

Anatomy of liver

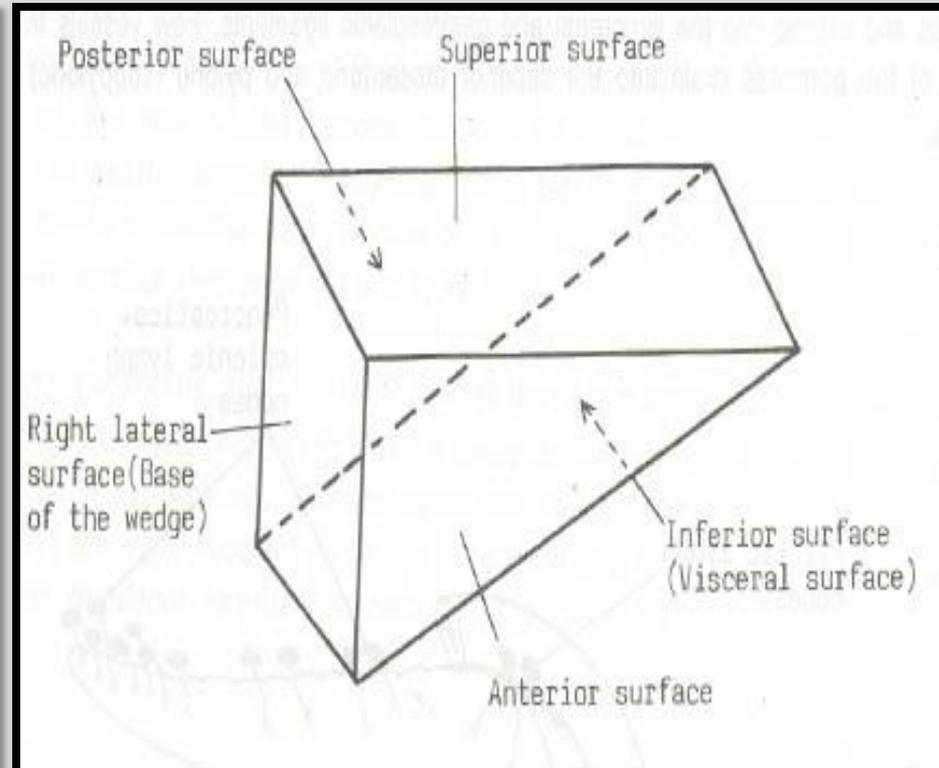
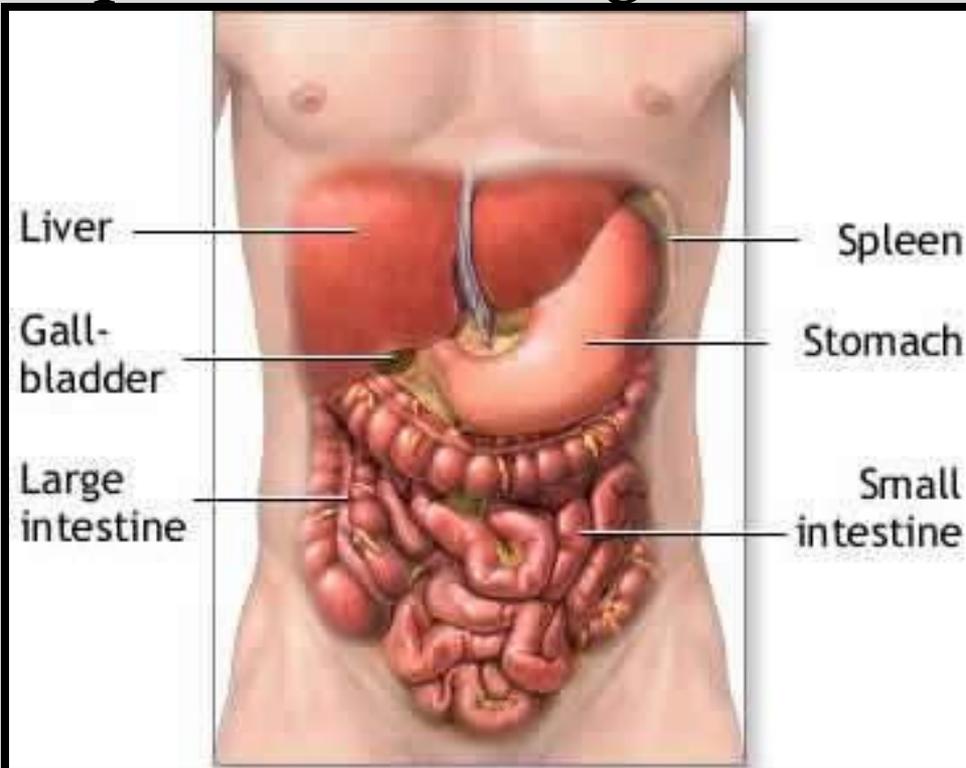
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BIRAM

The liver is the largest gland & largest single organ in the body

Site: It lies under the diaphragm, in the right hypochondrium, epigastrium and left hypochondrium.

Shape: It is wedge shaped with the base to the right side.. It has five surfaces: superior, inferior, anterior, posterior and right surfaces.



Regions of Abdominal Area

Right
hypochondriac
region

Epi-
gastric
region

Left
hypochondriac
region

Right
lumbar
region

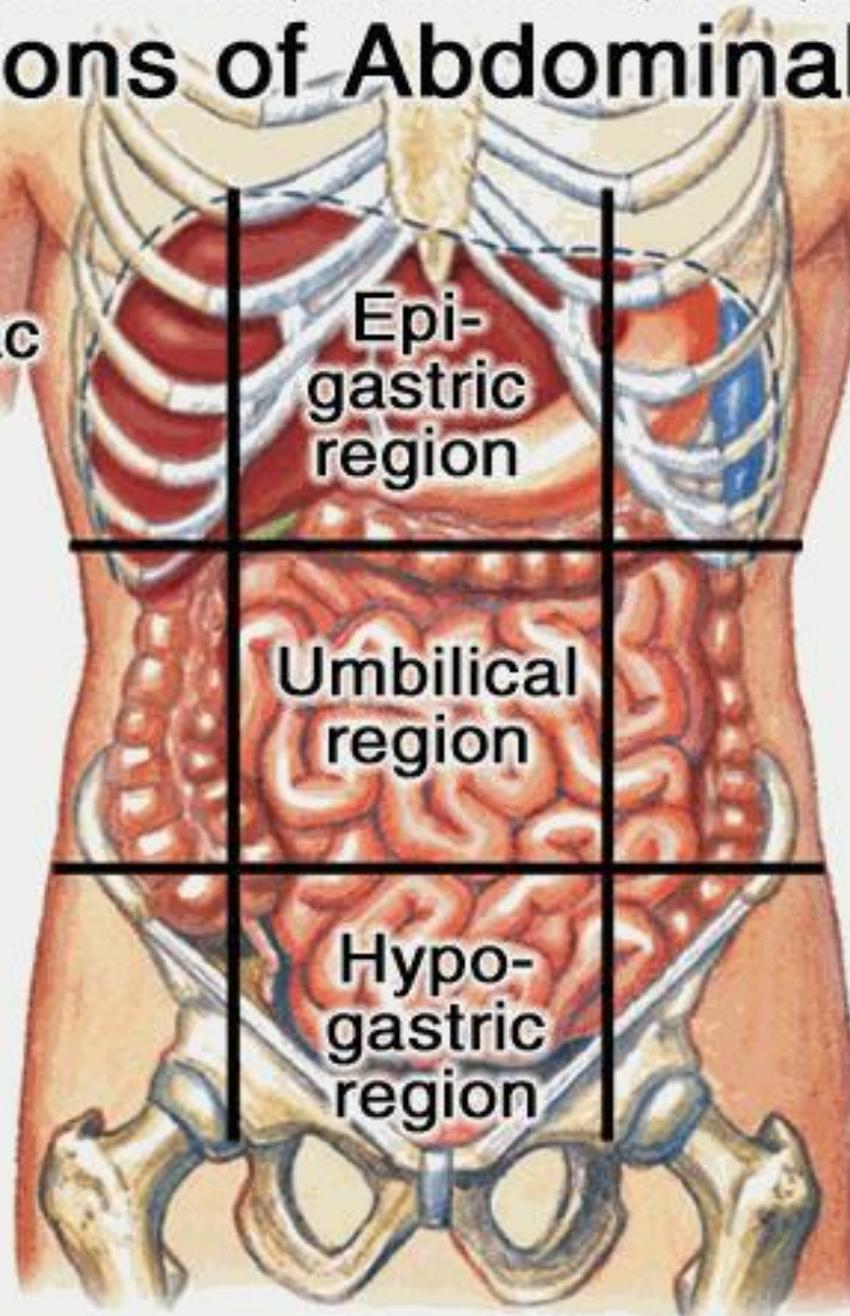
Umbilical
region

Left
lumbar
region

Right
iliac
region

Hypo-
gastric
region

Left
iliac
region

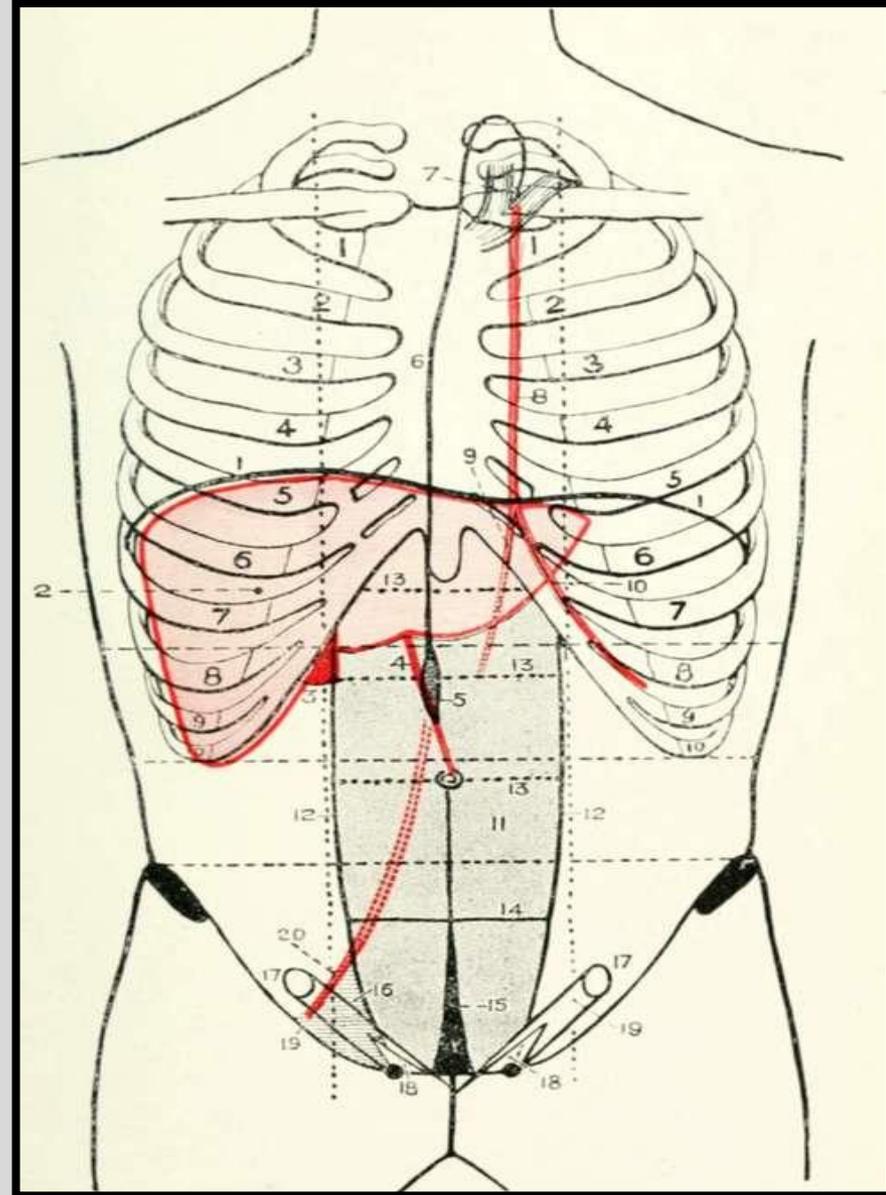


Surface anatomy of liver

1- Superior surface: from the 5th left intercostal space in the mid clavicular line to the upper border of right 5th costal cartilages in right lateral plane, to the 7th rib in mid axillary line.

