

The Liver

skin ← external ↵

The largest **internal** organ & gland in the body

Weighs 1- 2.5 kilo. → gender/built

Functions:

Bile prod. & secretion

Metabolism of hormones and drugs

Blood. Filtration from bacteria.

④ Surfaces: → diaphragmatic → Anterior superior
→ visceral → inferior posterior

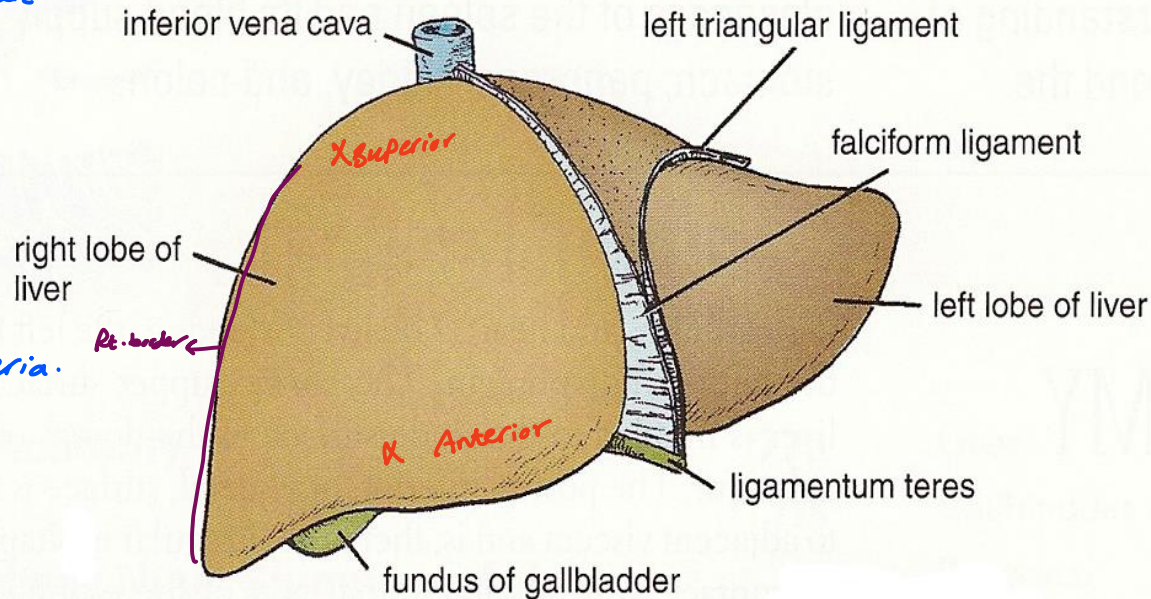
Convex Supero-Anterior (Diaphragmatic)

→ facing diaphragm ←
Rt. Capula of diaphragm in liver

Flat Infero-Posterior (Visceral)

→ facing viscera ←

+ ⑤ Rt. border of the liver.



Diaphragmatic Surface

Supero-anteriorly

Separated from diaphragm:

Subphrenic space ④ → Rt. anterior
→ Lt. anterior
→ Rt. posterior
→ Lt. posterior

Attached to ant. abd. Wall:

Falciform ligament

Superiorly:

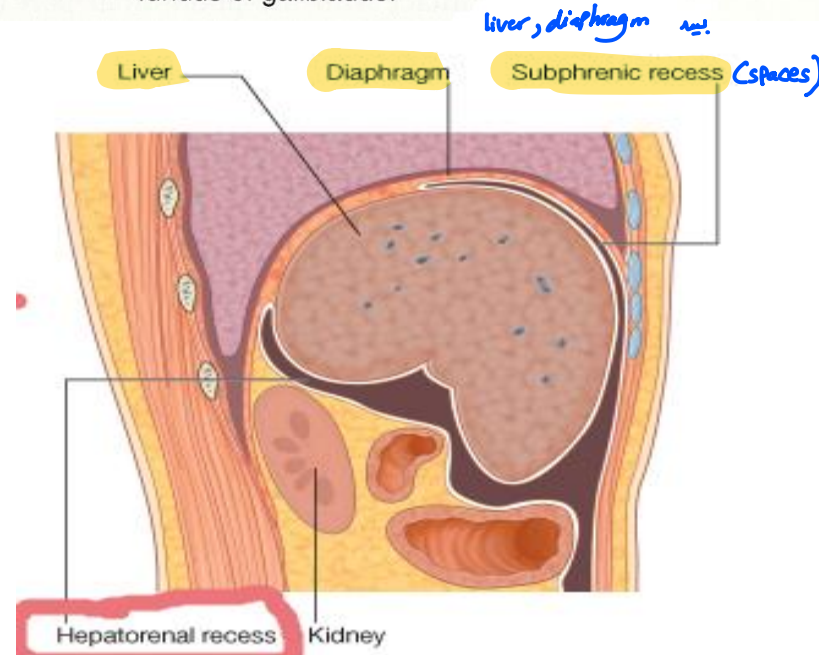
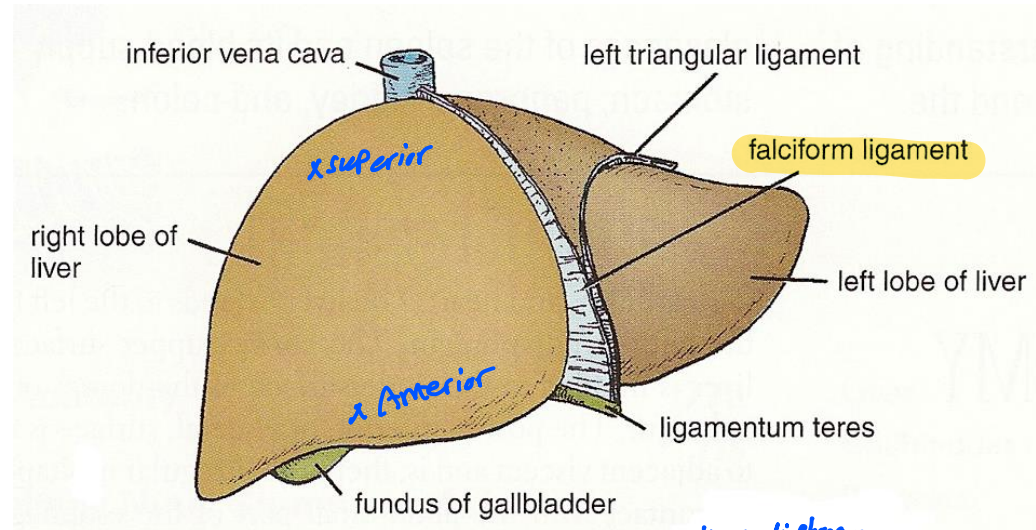
→ The area of the liver has no peritoneum covering.

Bare area of the liver Rt

extremity of post surface of liver

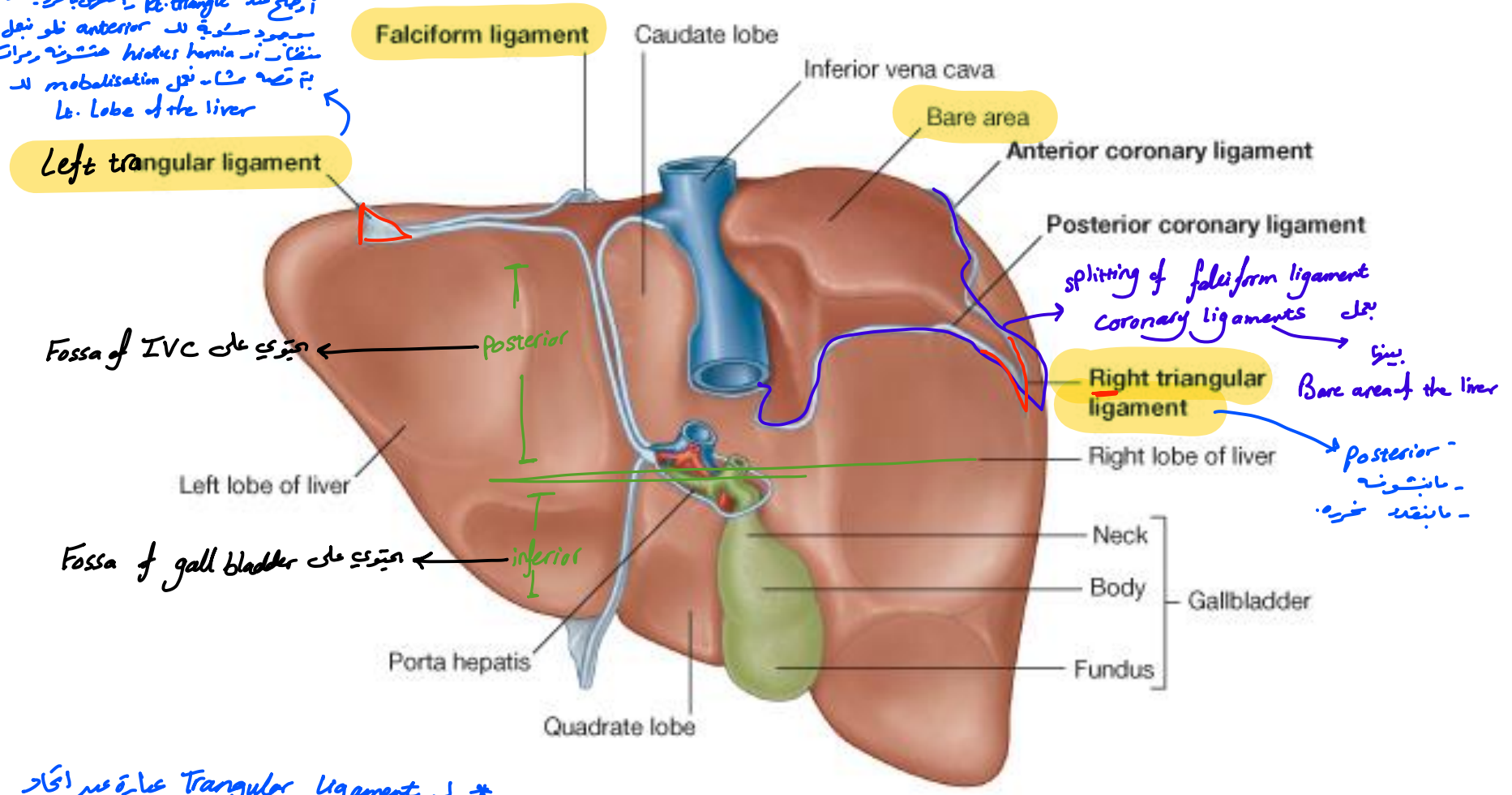
Due to split of falciform peritoneal layers,

Extends posteriorly between coronary peritoneal layers

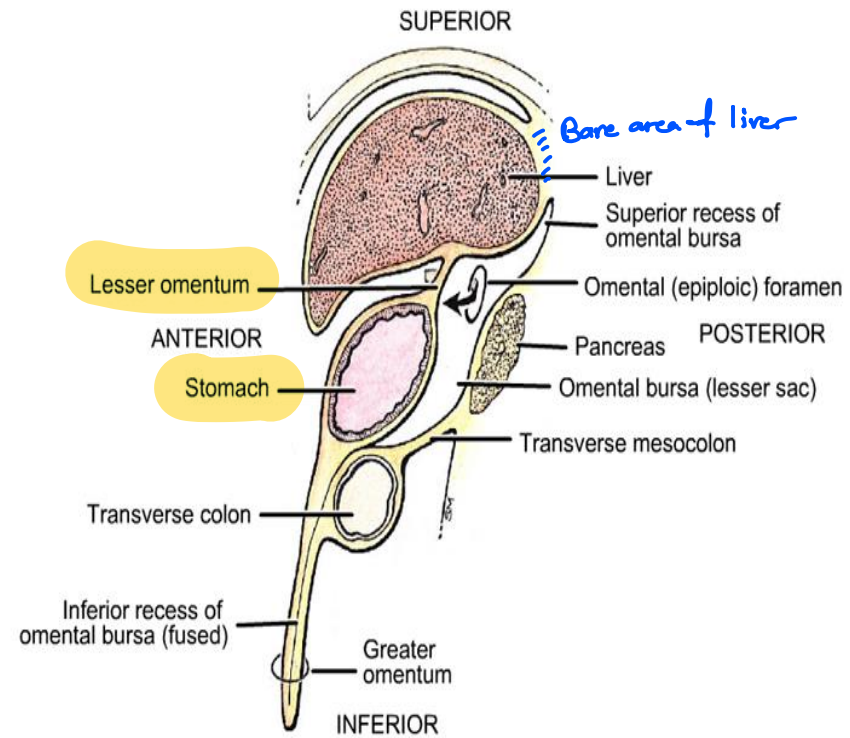
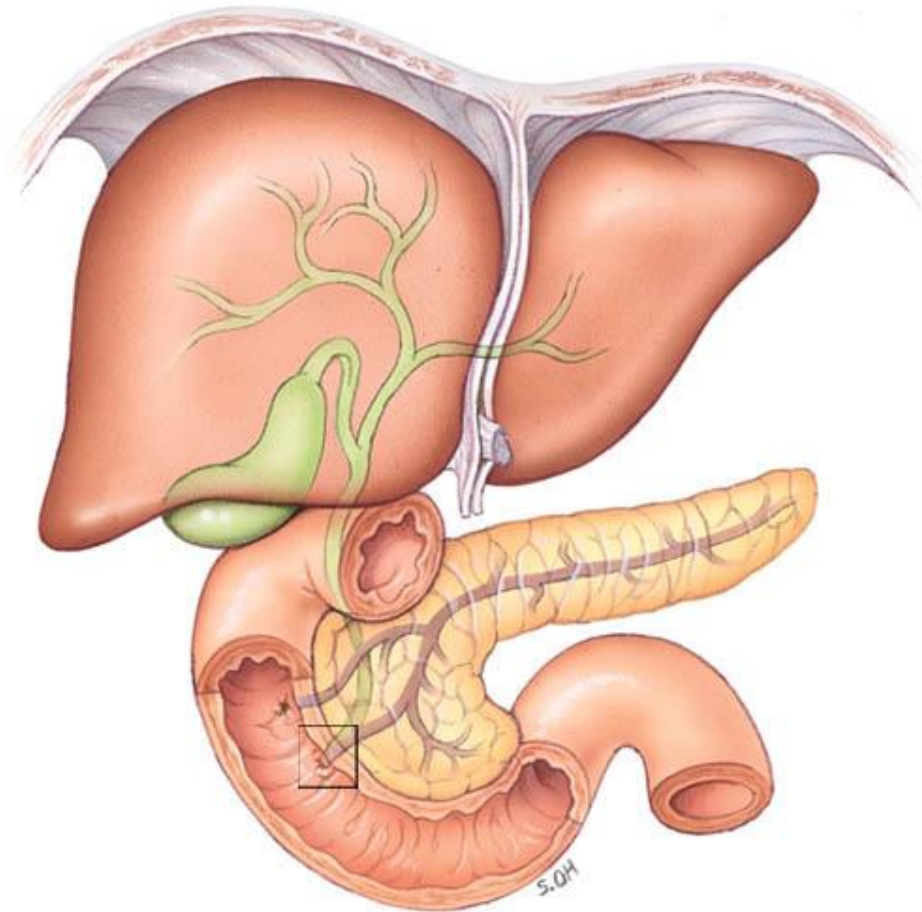


