GALL BLADDER &BILIARY PASSAGES

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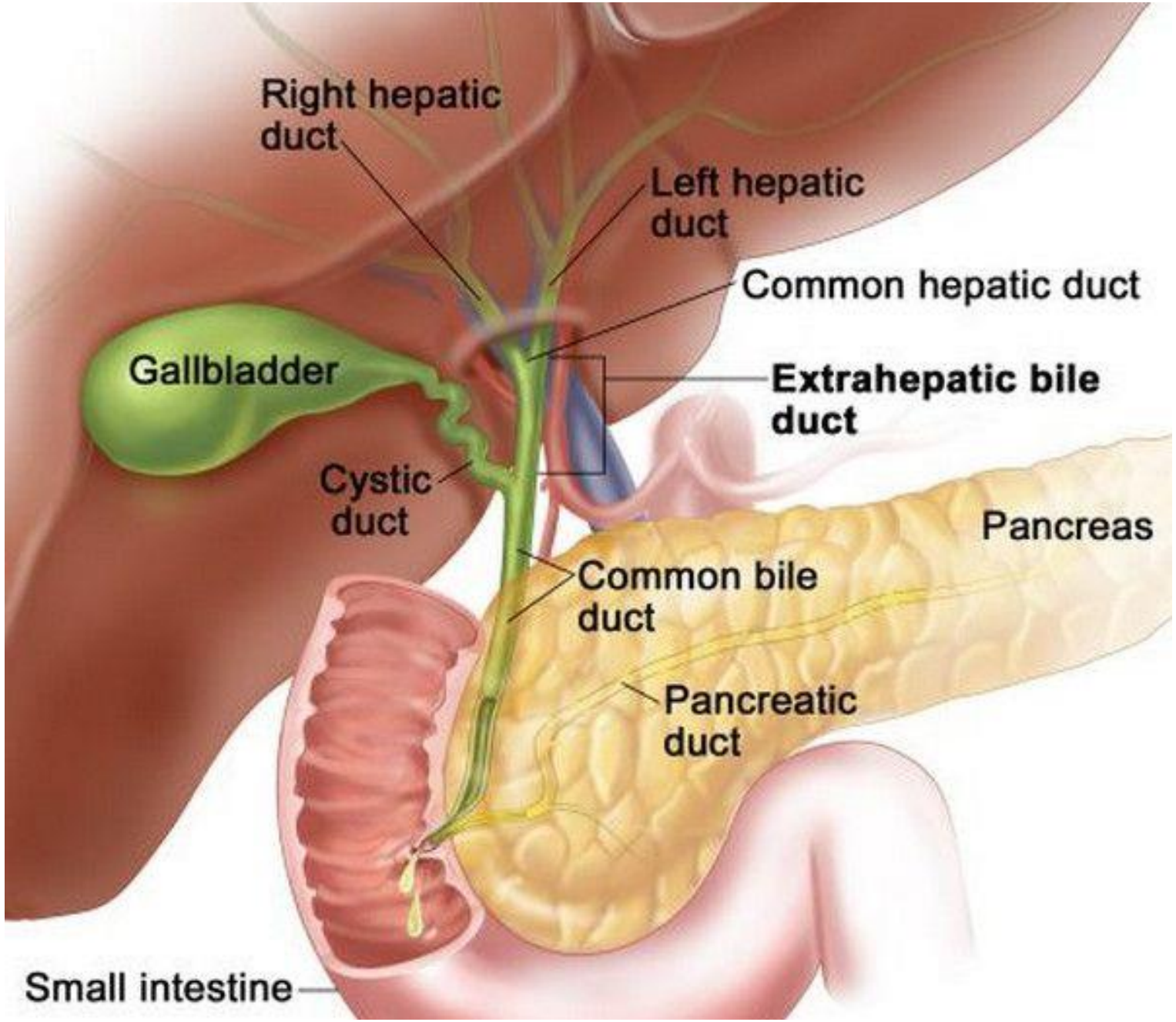
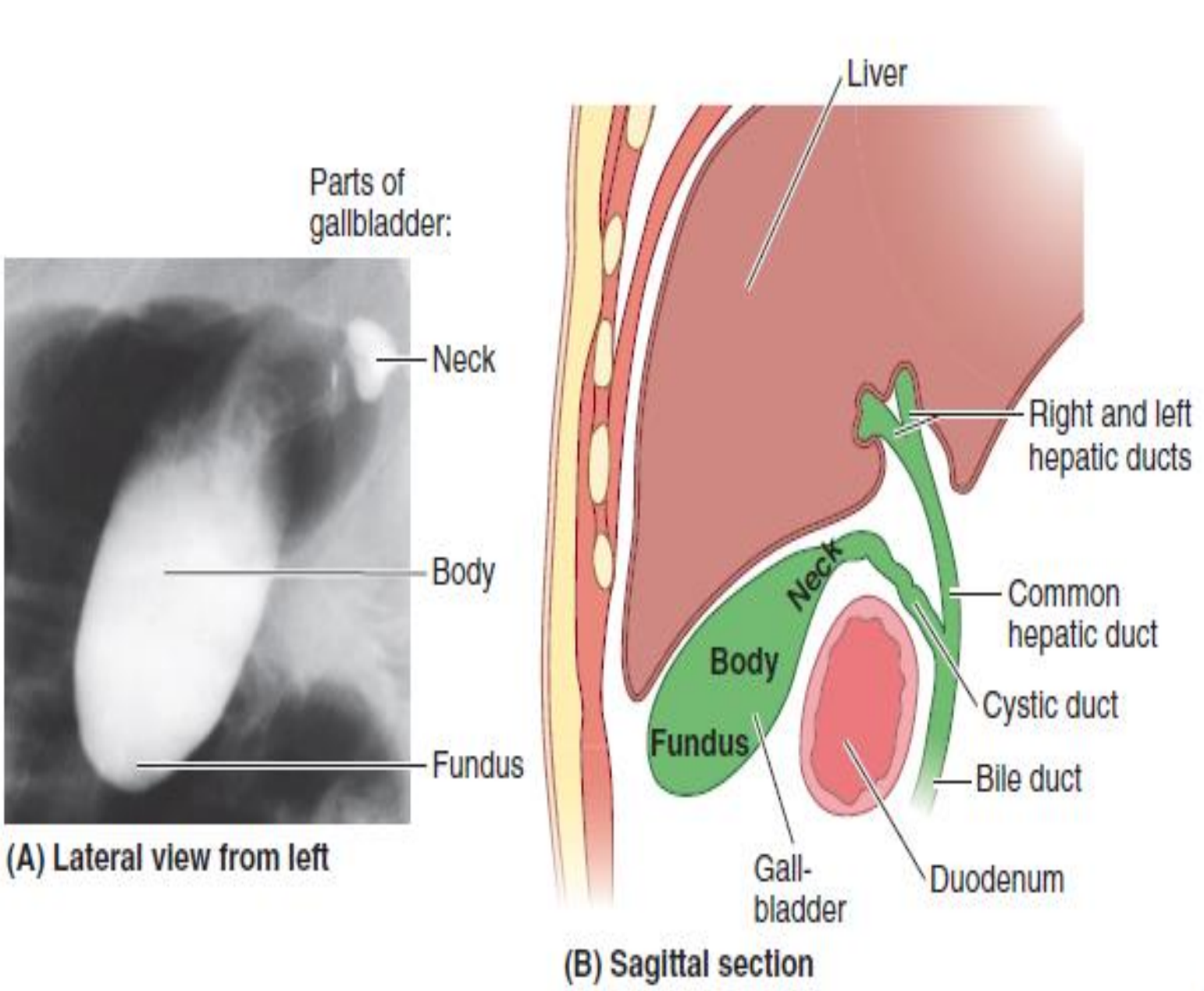
GALL BLADDER

- The **gallbladder** (*gall*-=bile) is a pear-shaped sac that is located on the inferior surface of the liver.
- It is 7–10 cm (3–4 inch) long and part of it typically hangs below the anterior inferior margin of the liver



The parts of the gallbladder are:

- the broad fundus, which projects downward beyond the inferior border of the liver
- the central portion, called the body
- and a tapered portion called the neck.
- ✓The body and neck project superiorly

