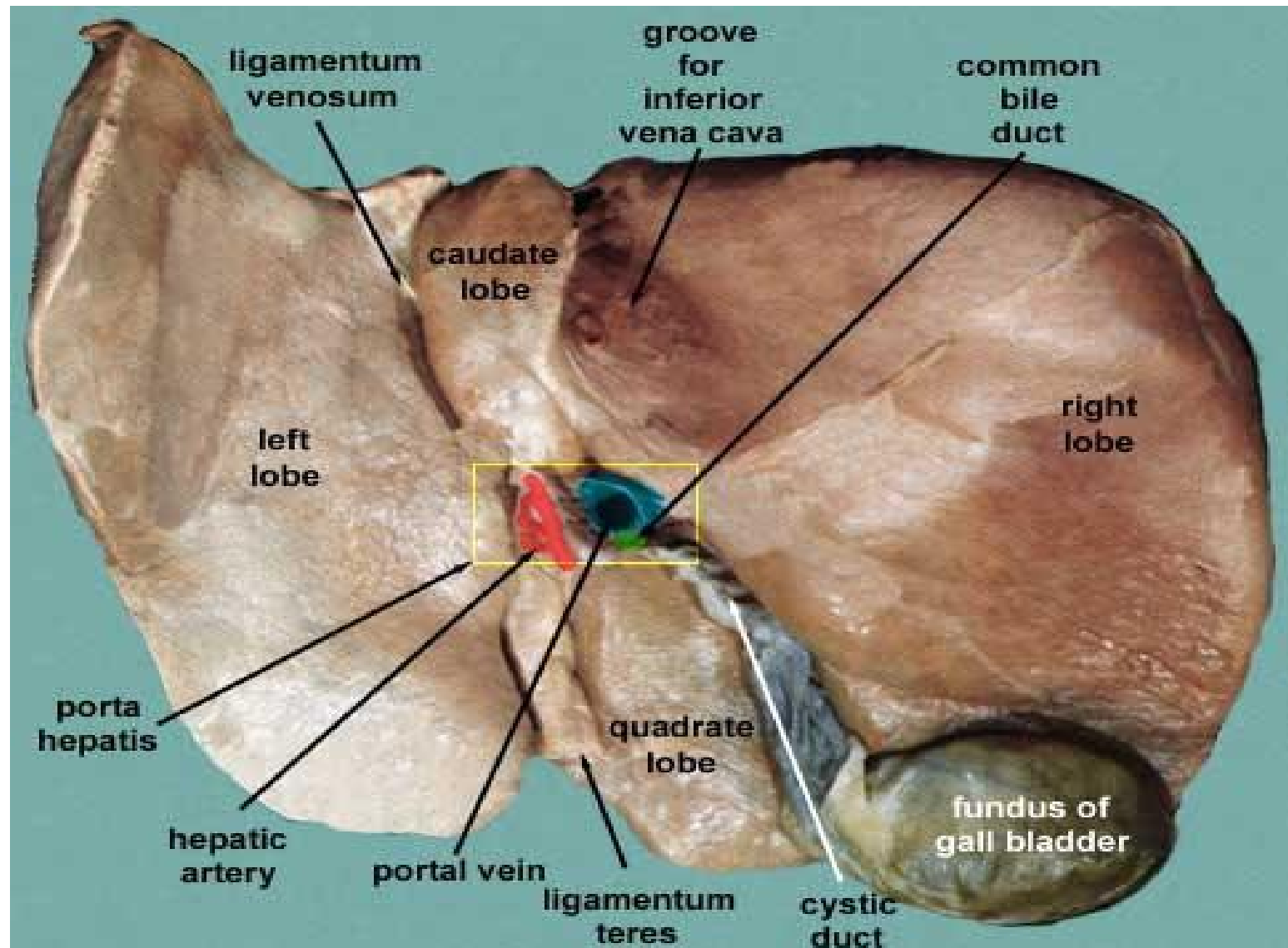
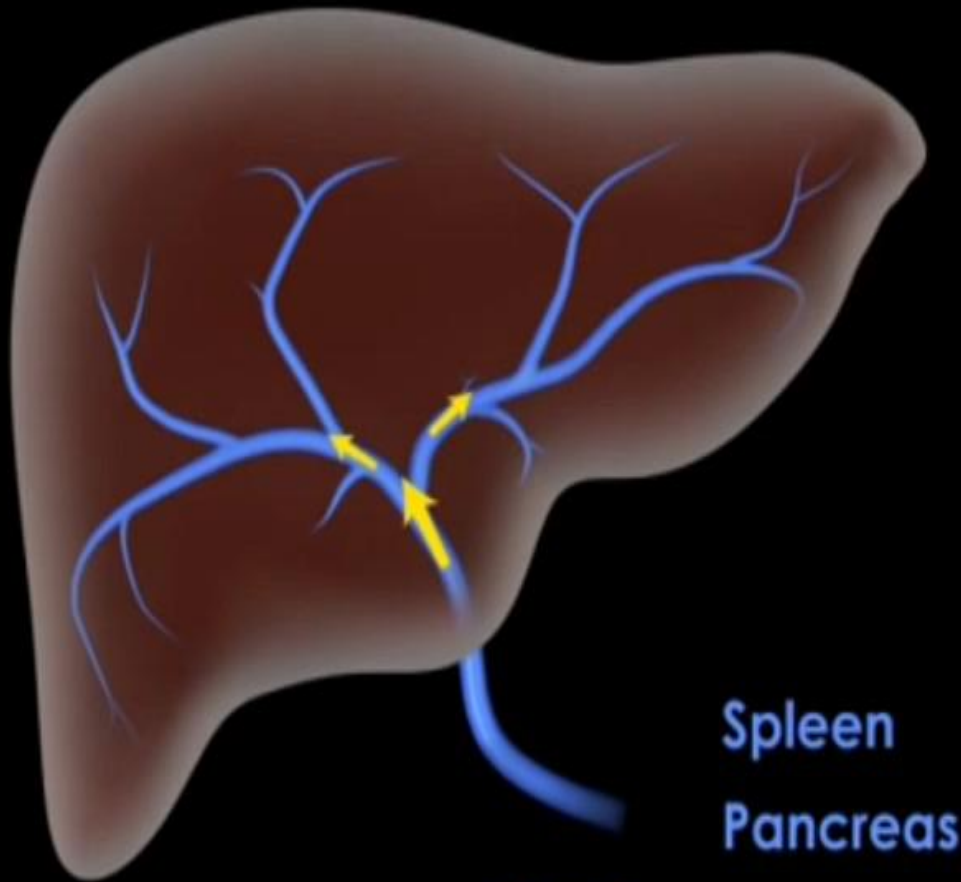