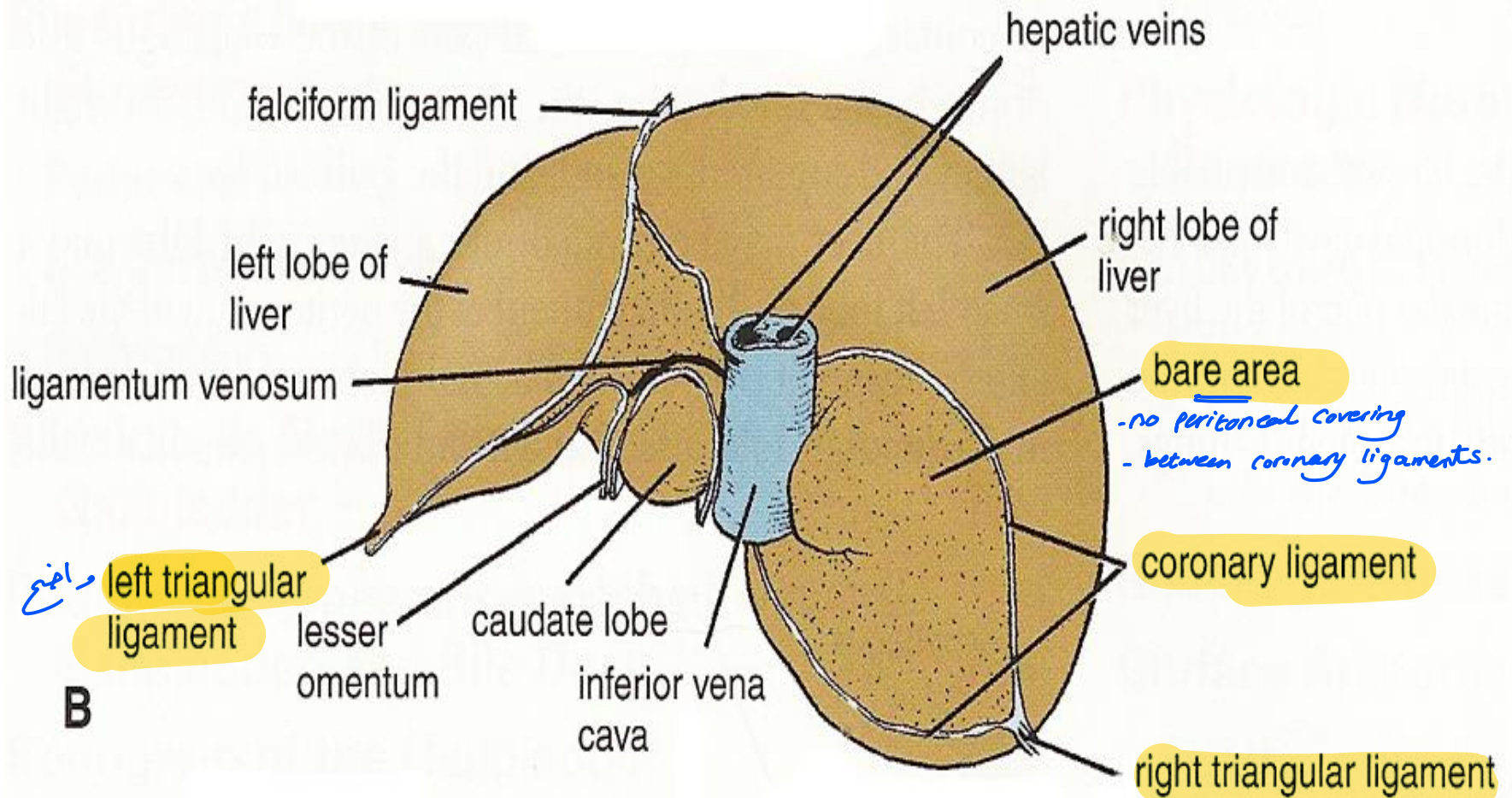
* visceral surface

أرضيحه من الـ **pt. triangle** - سطح البطنية ثلثه
 سمود سوية له **anterior** - سطوحه
 منقار - **hiatus hernia** - حشونة حبرات
 بت قصه مش - نقل **mobilisation** له
La. lobe of the liver



* **Triangular ligament** عبارة عن اتحاد
 anterior + posterior coronary ligaments.





Visceral Surface

Infero-Posteriorly (facing other abdominal viscera)

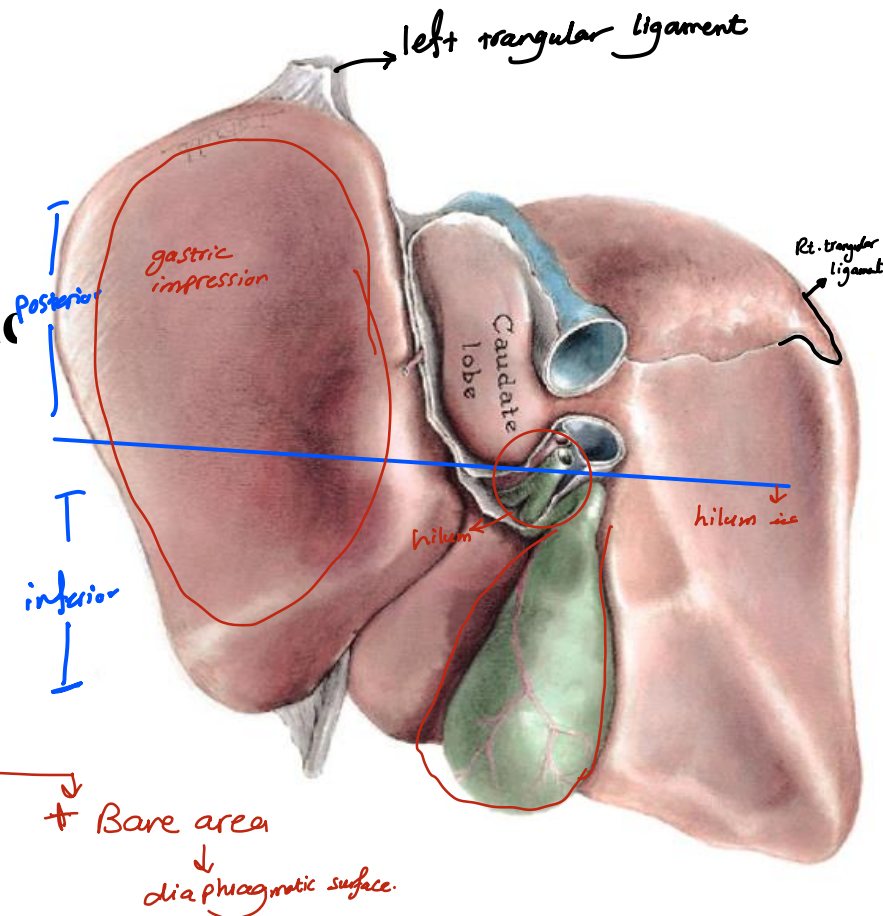
Contain impressions from other viscera:

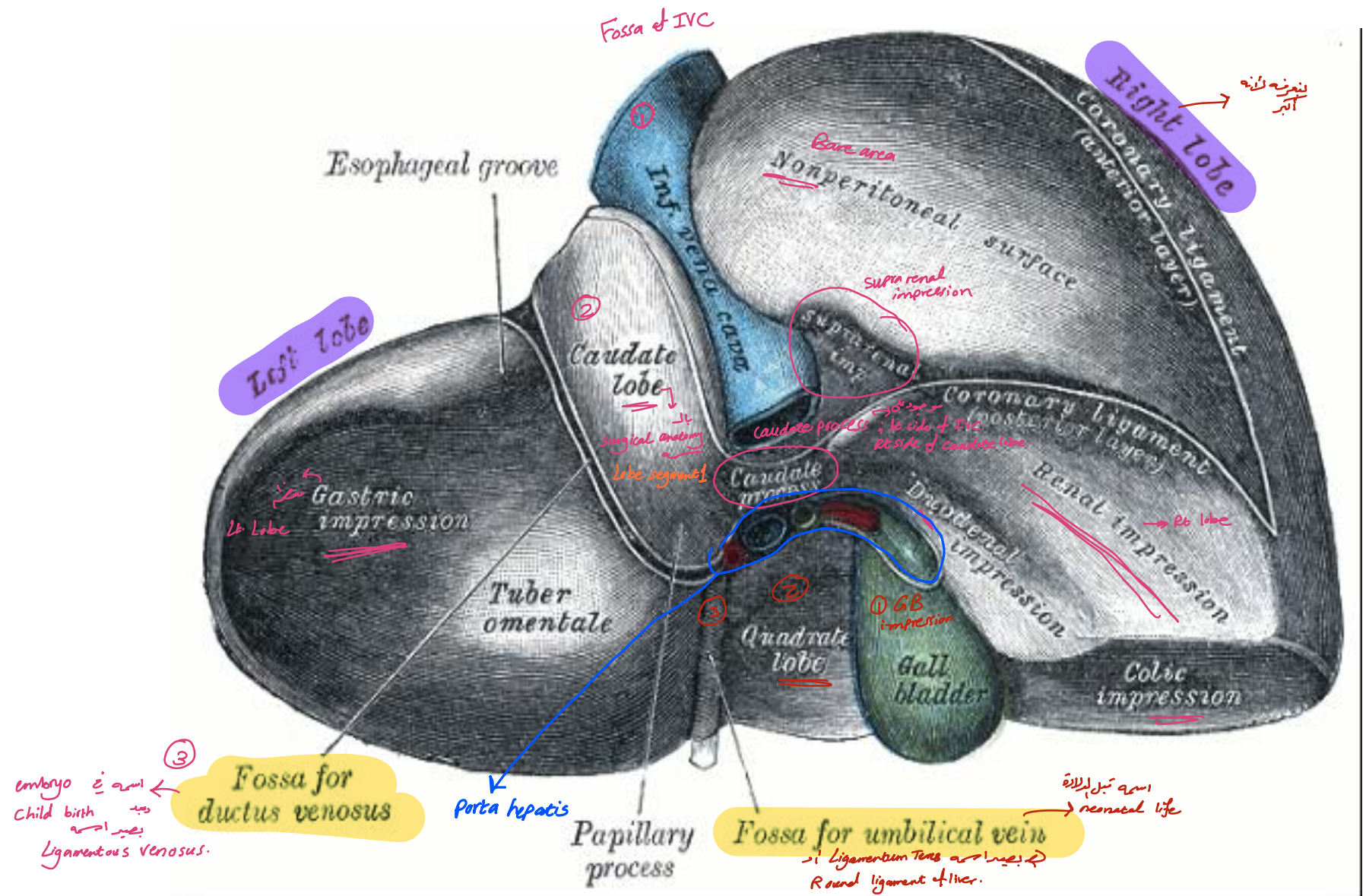
- Gastric imp body, pylorus. (Lf.)
- Renal, and suprarenal imp. (Rt. & Post.)
- Colic imp. (Rt. & Ant.): by Rt. Colic flexure, TC → Transverse colon
- 1st, 2nd part of duodenum
- Lesser omentum
- GB → in the inferior surface impression

Covered with peritoneum, except:

1. Over the bed of gall bladder

2. In porta hepatis (hilum of liver)





Porta Hepatis $\simeq$ Hilum of the liver.

In the middle of visceral surface 5 cm long

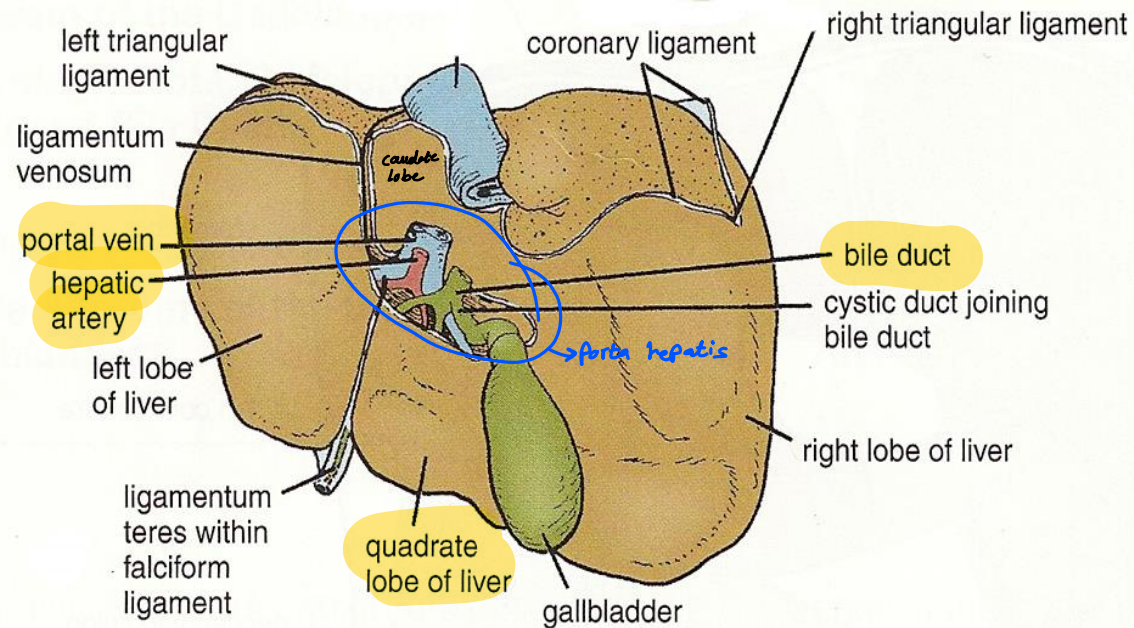
Rt $\frac{1}{2}$ of lesser omentum is attached to lips of porta hepatis

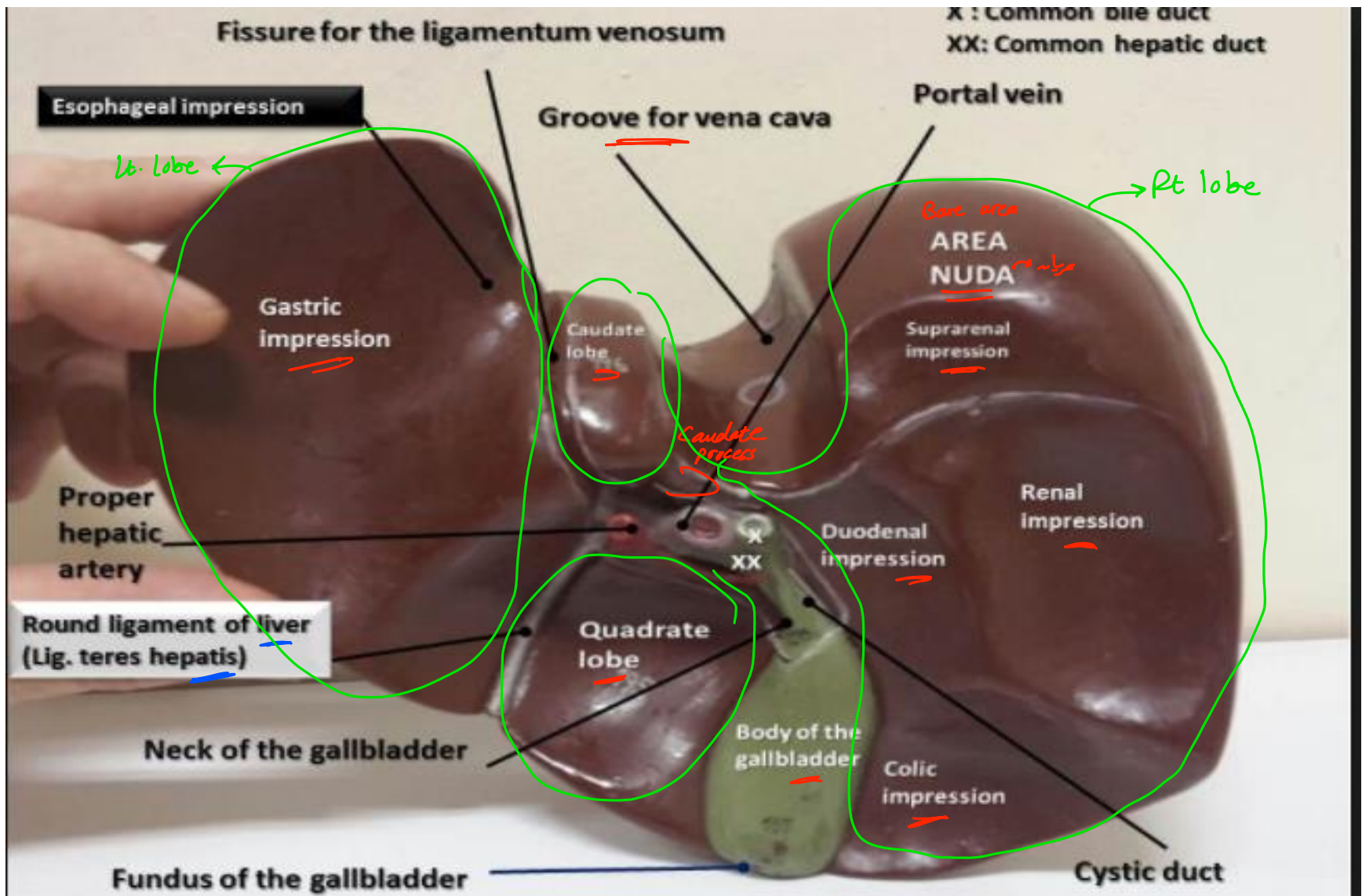
Contains: **(Portal Triad)**

Portal vein (in)

Hepatic artery (in)

Bile duct (out) → بیلے کا نالے
سید لایور
Small intestine
درجہ منہ برع کیخبرہ ہے
gall bladder





Lobes of The Liver

Specific partial parts of the organ that separated by fissures or ligaments

← صاف غلط

Anatomically:

4 lobes;

Rt., Lt., caudate & quadrat

↓
i.
posterior
surface

↓
i.
inferior
surface

Physiologically (Fxn.):

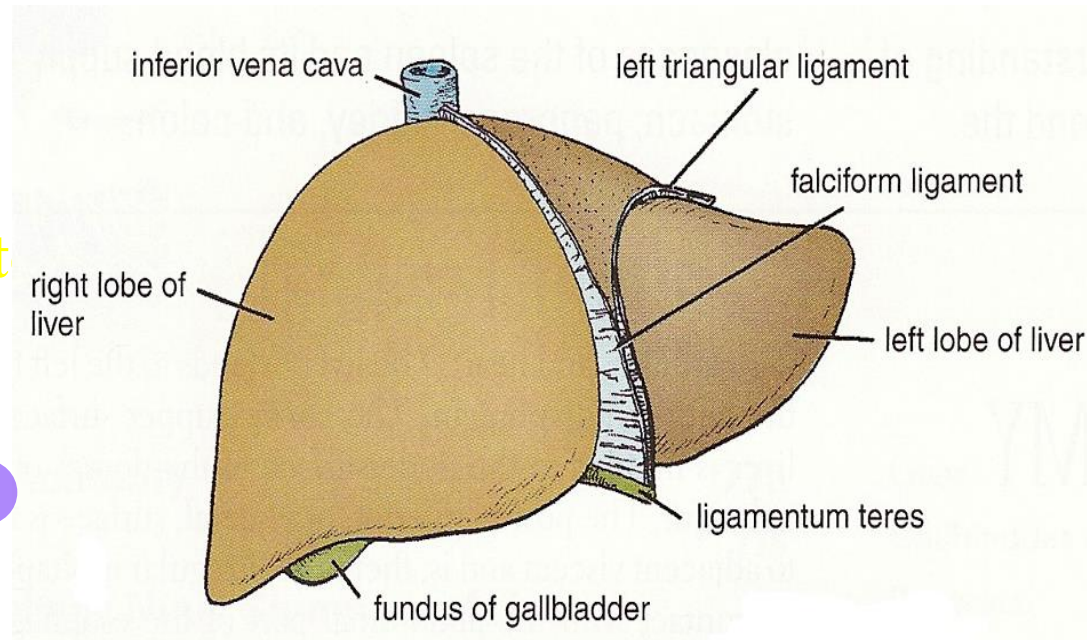
کچھ ایسی:

2 functional lobes

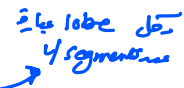
2 lobes;

Rt. & Lt.