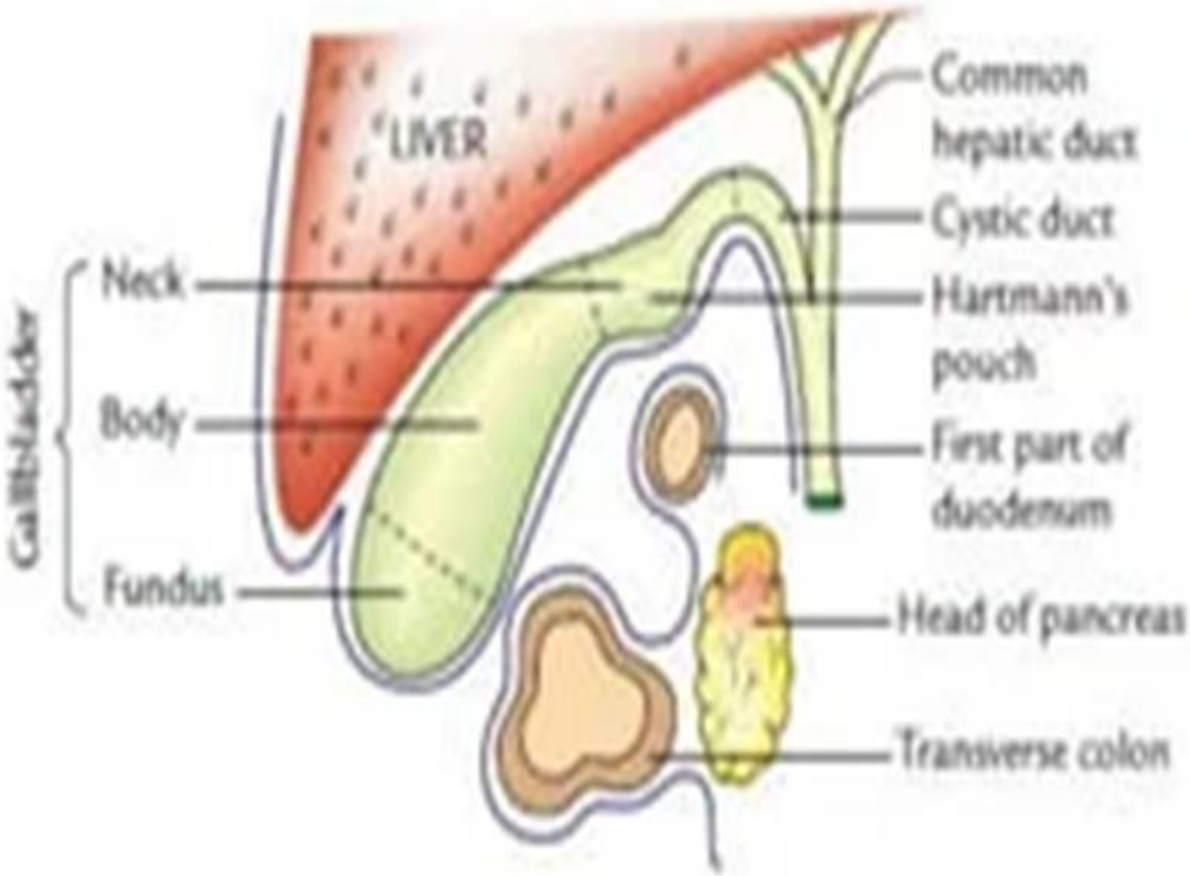


GALL BLADDER

PERITONEAL COVERING:

- Fundus: completely covered by peritoneum
- Body & neck: only covered posteriorly

FUNCTION: Stores & concentrates bile



Peritoneal covering of gallbladder

Covered by peritoneum except for the surface resting on liver.

The gallbladder is supplied by:

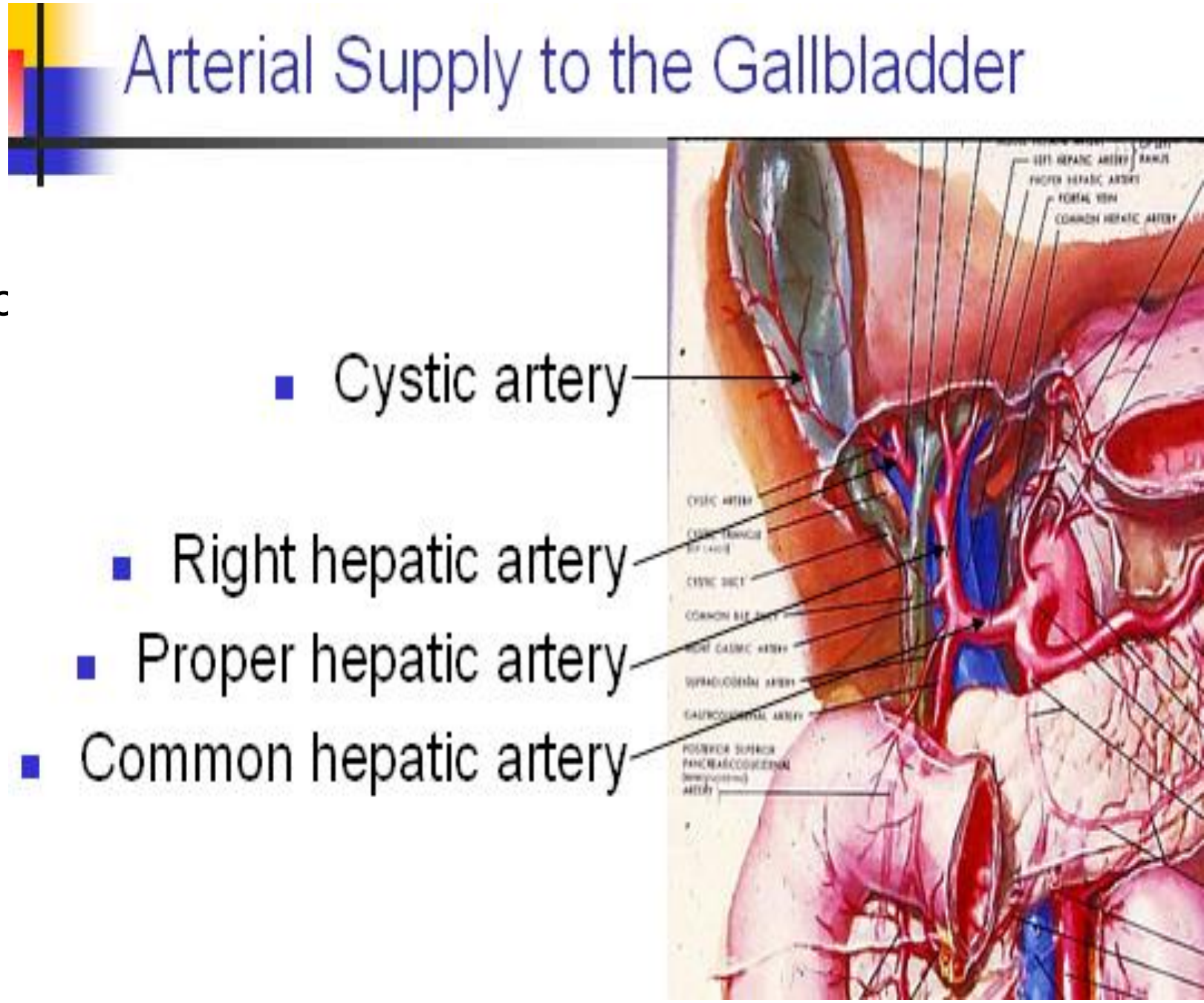
the cystic artery, which usually arises from the right hepatic artery.

It is drained by The cystic veins tc the portal vein.

The nerves to the gallbladder include branches from the celiac plexus and the vagus (X) nerve.

- **Lymphatic drainage**

- The gallbladder drains into nodes in the porta hepatis and to the cystic node in Calot's triangle, which is found at the junction of the cystic duct with the common hepatic duct.