PORTAL VEIN



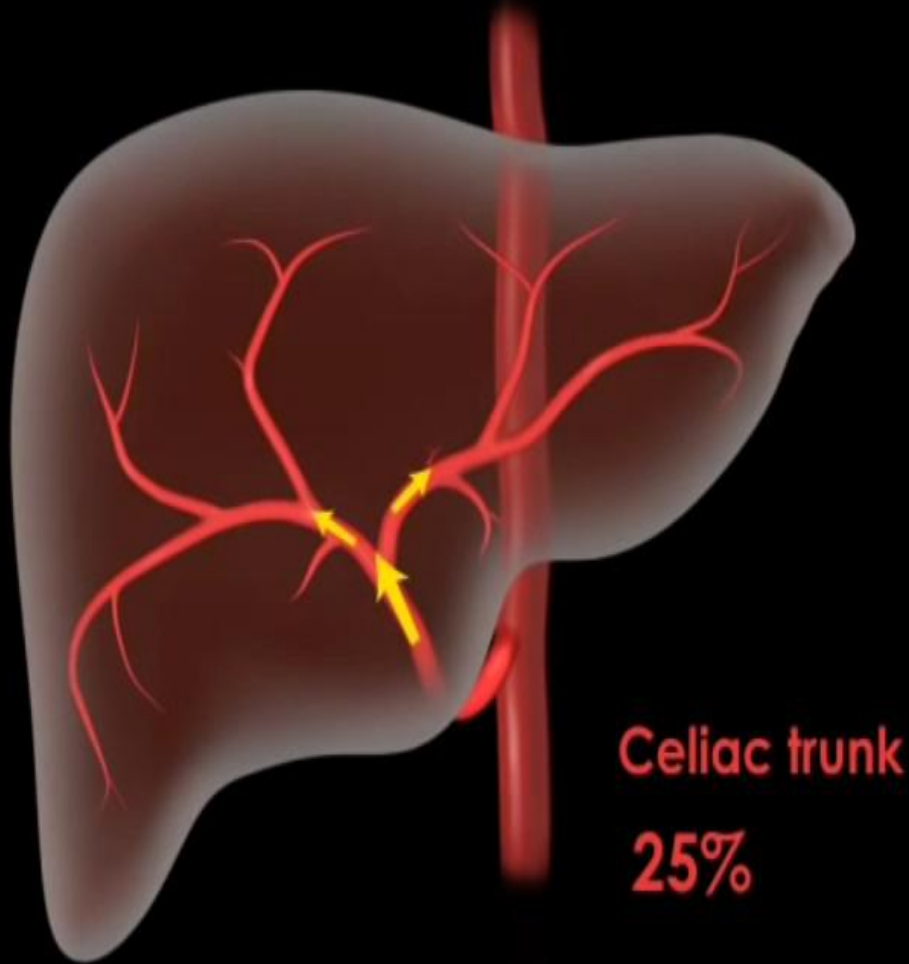


Portal Vein

Nutrient rich
Oxygen poor

Spleen
Pancreas
Intestines

75 %



Hepatic Artery

Oxygen rich

Nutrient poor

Celiac trunk

25%



Hepatic Portal Circulation

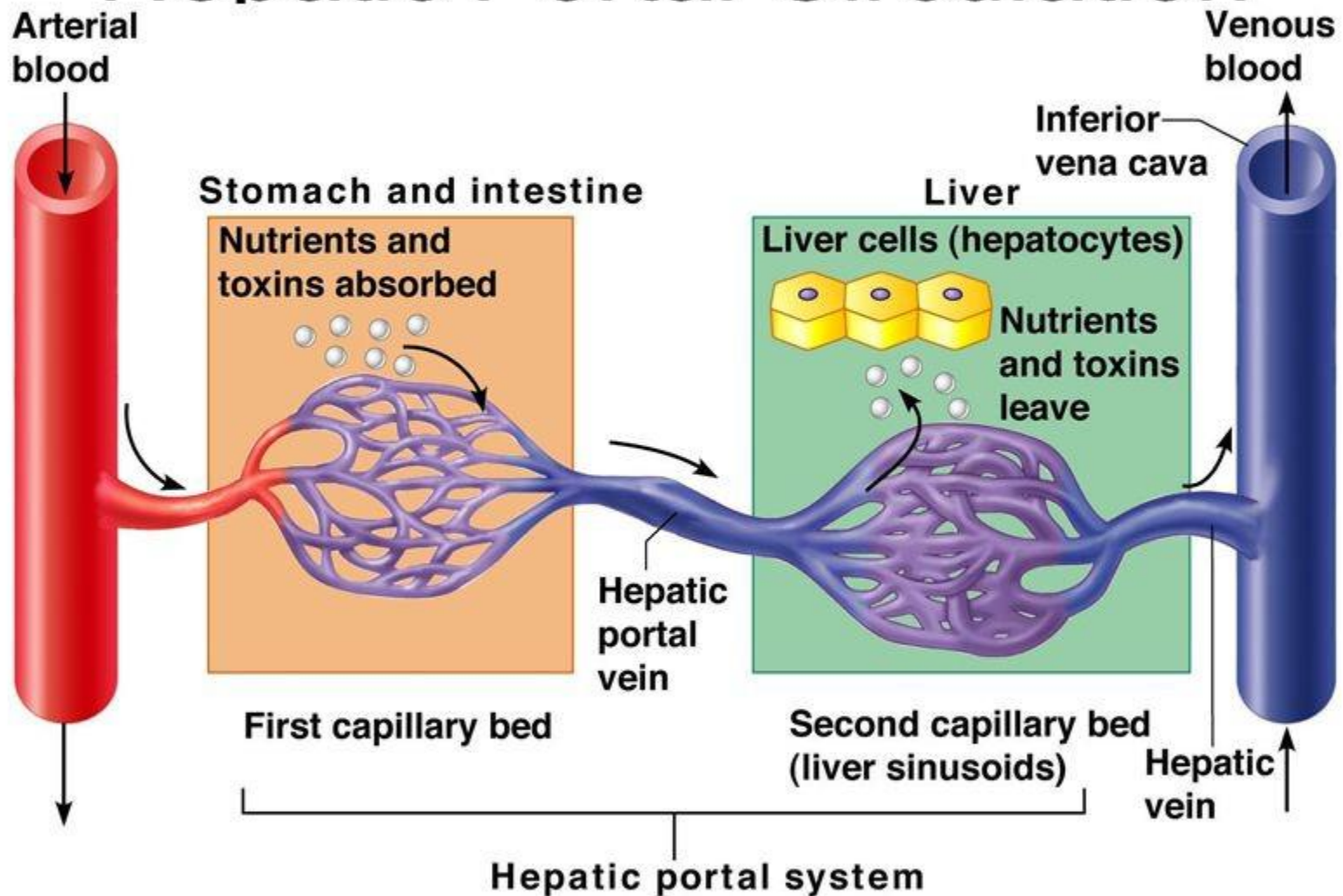
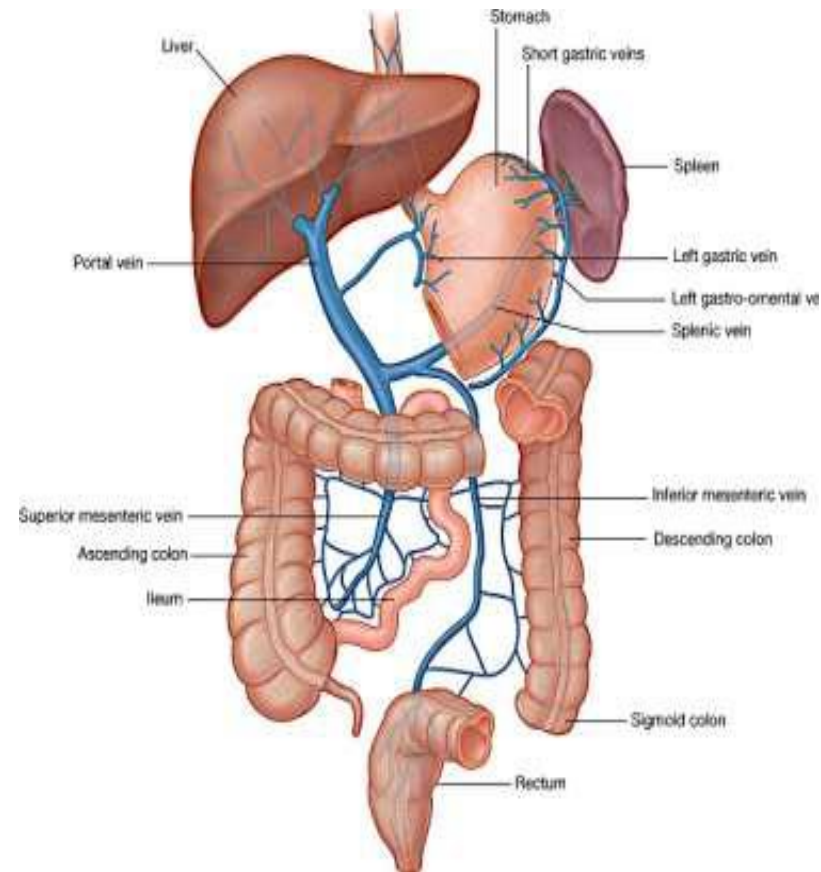


Figure 11.16

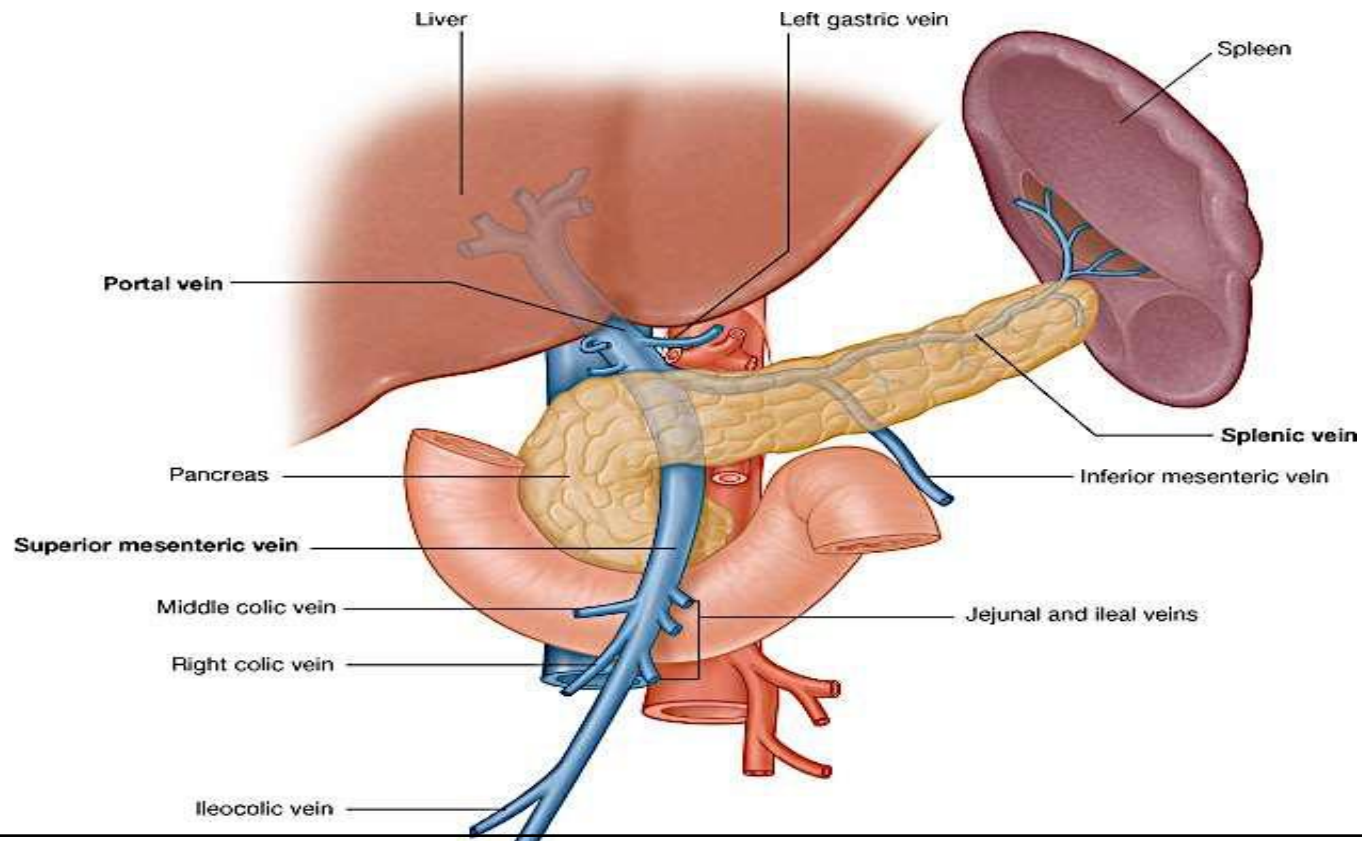
Hepatic Portal Vein

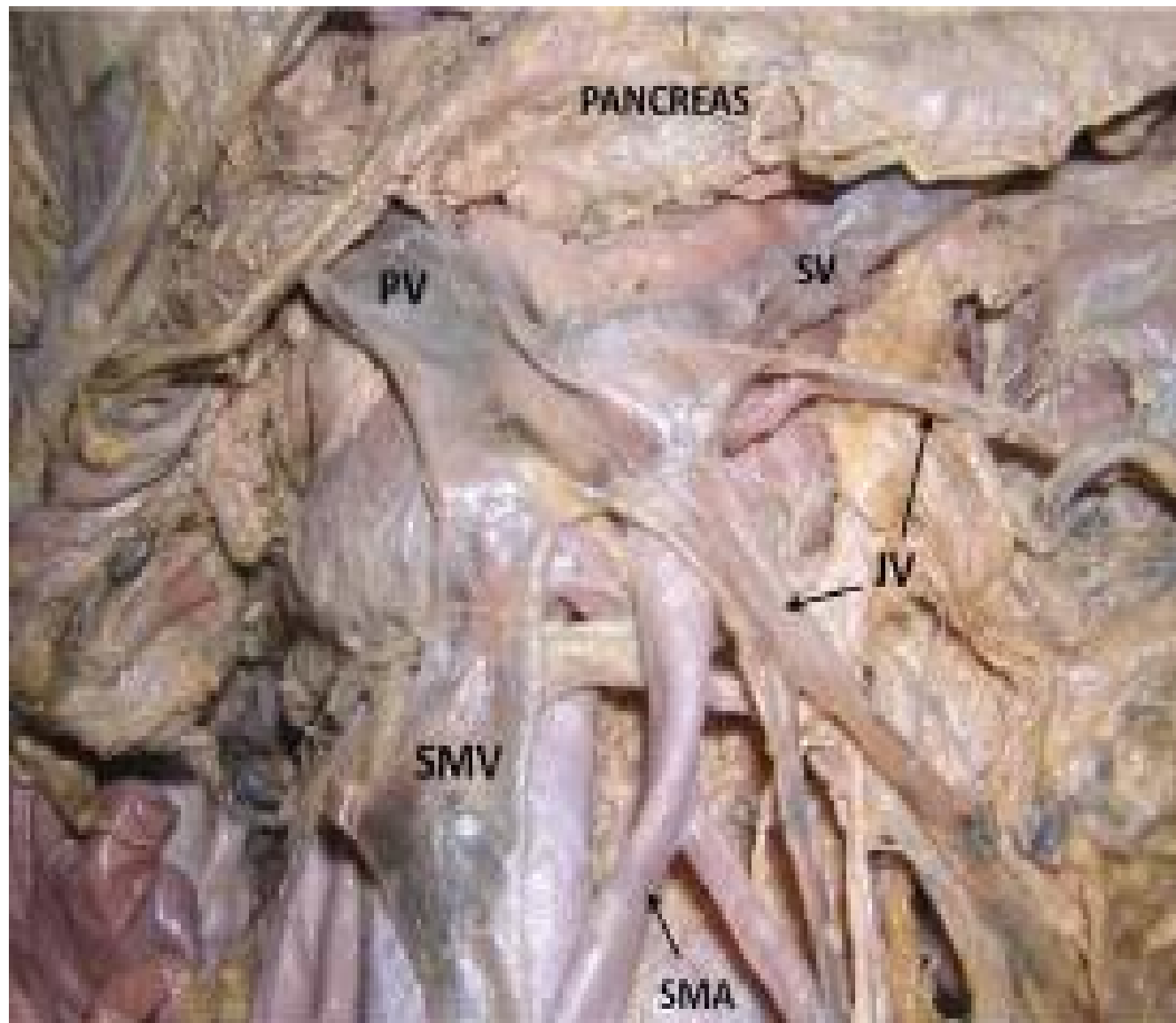
- Origin & end in capillaries / venous sinusoids
- Size: 8cm X 1 cm
- Drains
 - Abdominal part of alimentary tract (except lower part of anal canal)
 - Spleen & Pancreas
- Conveys absorbed products of digested food to liver
- Devoid of valves
- Reservoir of blood : 1200 ml / min



Formation

- Union of Sup mesenteric & Splenic vein
- Between neck of Pancreas & IVC at level L2