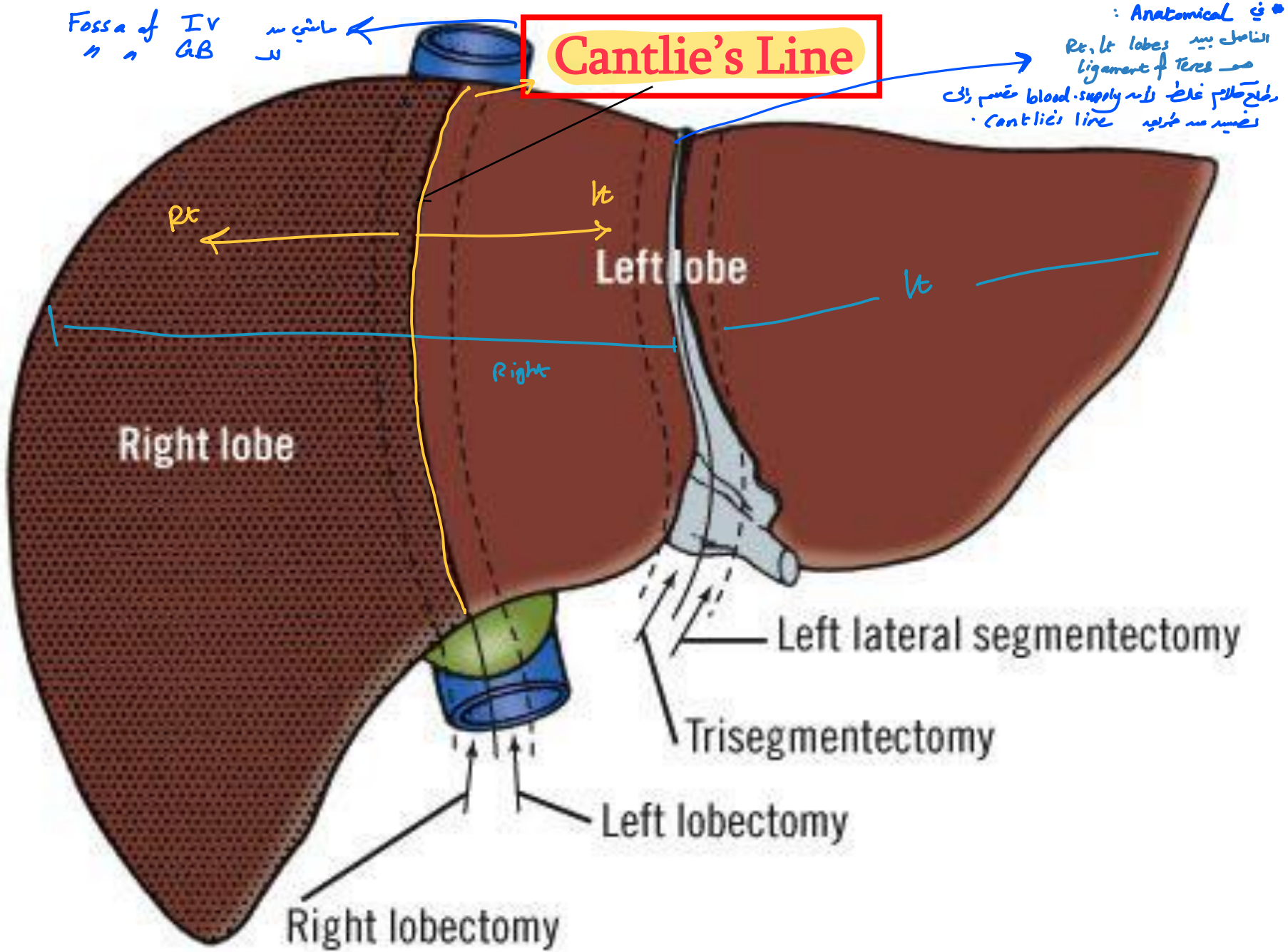
***Blood. Supply & Bile secretion of Caudate & Quadrate lobes are passing with Left Lobe.**

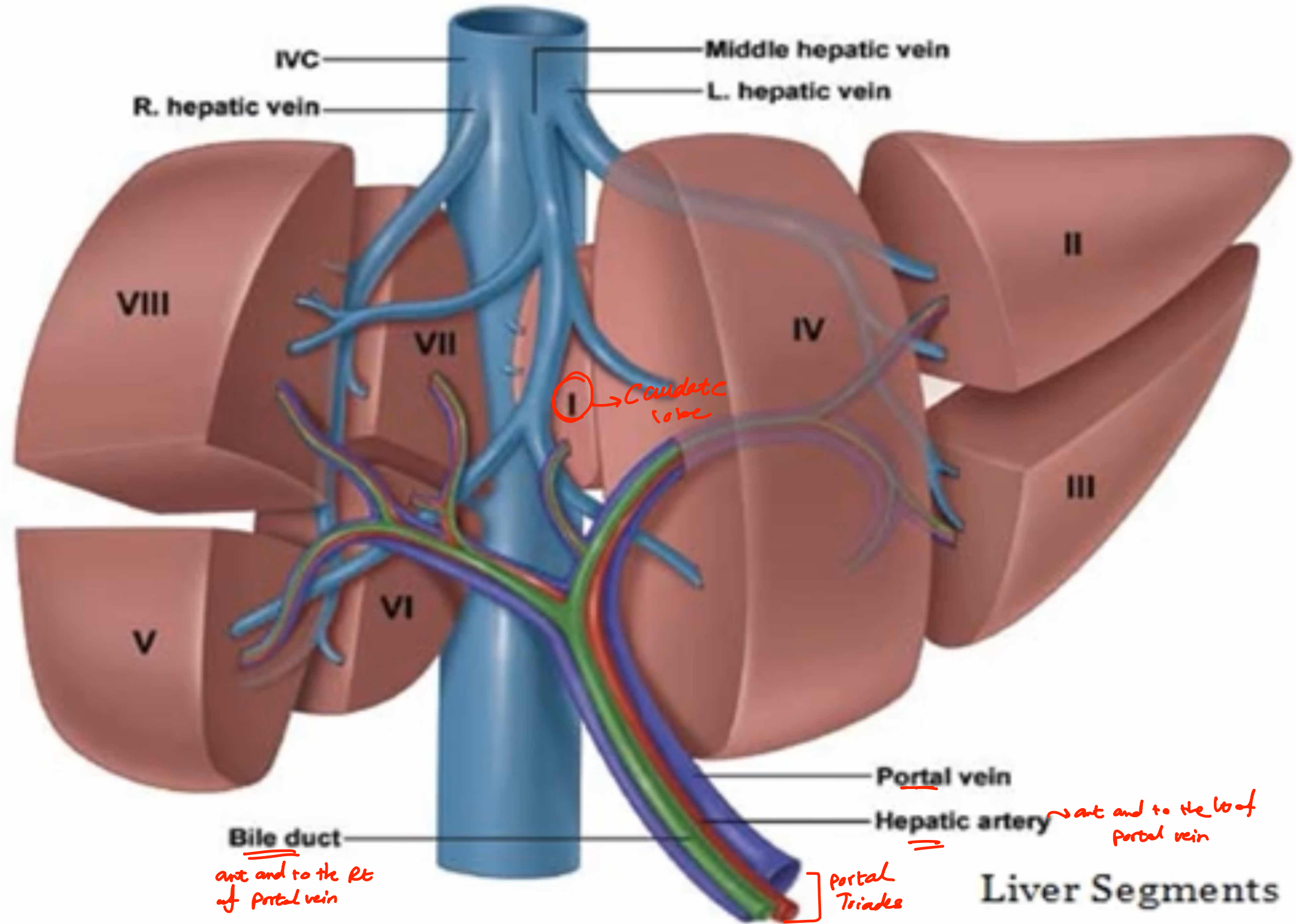


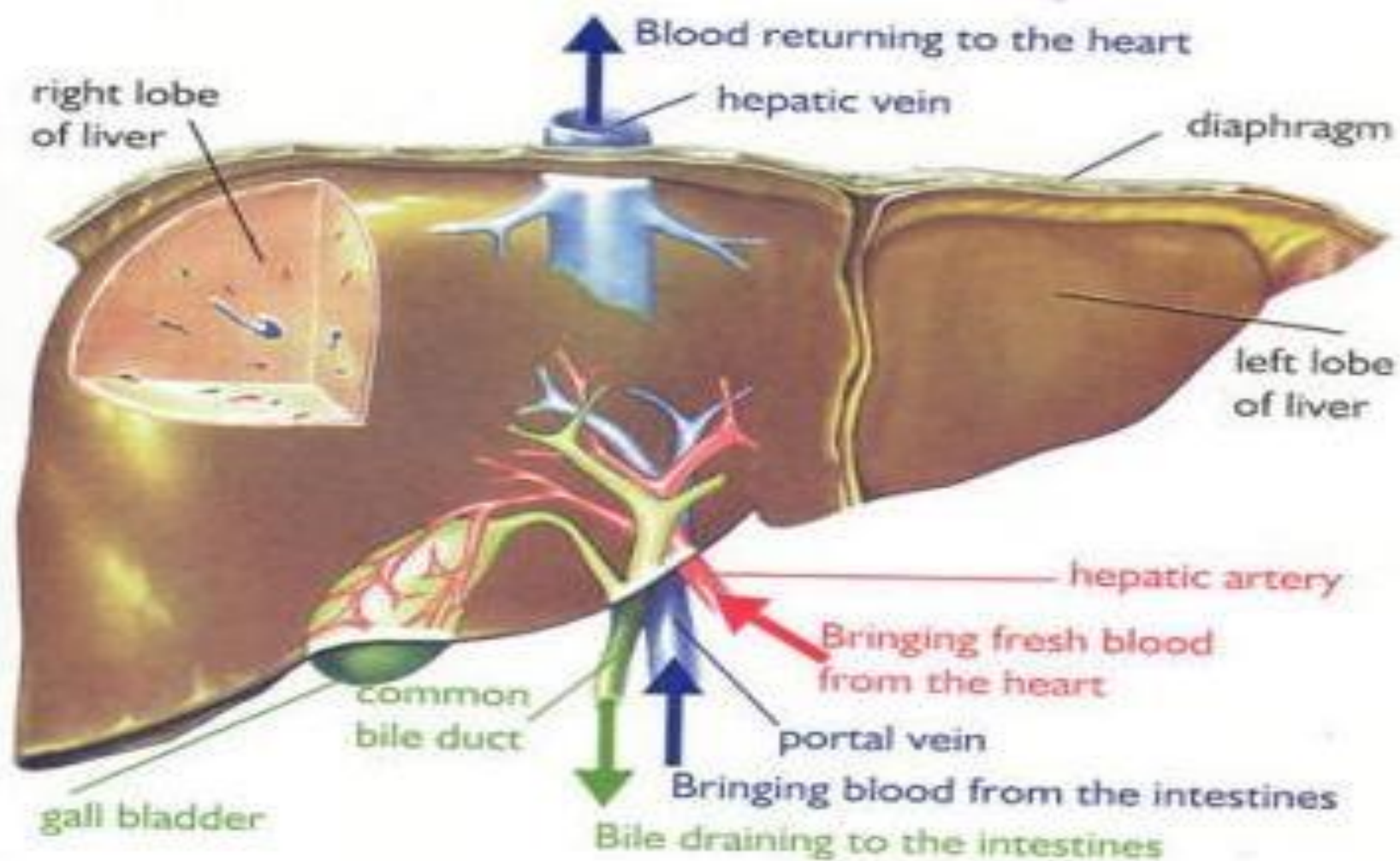
SURGICAL ANATOMY cont...

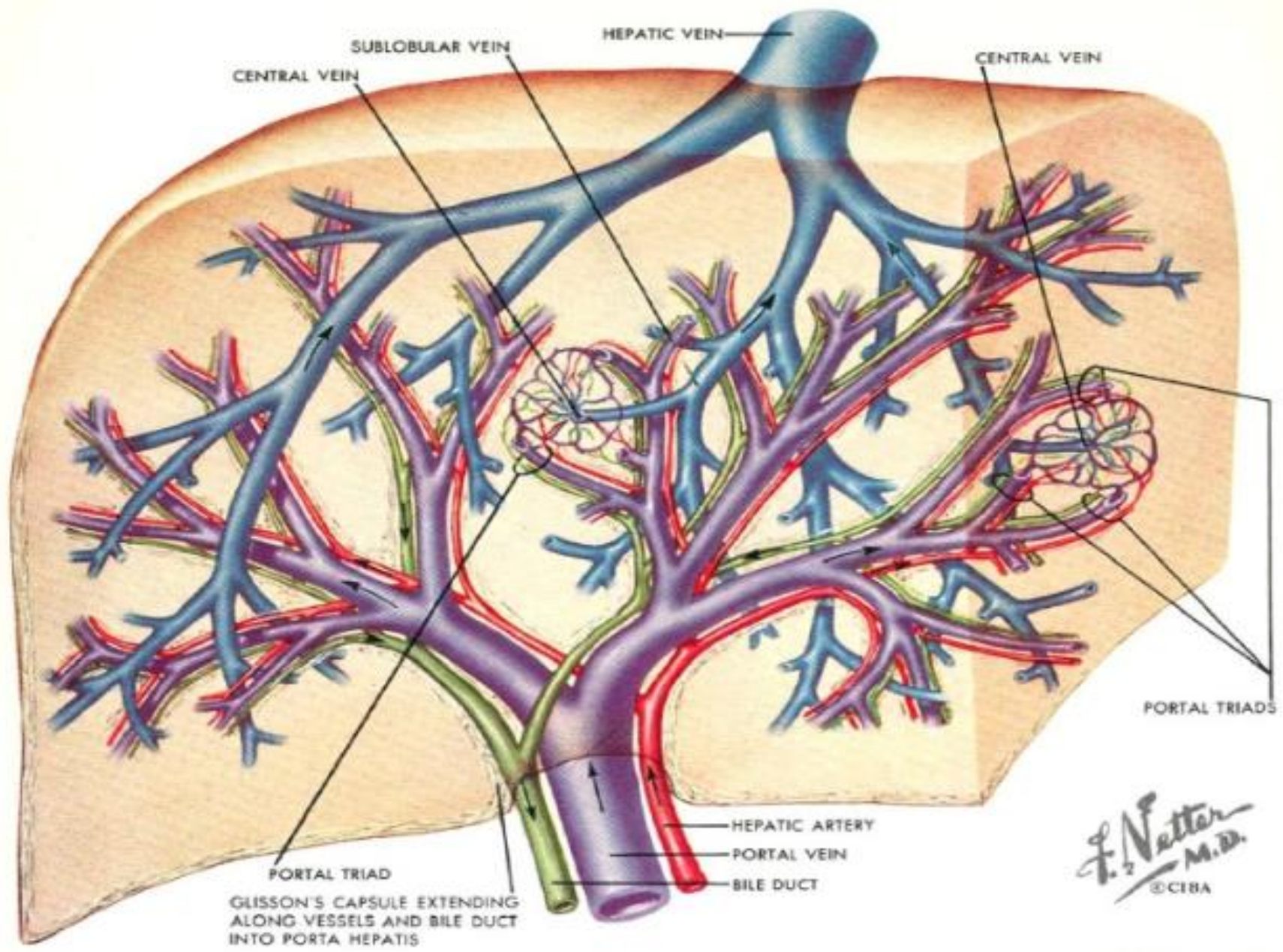
- Cantlie's Line: The overall anatomy of the liver is divided into a Functional Right and Left lobes along the line *between the gall bladder fossa and the middle hepatic vein* (8 Segments).