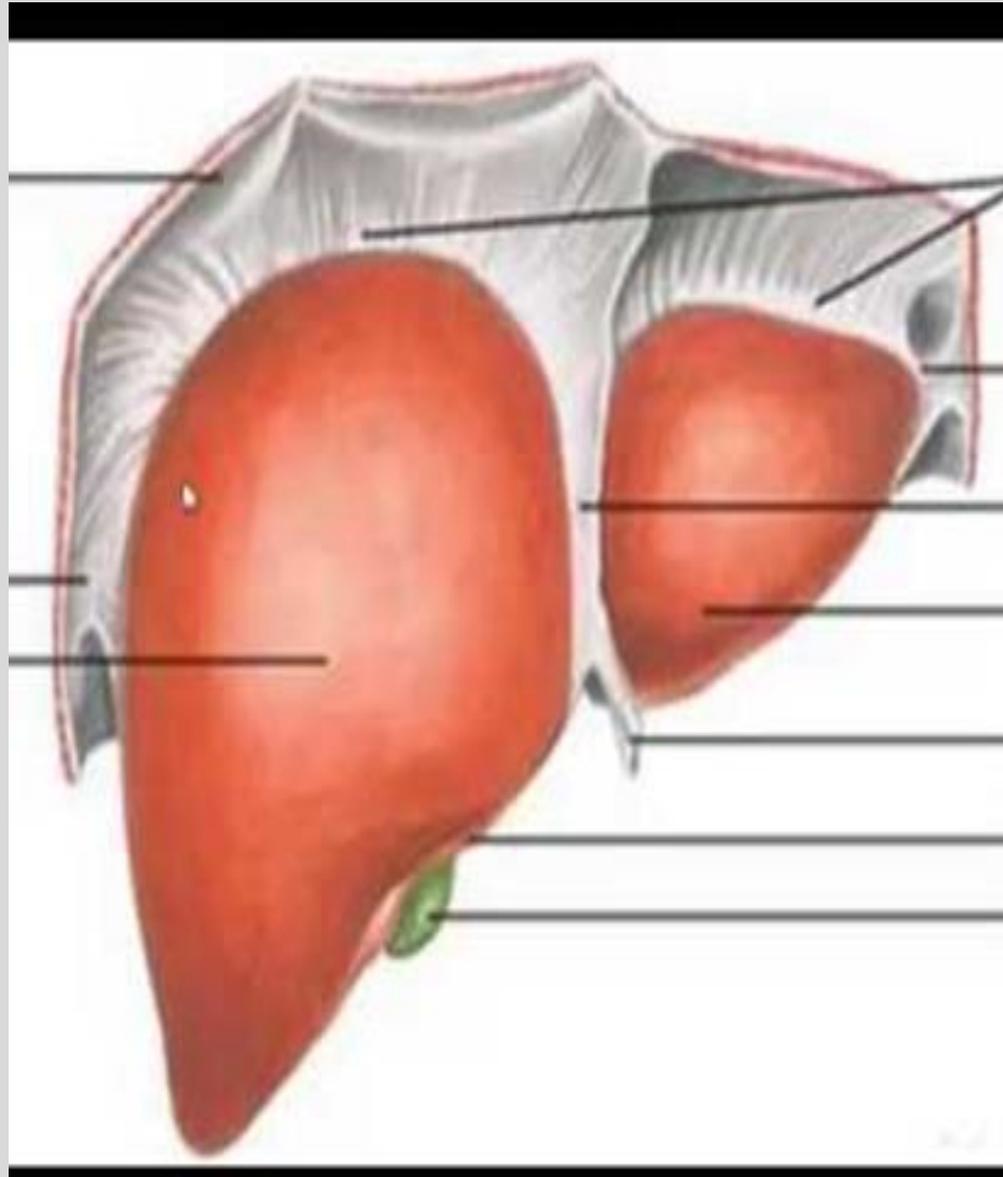
2- Right border: from right 7th -11th ribs (mid axillary line).

3- Fundus of gall bladder: tip of 9th right costal cartilage

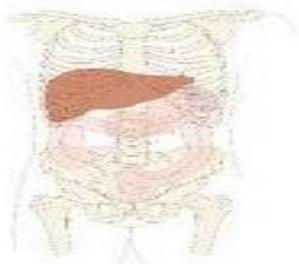


Anatomical Lobes of the liver

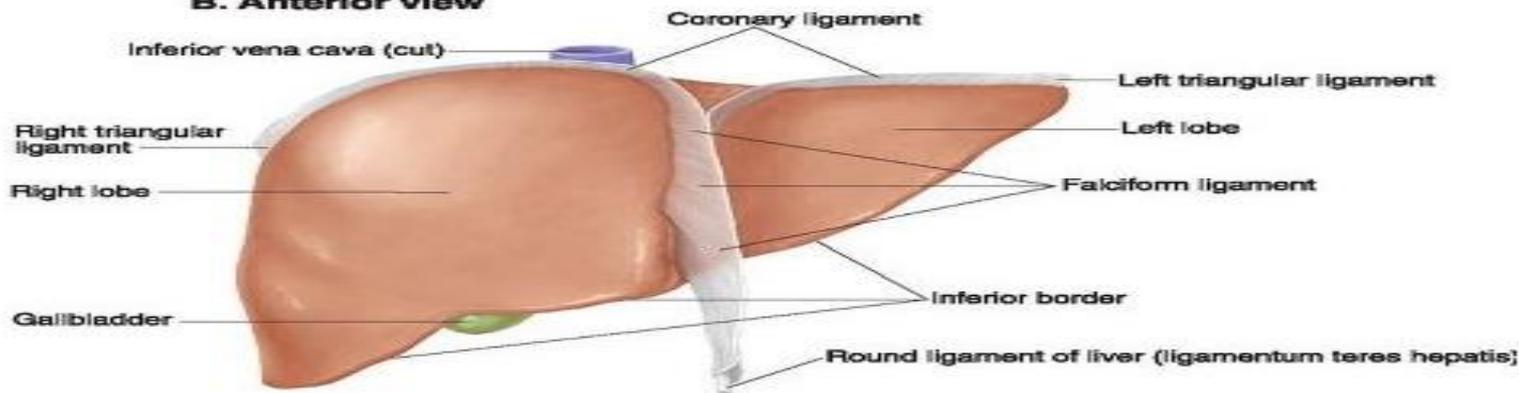
- Anatomically It is divided into large right and small left lobes by:
 - a. The attachment of **falciform ligament** on anterior and superior surfaces.
 - b. **fissure for ligamentum Venosum** on posterior Surface
 - c. **fissure for ligamentum teres** on inferior Surface.
- It also contains the caudate and quadrate lobes that belong **anatomically** to the right lobe.