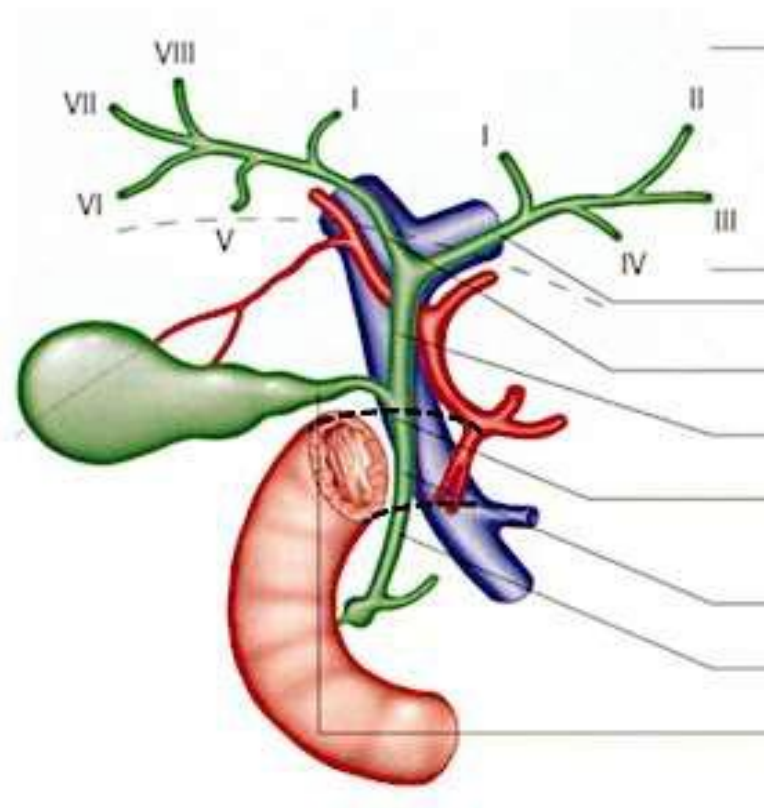




Course: Extrahepatic part

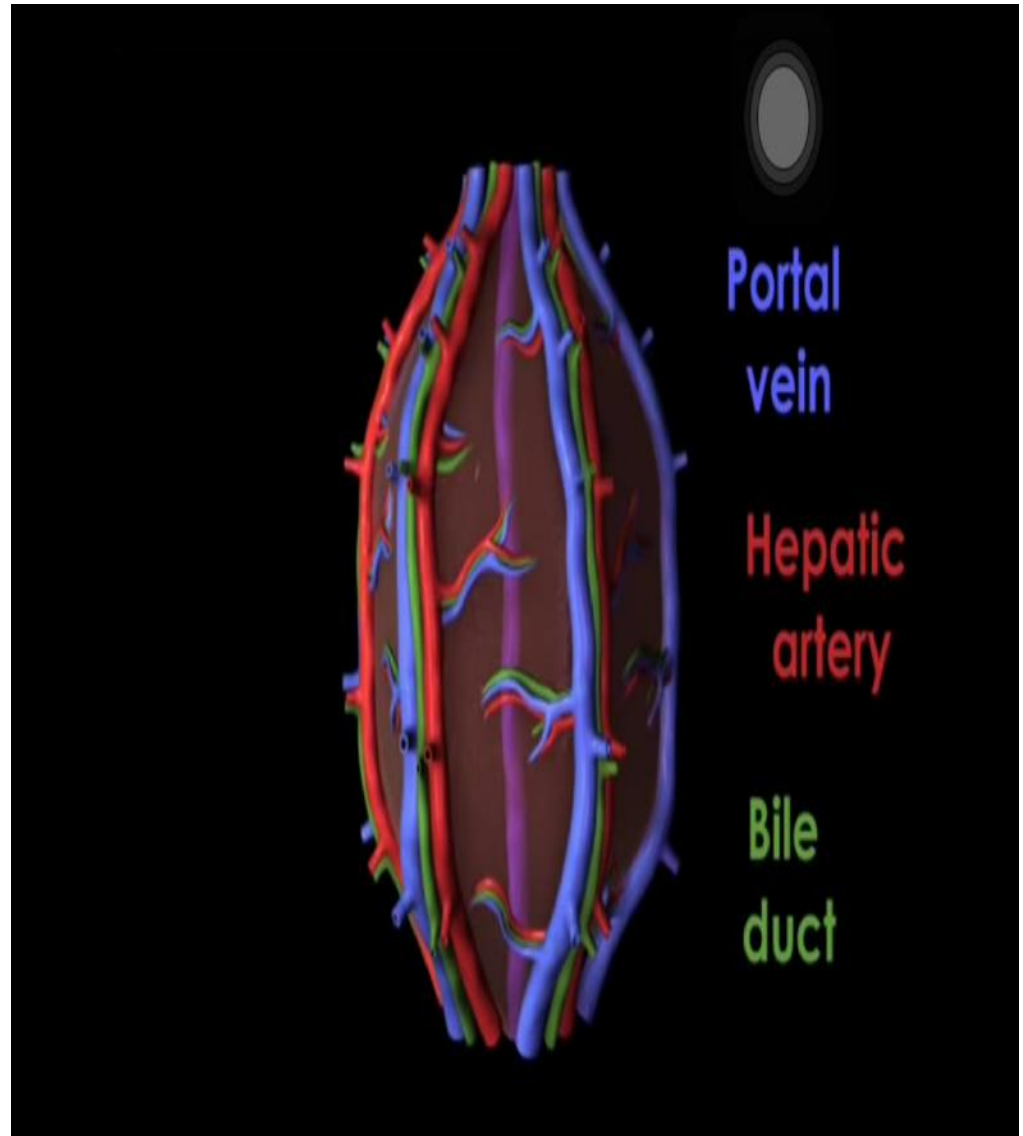
Passes upwards & Rt,
behind neck of pancreas &
1st part of duodenum

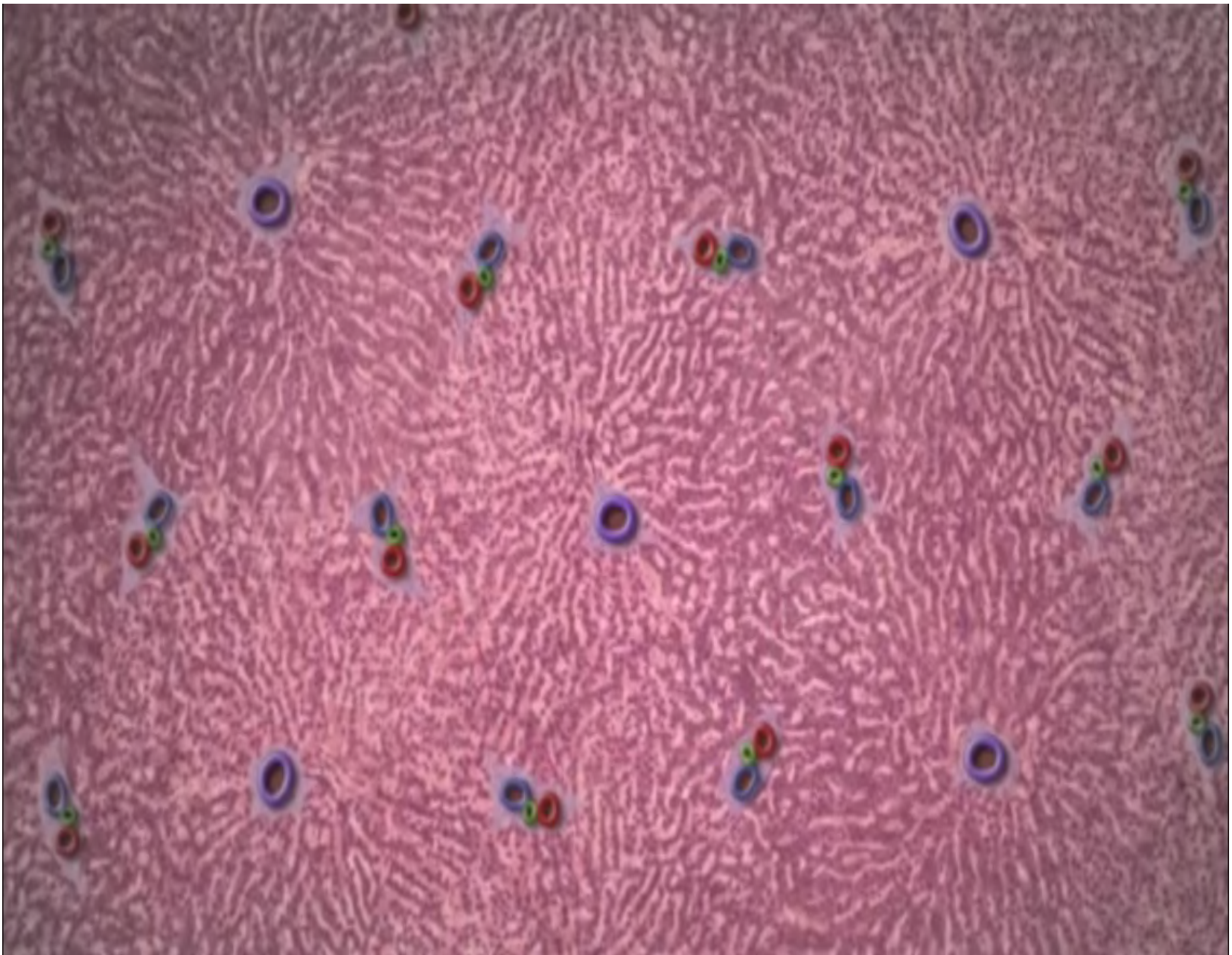
- Enters rt free margin of lesser omentum in front of epiploic foramen with Bile Dut & Hepatic artery.
- Reaches porta hepatis & divides into rt & Lt branches.

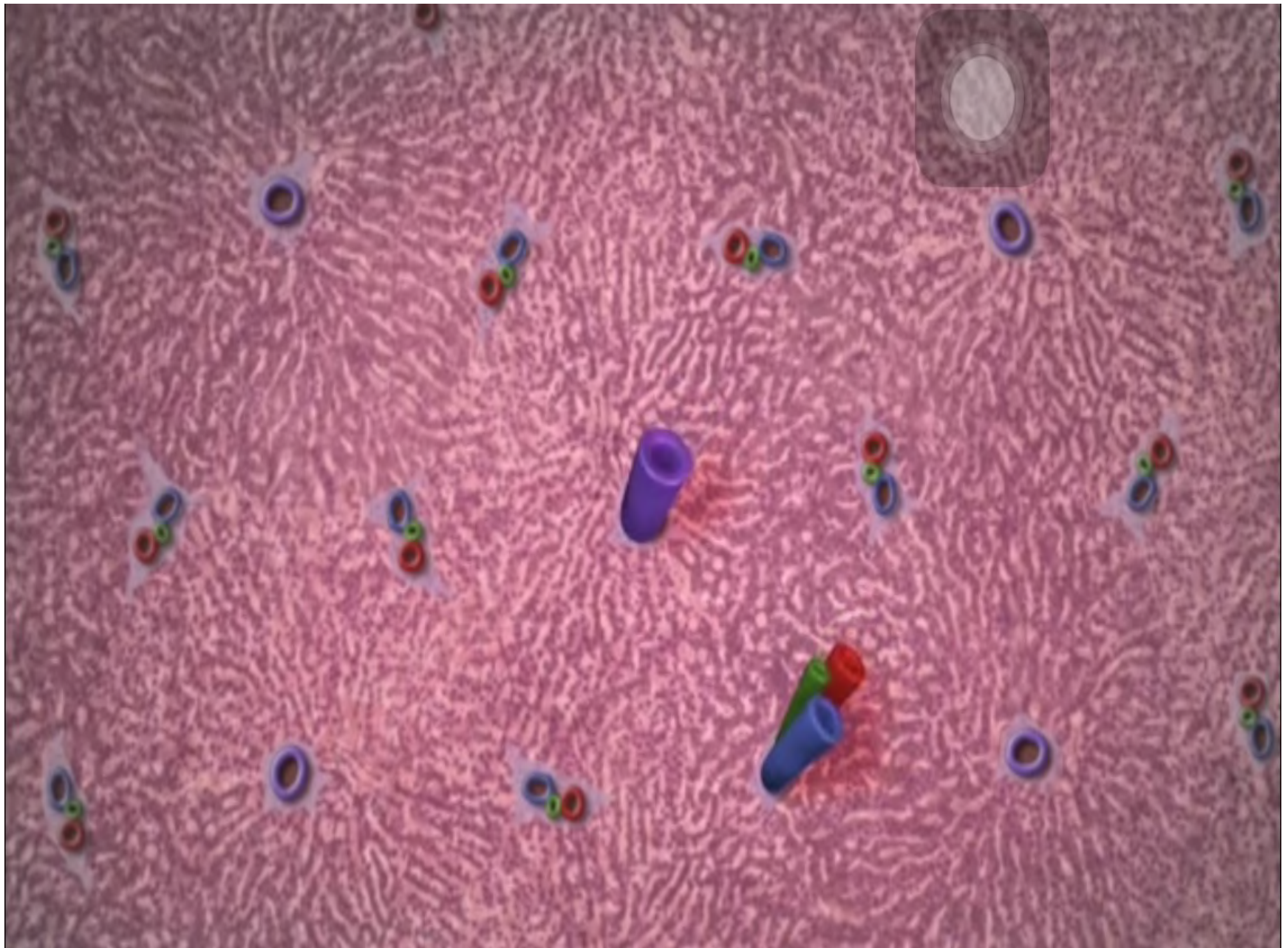


Course: Intrahepatic part

- Branches of portal vein
- Segmental brs
- Brs in Portal canal
- **Hepatic sinusoids**
- Central veins
- Sublobular veins
- Hepatic veins IVC