- Surgical segments : Each of these segments can be considered as a Functional Unit, with a branch of the hepatic artery, portal vein and bile duct, and drained by a branch of the hepatic vein.


Cantlie's Line









CENTRAL VEIN
SUBLOBULAR VEIN
HEPATIC VEIN
CENTRAL VEIN

PORTAL TRIADS

PORTAL TRIAD
GLISSON'S CAPSULE EXTENDING
ALONG VESSELS AND BILE DUCT
INTO PORTA HEPATIS

HEPATIC ARTERY
PORTAL VEIN
BILE DUCT

F. Netter M.D.
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Quadrate Lobe:

Quadrangular in shape

Lie on inferior surface

Between gall bladder &

Ligamentum teres

(round lig of liver)

Caudate Lobe:

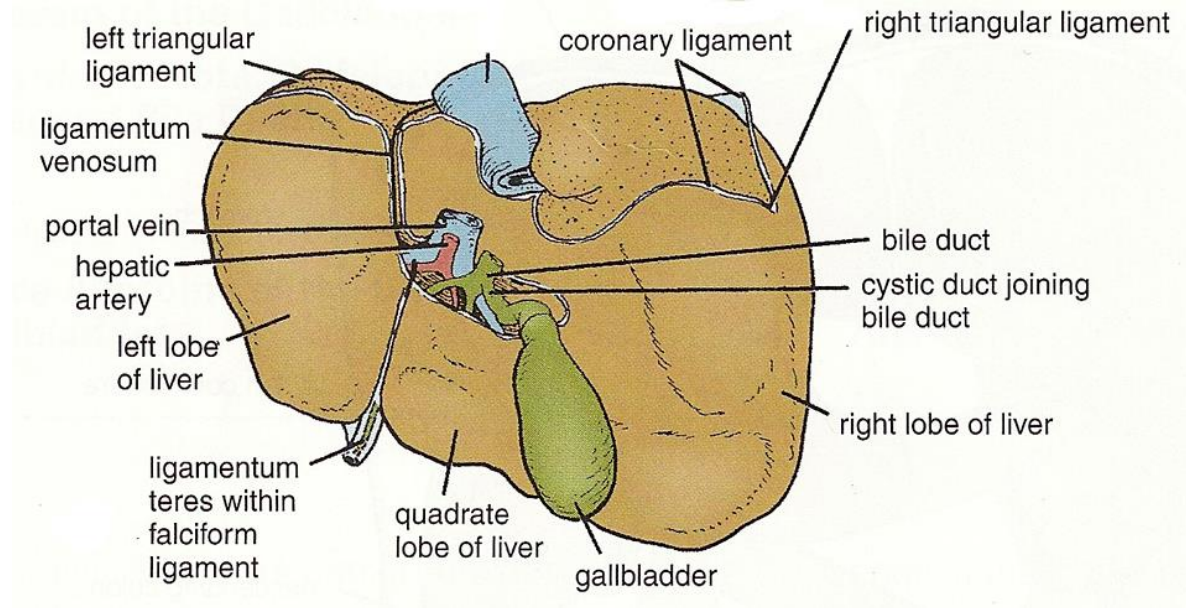
(Latin for tail)

→ Caudate process

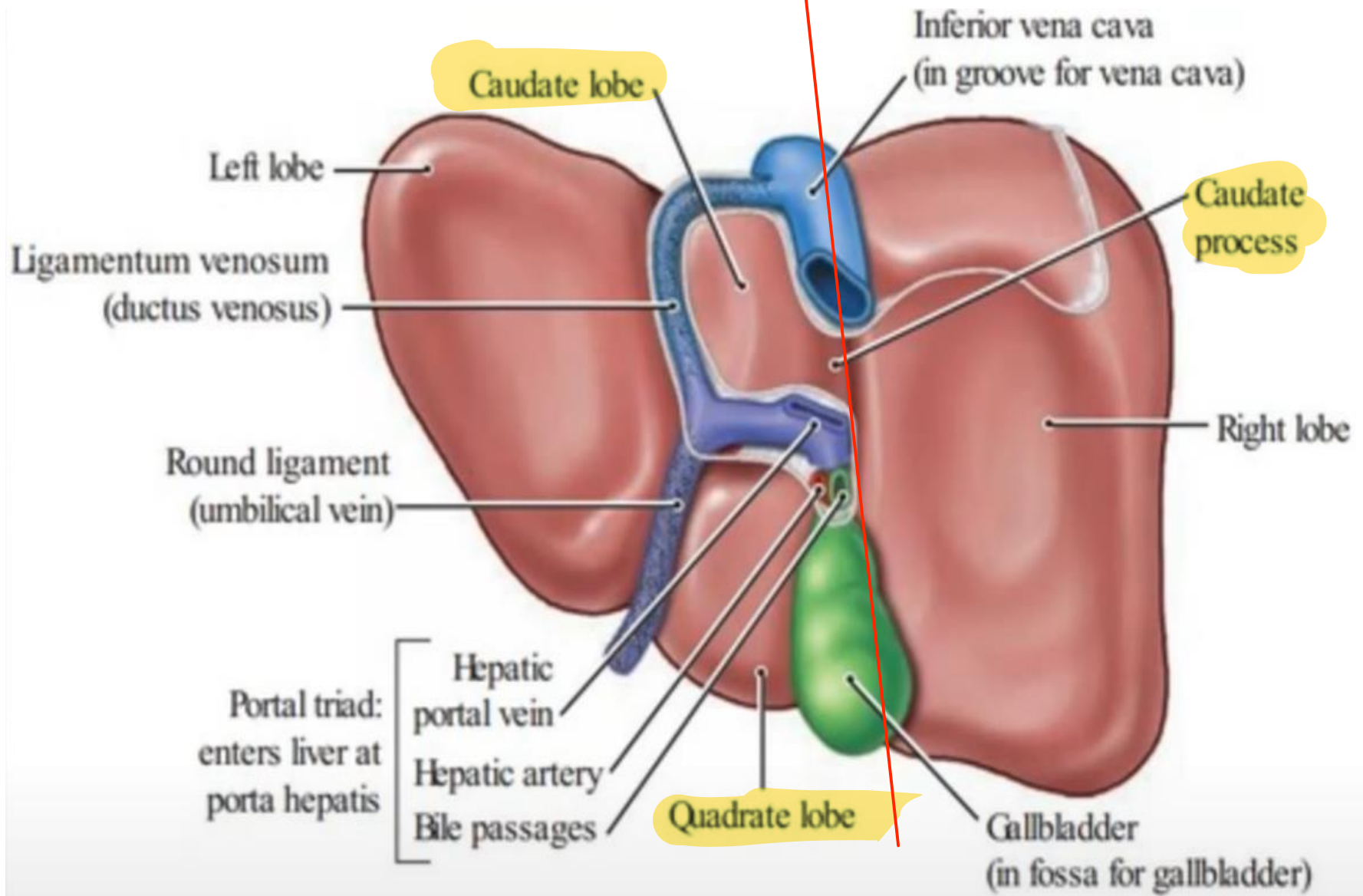
Lie on post surface

Between IVC &

Ligamentum venosum

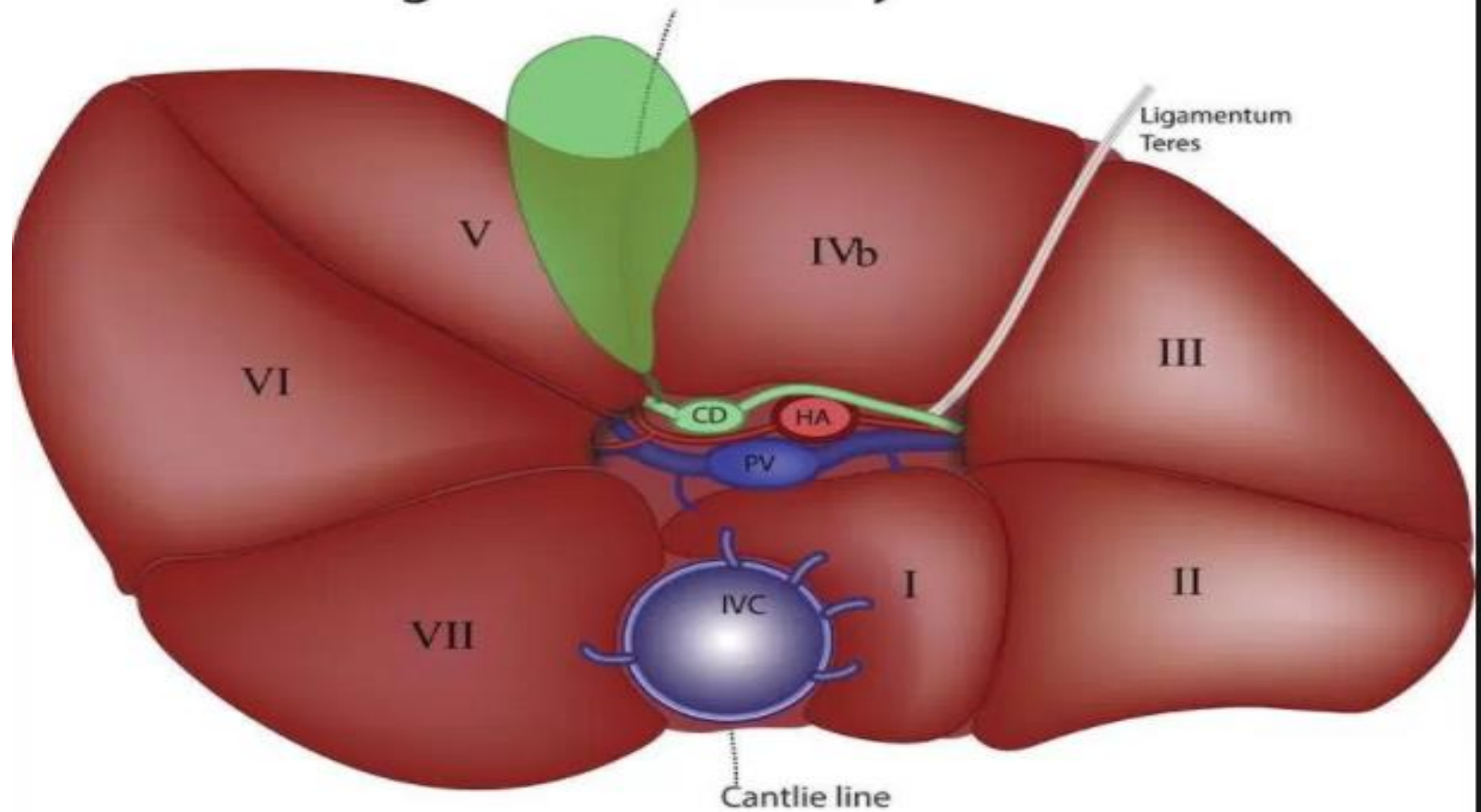


It. lobe and quadrate + caudate lobe base: Cantinle line

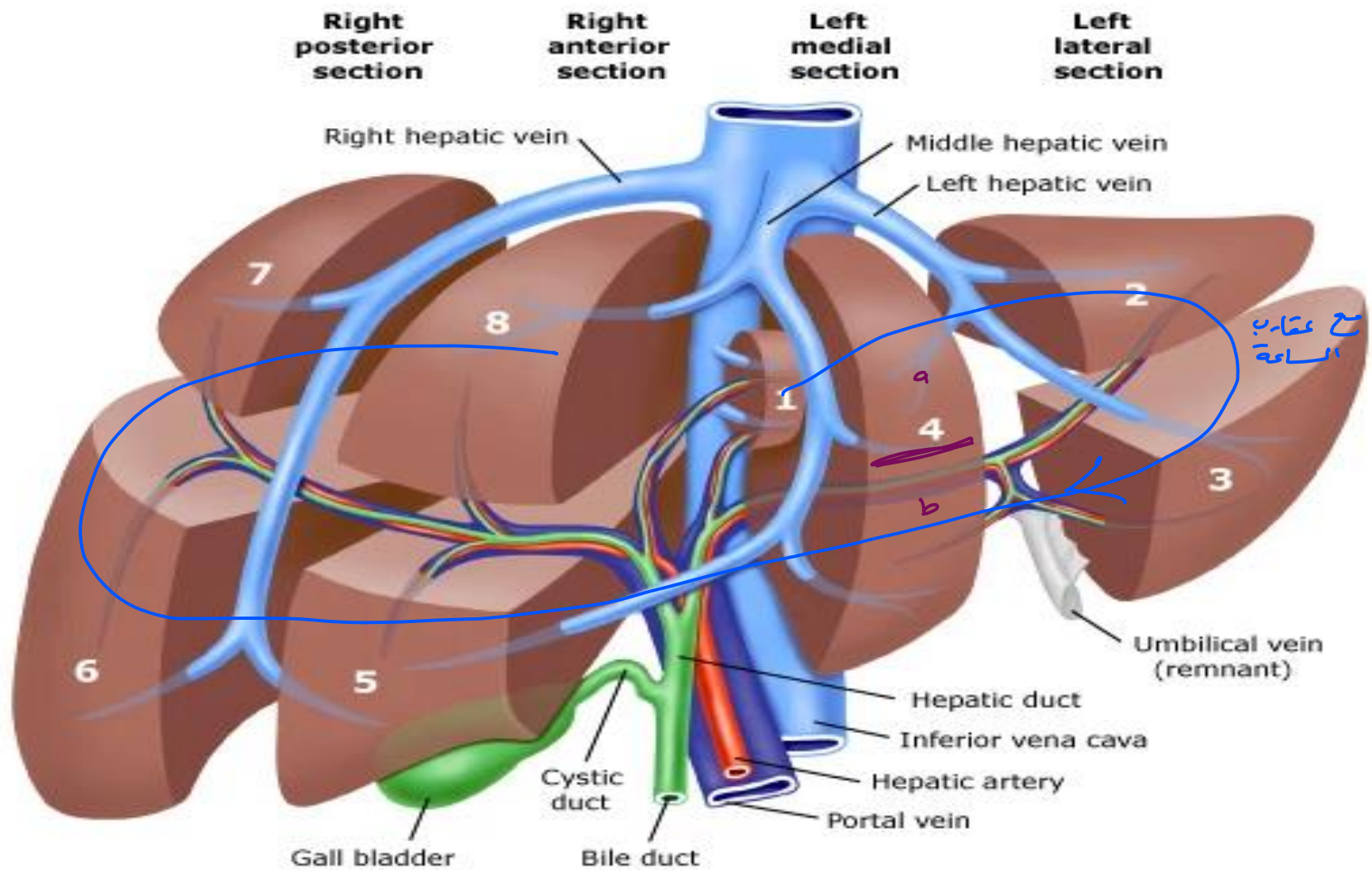


C. Postero-inferior View

Segmental Anatomy of the Liver



Inferior view of the liver





Right lobe

Left lobe

Right (part of) liver

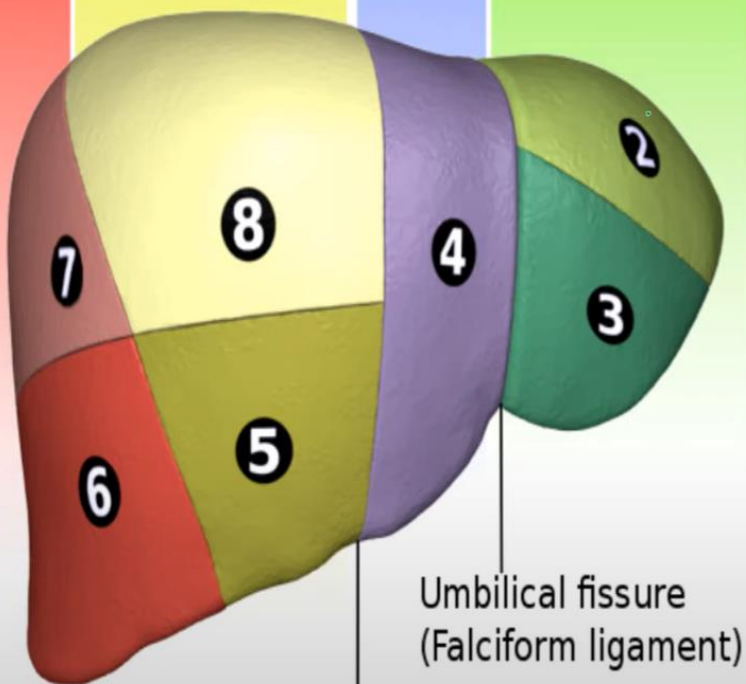
Left (part of) liver

Right posterior section

Right anterior section

Left medial section

Left lateral section



Umbilical fissure
(Falciform ligament)