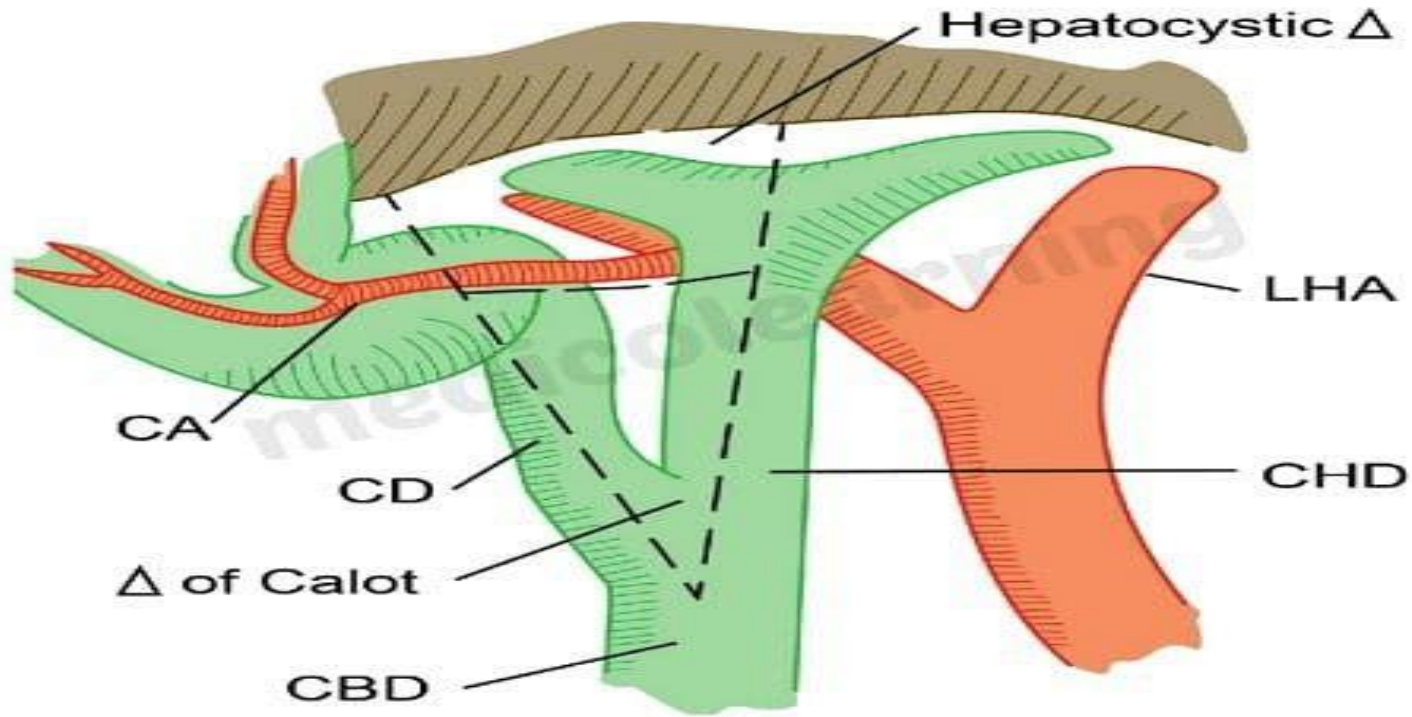


Calot's Triangle

Calot's triangle (cystohepatic triangle) is a small anatomical space in the abdomen.

Contents

- Right hepatic artery
- Cystic artery
- Lymph node of Lund
- Lymphatics

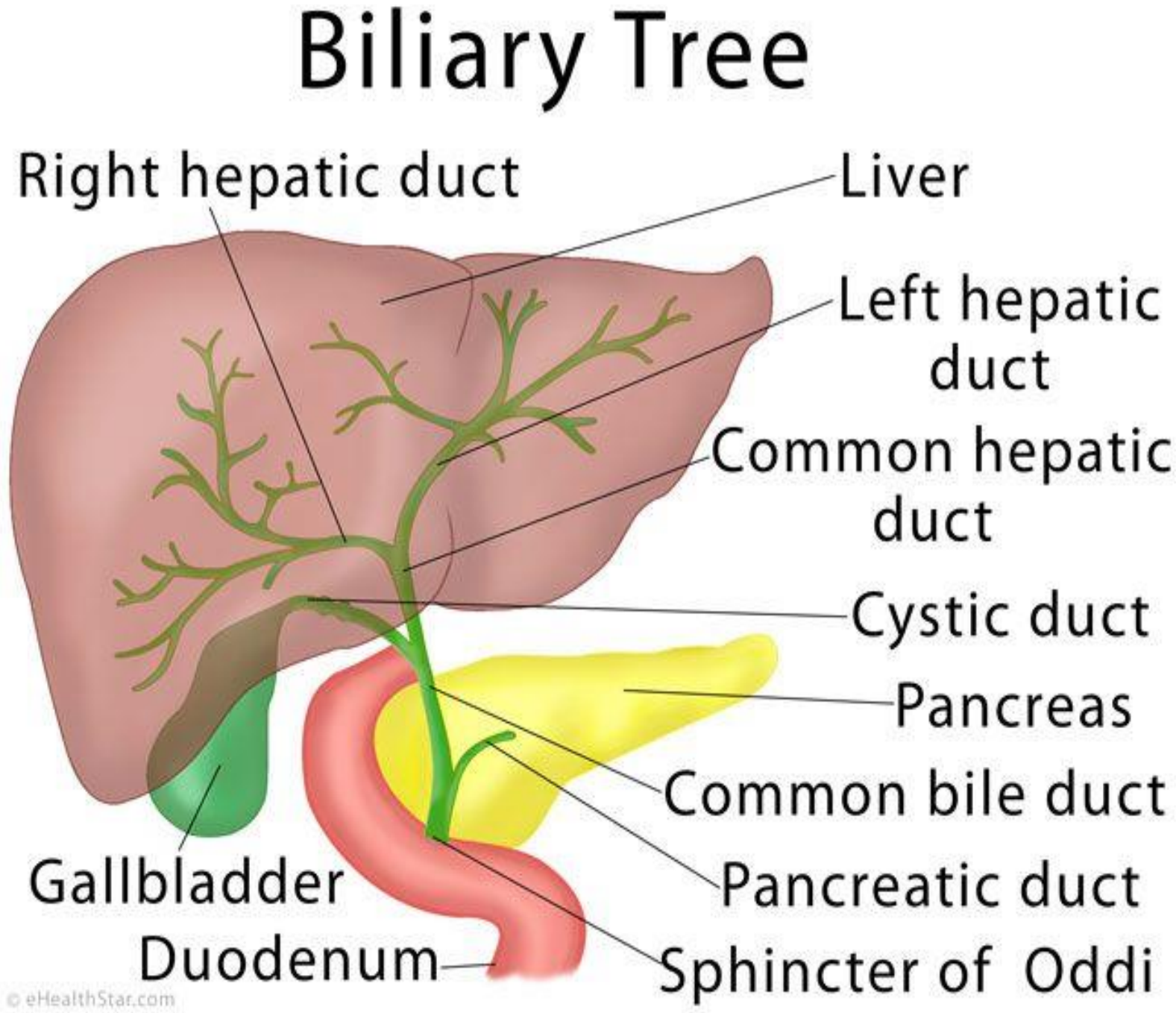


Border

- common hepatic duct medially
- cystic duct inferiorly
- Cystic Artery superiorly

BILIARY TREE

It is the Part of the digestive system.
Made up of:
-Intra hepatic biliary ducts
-Extra hepatic biliary ducts
The biliary ducts convey bile from the liver to the duodenum.
Bile is produced continuously by the liver and stored and concentrated in the gallbladder, which releases it intermittently when fat enters the duodenum.