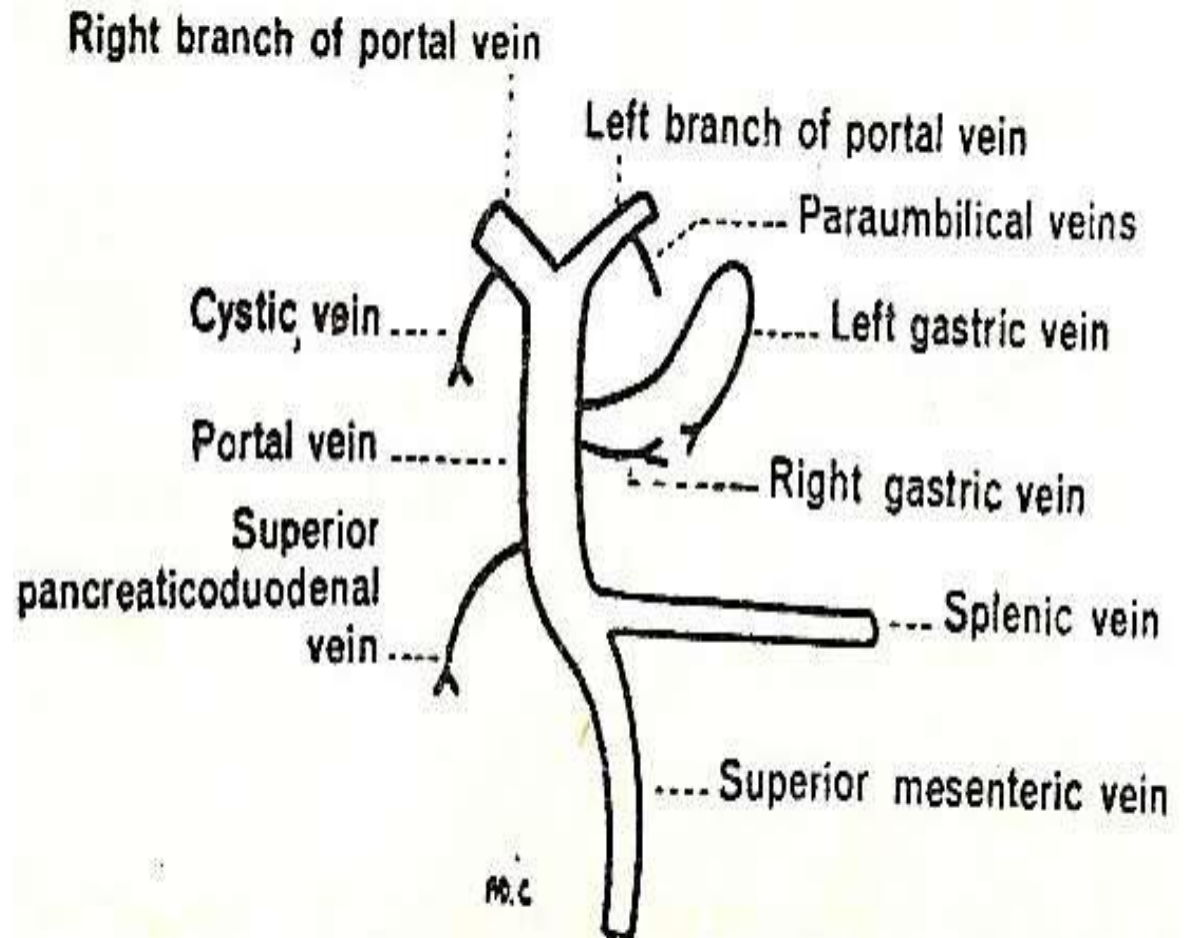
TRIBUTARIES

Rt Branch

- Shorter, wider
- Receives cystic vein

Lt branch

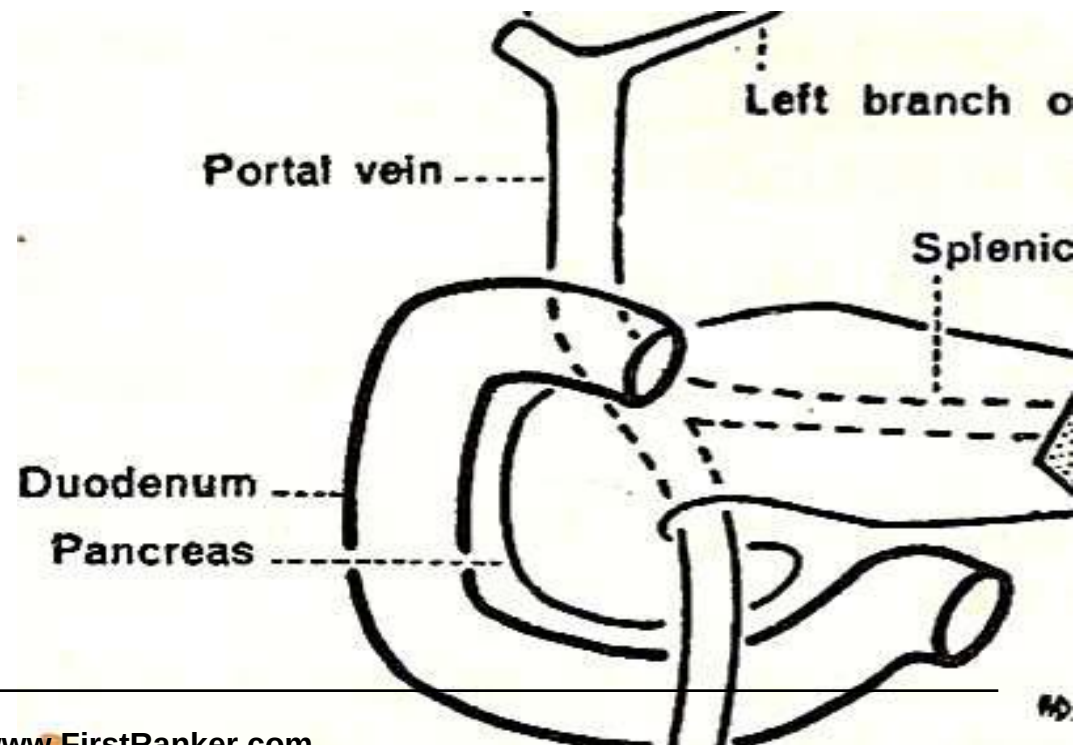
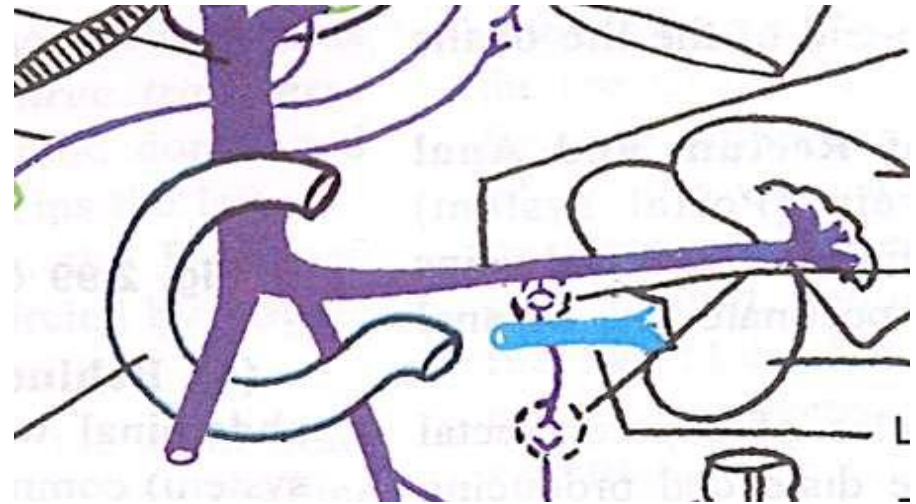
- Narrower, longer
- Runs in Porta hepatis from Rt to Lt
- Brs to Caudate & Quadrate lobe
- Receives Paraumbilical veins



PARTS

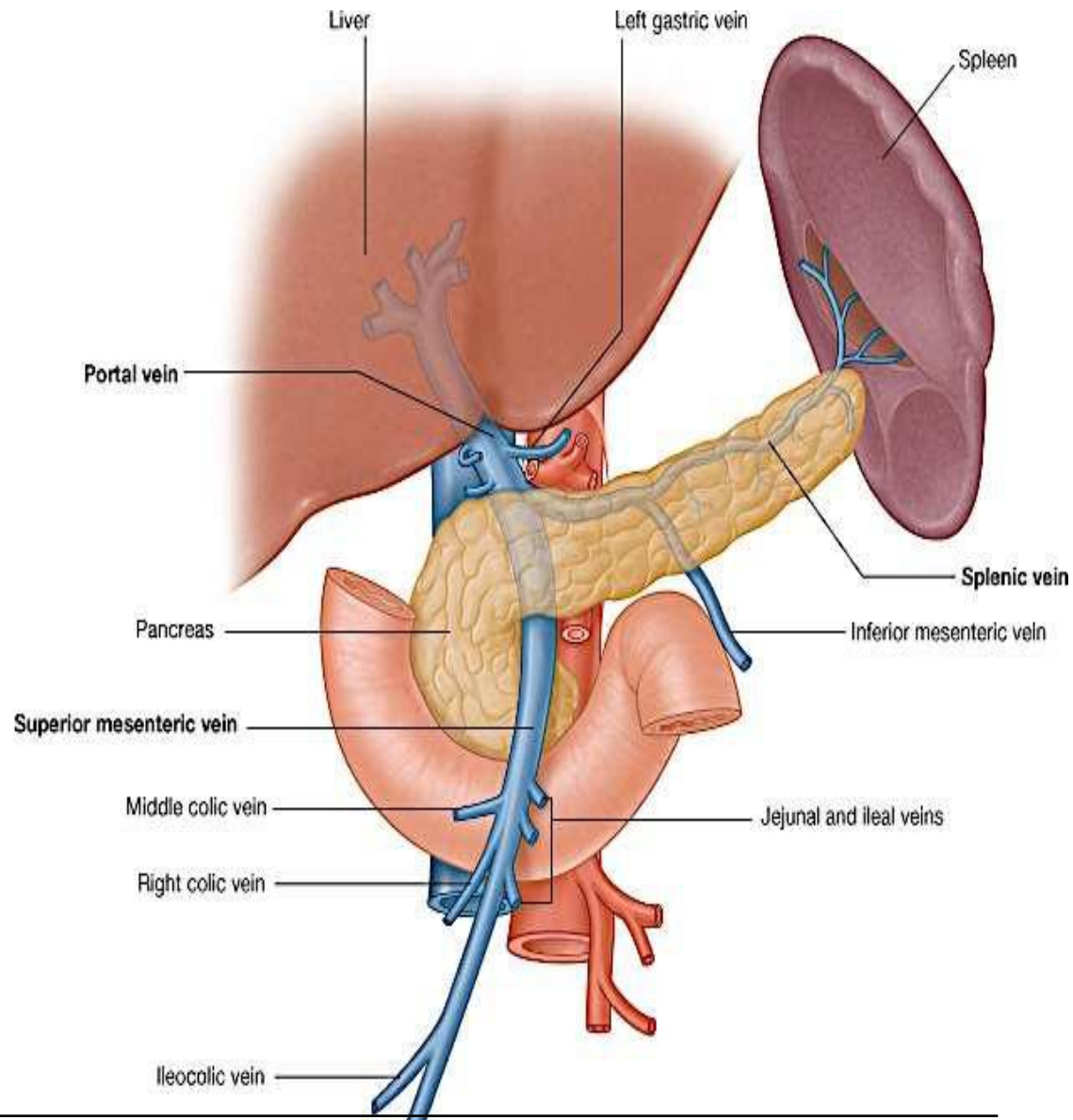
Parts

- Infraduodenal
- Retroduodenal
- Supraduodenal



RELATIONS

- **Infra duodenal**
 - **Ant:** Neck of Pancreas
 - **Post:** IVC
- **Retro duodenal**
 - **Ant:** Duodenum (1st Part), Bile duct, GD artery
 - **Post:** IVC
- **Supra duodenal** : In
 - rt free margin of lesser omentum
 - **Ant** : hepatic artery & bile duct
 - **Post:** IVC