Cantlie's line

Anterior view

Left lobe

Right lobe

Left (part of) liver

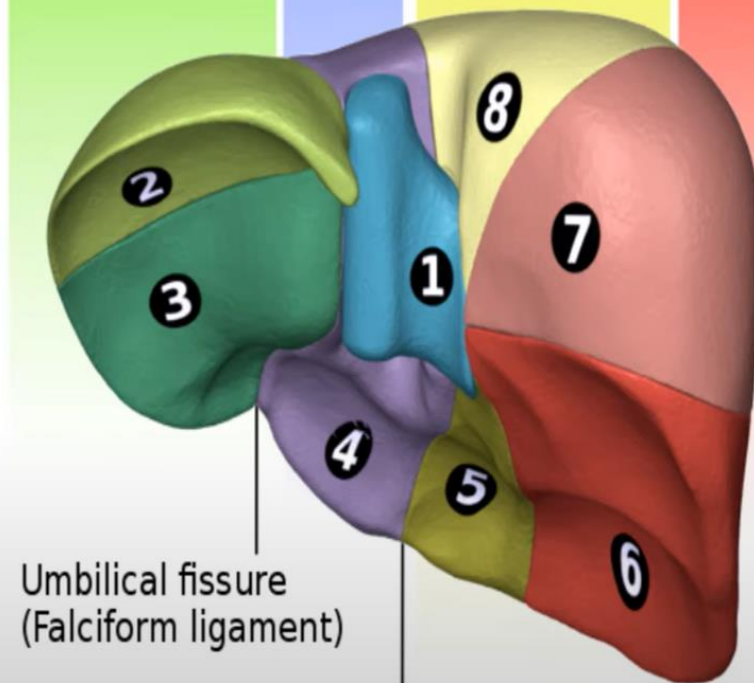
Right (part of) liver

Left lateral section

Left medial section

Right anterior section

Right posterior section



Umbilical fissure
(Falciform ligament)

Cantlie's line

Posterior view

Right hand

RHV

LHV

Lt

Rt

Portal plane

I

II

III

IVa

IVb

V

VI

VII

VIII

1

2

3

4

4

5

6

7

8

superior

anterior

الفلة بلاصبع مشن

Candidate lobe posterior

Right hand

Portal plane

Regions: I, II, III, IVa, IVb, V, VI, VII, VIII

Nerve roots: C5, C6, C7, C8, T1

Handwritten notes: "الفردة بإصبع مشن", "Caudate lobe", "posterior"

Right hand

RHV

LHV

Lt

Rt

Portal plane

I

II

III

IVa

IVb

V

VI

VII

VIII

1

2

3

4

4

5

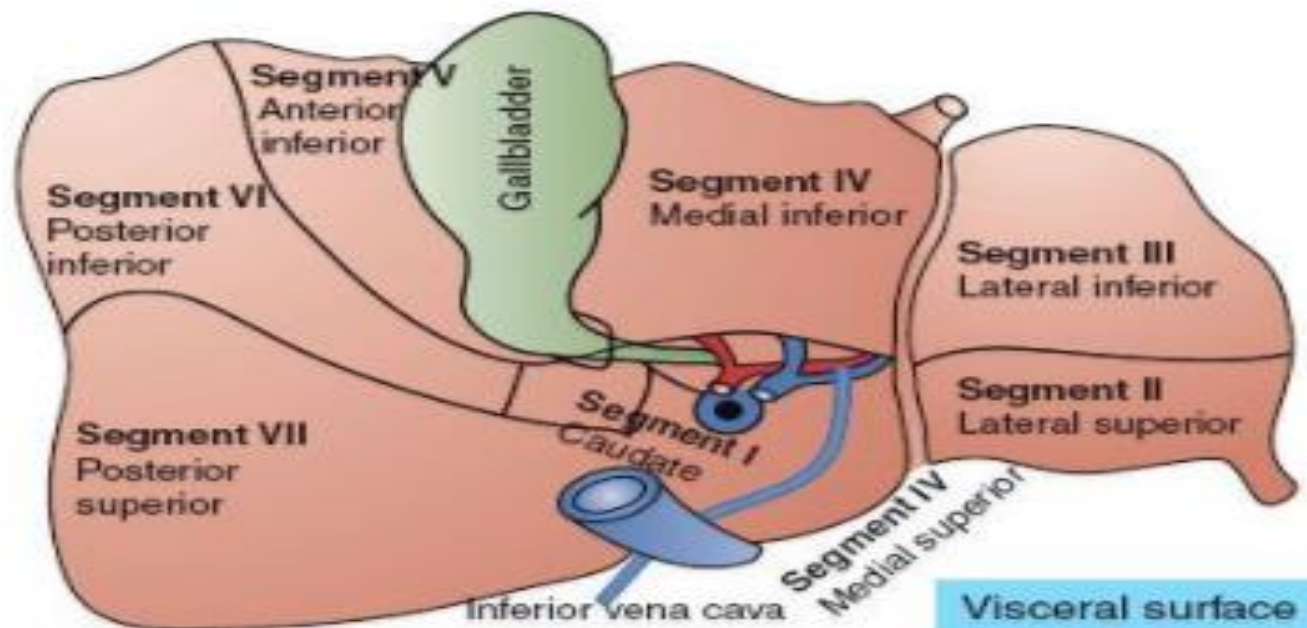
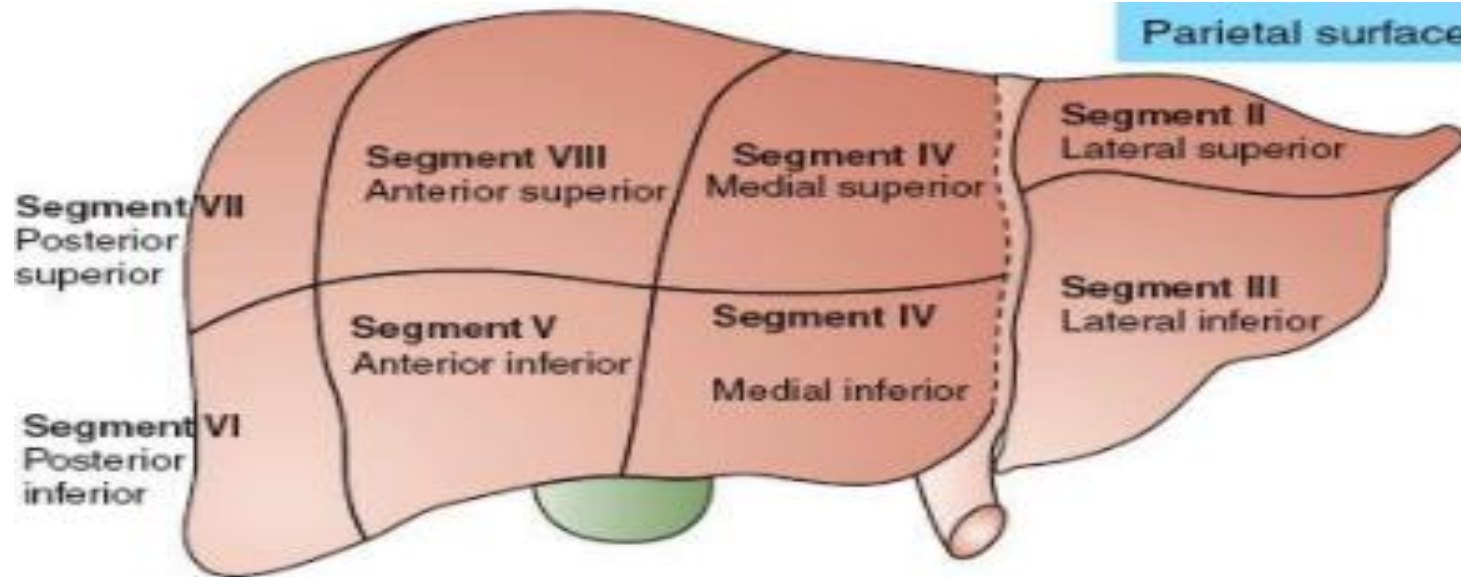
6

7

8

الفلة بلاصبع مشن
Candidate lobe
posterior

Parietal surface



Visceral surface

Ligaments of The Liver

Double layers of peritoneum that attach the liver to another organ or to the abdominal wall

سيف الفارس
Falciform Lig.: (located Ant. *superior surface*)

Attaches liver to ant. abd. Wall *and the diaphragm.*

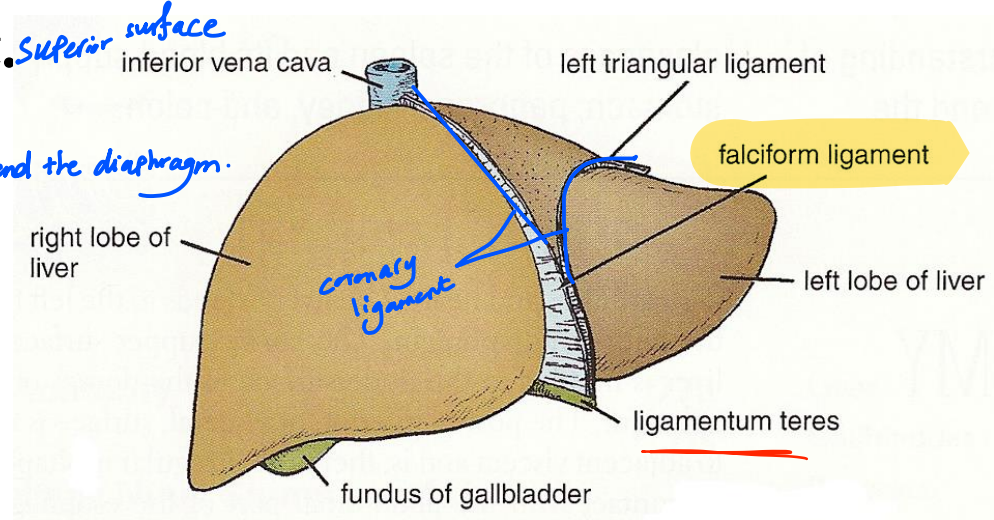
Inf.:

encloses **ligamentum Teres**

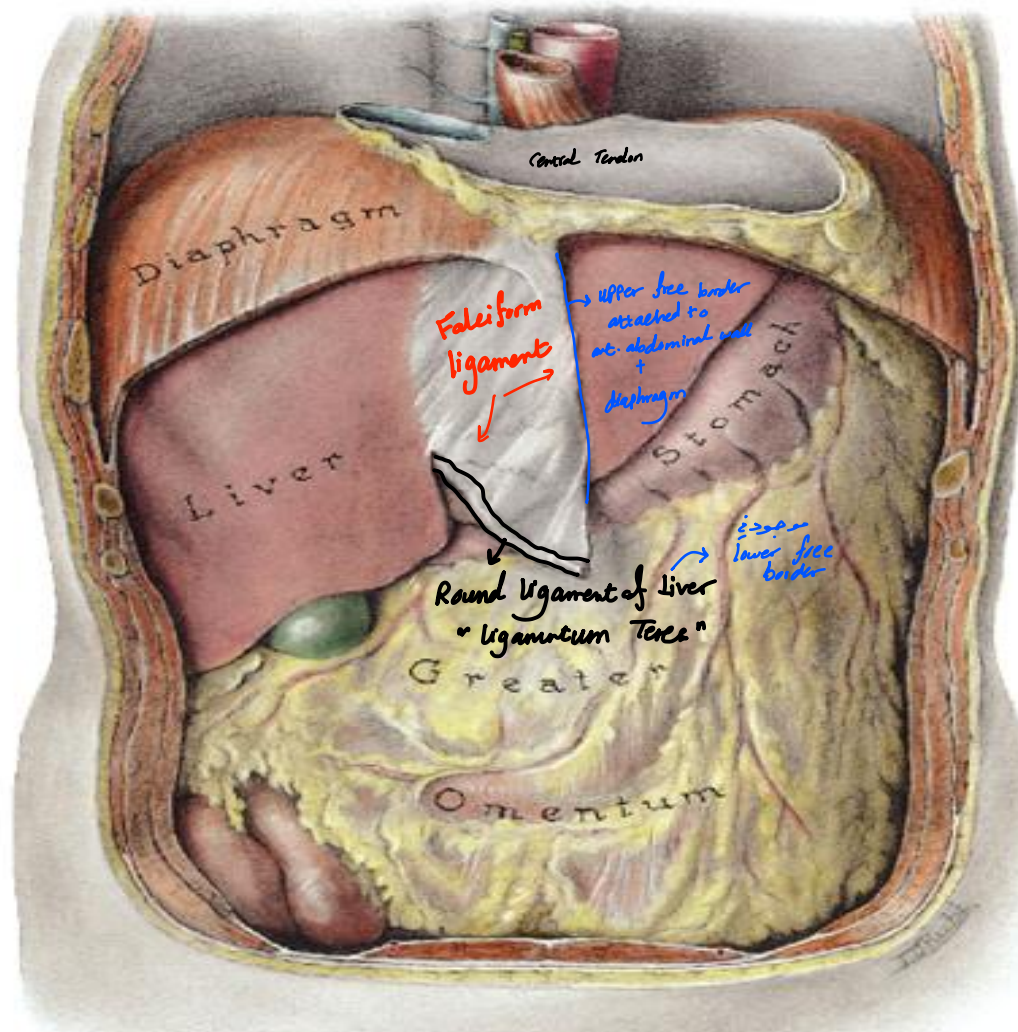
coronary lig
التي تقسم إلى
Sup.:

Triangular ligament
splits to Coronary & lf. Triangular lig.s

⇒ forming the bare area



Falciform lig. & lig. teres



Superior Ligaments (3 lig.)

Right side

① Coronary lig.:

2 layers that are widely separate

⇒ Extends the bare area

② Rt. Triangular ligament:

Termination of the coronary lig.

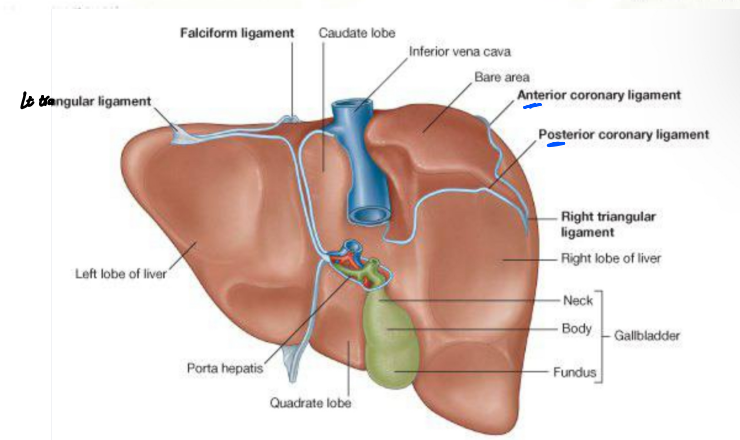
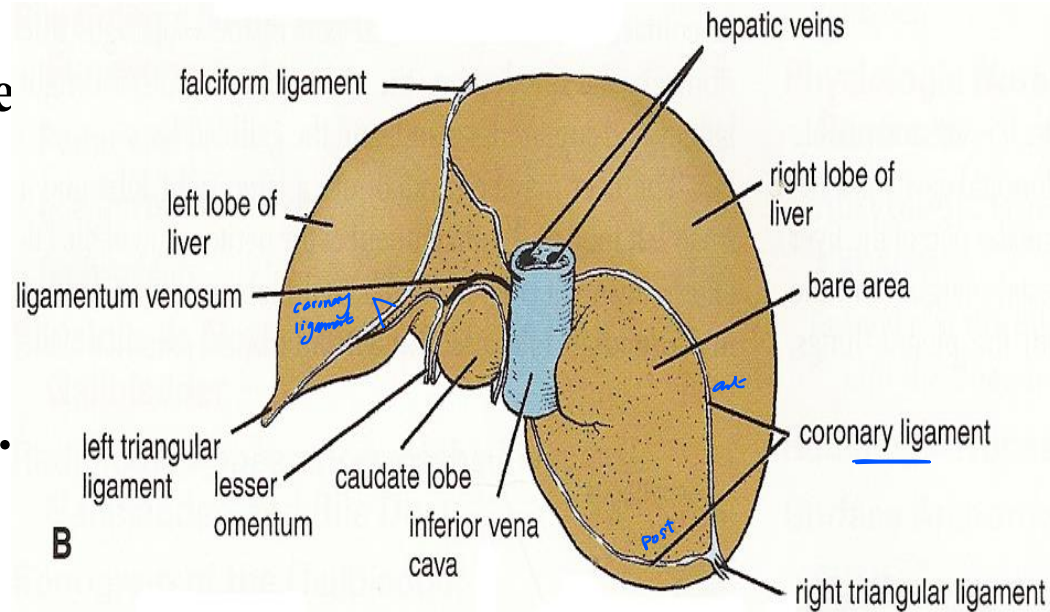
When the 2 layers meet

Connects liver to diaphragm

Left Side

③ Lf. Triangular lig.