HEPATIC DUCTS

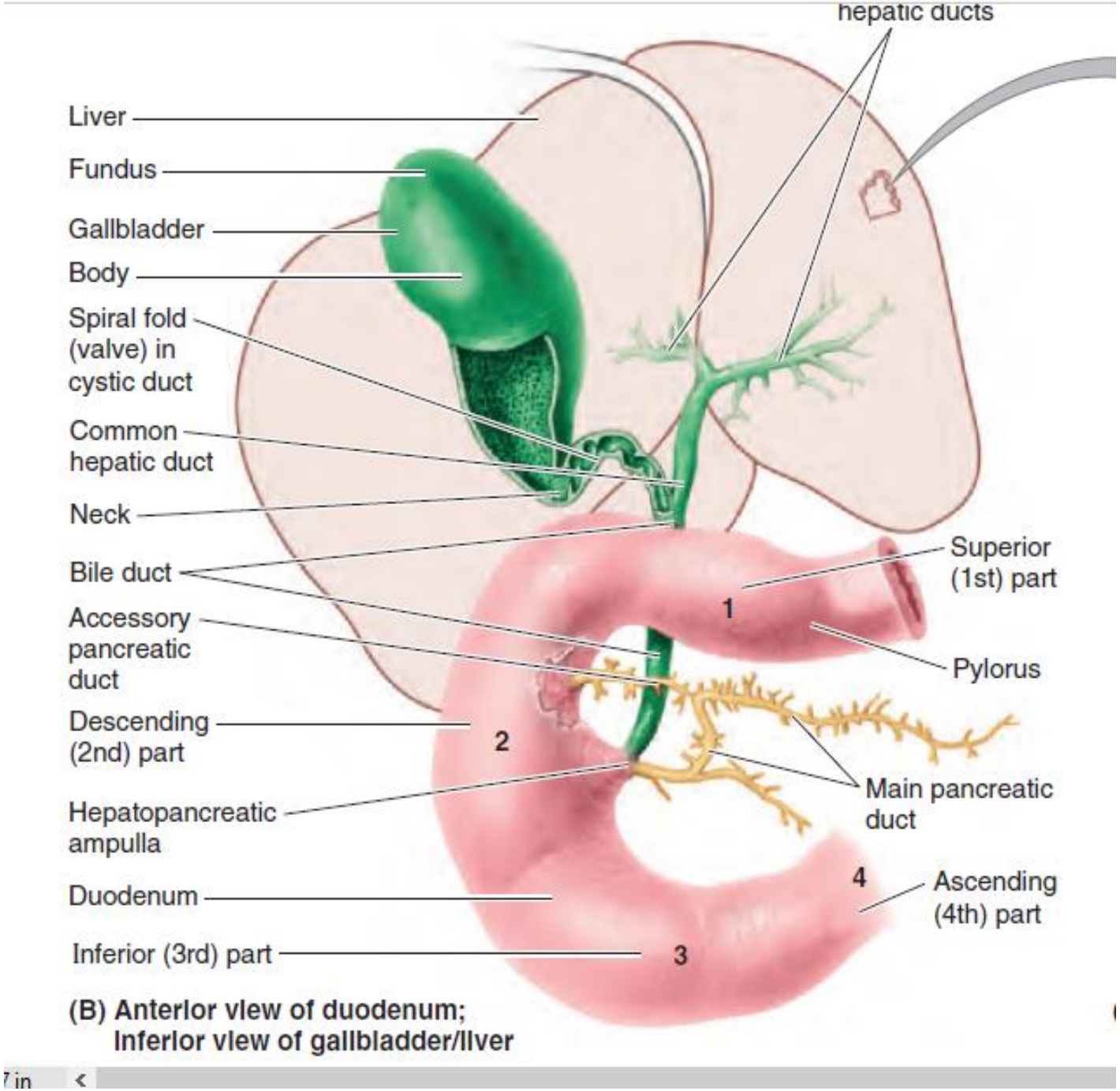
- **The hepatocytes secrete bile into the bile canaliculi formed between them. The canaliculi drain into the small segmental biliary ducts and then into large collecting bile ducts which merges to form the hepatic ducts**

1-The right and left hepatic ducts drain the right and left (parts of the) liver, respectively. Shortly after leaving the porta hepatis, these hepatic ducts unite to form the common hepatic duct,

2- common hepatic duct is joined on the right side by the cystic duct to form the bile duct

3- Cystic duct:

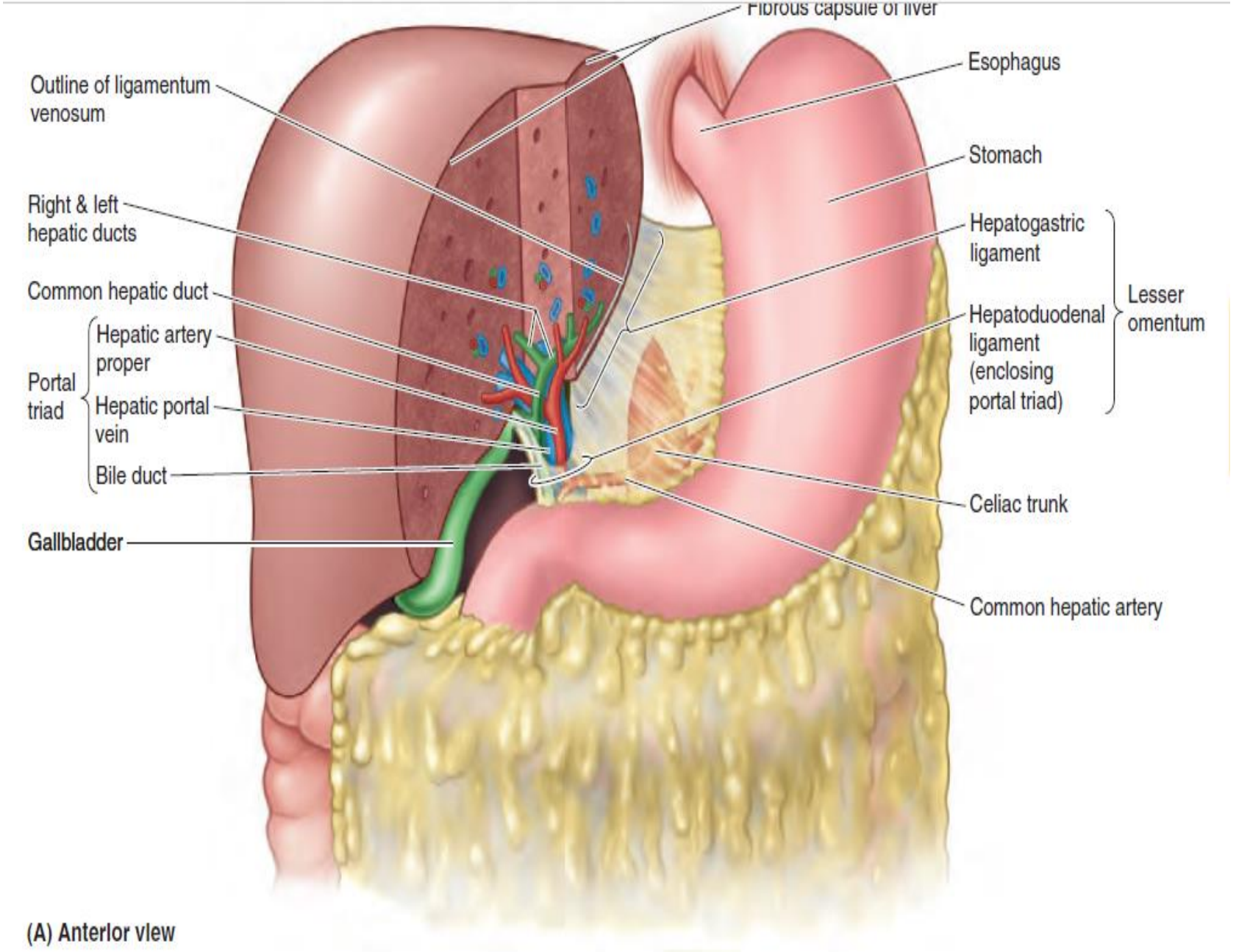
- **It is one and half inches long.**
- **It is S- shaped.**
- **It joins the common hepatic duct at an acute angle to form the bile duct just below the porta hepatis.**



(B) Anterior view of duodenum; Inferior view of gallbladder/liver

4- BILE DUCT

- **The bile duct (formerly called the common bile duct) forms in the free edge of the lesser omentum by the union of the cystic duct and common hepatic duct**
- **The length of the bile duct varies from 6 – 8 cm long, 6 mm wide.**
- **The bile duct descends posterior to the superior part of the duodenum and lies in a groove on the posterior surface of the head of the pancreas.**