PORTO-CAVAL ANASTOMOSIS

Normal circulation

- Heart
 - Arteries
 - Arterioles
 - Capillaries
 - Venules
 - Veins
 - Heart

Hepatic Portal System

- Heart
 - Arteries
 - Arterioles
 - Capillary #1 (lamina propria)
 - Venules
 - Veins (Hepatic portal system of veins)
 - Venules
 - Capillary #2 (hepatic sinusoids)
 - Venules
 - Veins
 - Heart

Hepatic Portal Circulation

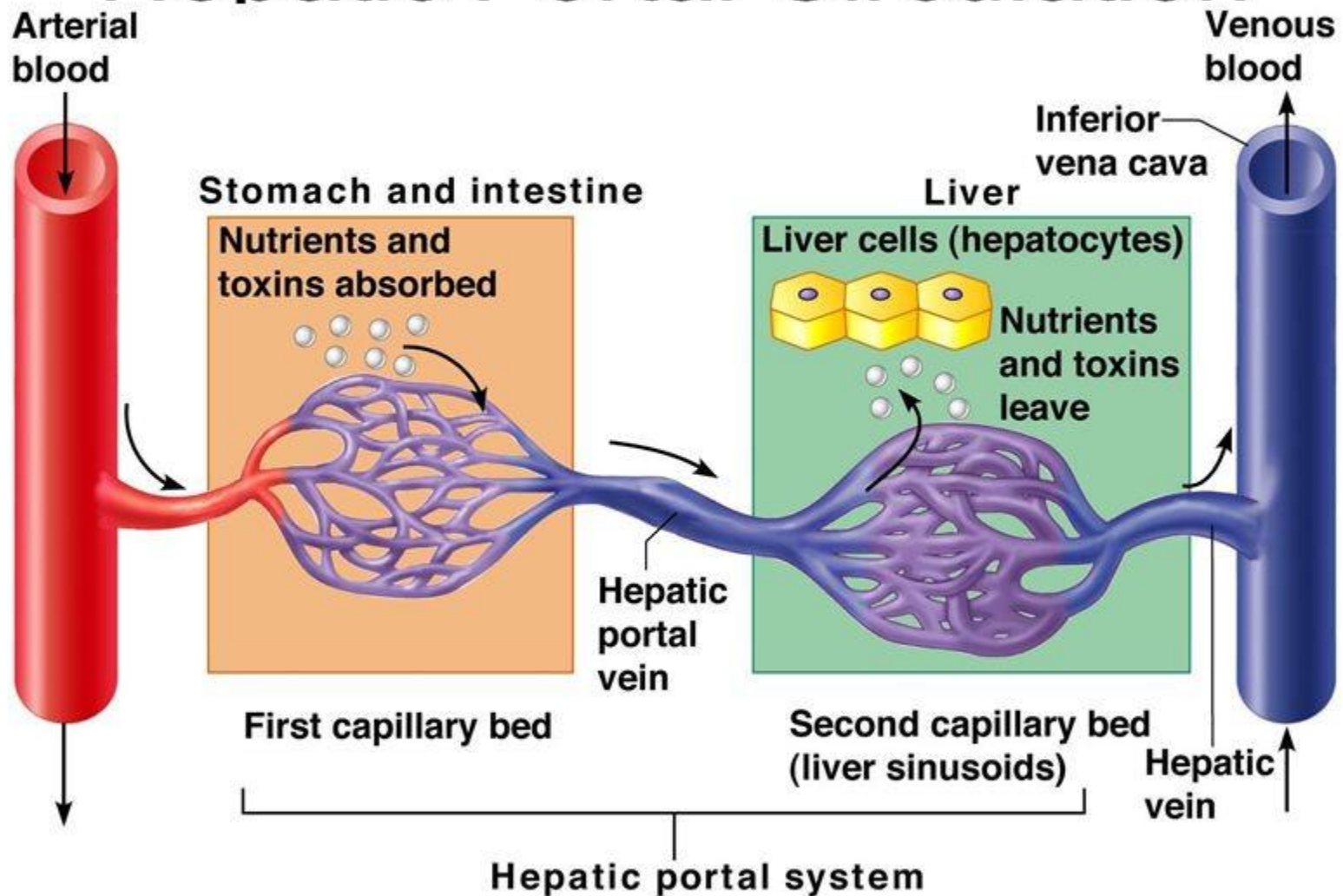


Figure 11.16



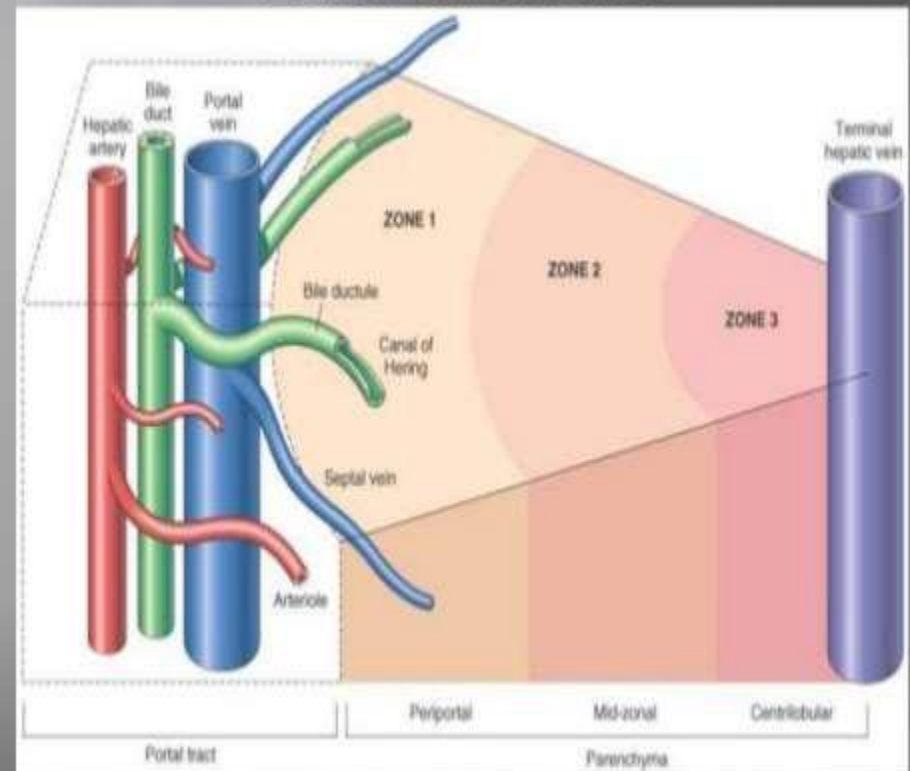
Portal Blood Flow

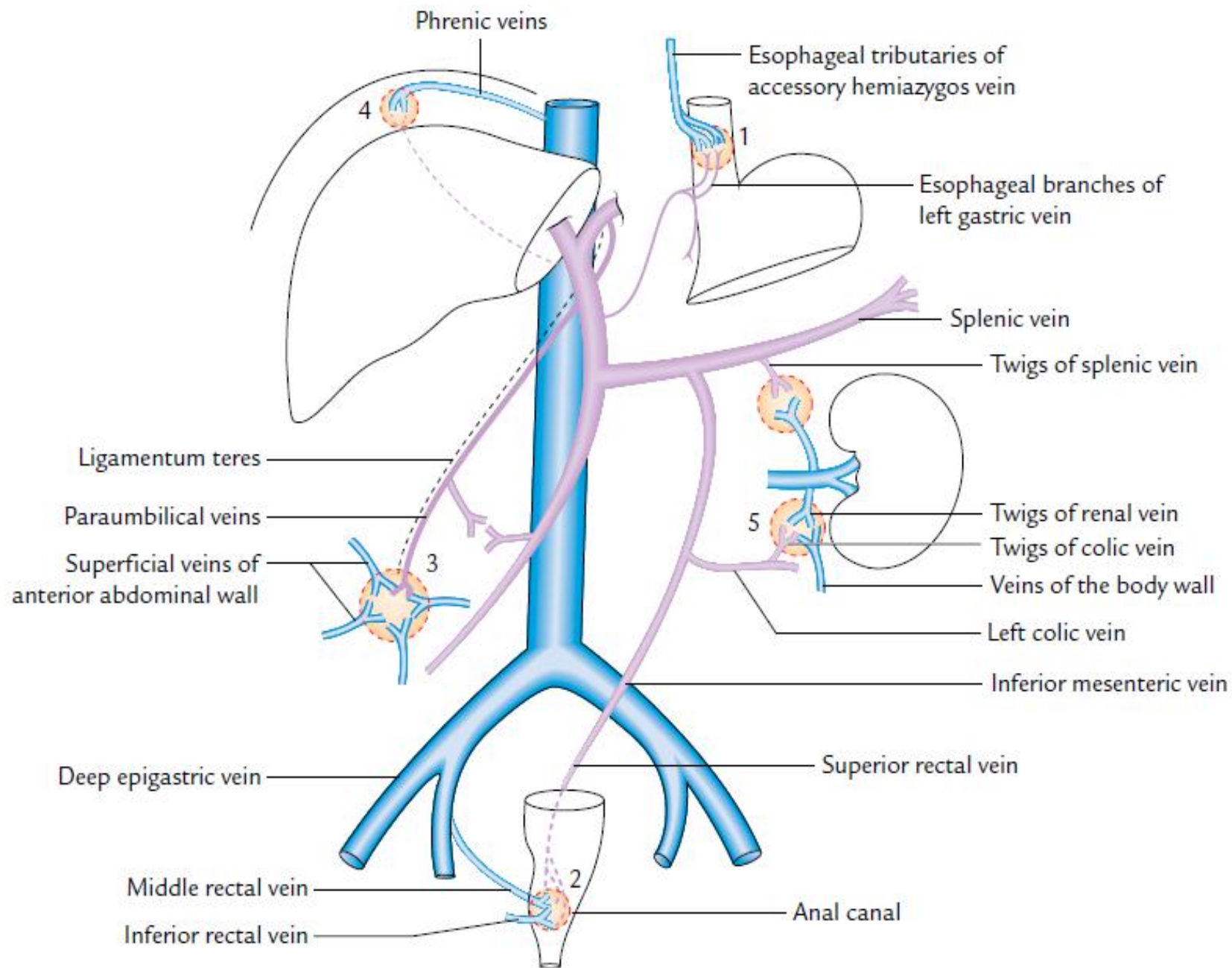
Liver like lungs has dual blood supply. The hepatic portal vein brings 75-80% blood to liver. Portal vein contains 40% oxygen than blood returning to the heart from systemic circuit.