Connect liver to diaphragm more obvious than Rt lig



Inferior Ligaments (2 lig.)

① Ligamentum Teres:

En inferior

(Round lig. of the liver)

*in the lower part of Falciform ligament.
* in the left side of quadrate lobe.*

Remnant of umbilical vein.

Umbilicus → Portal vein (lt. Branch)

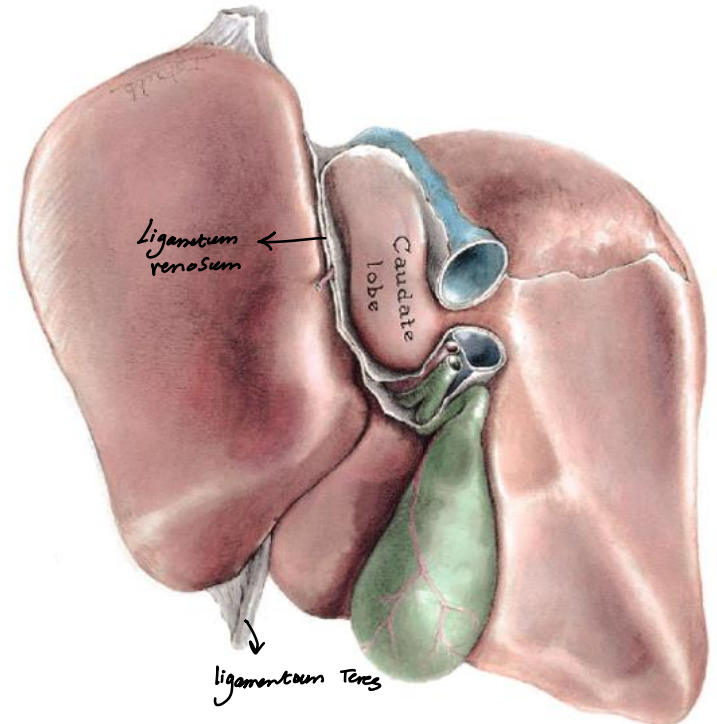
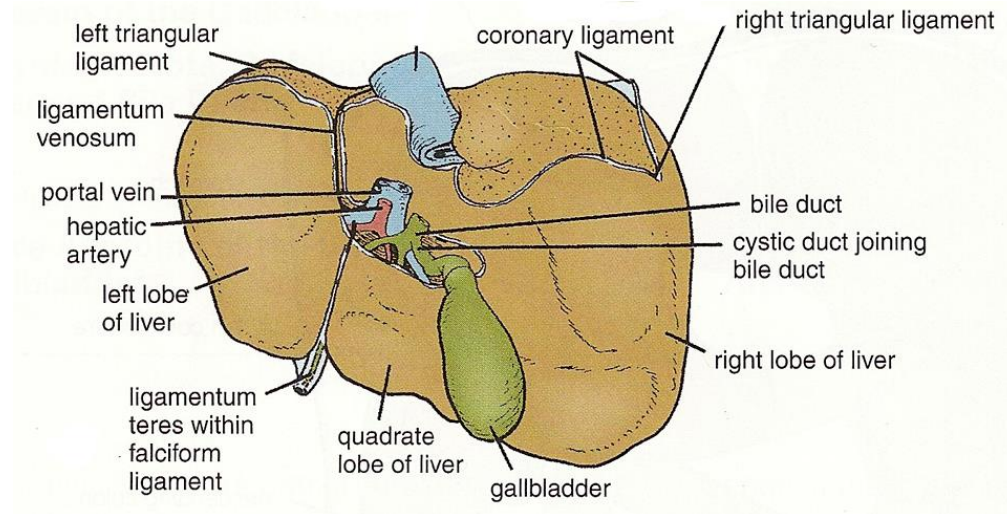
② Ligamentum Venosum:

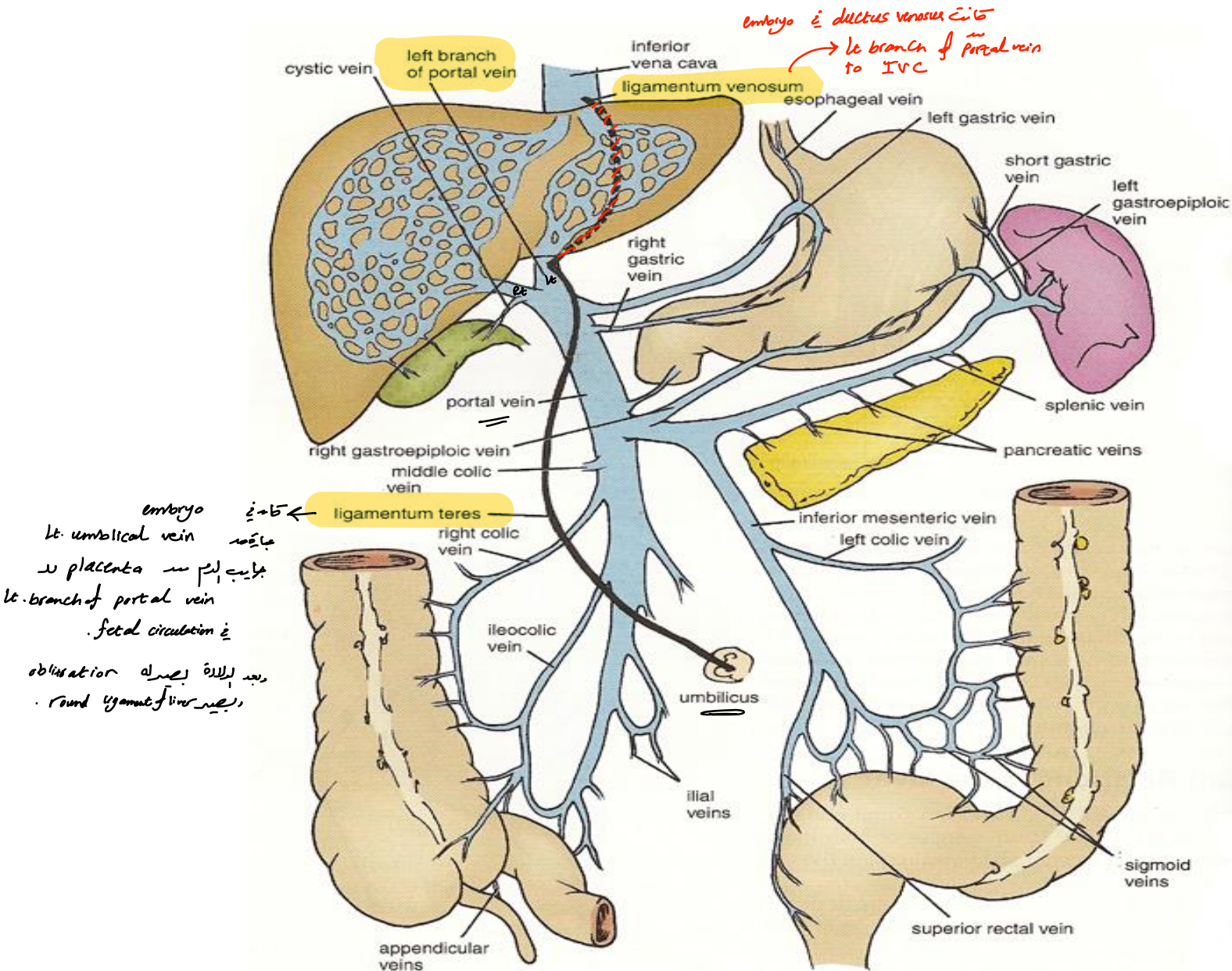
post.

Remnant of ductus venosus in fetus

** in the left side of caudate lobe.*

Lt branch of Portal vein → IVC





Blood Supply to Liver

*Bld. Comes from 2 sources to the liver

1. Hepatic artery: (oxygenation) 30% of liver blood supply

from Celiac Trunk of Abdominal Aorta

brings O₂ blood.

glucose, A.A., nutrients
splenic, sup. mesenteric veins
small intestine
70% of liver blood supply. "not fully oxygenated"

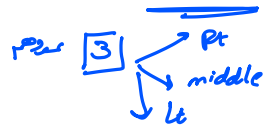
2. Portal Vein: (filtration)

formed by Splenic & Sup. Mesenteric veins

brings de O₂ bld. For filtration.

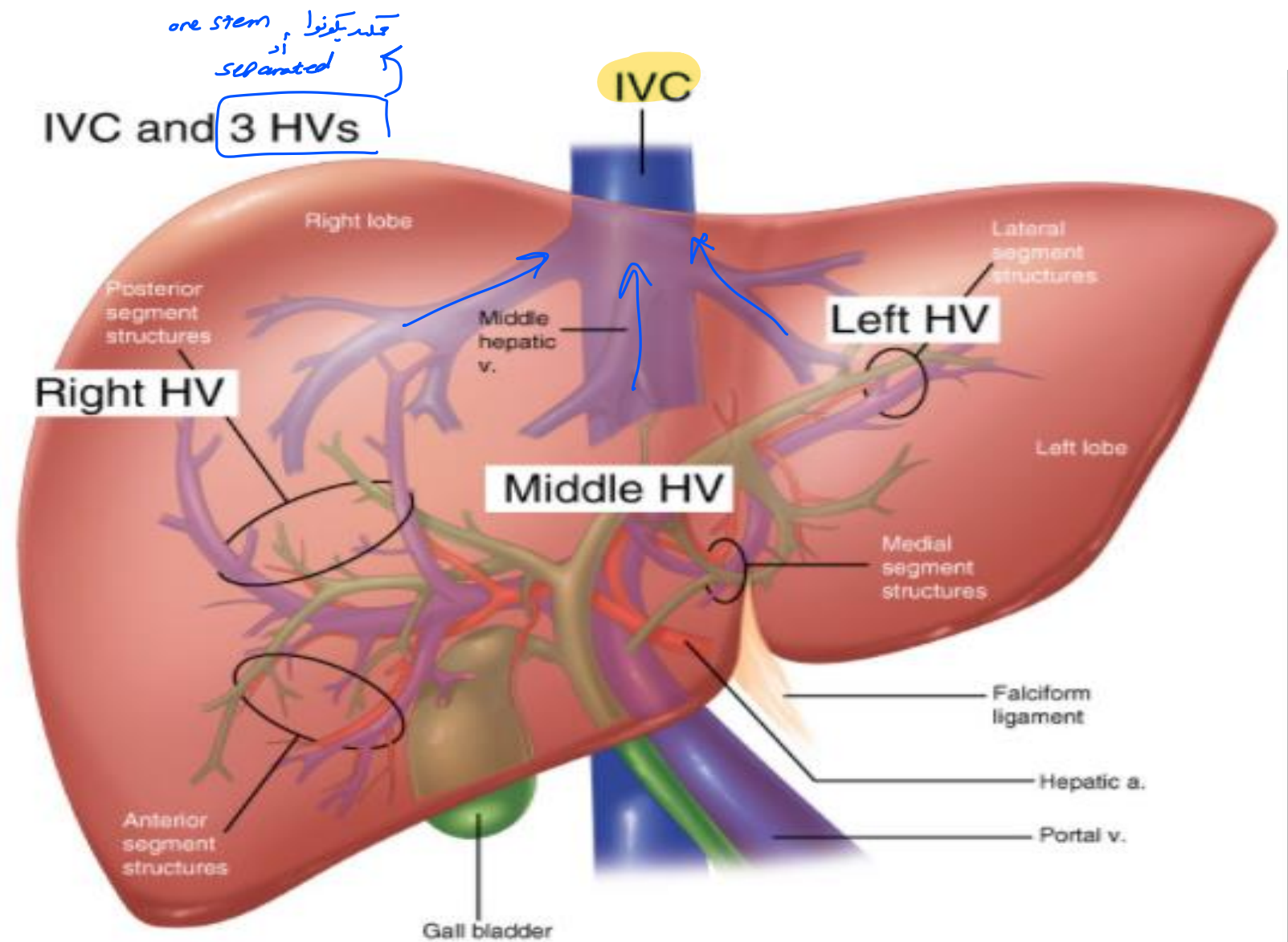
* bld. Mix within the liver & drain through →

Hepatic Veins:



located post.

open Directly into IVC



Bile Ducts

Bile Secretion: + Formation

Liver

Bile Storage: 30-50 cm

gall bladder

كيس صفراء ١٠-١٢ cm
منه يخرج bile بنزله
duodenum من طريق hepatic ducts الـ ١٢ ، الـ ١٢

Hepatic (liver) bile ducts:

Rt. & Lf. Hepatic ducts

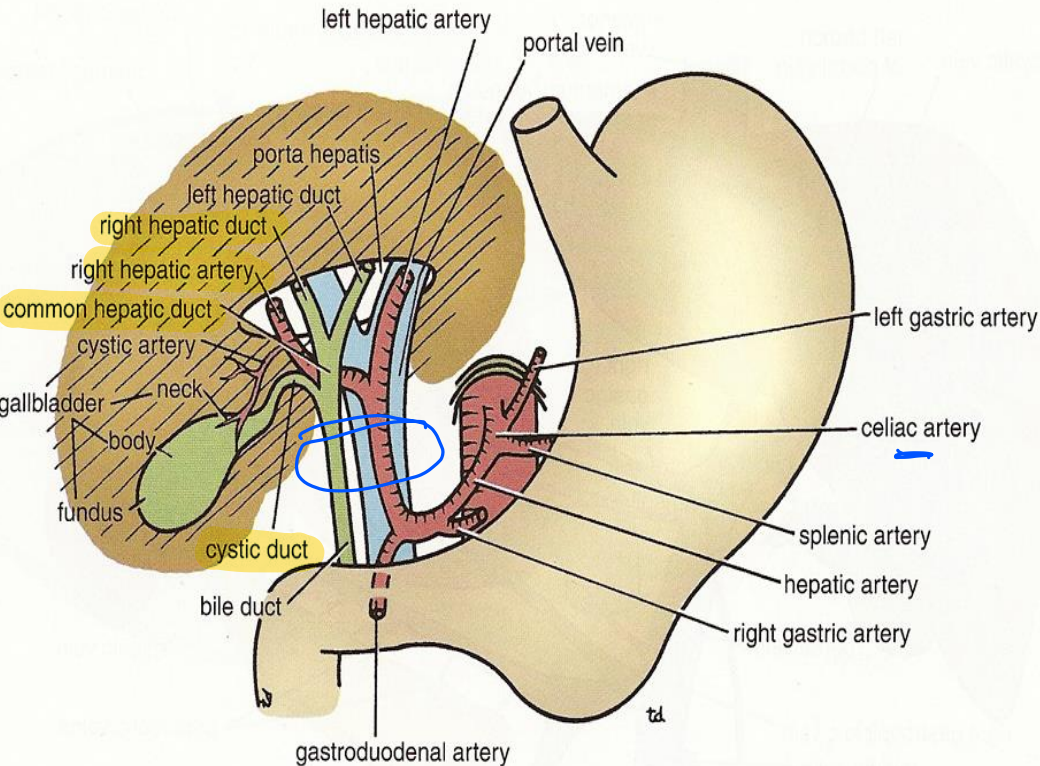


Common hepatic duct(4cm)

Gall bladder duct:

Cystic duct(3-4cm)

Common Hepatic Duct + Cystic Duct = Common Bile Duct



الـ liver مـ bile
ampulla of Vater in
duodenum.

Common Bile Duct (CBD)

طول

عرض

Formed by union of: CHD+ Cystic Duct **3-4 Inches long 5-6 mm wide**

العصبه أهم سه بطوك ثمة
لدمعقون زاد يعيقه obstruction
نرسه حصرة أو سرطان في كبده
أو سرطان في bile duct

Descends down behind 1st part
of D1

Joins the main pancreatic duct

Opens in **2nd part** of duodenum

Through:

Ampulla of Vater

in Postero medial
aspect of D₂ just below
the middle.