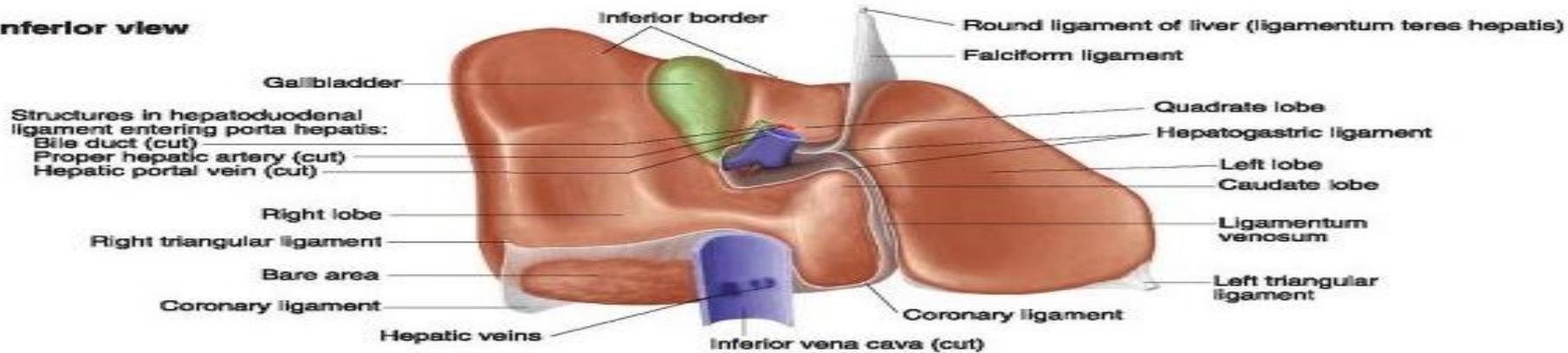
A. Orientation



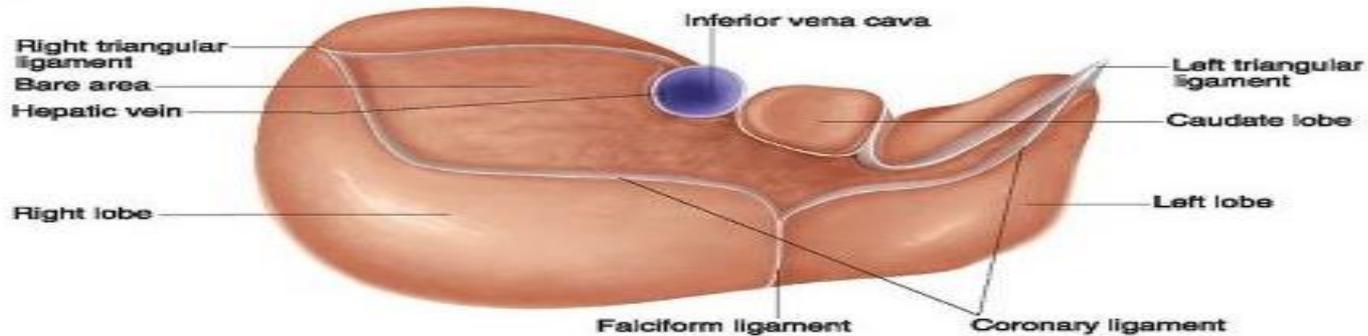
B. Anterior view



C. Inferior view



D. Superior view



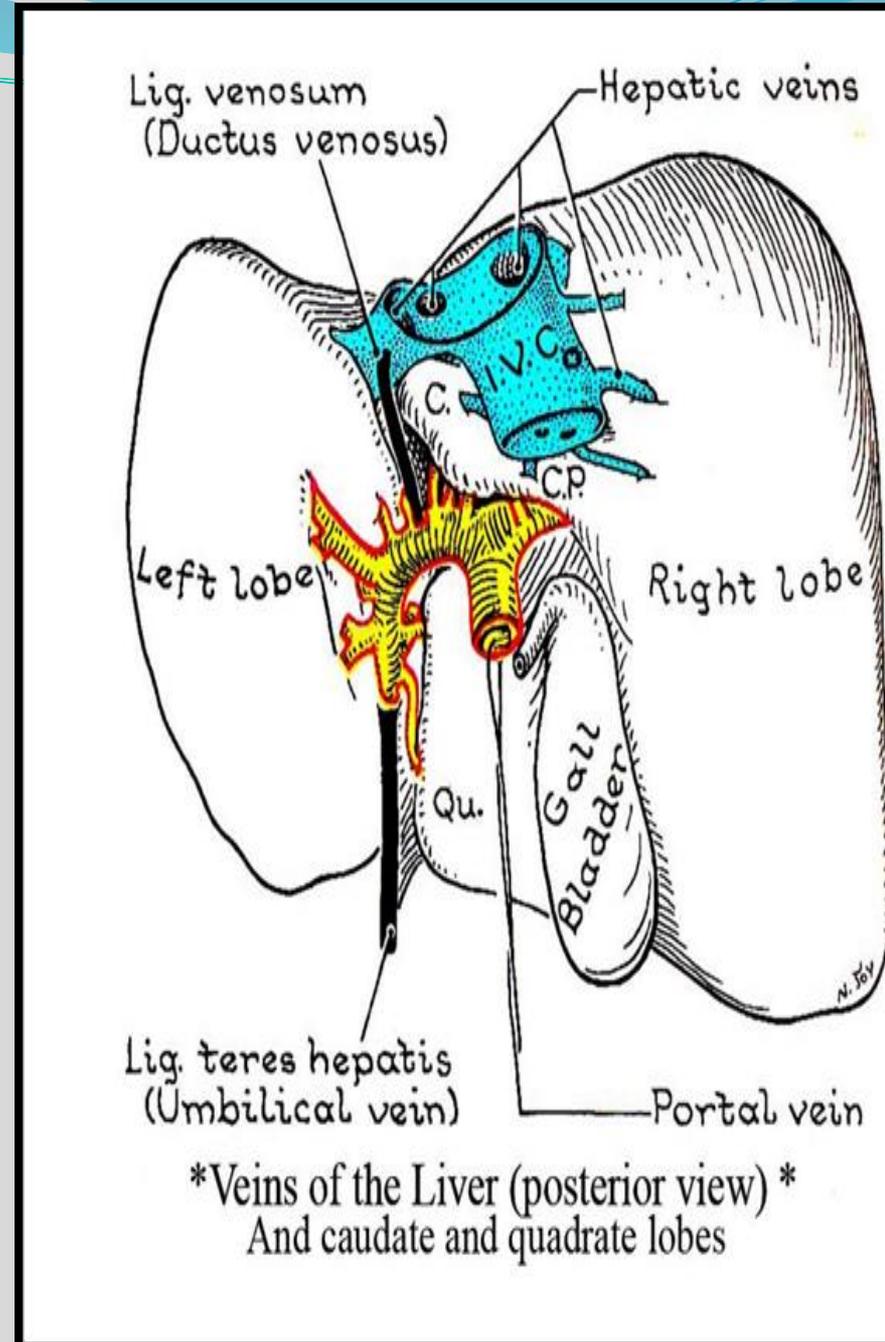
Caudate lobe

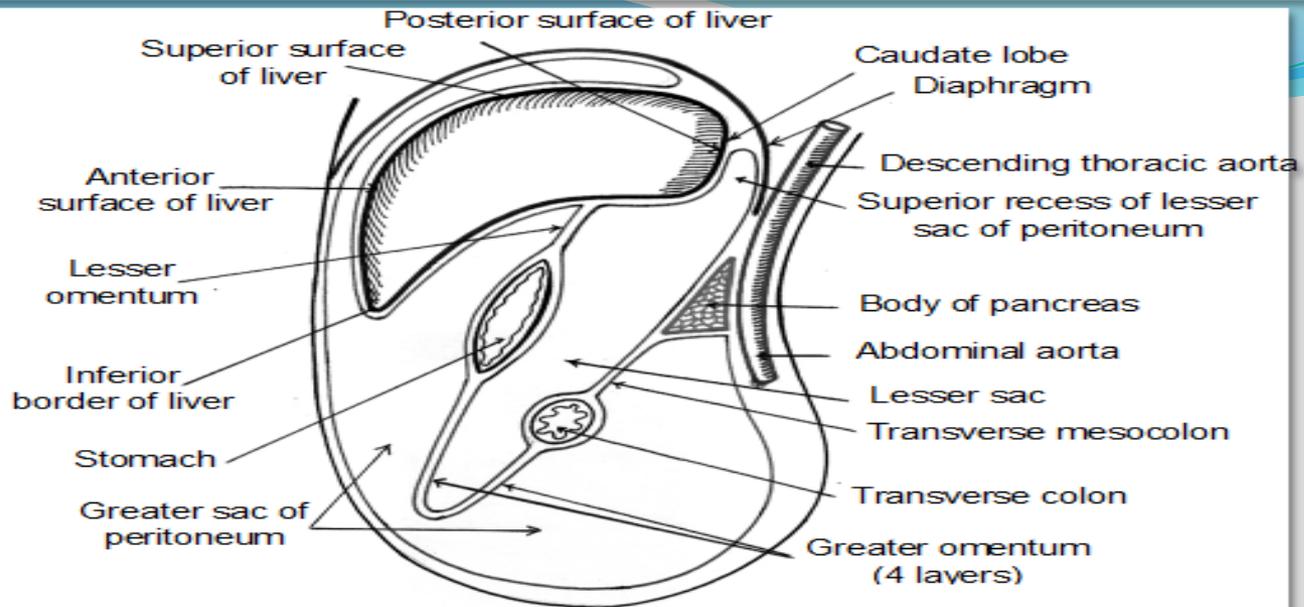
It lies on the posterior surface of right lobe.

Boundaries: Fissure for ligamentum venosum superior and to the left, groove for inferior vena cava to the right, porta hepatis lies inferiorly separating caudate and quadrate lobes of liver.

Processes It has 1- papillary process (left) 2-caudate process(right)& separates IVC from portal vein in porta hepatis).

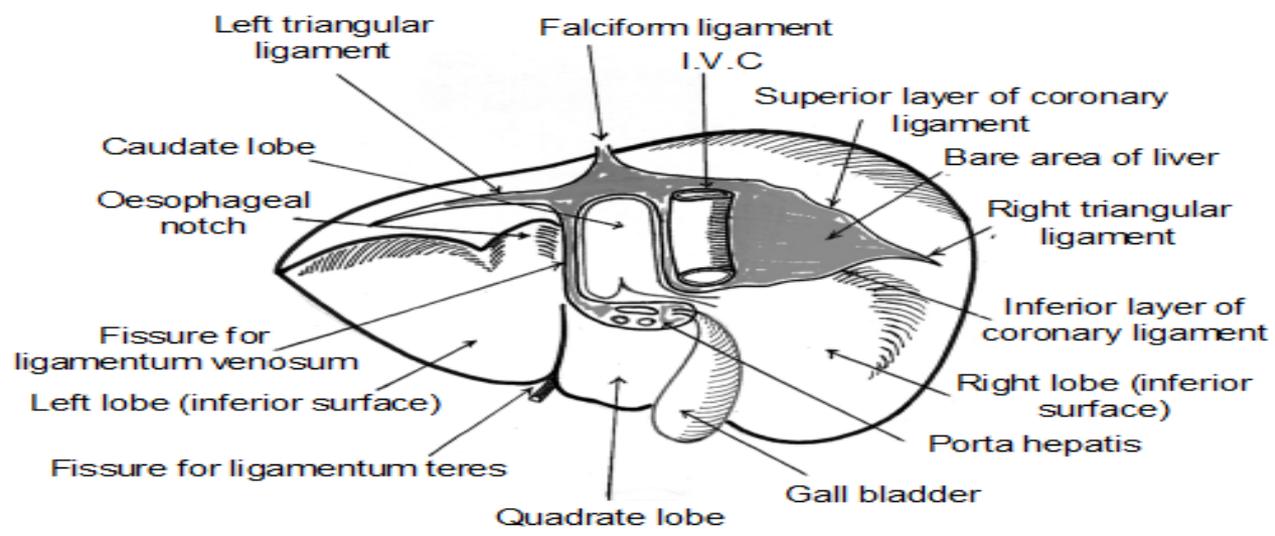
Relations It is related posteriorly to lesser sac, diaphragm and descending thoracic aorta.





*** Saggital section of abdomen and liver ***

Posterior surface



*** Posterior aspect of liver ***

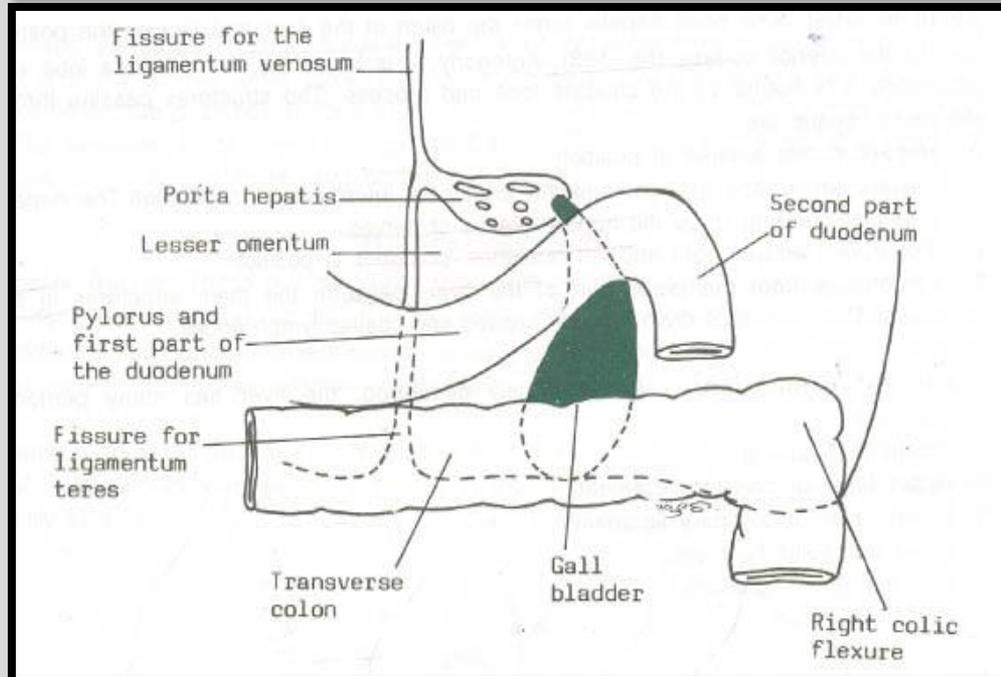
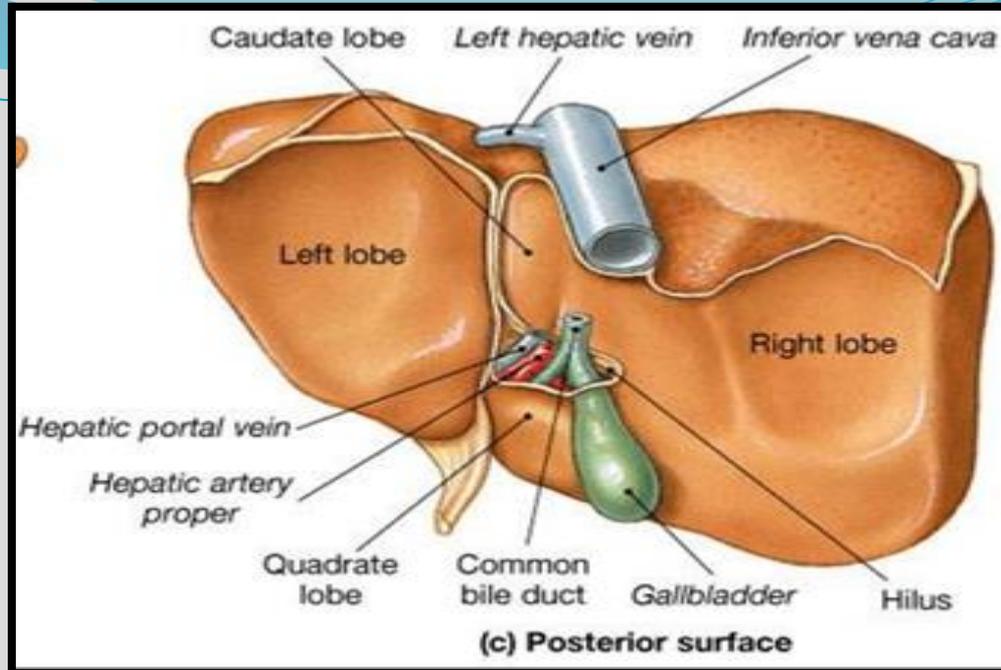
Quadrate lobe

