
(nutrients, O_2 قوي)

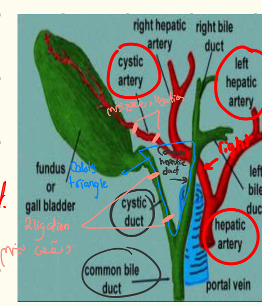
Portal vein : give 75-80% of blood
nutrition كمية الدم كبيرة لانه فيها غذاء كثير كمية

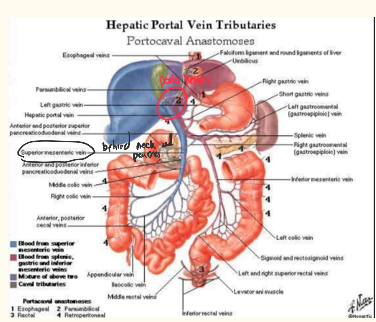
hepatic Artery (branch of celiac trunk) : give 20-25% of blood (oxygenated blood).

liver makes bile, through (common B.D) reach 2nd part of duodenum.

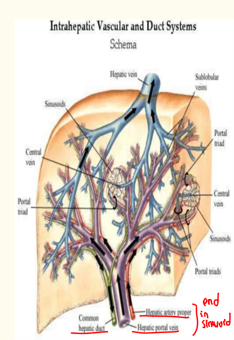
* Calots triangle important surgically (in cholecystectomy) after 2 ligations we remove the gallbladder.

* 80% of blood vessels are posterior to the duct
20% " " " Anterior to the duct.





← then



* lymphatic drainage : 2 lymphatic drainage.

1) Most of liver to porta hepatis to hepatic lymph nodes → celiac lymph nodes ↓ cysterna chyli ↓ thoracic duct.

2) bare area penetrate diaphragm to reach right lymphatic duct. on right side.

ERCP

E → endoscope, R → retrograde, C → cholangio gram to C.b.d, P → pancreatic

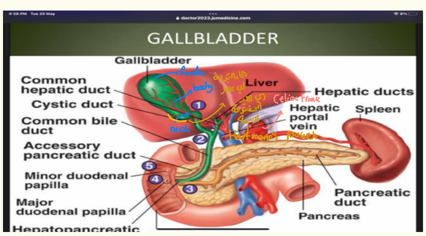
• بندخل endoscope من الفم لل duodenum بدخل من major papilla من خلال sphincter of oddi يوصل لل C.b.d / pancreatic duct to release stones without complication.

• 6 ساعات بعد العملية دبروح

* Liver Cirrhosis — تشمع الكبد
Cause: Alcohol
أعراض الكبد تترتيبية بالتالي ح تلاقي كل الكبد مُعاب

* liver fibrosis
Cause: Schistosoma — بلهارسيا

Gallbladder



* Hartmann's pouch has disadvantage which is: Secretions that present inside this pouch
. single stone يعمل stasis بصير

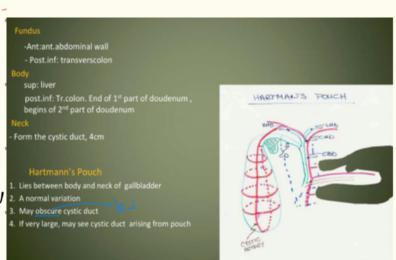
* found in visceral surface of liver (has impression)

* It's function: absorption of water + concentration of bile about 20x.

* Fundus ——→ meet 9th right costal cartilage.

* Capacity: 40-60 cc cm^3

* Relations of Gall bladder:-



- always sphincter of oddi is contracted, عشان كل الإفرازات
أي جاي من الكبد يروح للمرارة ليصير concentration
بينفتح ال sphincter لما يصير في fat out of bile
بال duodenum في هرمون بيطلع Cholecystokinin hormone

- Histology:

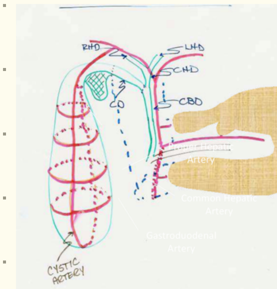
Mucosa is simple columnar epi without goblet cell (as stomach).