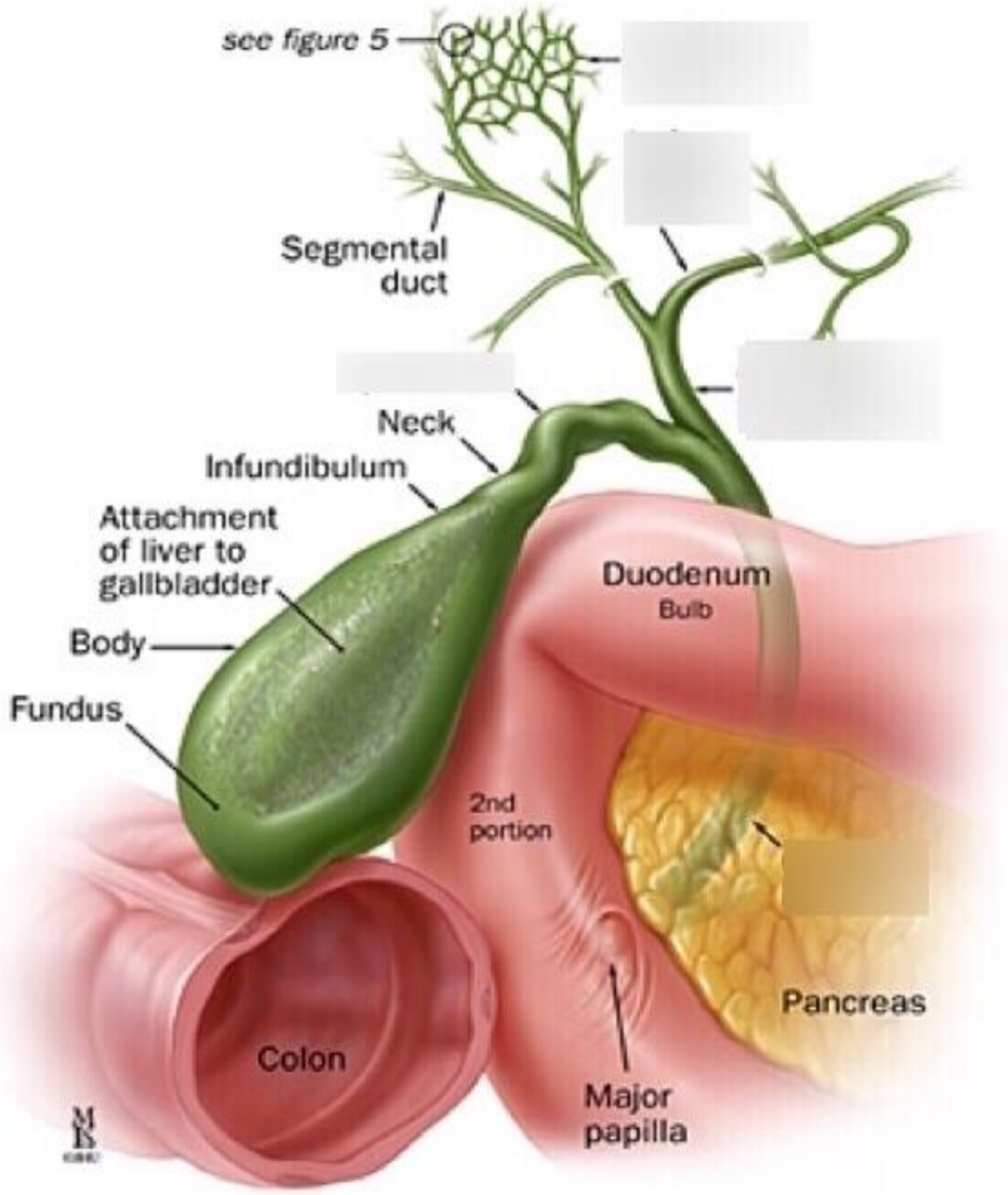
Parts of CBD

1-The supraduodenal portion accounts for 2.5 cm of the total length of the structure. It travels inferiorly in the right part of the free edge of the lesser omentum, anterior to the gastroepiploic foramen of Winslow.

2-The retroduodenal portion travels behind the pars superioris (first part) of the duodenum along with the gastroduodenal artery also medially related to the duct at this level.

3-The infraduodenal portion travels in a groove on the posterior surface of the head of the pancreas. The inferior vena cava is posterior to the duct here. The duct usually lies within 2 cm of the second part of the duodenum.

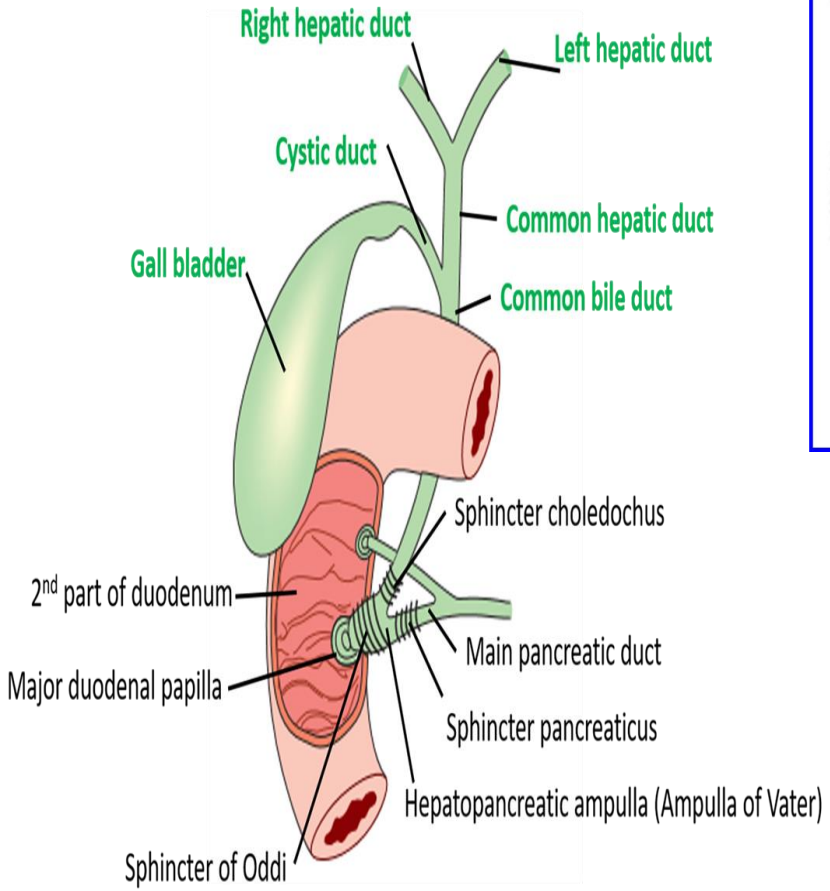
4-The intraduodenal portion pierces the medial wall of the second part of the duodenum along with the pancreatic duct.

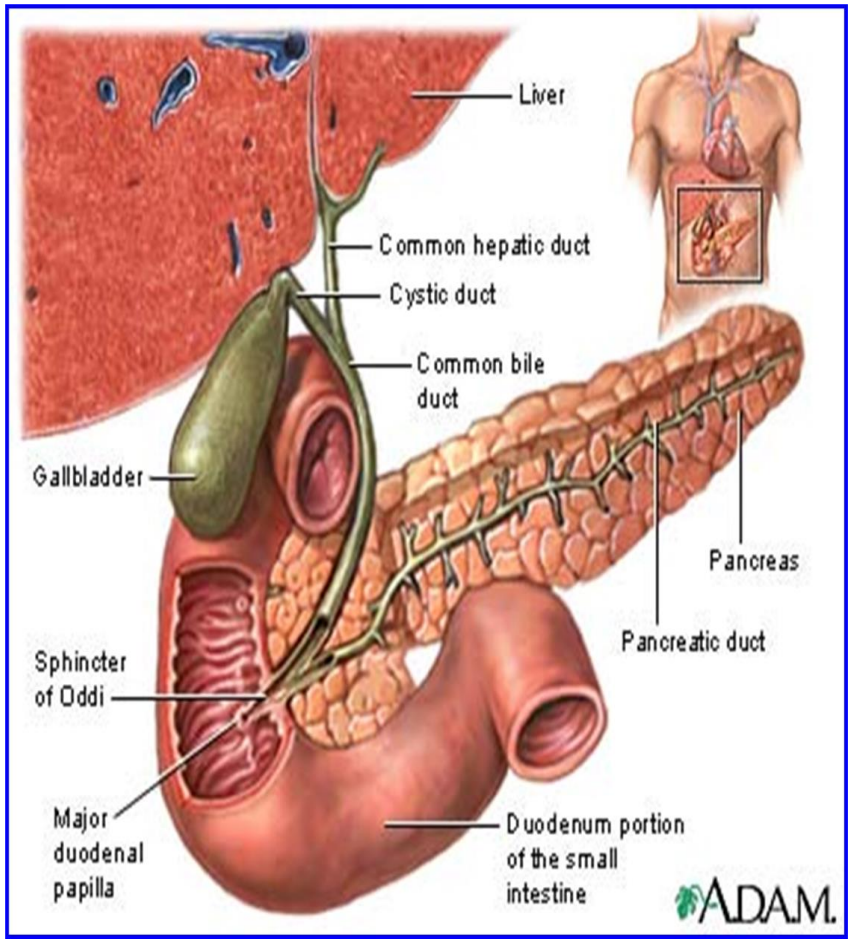


- **These ducts run obliquely through the wall of this part of the duodenum, where they unite, forming a dilation, the hepatopancreatic ampulla The distal end of the ampulla opens into the duodenum through the major duodenal papilla**
- **The circular muscle around the distal end of the bile duct is**

thickened to form the sphincter of the bile duct

there are two circular muscular structures around the hepatopancreatic ampulla – superior and inferior sphincter choledochus. The superior sphincter choledochus is located around the distal portion of the common bile duct. There is also a similar sphincter around the distal aspect of the main pancreatic duct. Therefore, release of contents from the biliary tract and pancreatic duct can be regulated independently. The inferior sphincter choledochus becomes the hepatopancreatic sphincter of Oddi.