It is a rectangular part in the inferior surface of liver. **It is bounded by:**

- inferior border of liver antero-inferiorly.
- porta hepatis posteriorly
- gall bladder fossa (on the right)
- fissure for ligamentum teres (on left side)

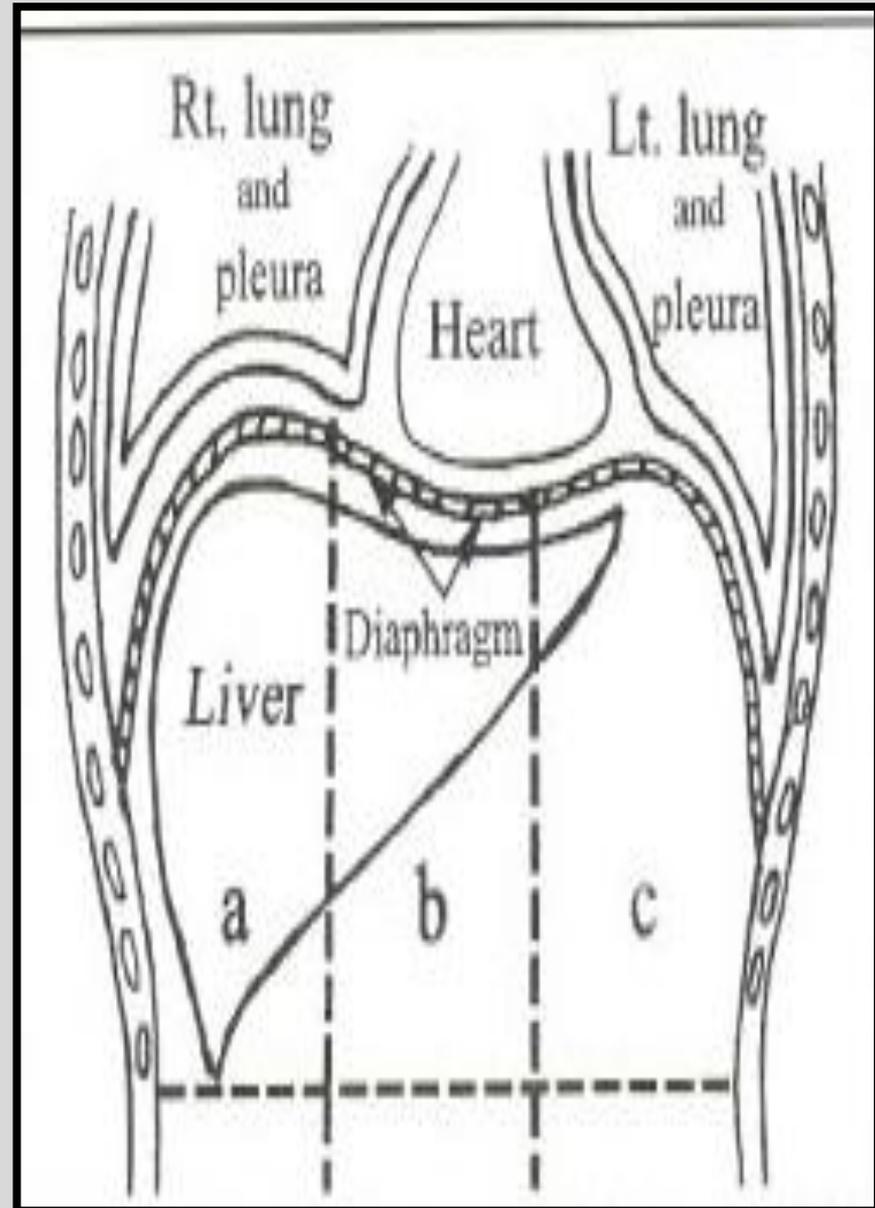
***It is related to:**

- 1- transverse colon (ant.)
- 2- pylorus & 1st part of duodenum (middle)
- 3- lesser omentum (post.)



Surfaces & Relations of the liver

- The diaphragm is related to the superior, anterior and right lateral surfaces.
- 1) **Right Lateral surface:** diaphragm and 7th to 11th ribs.
 - 2) **Superior surface:** Diaphragm separating it from pleura, lung, pericardium & heart.
 - 3) **Anterior surface:** Diaphragm, anterior abdominal wall & xiphoid process..



Relations of the liver

4-Posterior surface: (from left to right).

- **Esophageal area** :related to abdominal part of the esophagus.
- **Fissure for ligamentum venosum**

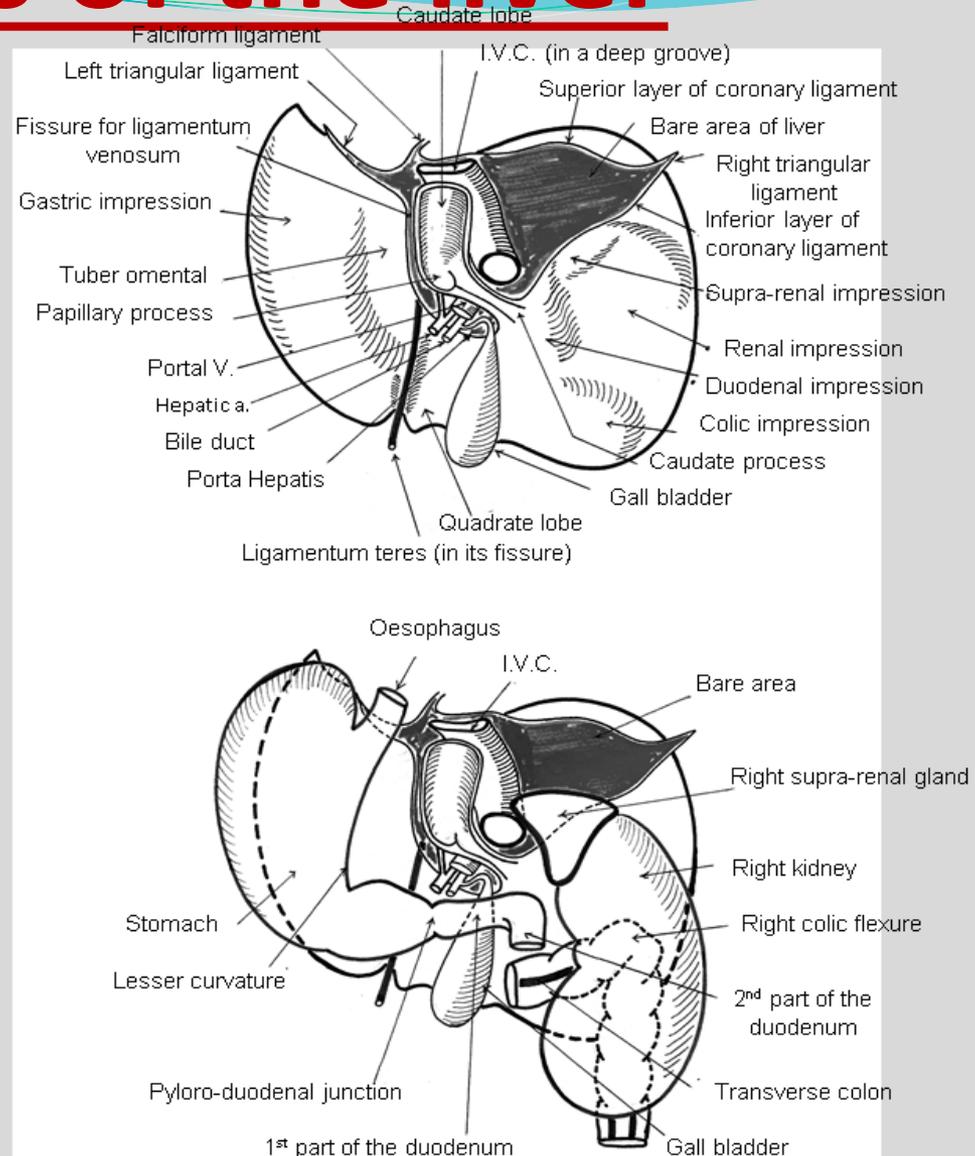
It gives attachment to lesser omentum.

➤ **Ligamentum venosum** is obliterated ductus venosus which extends from left branch of portal to upper end of groove for IVC.

- **Caudate lobe:** Related to diaphragm.

- **Groove for I.V.C.**

- **Bare area** related to diaphragm and suprarenal gland.