Contain abundant folding of Mucosa, [Adventitia → closed to the liver. / Serosa → cover Anterior surface]

little gland in lamina propria, ill defined submucosa, irregular muscularis externa (not inner outer)

. Cystic duct (4cm) meet with common hepatic duct to form common bile duct in porta hepatis.

. Blood supply: right hepatic → cystic A
right branch of portal.v ← cystic vein

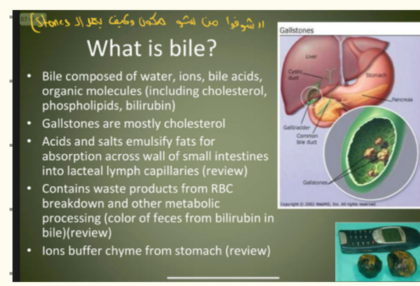


* lymphatic drainage:
Cystic lymph node → hepatic lymph node → بالآخر بروح celiac lymph node.

* Nerve supply:
1) symphatic + para.
2) Hormones (CCK) from duodenum to wall of gallbladder to contract.

. Common bile duct (10 cm) divided to
→ Supra duodenal (in free edge of lesser omentum).
→ Retro duodenal (behind 1st part of duodenum)
→ Retro pancreatic (pierces head of pancreas to open in major duodenal papilla).

• Blood supply of CBD
a. Arise from cystic artery
b. Posterior branch of superior pancreaticoduodenal artery



* Cholelithiasis means stones in gallbladder (إزالة المرارة العلاج الوحيد في أنواع الحصى)
لأنه لو ال stone ممكن تتحول ل malignant / أو تسكر ال C.b.d وتعمل Obstructive Jaundice

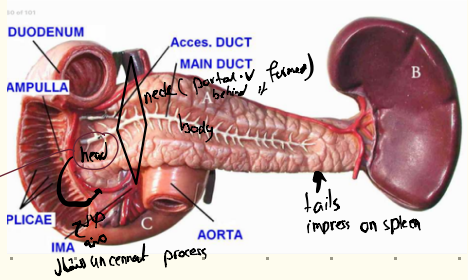
* gangrene rare in gallbladder (double blood supply → cystic A, direct from liver) but common in appendix.

Gallbladder Diseases
1- Cholelithiasis & Cholecystitis
Cholecystitis = inflammation of GB
Cholelithisi = Stone(s) in GB
(both the treatment is Cholecystectomy)
2- Obstructive jaundice: liver patterns
3- Gangrene of gall bladder rare

اللهم لك الحمد الذي وعدت اللهم اغفرلنا ..

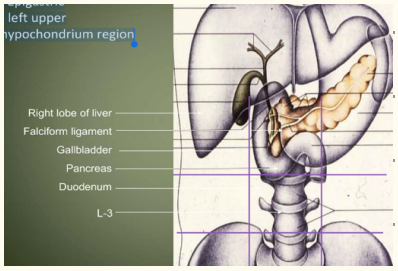
pancreas is mixed gland ← exocrine
endocrine

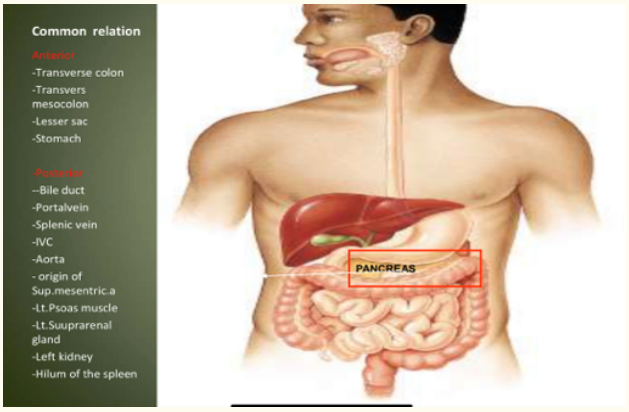
Anatomical position
- Epigastric
(- left upper ... hypochondrium region)