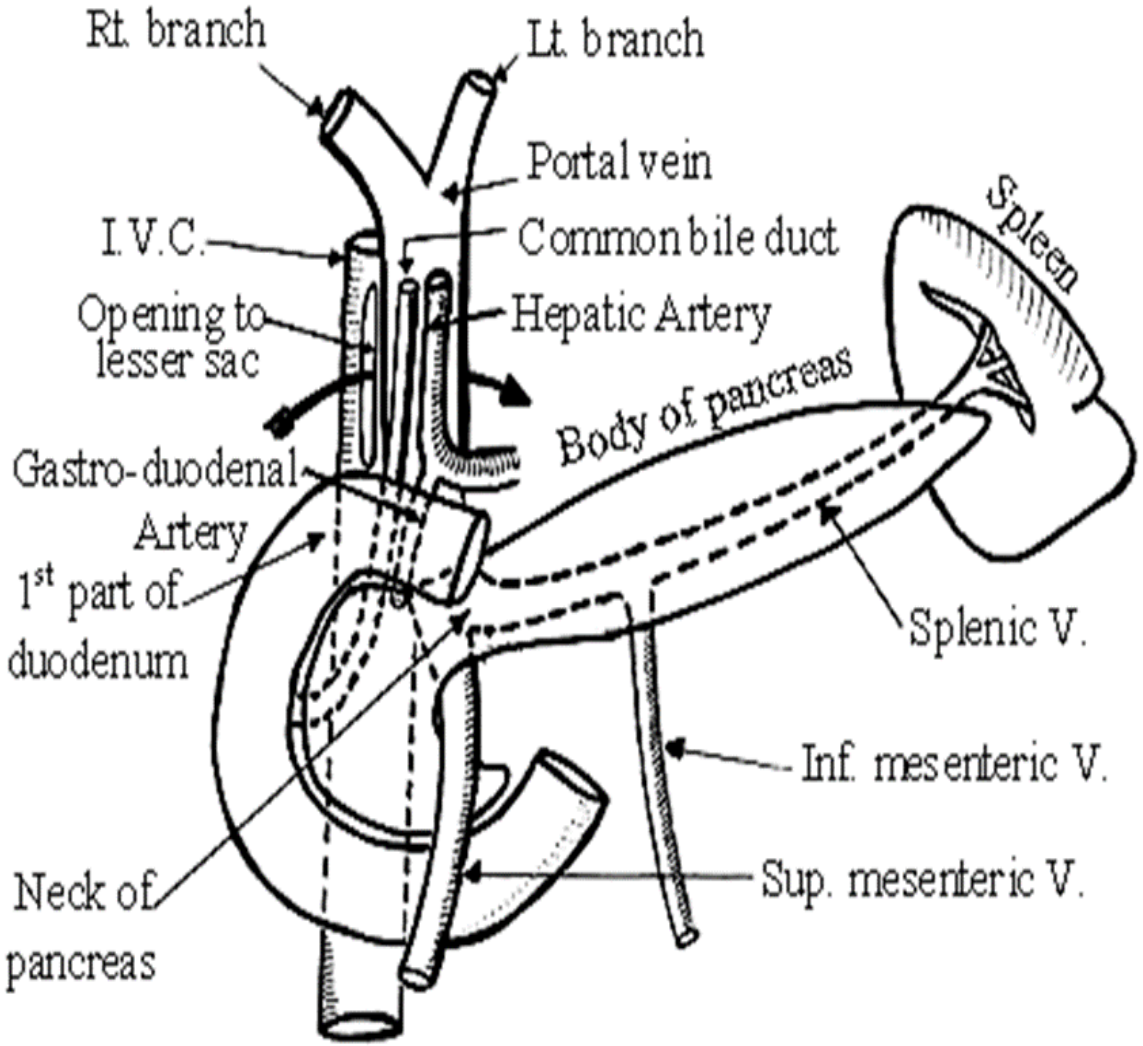
Portal vein

BEGINING:

It is formed by union of the superior mesenteric and splenic veins behind the neck of pancreas and in front of IVC.

Course& relations:

- It is about 3 inches long and up to 12 mm. in diameter.
- It has no valves. So, it allows the passage of blood in the two directions.
- It ascends behind the 1st part of duodenum and in front of IVC, then in the free border of lesser omentum with the hepatic artery (left) and bile duct (right) anterior to it.
- At the porta hepatis, it divides into right and left branches which enter its corresponding lobe.



PORTAL VEIN

Tributaries:

1- Superior mesenteric vein.

2- Splenic vein (receives the inferior mesenteric vein).

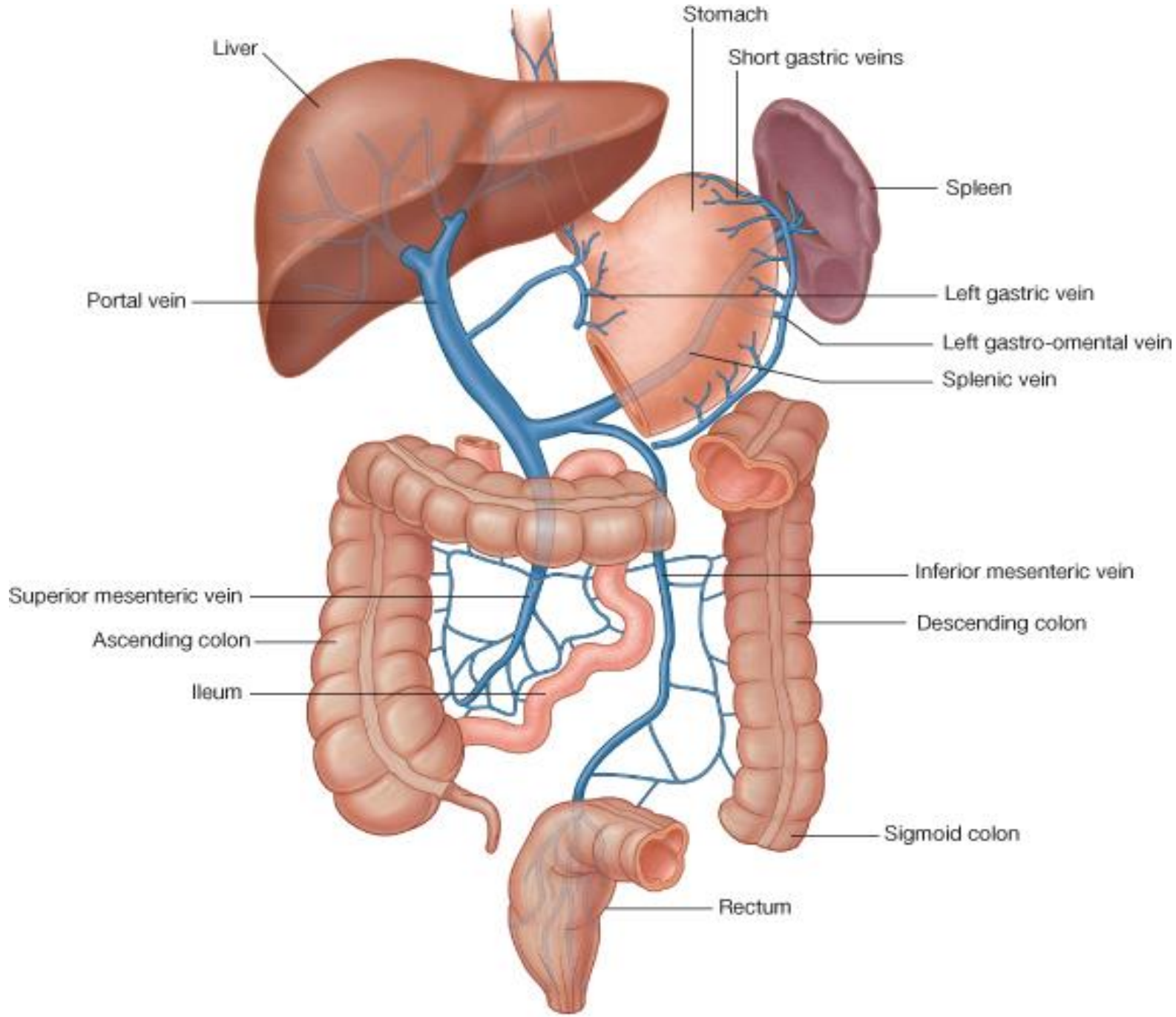
3- Right gastric vein.