* Relations of inferior and posterior surfaces of liver *

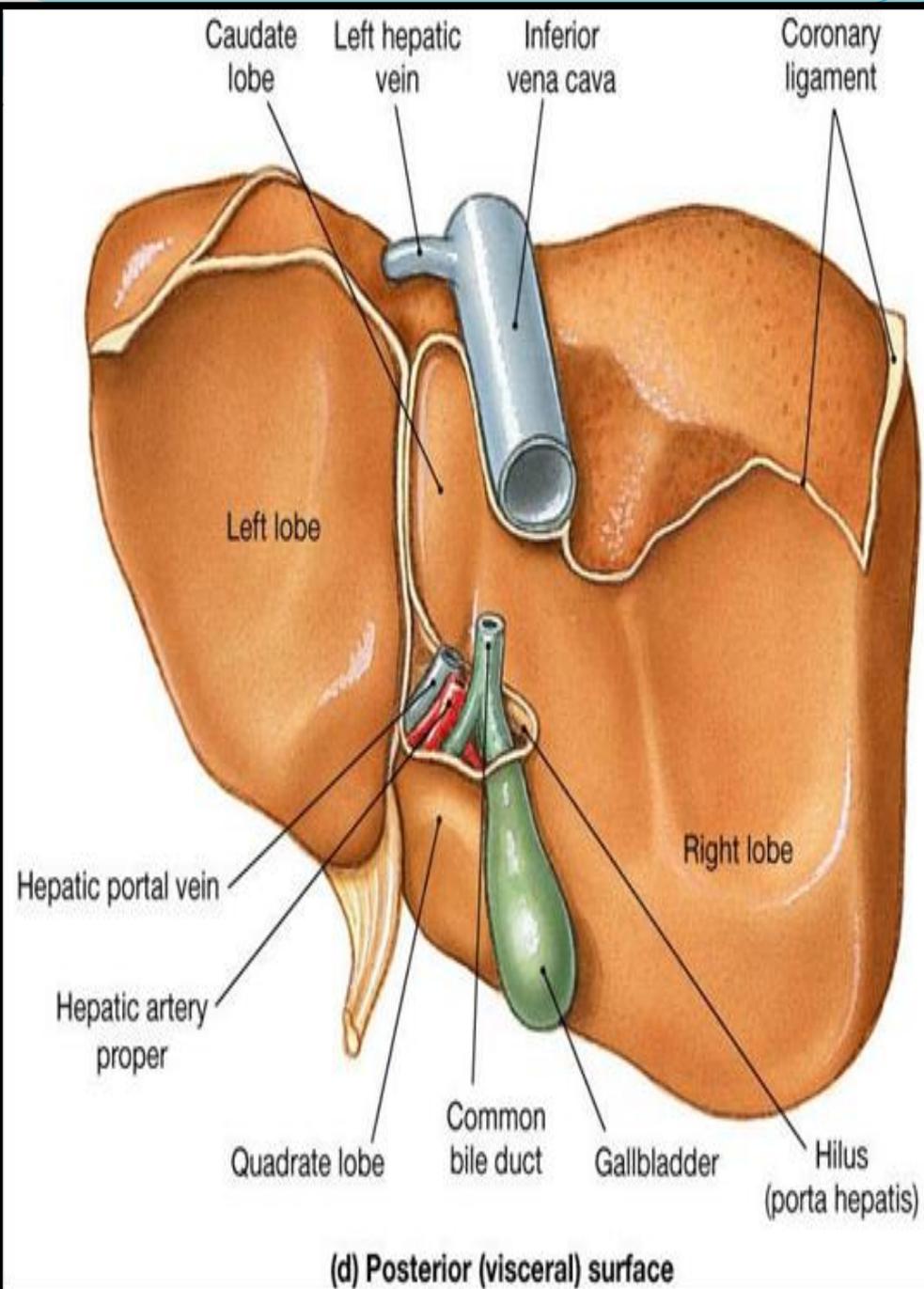
Bare area of liver:

It is a triangular area related directly to the diaphragm

its **base** is formed by the groove for IVC its **apex** is formed by right triangular ligament

its **sides** are the two layers of coronary ligament.

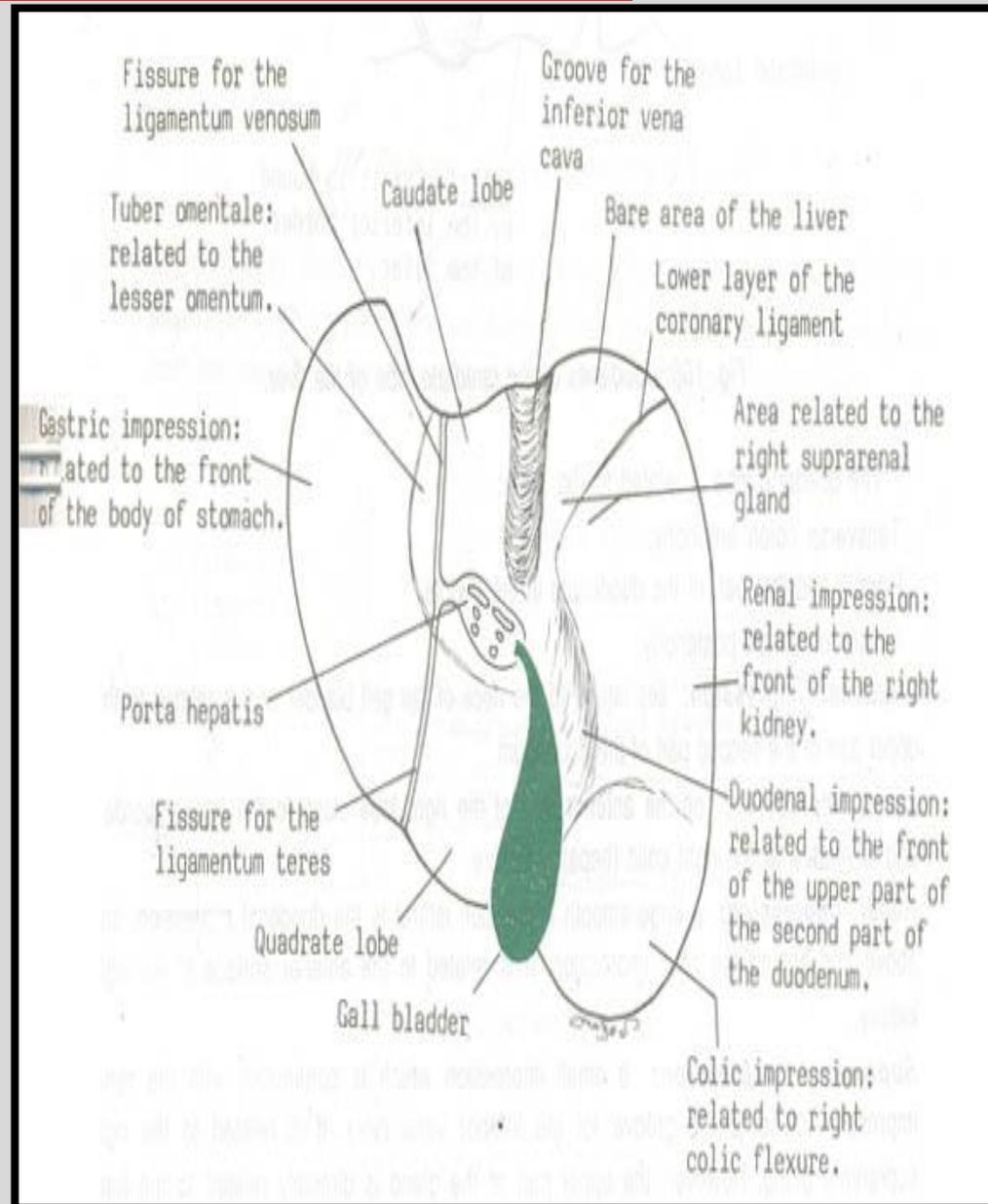
It is related to diaphragm and right suprarenal gland

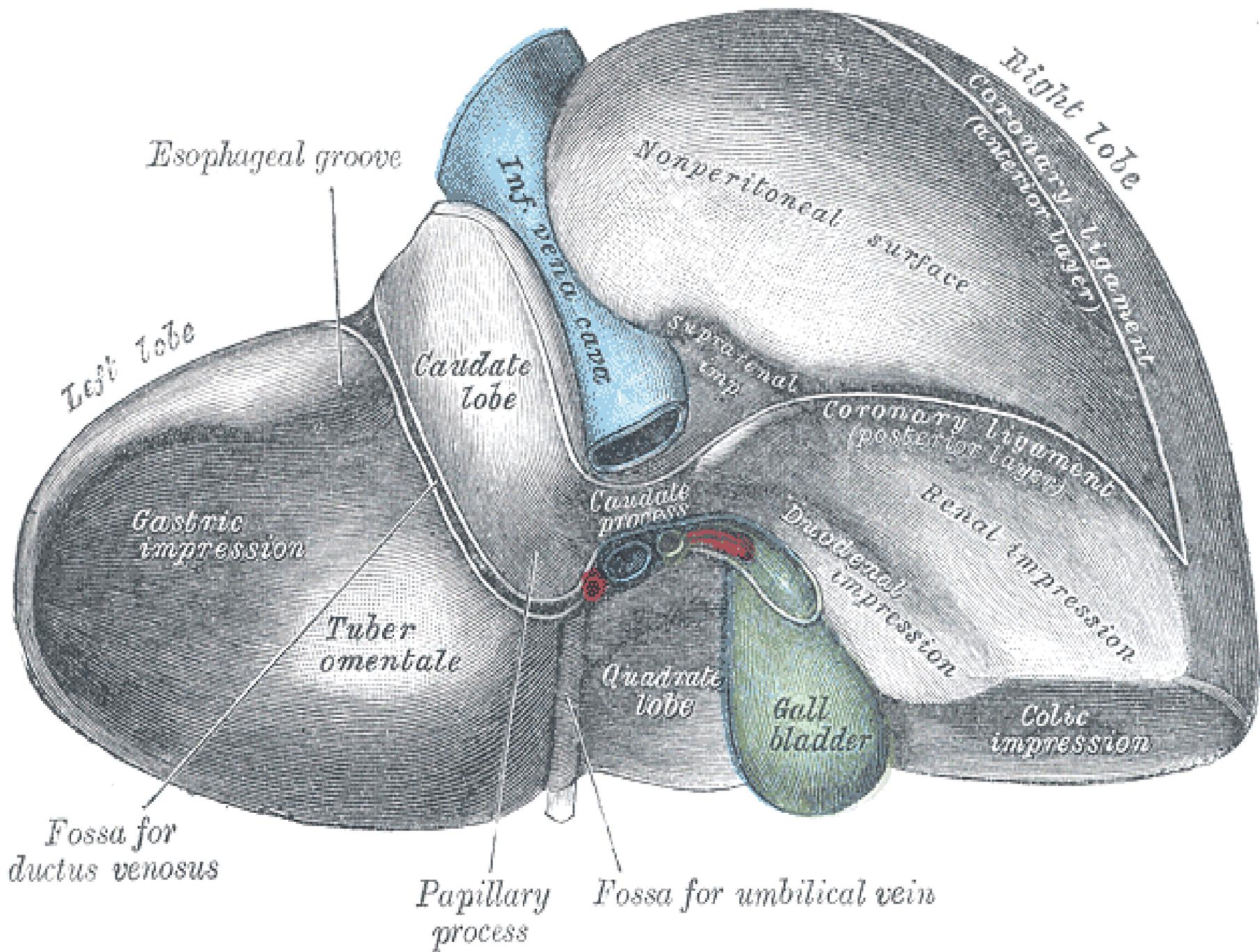


Relations of the liver

5- inferior surface: it shows the following features and impressions of organs from left to right:

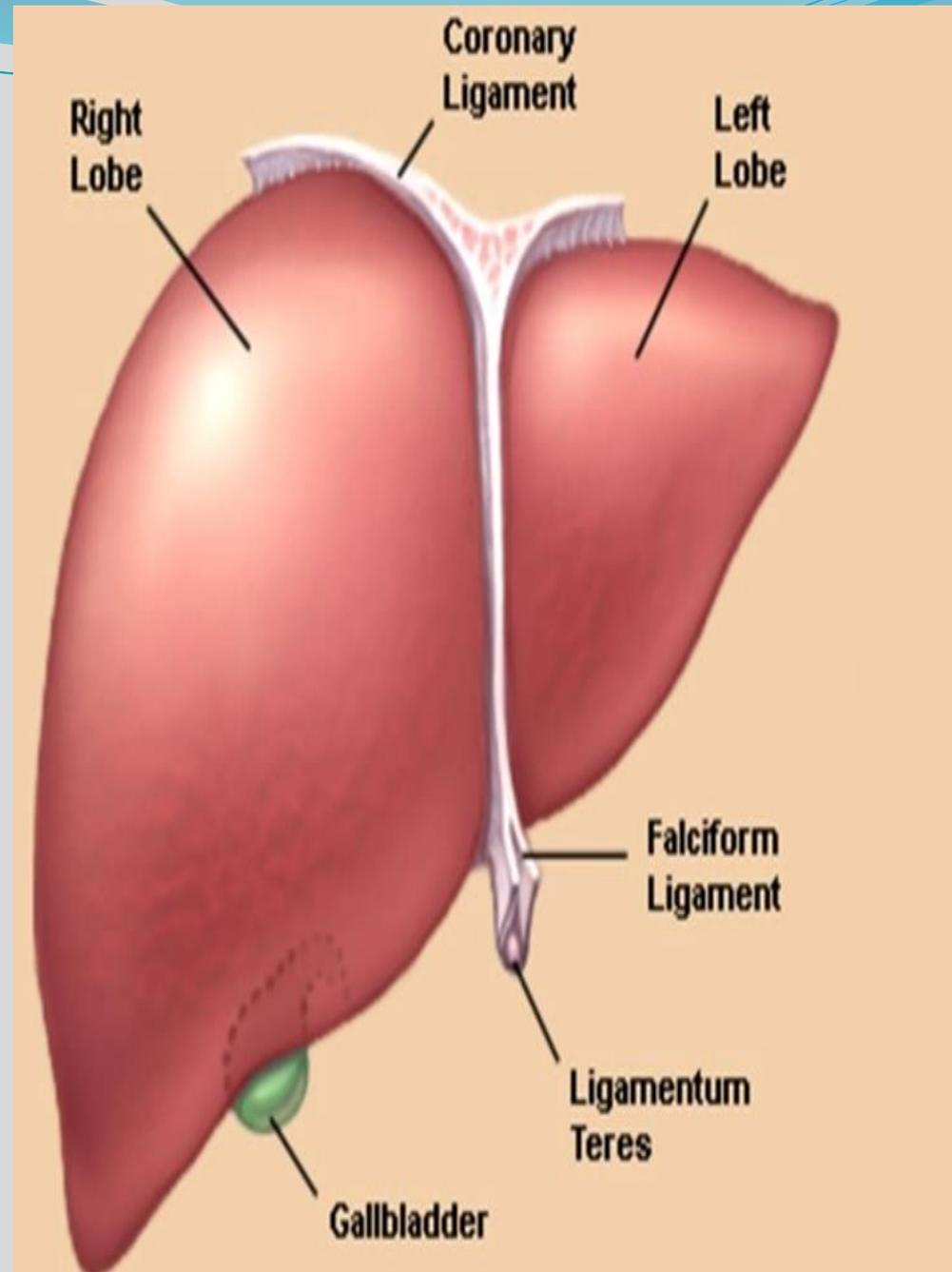
- **Gastric impression** related to upper part of stomach.
- **Tuber omental** related to lesser omentum.
- **Fissure for ligamentum teres :**
 - Ligamentum teres is **obliterated left umbilical vein & it extends** from the umbilicus to left branch of portal vein.
- **Quadrate lobe**
- Bare area related to **G.B.** (gall bladder fossa)
- **2nd part of duodenum.**
- **Right colic flexure .**
- **Right kidney.**
- **Right suprarenal gland**





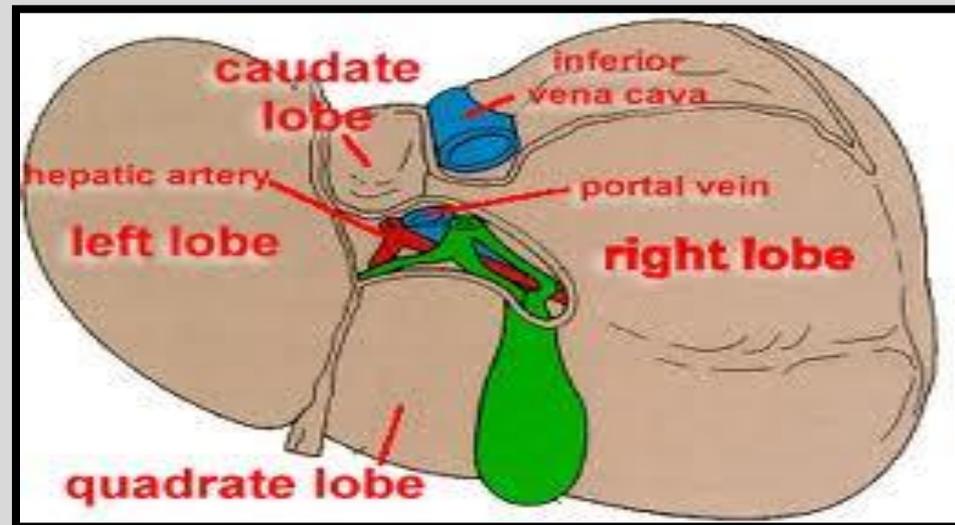
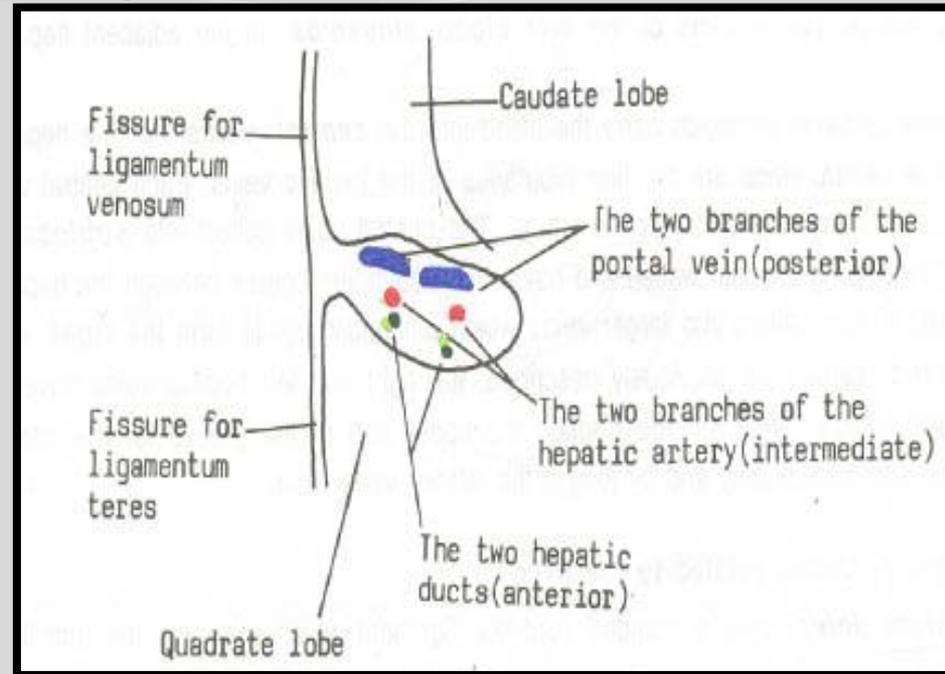
★ Borders :

- Surfaces of liver are continuous together at rounded borders except the anterior and inferior surfaces are separated from each other by sharp **inferior border**.
- The inferior border has **2 notches**, one for the ligamentum teres and one for fundus of G.B.



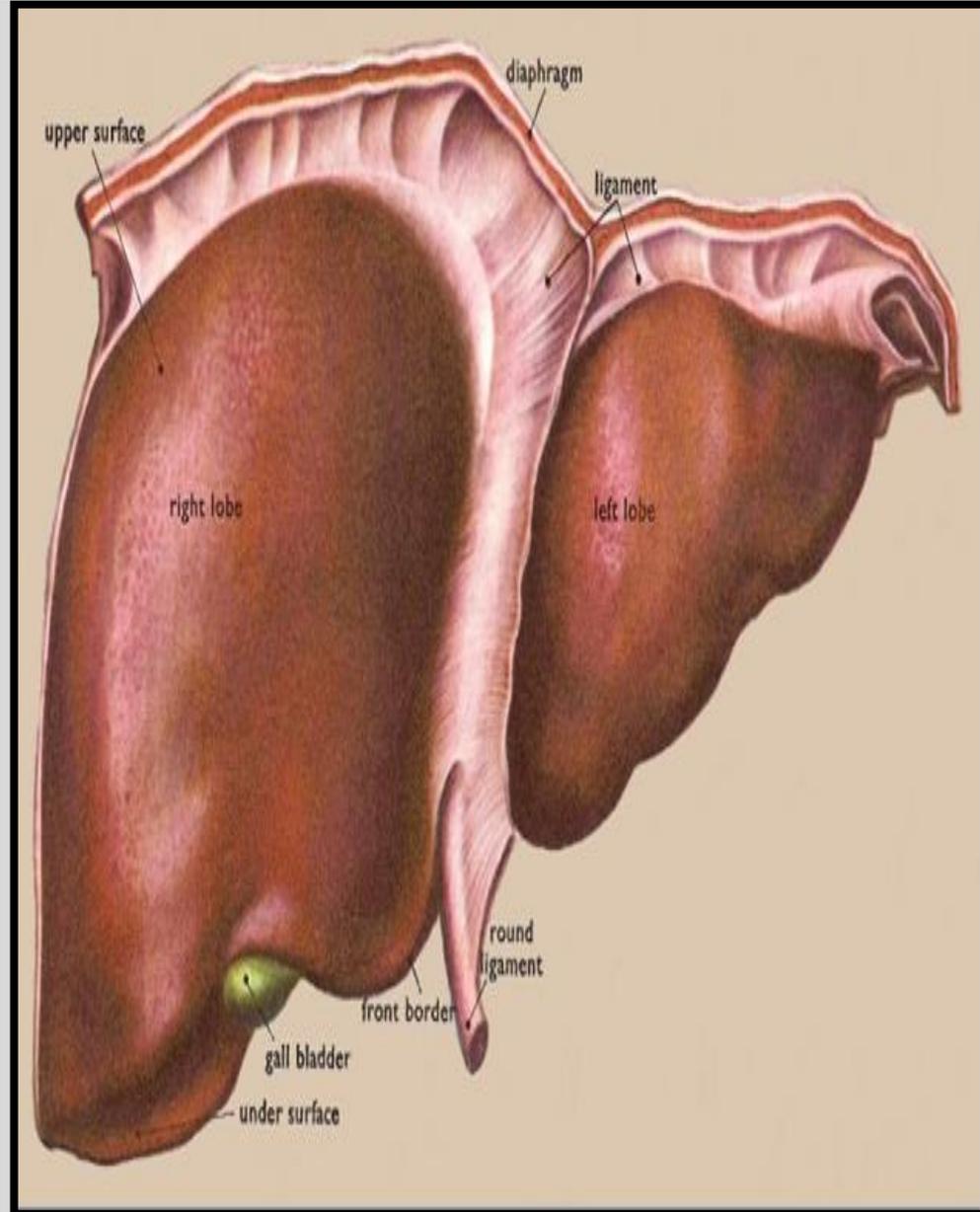
Porta hepatis

- It forms the hilum of the liver. Anteriorly, it is bounded by quadrate lobe and posteriorly, by caudate lobe and process.
- Structures passing through it:
 - a. Hepatic ducts: anterior In position.
 - b. Hepatic artery: intermediate in position.
 - c. Portal vein: posterior in position.
 - d. lymph nodes ,lymphatics and autonomic nerves .
- **Its margins give attachment to the lesser omentum.**