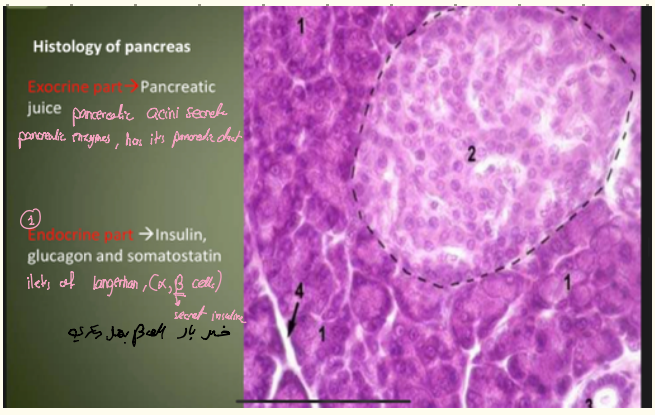


in Concavity of duodenum

* pancreatic lymph node present on posterior surface.







Cross-section from body shows 3 surface, 2 borders:

Relation of these surfaces:

posterior surface: retroperitoneum, found on posterior abdominal wall

upper border: celiac trunk + splenic artery (tortuous)

Anterior border: transverse mesocolon ... to

inferior border

The Tail → spleen ... impression

- Passes forward in the splenicorenal ligament and comes in contact with the hilum of the spleen

* 1 inch above main duct there is accessory duct.

* Blood supply:- as duodenum superior, inferior pancreaticoduodenal Artery.

* lymphatic drainage: splenich lymph node → to superior mesenteric
celiac lymph node →

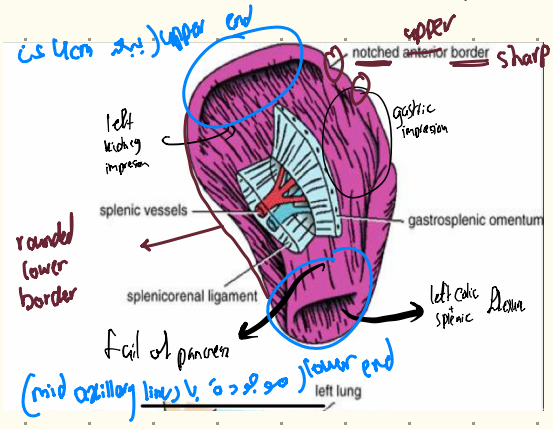
* Clinical notes
- Cancer head of pancreas → Obstruction jaundices
- Cancer body of pancreas → pressure ... I.V.C & portal vein
- Acute pancreatitis = inflammation of pancreas

Spleen

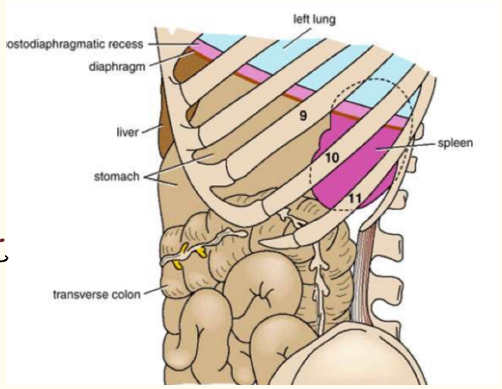
- 2 ends, 2 surfaces, 2 borders.

- resorvoire of blood but it is lymphatic organ

- Visceral surface



Costal Surface has relation with rib 9,10,11



- completly covered by peritoneum, attached to 2 ligs
gastrosplenic
splenicorenal (lienorenal)

- blood supply: Splenic artery that divided into 5-6 branches in hilum.

- lymphatic drainage: Splenic lymph node → superior mesenteric → celiac