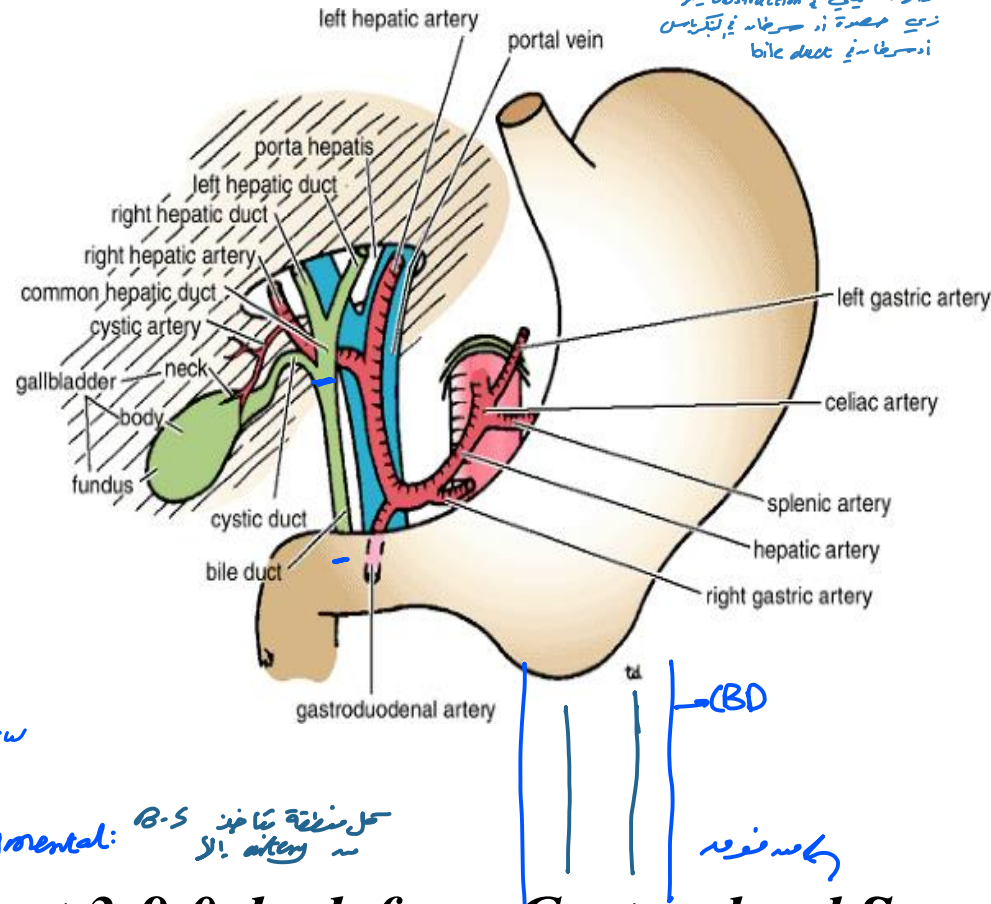
Into major duodenal papilla

+ segmental: 8-5
كل منطقة يتأخذ
من artery

Blood supply; Run longitudinally, at 3-9 o'clock from Gastro duod, Sup

Pd, Hepatic a

لـ يعيق blood ما مشي بالـ طول - لـ يعيق



CBD ← أهم جزء في biliary anatomy توجد في جزء منه بكونه خروجه *duodenum* يسمى
 just below porta hepatis liver ← الخارطة من
 free part of lesser omentum جزء في *24ykes* *supra duodenal part* جزء عبارة عن

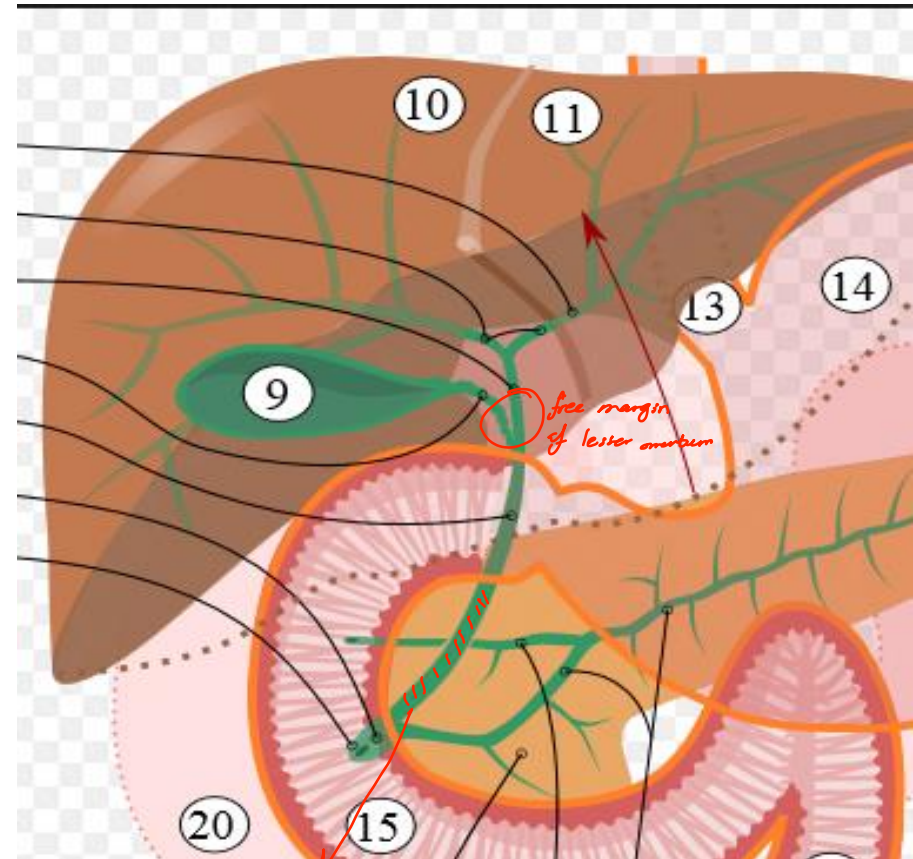
- Bile duct has 4 parts

① *supra duodenal*
In and just below porta hepatis

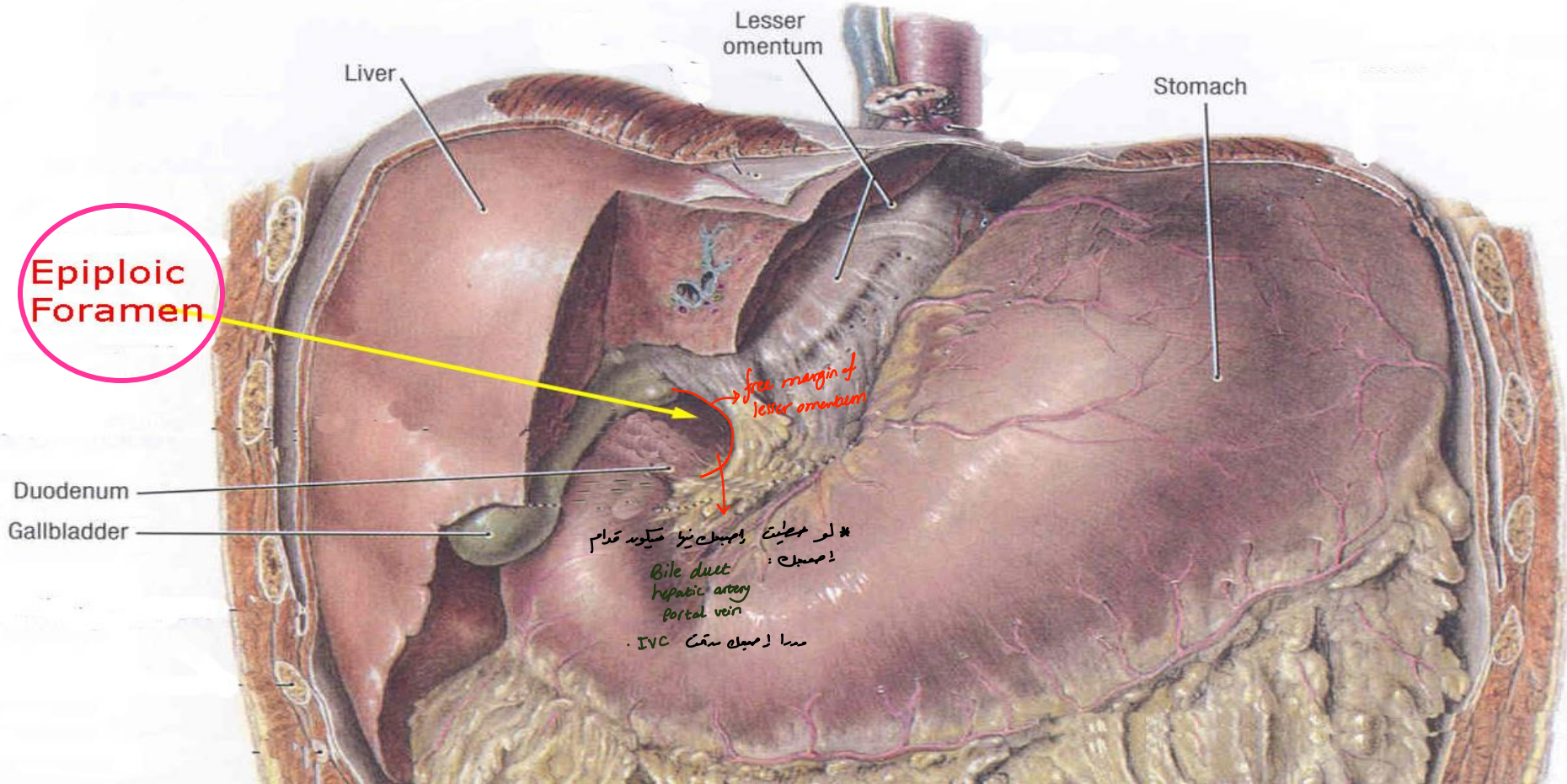
② In free margin of lesser
 omentum: lie on Rt side of
 Hepatic artery

③ *great inchief*
Behind D1: lie on Rt side of
 gastro duod a, infront of
portal v

④ Behind head of pancreas; Lie
infront of IVC

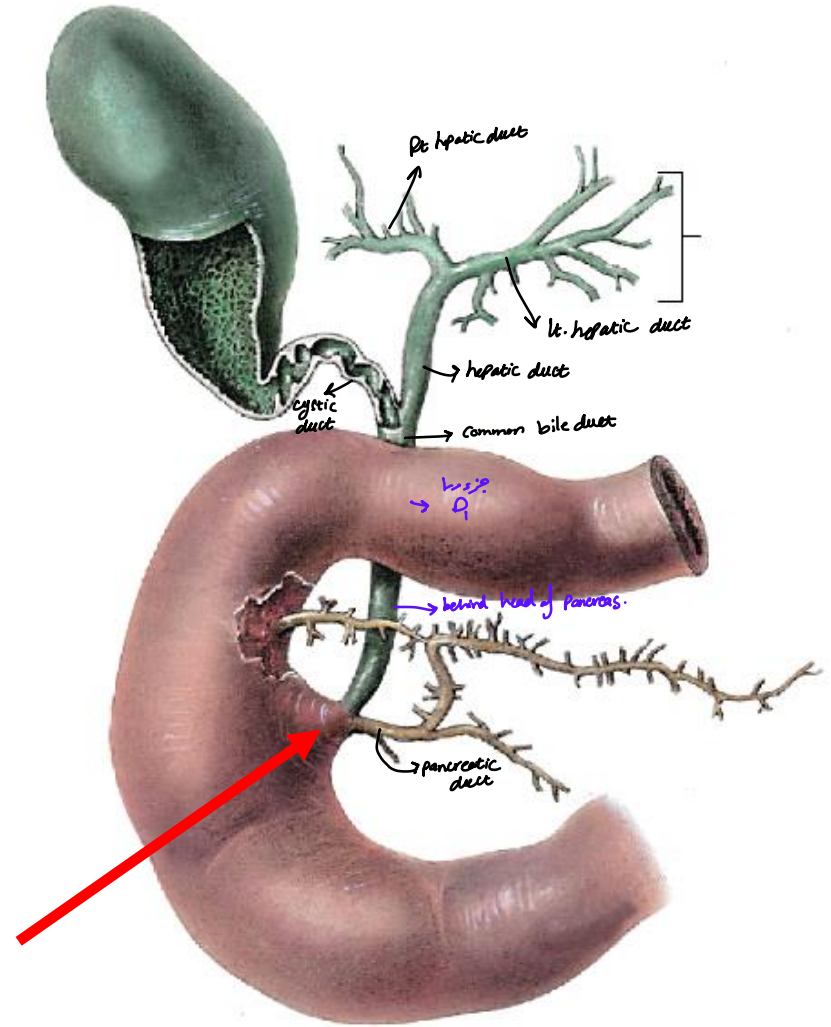
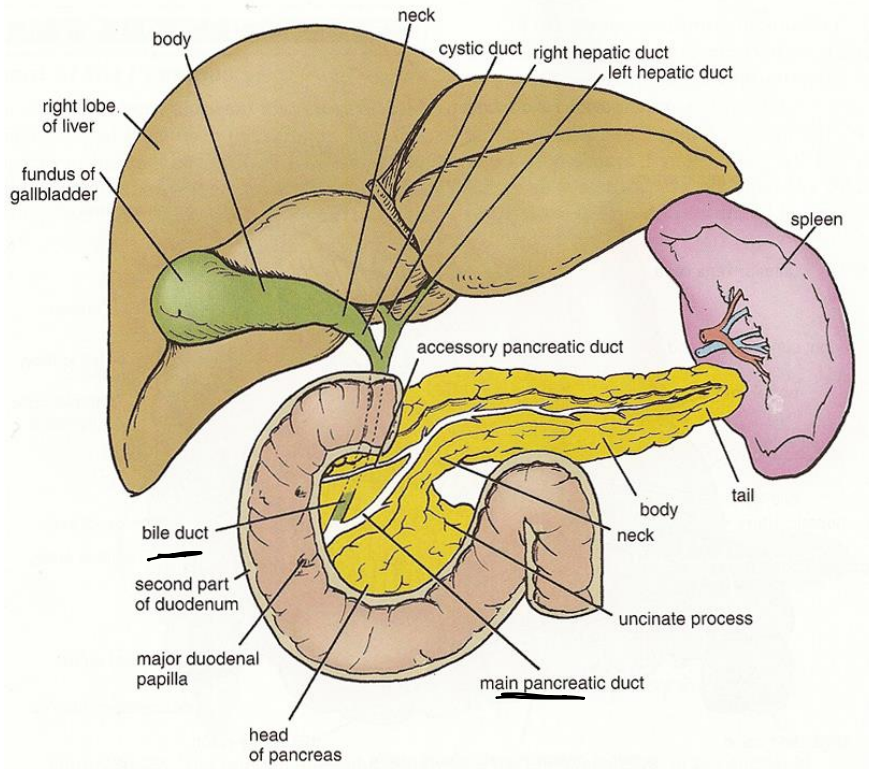


* "cancer of the head of pancreas"
 ← الخارطة بكونه خروجه *duodenum* يسمى
 obstruction bile duct
 jaundice



- The greater sac communicates with the omental bursa through the **Epiploic foramen (of Winslow)**.
- The epiploic foramen can be located by running a finger along the edge of the gall bladder to the free edge of the lesser omentum.
- The epiploic foramen usually admits two fingers.

Ampulla of Vater & Major duodenal papilla



Ampulla of Vater

Common bile duct + pancreatic duct
below its middle ← Postero medial

Bile
 1000 cc
 950 cc
 50 cc

الكيس الصفراوي في الكبد ~ liver

Gall Bladder

Stores & concentrate 50 cc of bile → *مخزن 50 cc من الصفراء*

Anatomy: pear shape sac has 3-4 inch long 6 mm in diameter.

Fundus, body & neck

Fundus project from LB of liver, come in contact of AA wall

Surface anatomy of Fundus of GB

Body of GB is related to

* clinical anatomy : Murphy sign

T colon

Junction of D1-D2

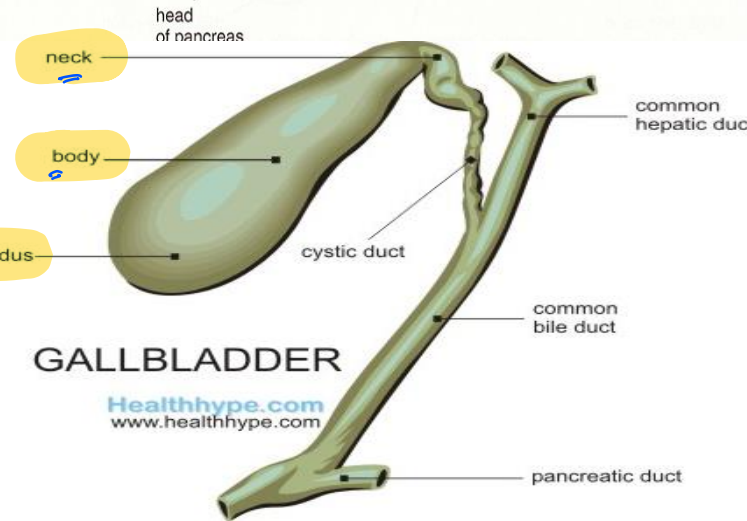
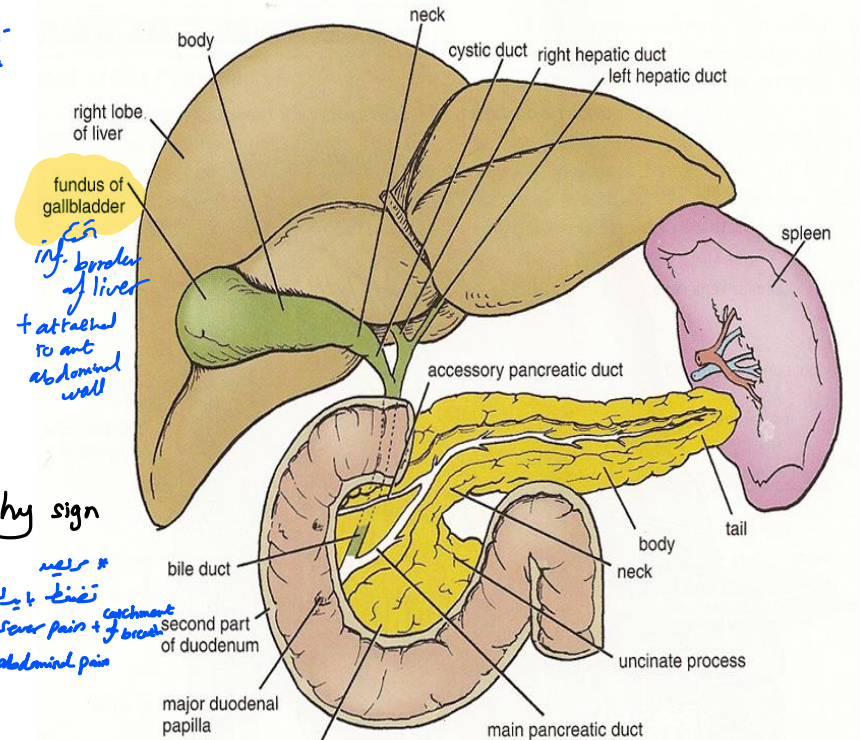
Cystic duct: 1.5 inch long, MM is folded

Joins CHD To form CBD

Bld. Supply: → not like appendix blood supply. → appendix: appendicular artery only.