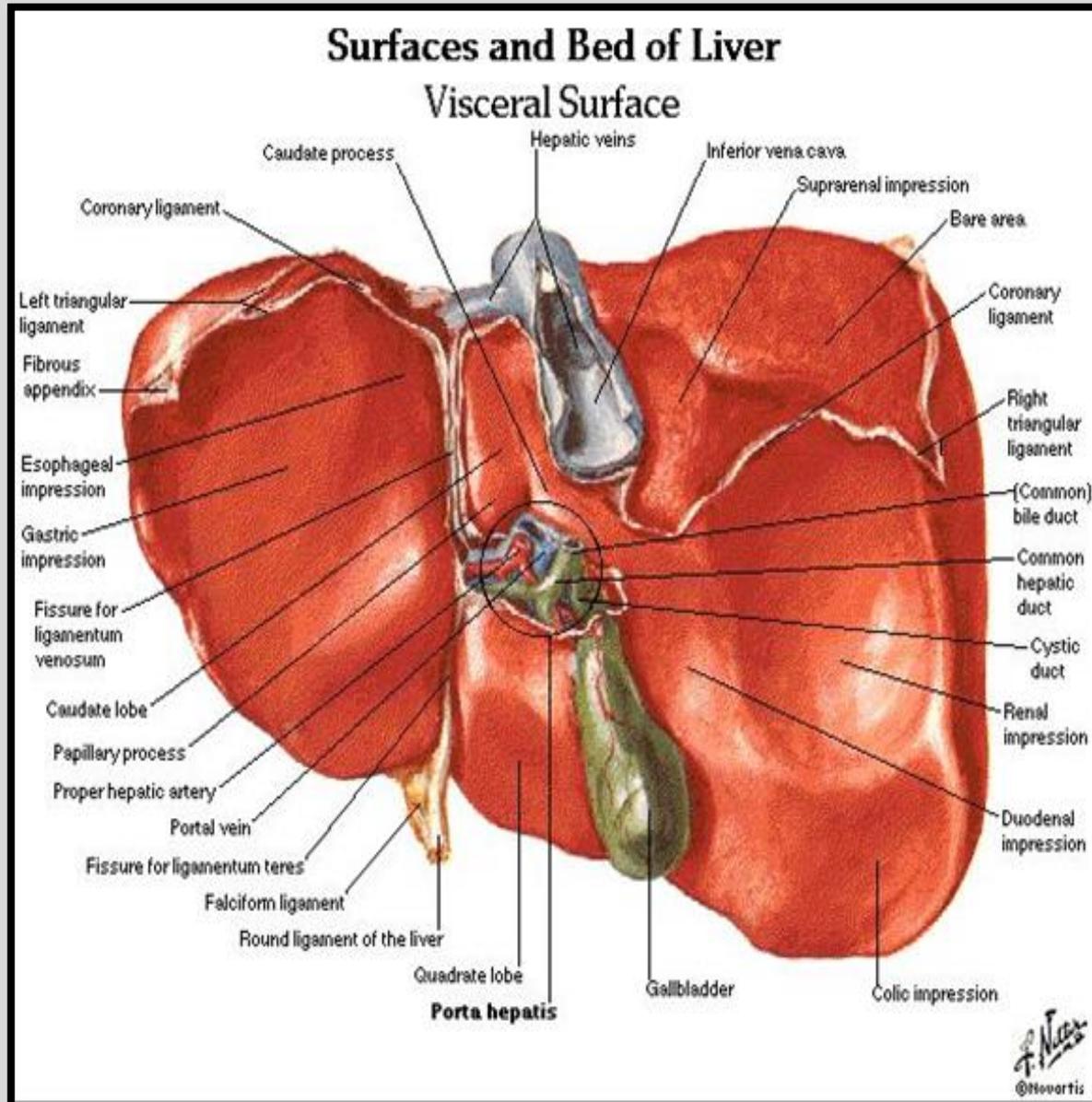
Peritoneal relations

- The liver is completely **covered** with peritoneum except the following bare areas:
 - 1- Triangular Bare area related to the diaphragm, on the posterior surface.
 - 2- Groove for inferior vena cava, on the posterior surface.
 - 3- Fossa for gall bladder, on the inferior surface.
 - 4- Porta hepatis.
 - 5- Fissure for ligamentum teres
 - 6- Fissure for ligamentum venosum which **give attachment to the lesser omentum.**



Peritoneal folds and ligaments related to the liver

- 1- falciform ligament.
- 2- upper layer of coronary ligament.
- 3- lower layer of coronary ligament.
- 4- right triangular ligament.
- 5- Left triangular ligament.
- 6- lesser omentum.



Embryonic remnants

1- Ligamentum teres:

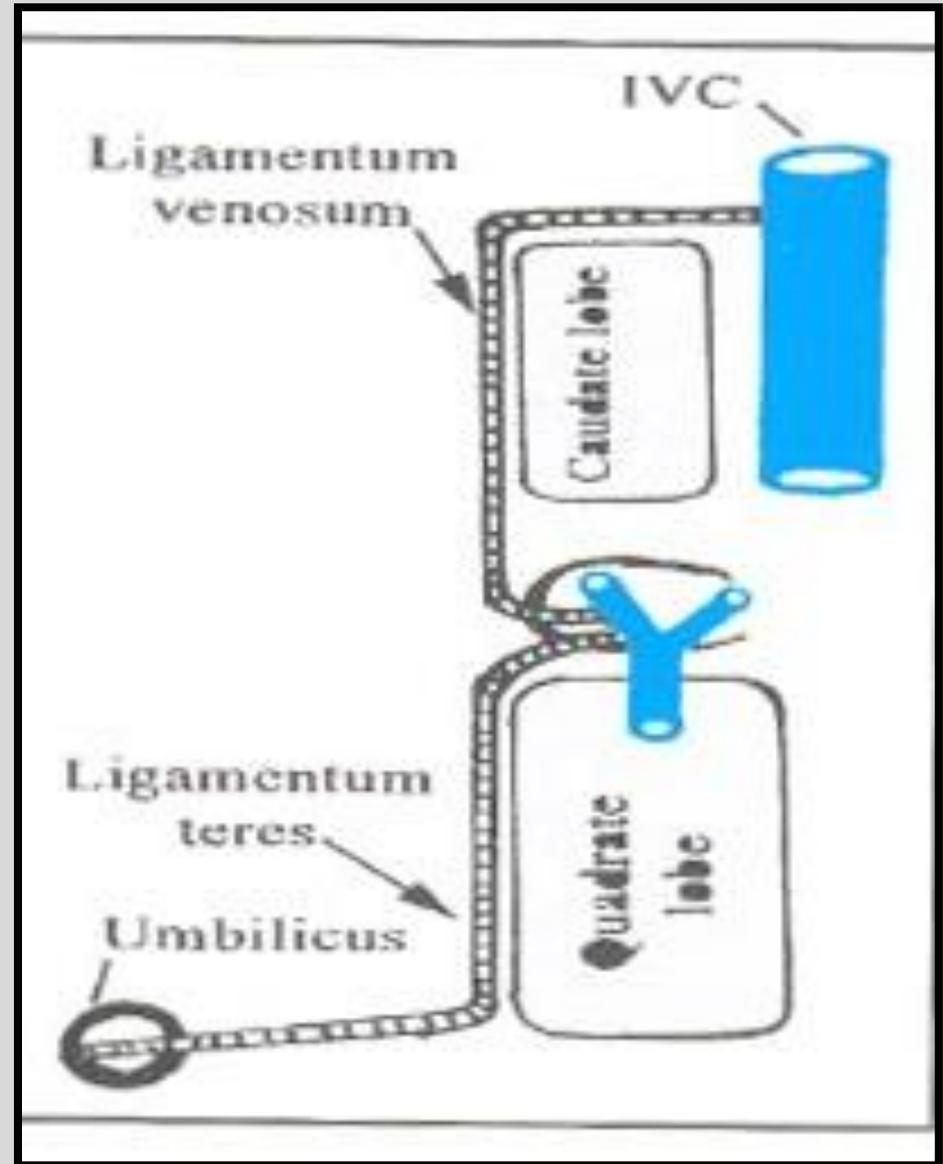
It represents the obliterated umbilical vein.

It connects the umbilicus with the left branch of portal vein.

2- Ligamentum venosum:

It represents the obliterated ductus venosus.

It connects the left branch of portal vein with the IVC.