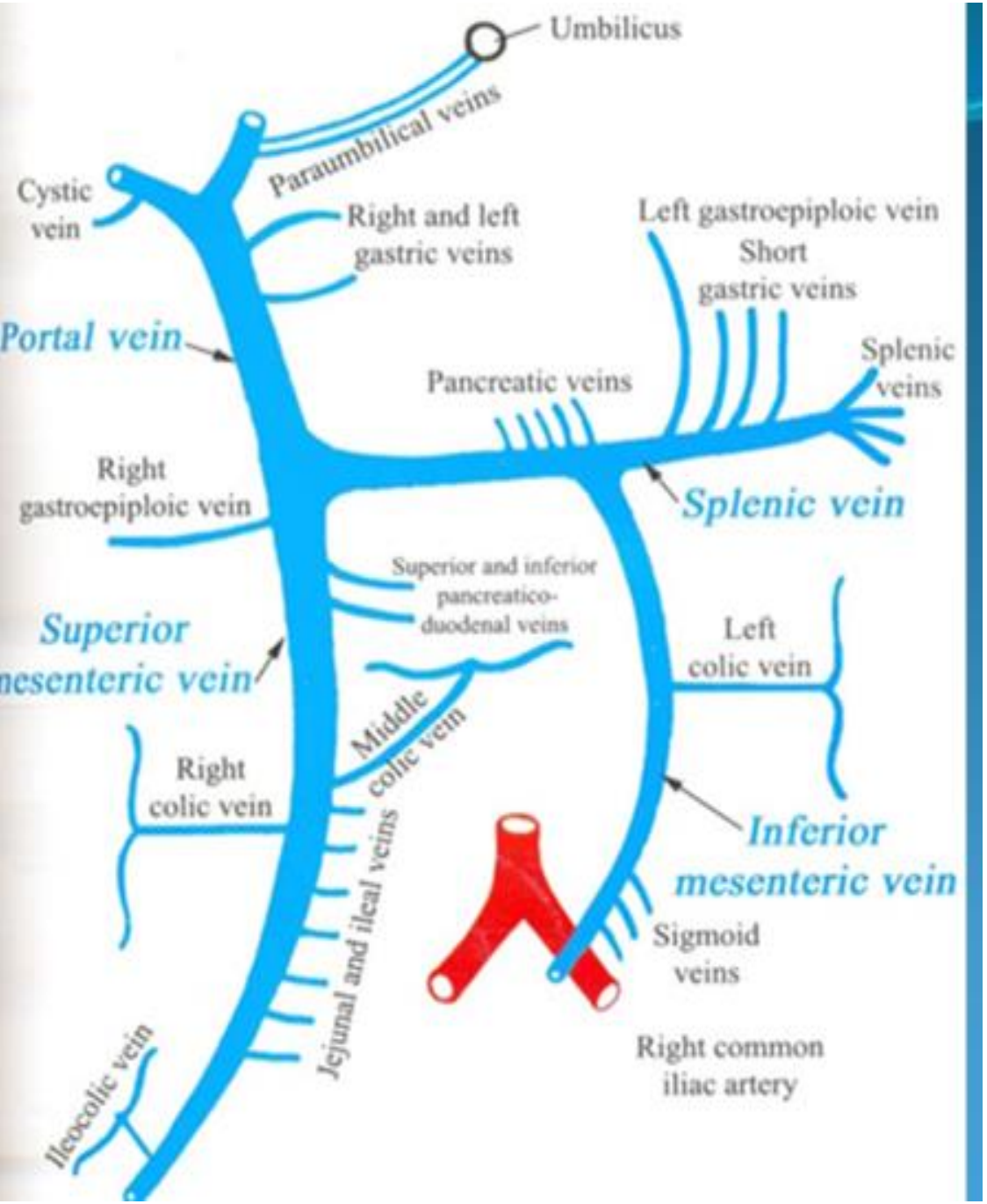
4- Left gastric vein.

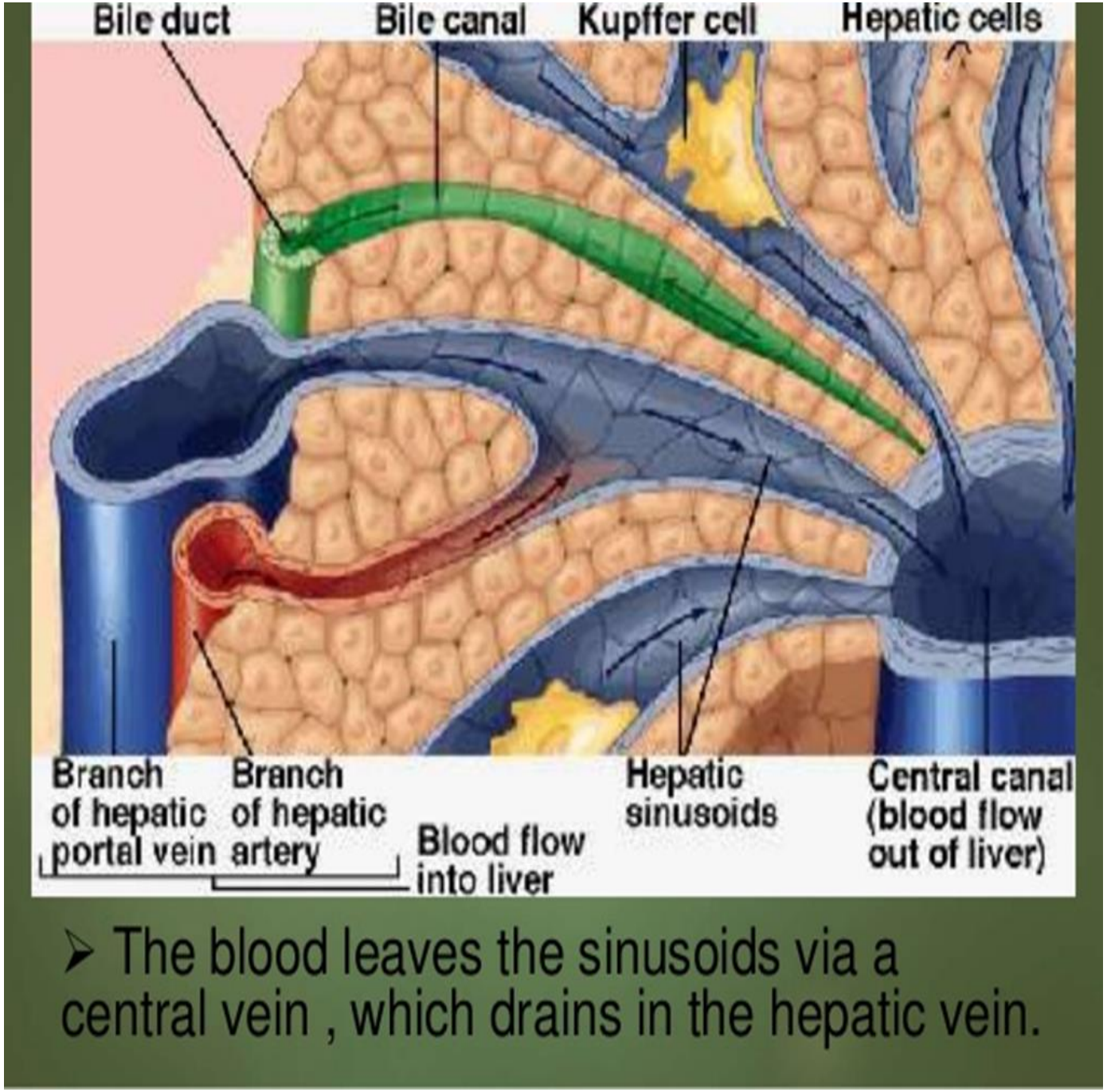
5- Paraumbilical vein

(in the left branch).

6- Cystic vein (in the right branch).







➢ The blood leaves the sinusoids via a central vein , which drains in the hepatic vein.

Portal venous system

The portal circulation receives venous blood from four sites:

1) Abdominal part of the GIT (from abdominal part of esophagus to the upper 1/2 of anal canal).

2) Pancreas.

3) Gall bladder.

4) Spleen.

These veins collect into the portal vein which breaks into the liver sinusoids.

Blood pass through portal vein to the liver where metabolism occurs.