Cystic a. from right hepatic artery.

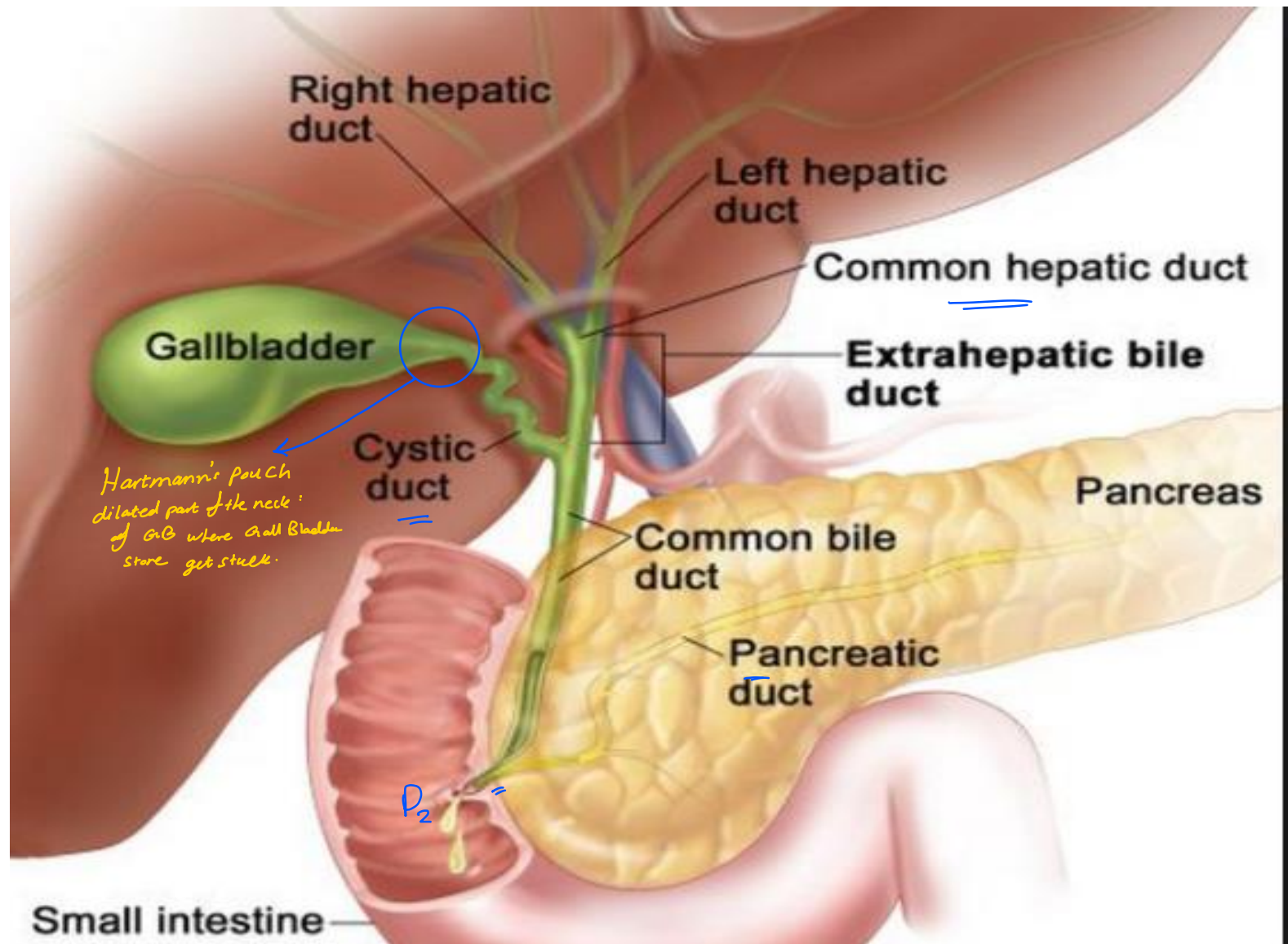
liver Bed direct branches

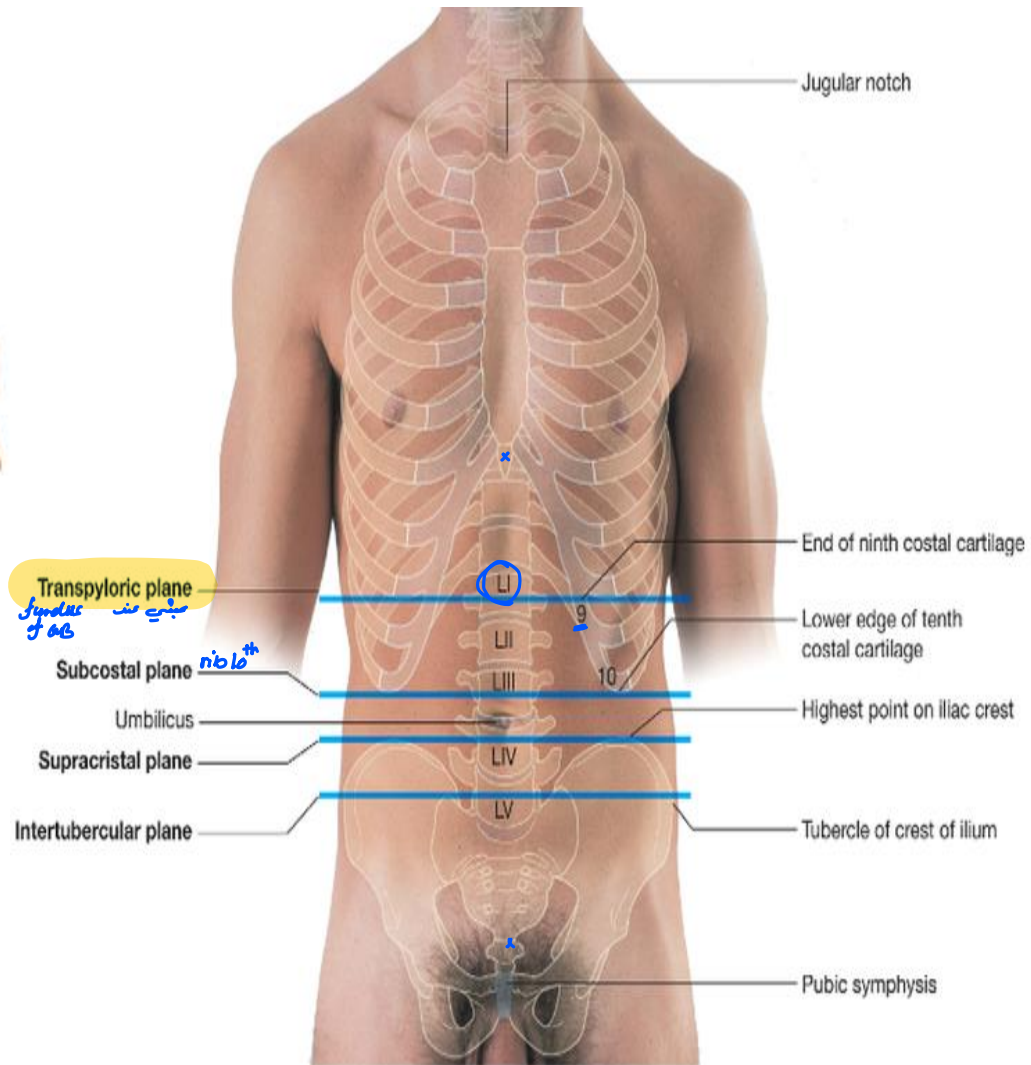
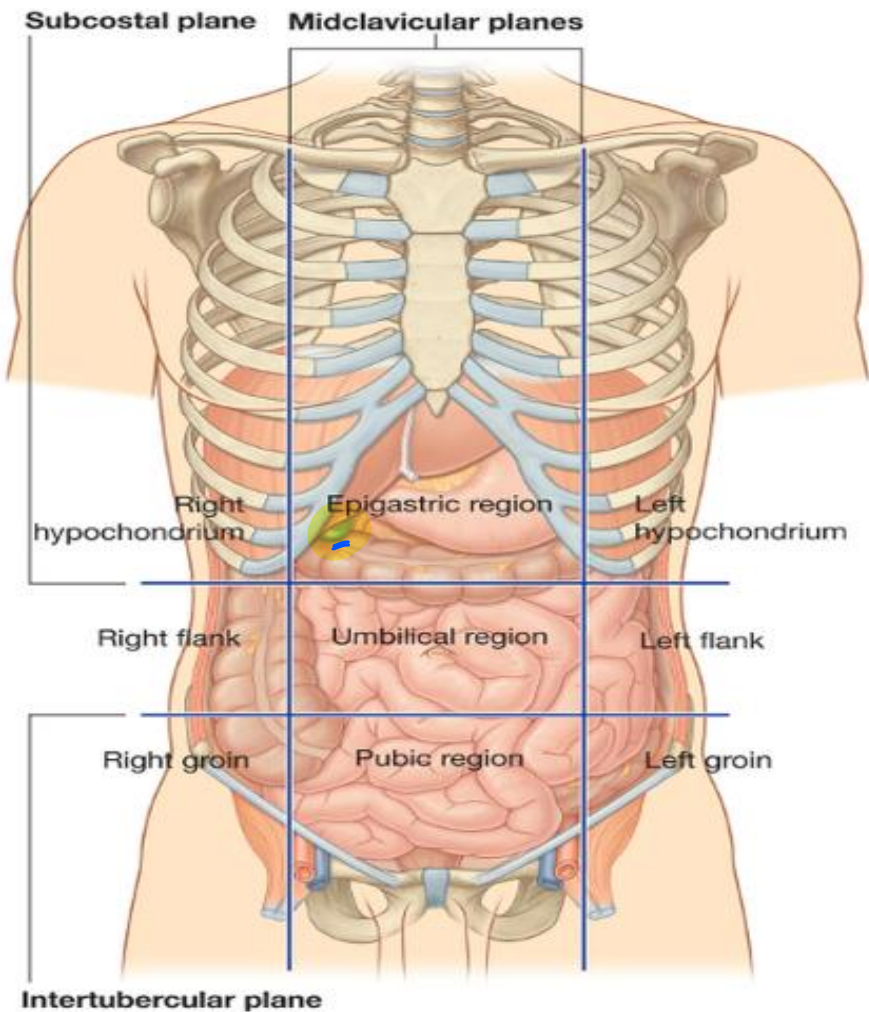


GALLBLADDER

Healthhype.com
 www.healthhype.com

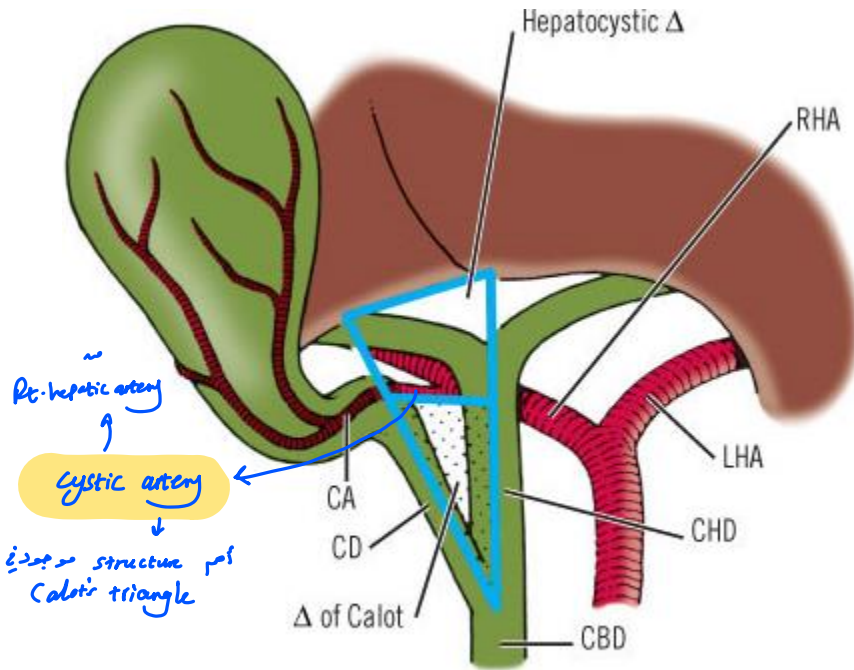
* بالوريد المرئيا a. cystic. ينقل الصفراء من الكبد المرئية a. appendicular. مخرج (ganglion)



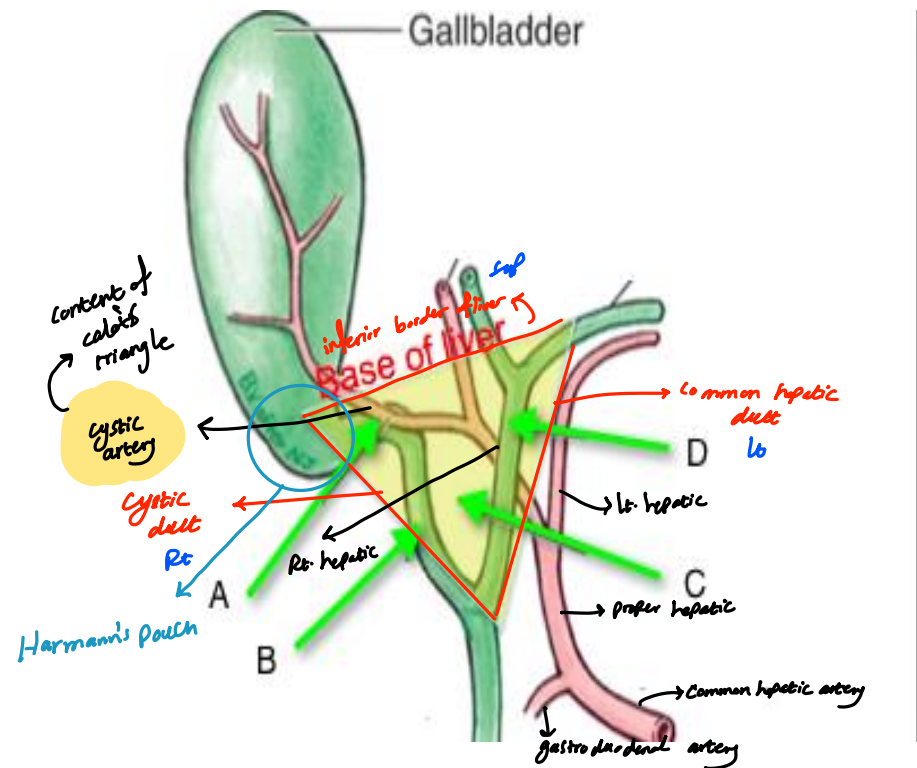


← عده ذره في حوضه شائع في عمليات المرارة
 يتم ربط Common hepatic duct و Bile duct
 بدلاً من Cystic duct، فيسبب صدمه مع ليمفا
 jaundice مصدرة آتية من قلوب المرارة.

Calot's Triangle



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At the junction of the neck of the gallbladder and the cystic duct, there is an out-pouching of the gallbladder wall forming a mucosal fold known as Hartmann's pouch, where Gall Stones commonly get stuck.

عندما يعلق Gall stones
 jaundice