The hepatic portal vein contains virtually all nutrients absorbed from the alimentary tract to the liver with the exception of lipids which is absorbed through the hepatic artery.

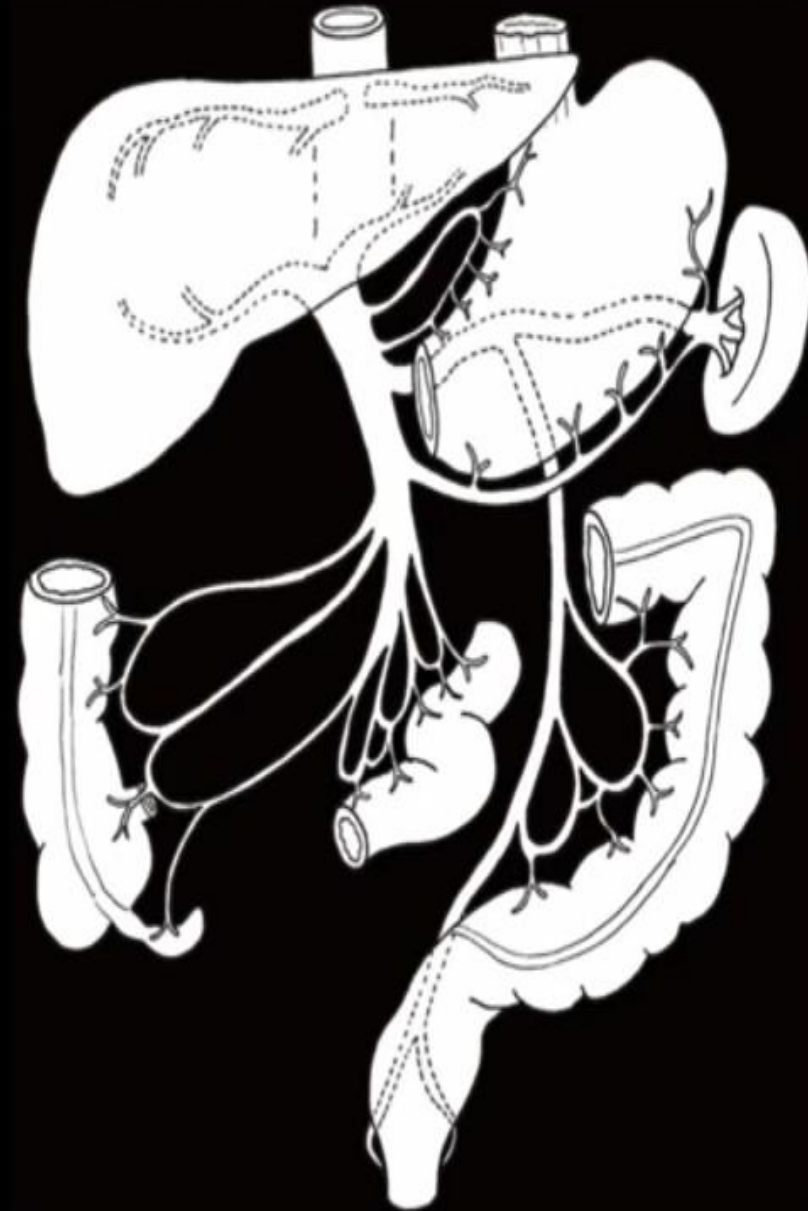
➤ Portal Triads: Branches of two vessels: portal vein, hepatic artery, along with bile drainage ductules all run together to infiltrate all parts of liver.