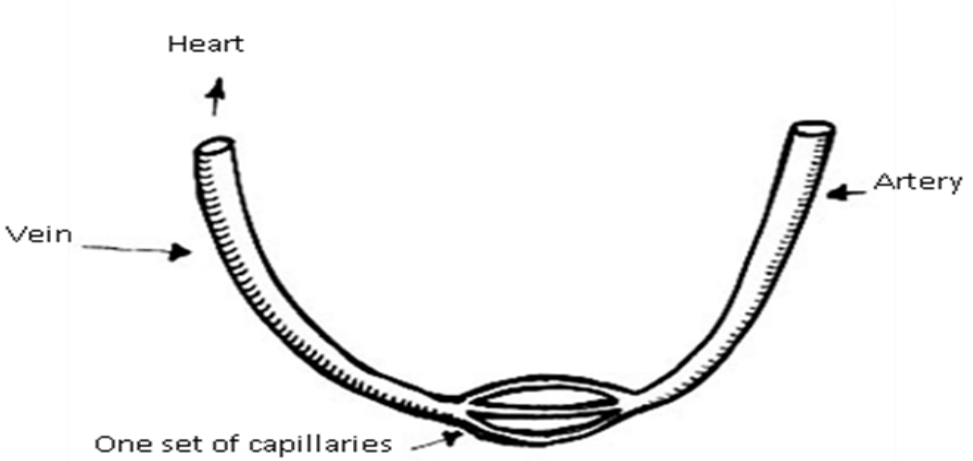
Portal circulation begins by capillaries and ends by sinusoids i.e. arterial blood which leaves the heart has to pass through two peripheral networks before it reaches the heart as follows:

(a) The 1st. network of capillaries lies in the drained organ e.g. submucosa of the GIT.

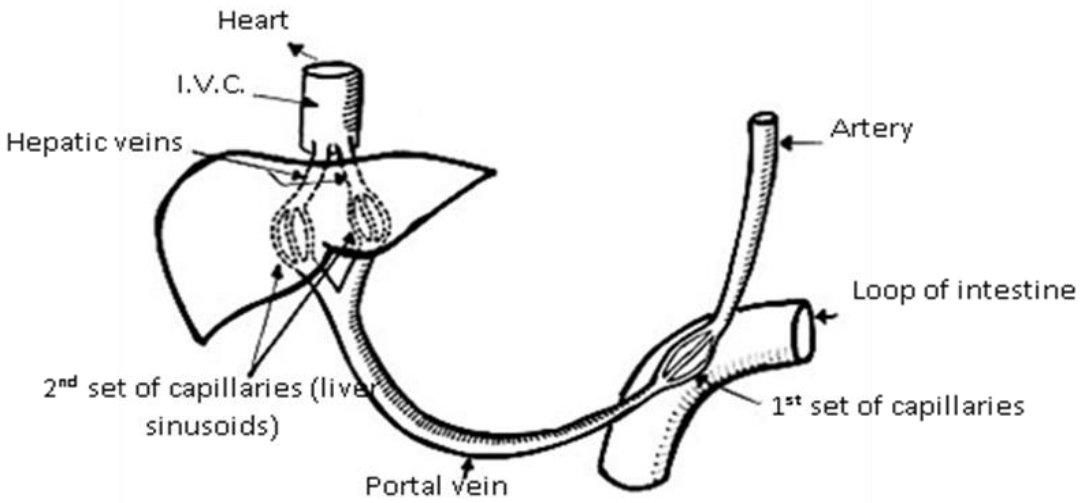
(b)The 2nd network of sinusoids in the liver.

blood circulates in the sinusoids of the liver, pass to centeral veins which are collected in 3 hepatic veins which end in the inferior vena cava.

- **General circulation**



*** Portal Circulation***



Portosystemic anastomosis

- These are the sites where veins belong to portal venous system anastomose with veins belong to systemic circulation.
- They are important Surgically because in case of liver cirrhosis, the pressure in the portal vein and its tributaries increases . The anastomotic veins will be enlarged , tortuous and engorged with blood which will pass from these veins to the systemic circulation.

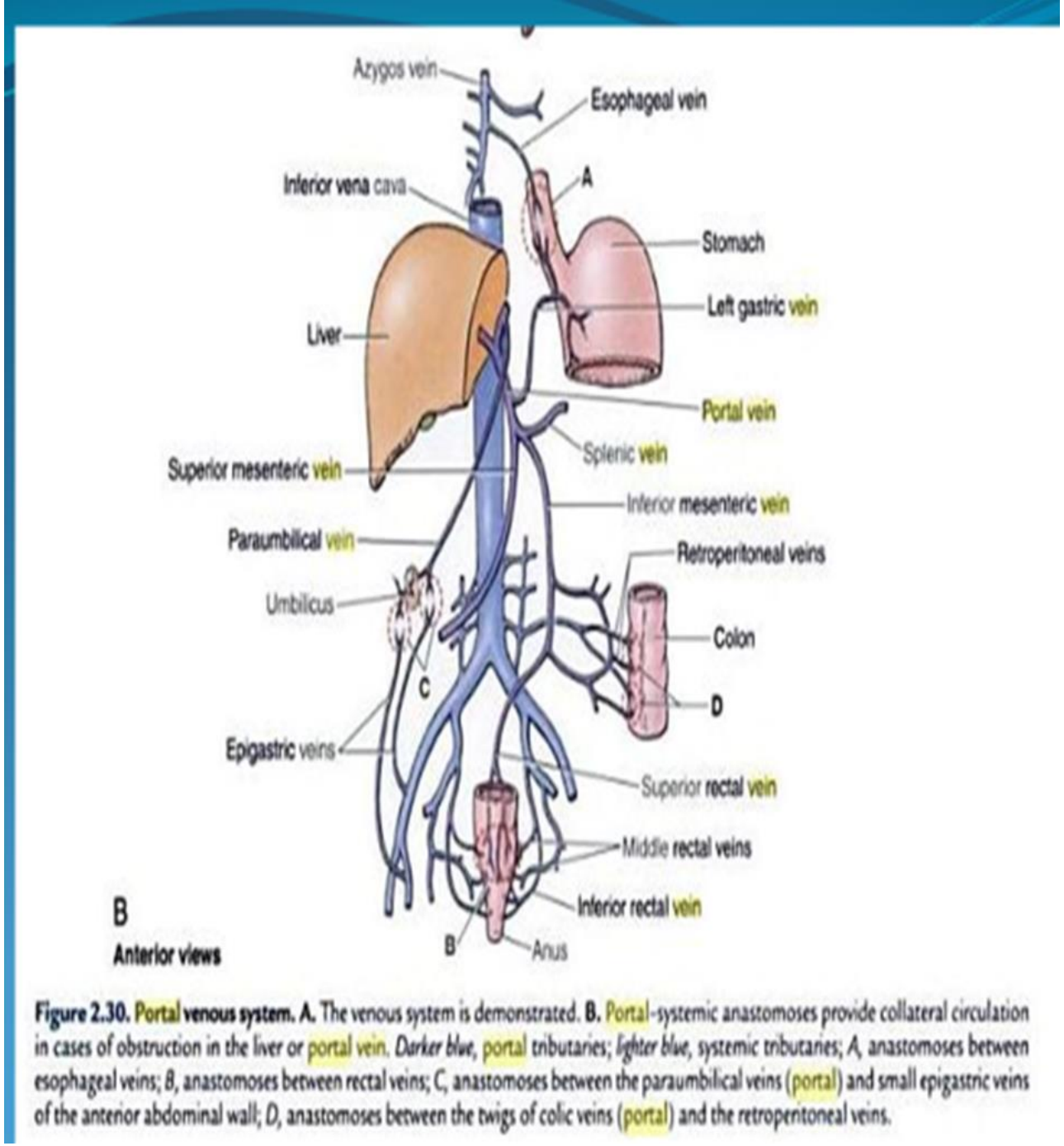


Figure 2.30. Portal venous system. A. The venous system is demonstrated. **B.** Portal-systemic anastomoses provide collateral circulation in cases of obstruction in the liver or portal vein. *Darker blue*, portal tributaries; *lighter blue*, systemic tributaries; *A*, anastomoses between esophageal veins; *B*, anastomoses between rectal veins; *C*, anastomoses between the paraumbilical veins (portal) and small epigastric veins of the anterior abdominal wall; *D*, anastomoses between the twigs of colic veins (portal) and the retroperitoneal veins.

Sites of portosystemic anastomosis

Site	Portal vein	Systemic vein	Effect
1- At the lower end of esophagus	Left gastric vein	Azygos vein	Esophageal varices→ hematemesis
2- At the lower end of anal canal	Superior rectal vein	Middle, inferior rectal veins	Rectal varices (piles)→ bleeding per rectum
3-Around umbilicus	Left branch of portal vein	Veins of anterior Abdominal wall	Caput medusa
4-posterior abdominal wall	Right , left colic vein	Right , left renal vein	
5- Bare areas of gut	Veins of gut	Veins of posterior Abdominal wall	
6- Bare area of liver	Portal vein	Phrenic veins