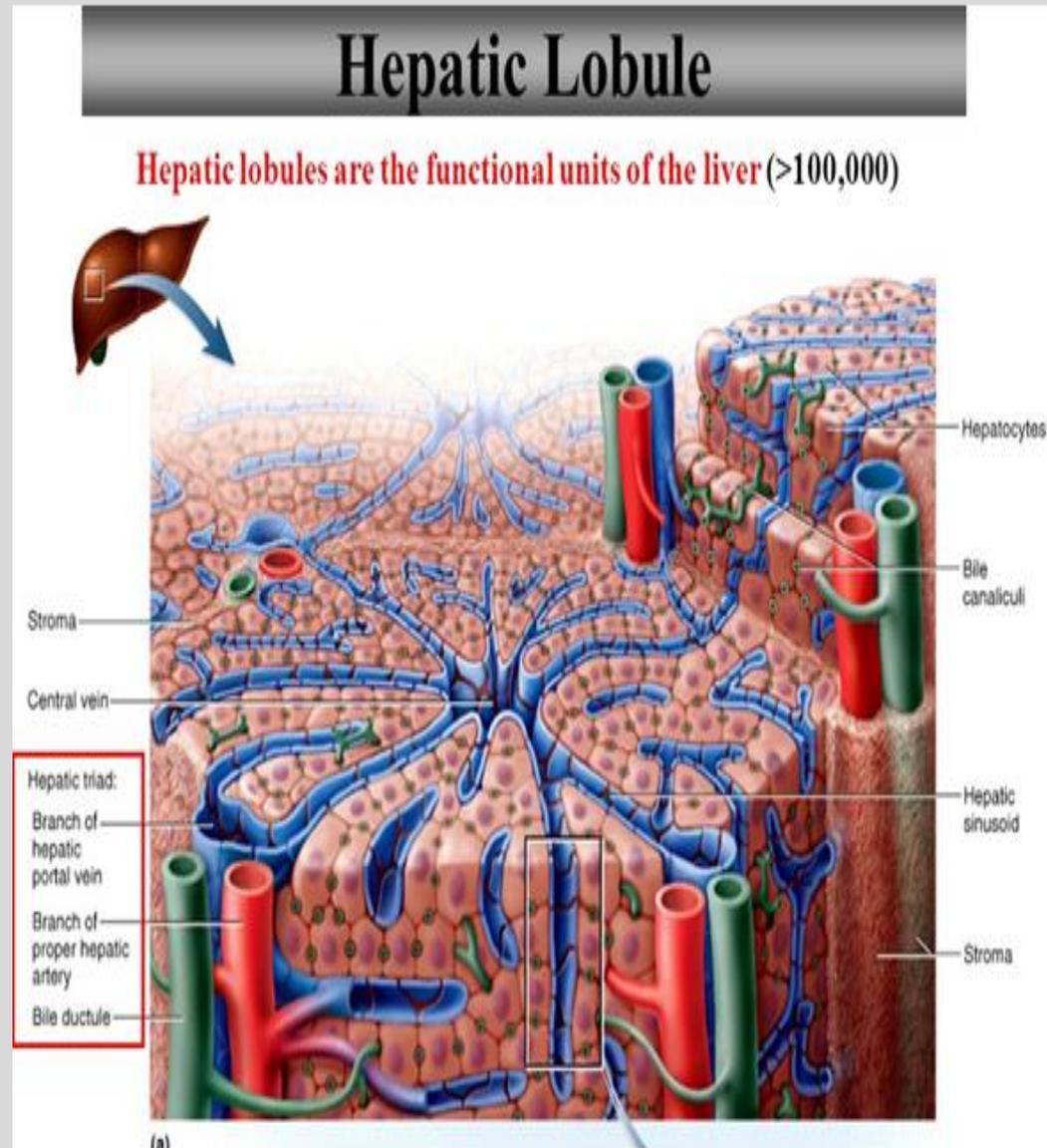


Factors supporting the liver in position

- The liver is **fixed** in its position by the following factors:
- **Intra-abdominal pressure and tone** of the anterior abdominal wall.
- **The peritoneal folds** attaching the liver to the diaphragm and the anterior abdominal wall.
- **Hepatic veins** fix the liver to IVC which is fixed to the posterior abdominal wall.

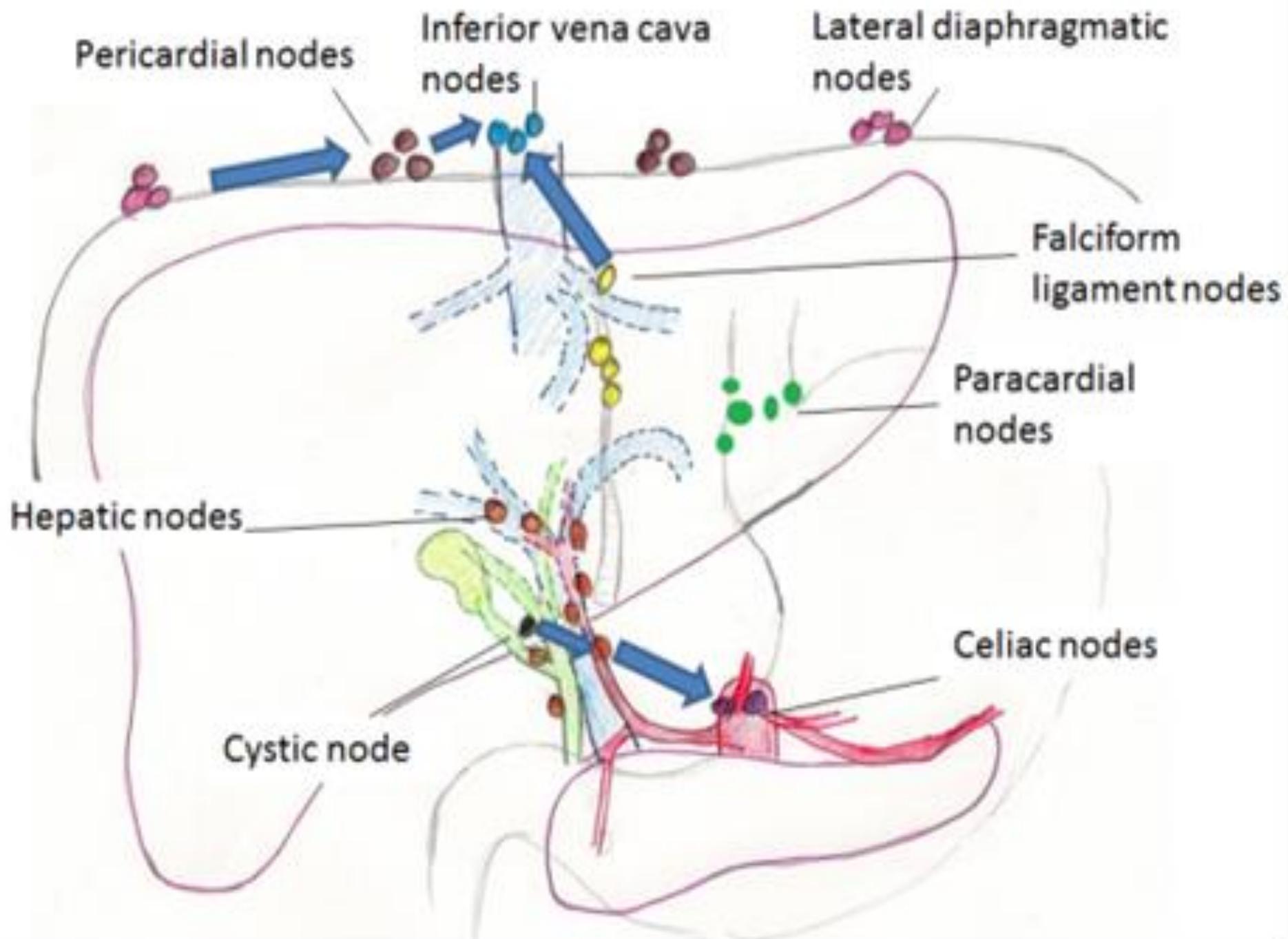
Blood supply

- Mainly portal vein (75%) & hepatic artery (25%).
- Inside the liver, blood coming from the portal vein & hepatic artery are mixed in the sinusoids. Blood is collected from each hepatic lobule in a central vein. The central veins are collected to form 3 hepatic veins which join the I.V.C.



Lymphatic Drainage

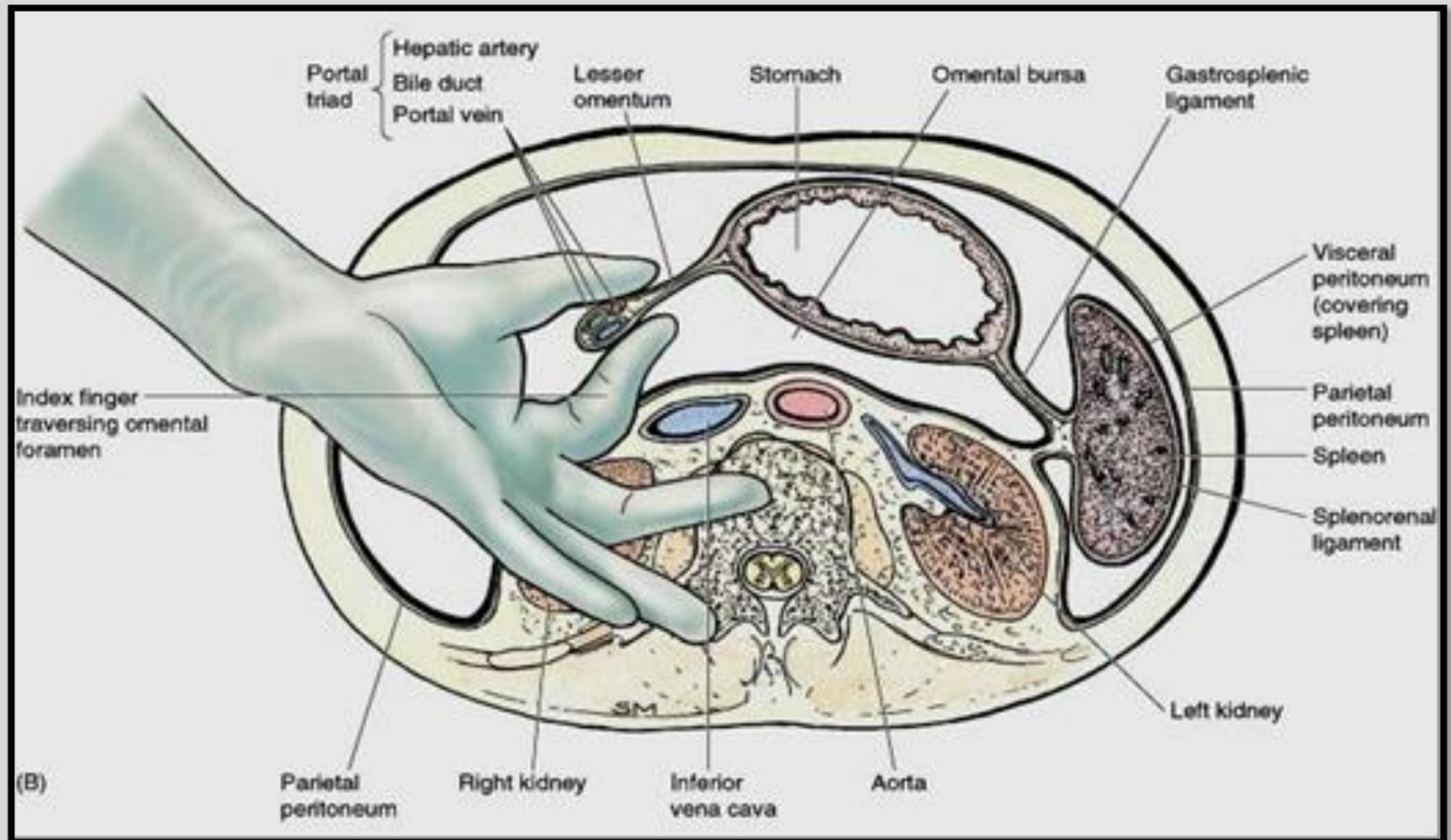
- Mainly to **hepatic lymph nodes** (in the porta hepatic and free border of lesser omentum around the hepatic artery)
- **Paracardial lymph nodes**, around the lower part of the esophagus, drain the posterior part of left lobe of liver.
- **Coeliac lymph nodes**, around coeliac trunk, drain the hepatic & paracardial lymph nodes.
- Some lymphatics pass along IVC and its opening in the diaphragm to drain into lymph nodes around end of IVC.



Applied Anatomy

- In the living, the liver is soft, fixed and friable, therefore it is the second common solid abdominal organ to be injured (after spleen), producing severe hemorrhage and its tear is difficult to be repaired.
- To stop bleeding from liver tear, compress the free border of the lesser omentum by clamp or two fingers to occlude the hepatic artery and portal vein for a period up to 20 minutes (Pringle's maneuver).
- In the living adult, normal liver is soft and can not be felt but its position can be determined by percussion. If the liver can be felt, this indicates pathology.
- Enlargement of the liver is called **hepatomegaly**.

Pringle's maneuver





Thank you