Zonal Flow of Blood



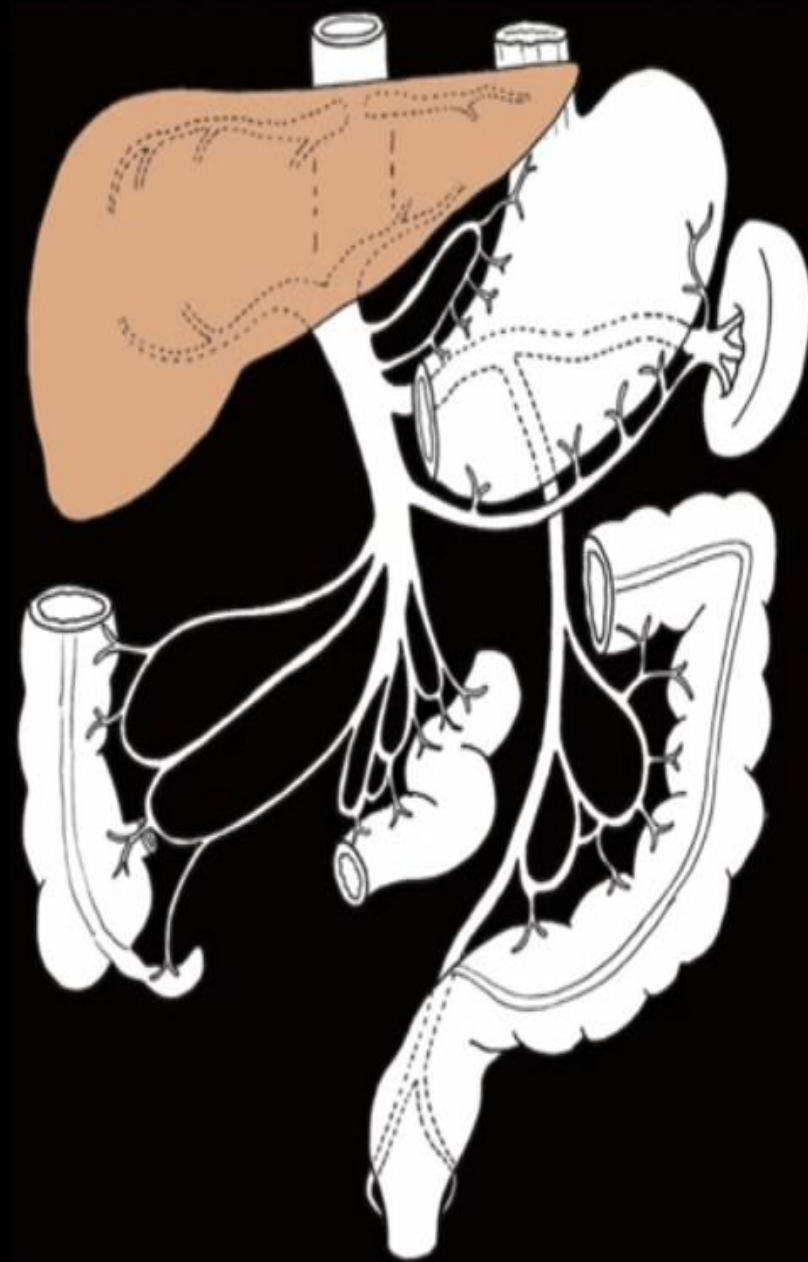


Hepatic portal system



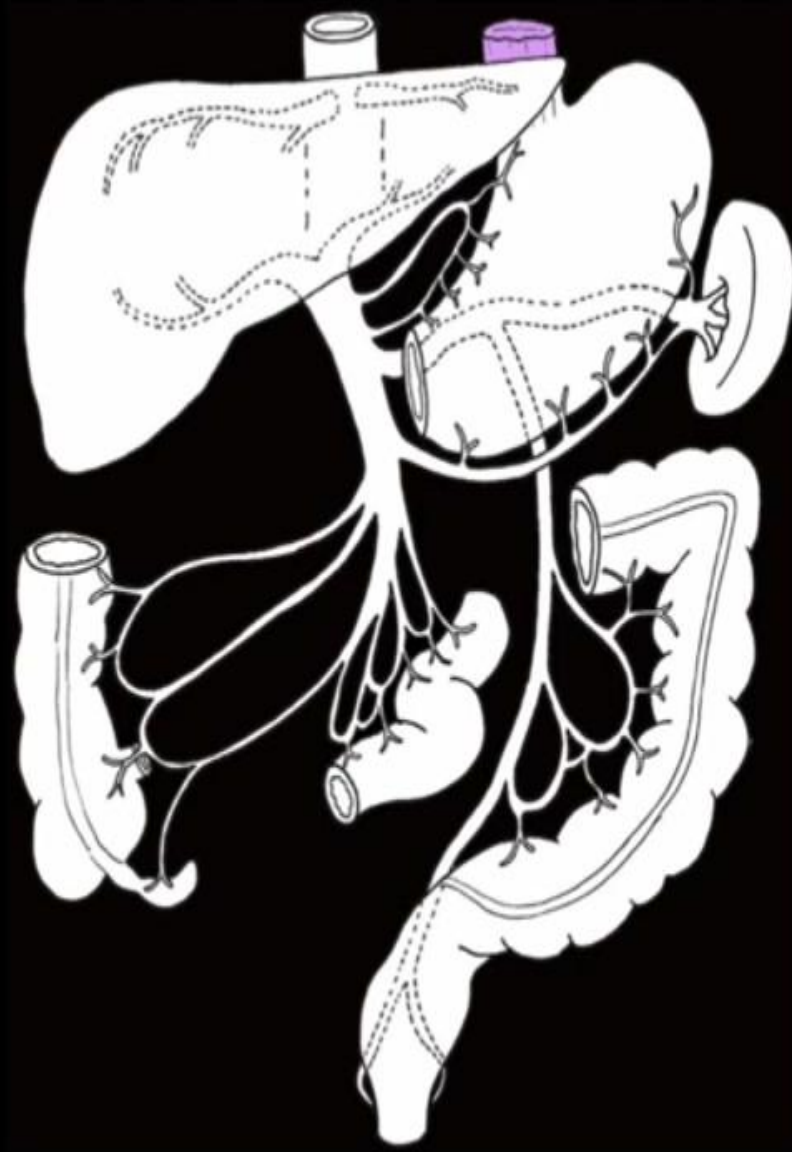
Hepatic portal system

Liver



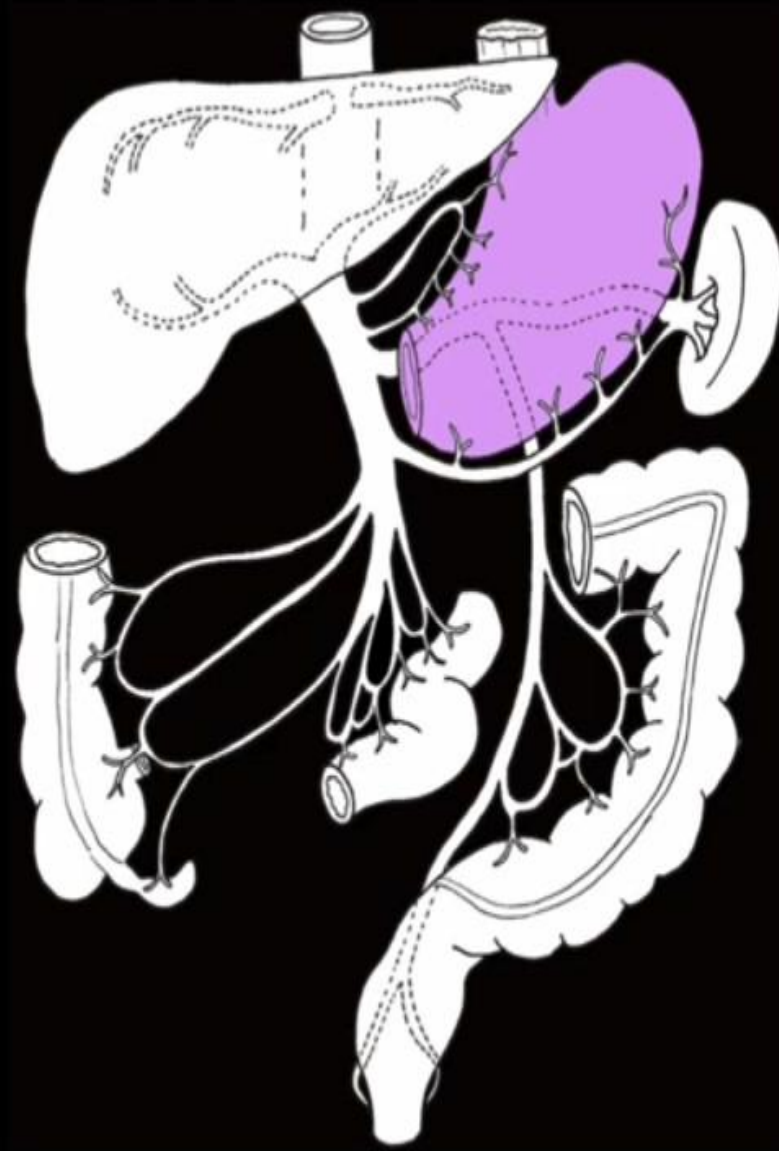
Hepatic portal system

Esophagus



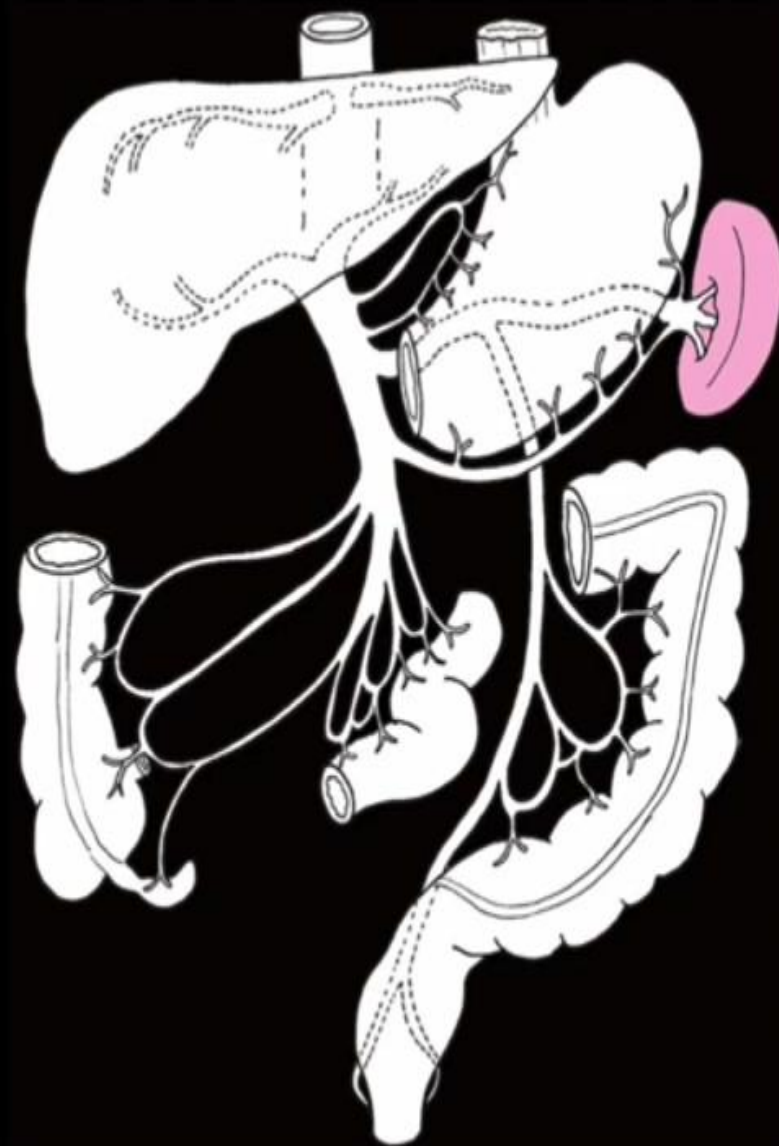
Hepatic portal system

Stomach



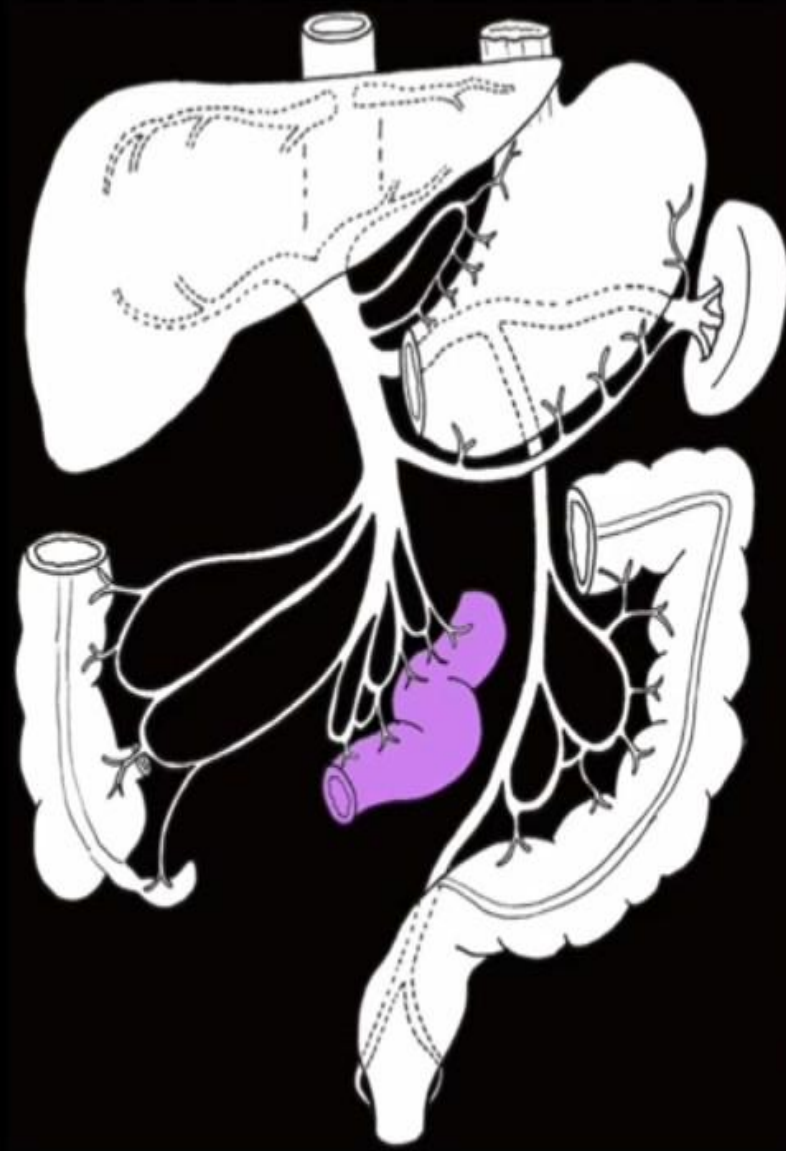
Hepatic portal system

Spleen



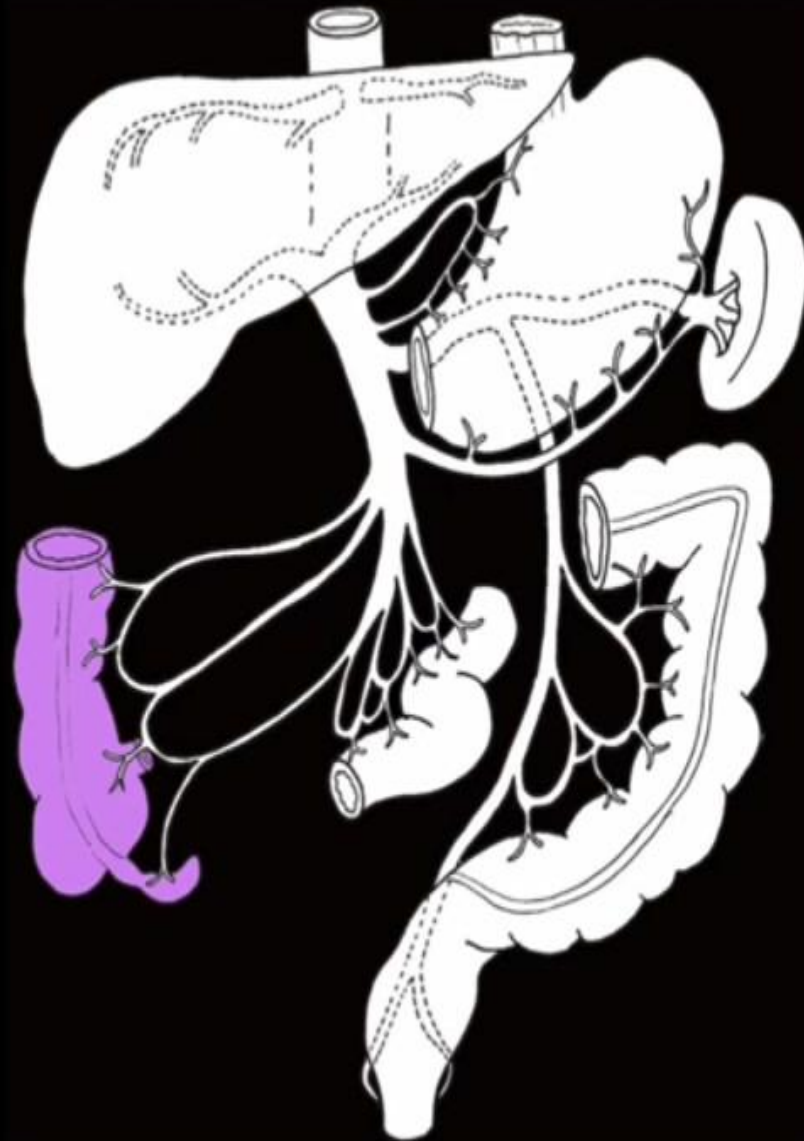
Hepatic portal system

Jejunum and Ileum



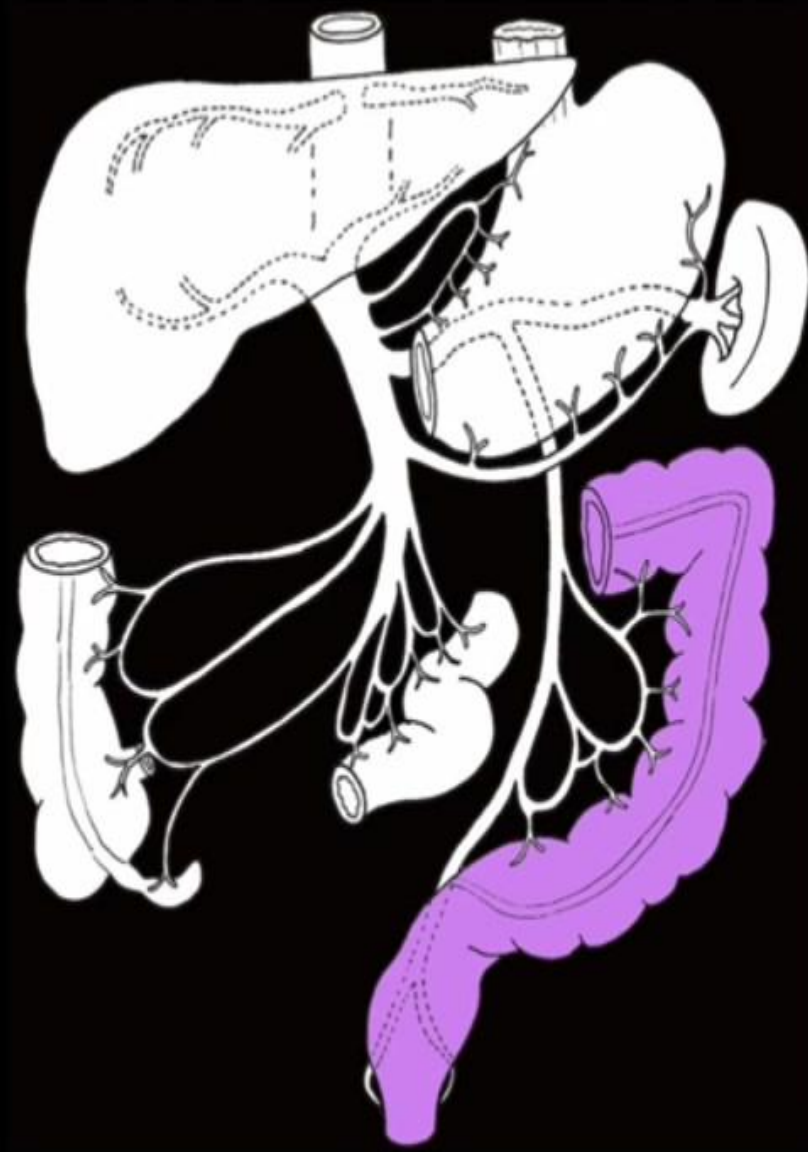
Hepatic portal system

Ascending colon



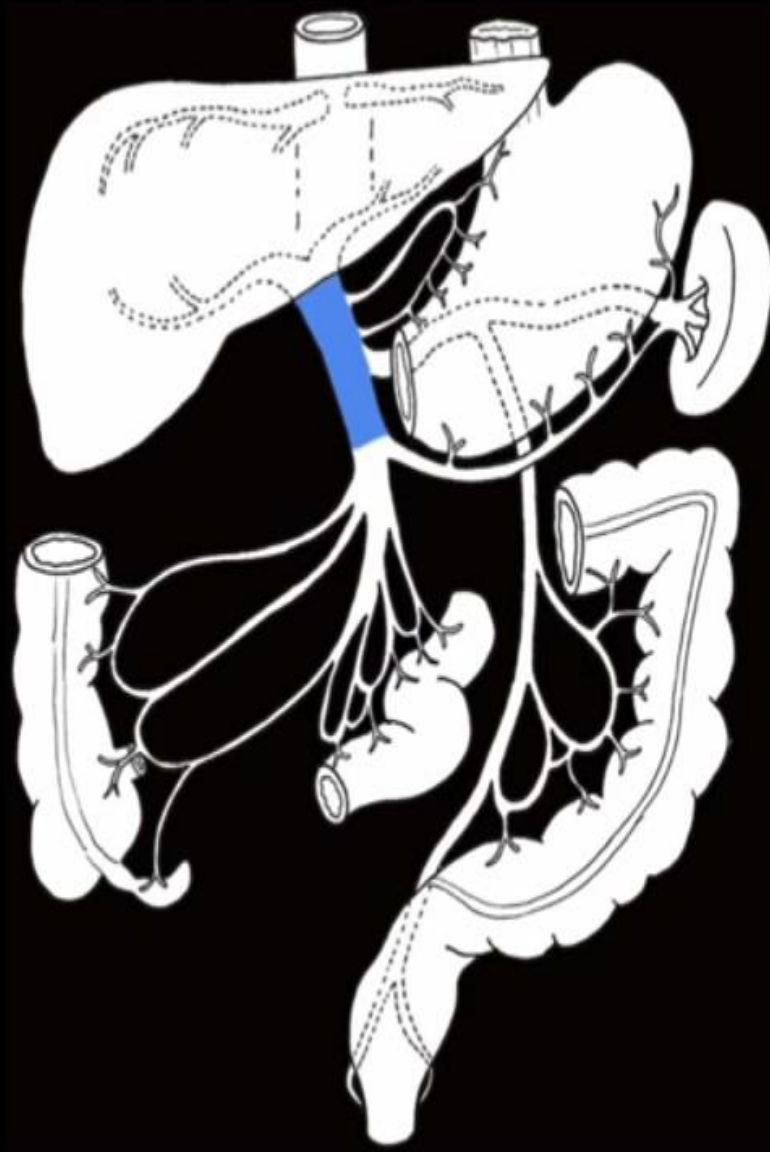
Hepatic portal system

Hindgut



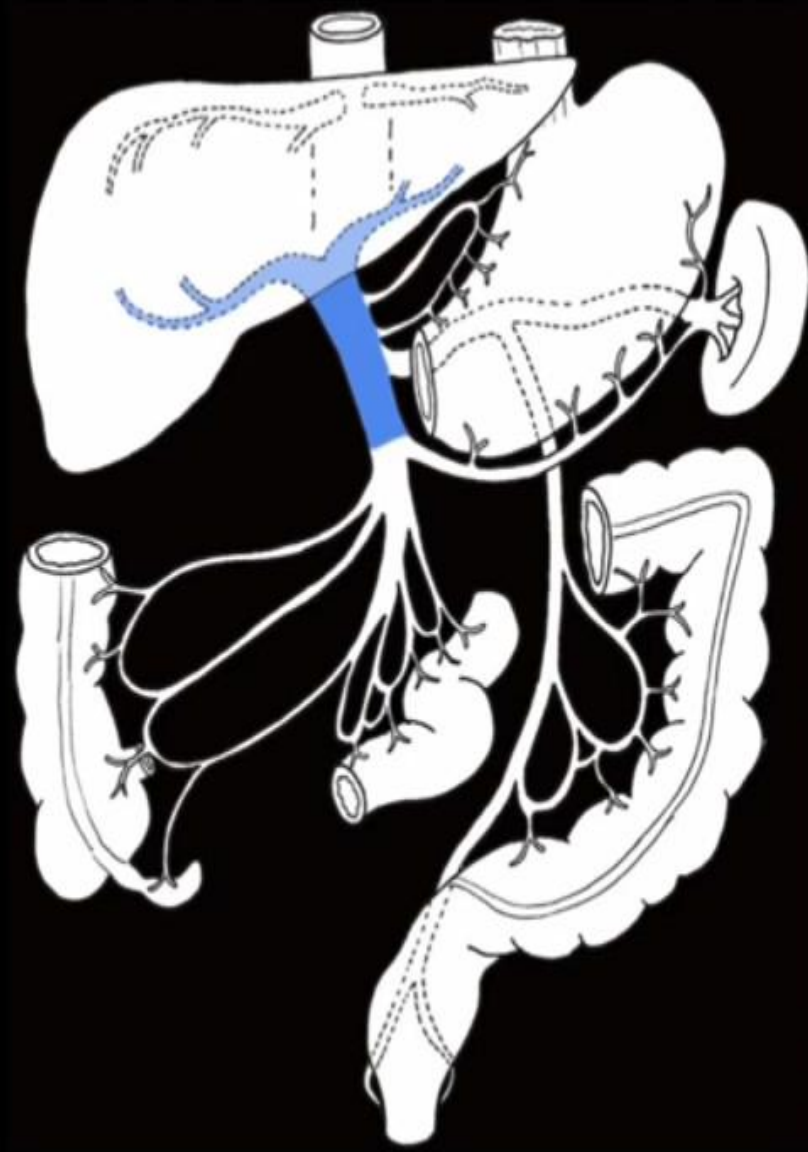
Hepatic portal system

Hepatic portal vein



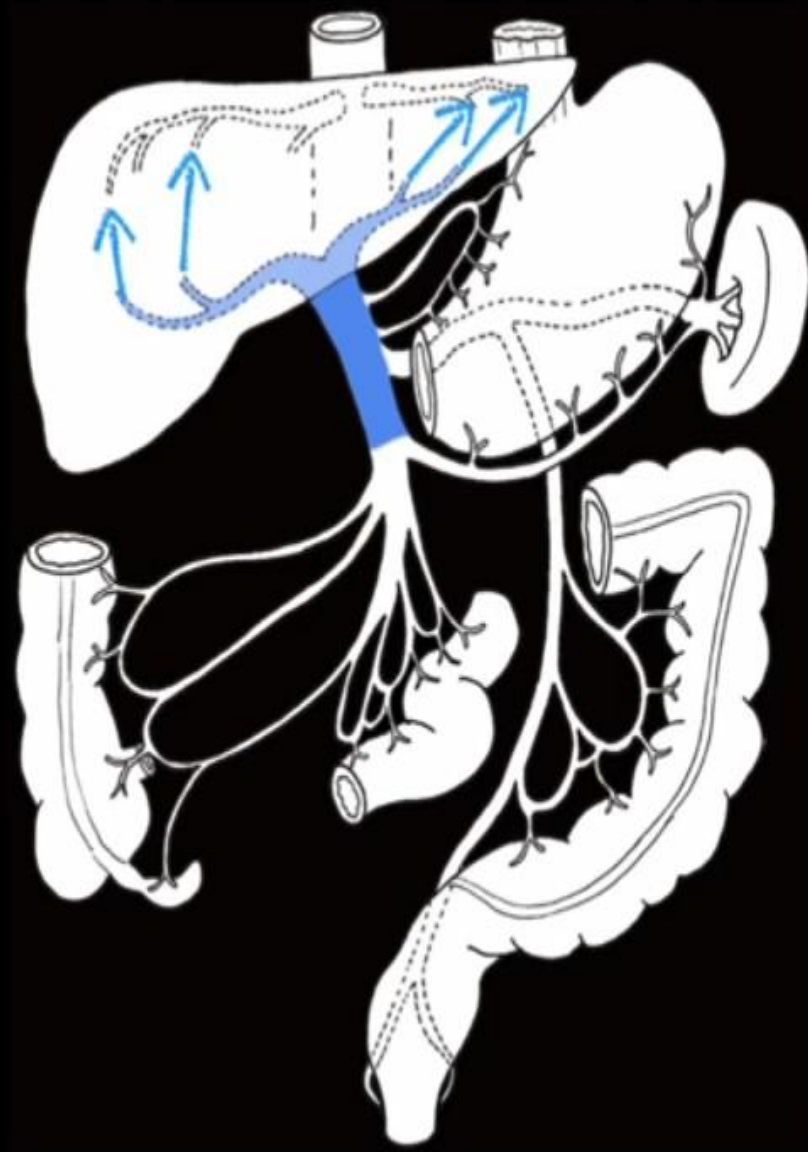
Hepatic portal system

Portal vein



Hepatic portal system

Portal vein



Hepatic portal system

Hepatic veins

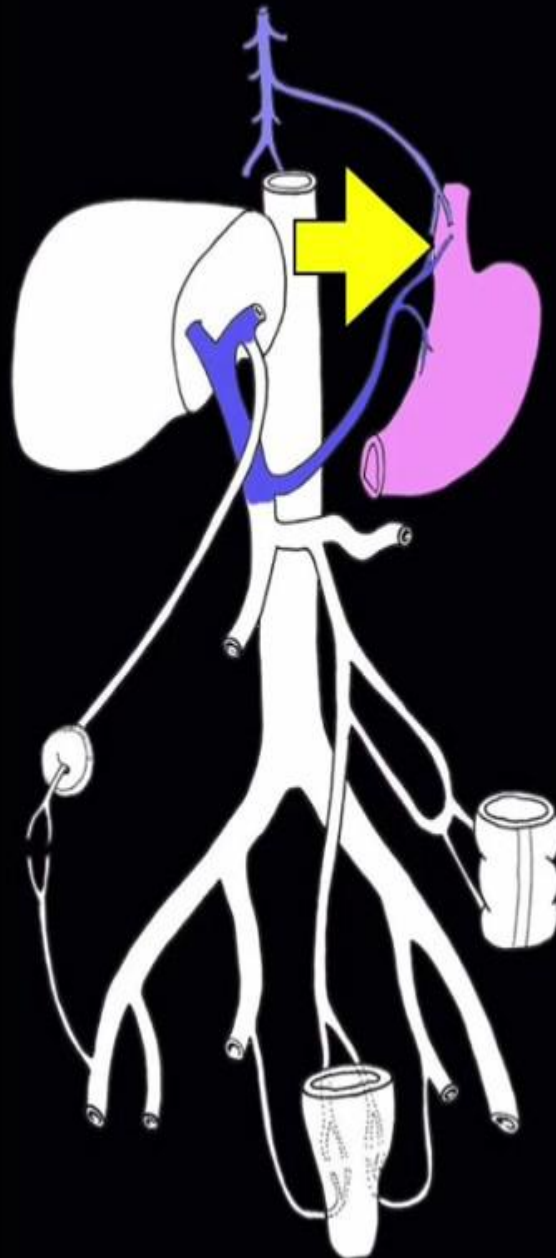


Porto-Caval Anastomoses

1. Esophagus

Portal. Left gastric vein - HPV

Caval. Esophageal vv. - Azygos vv.

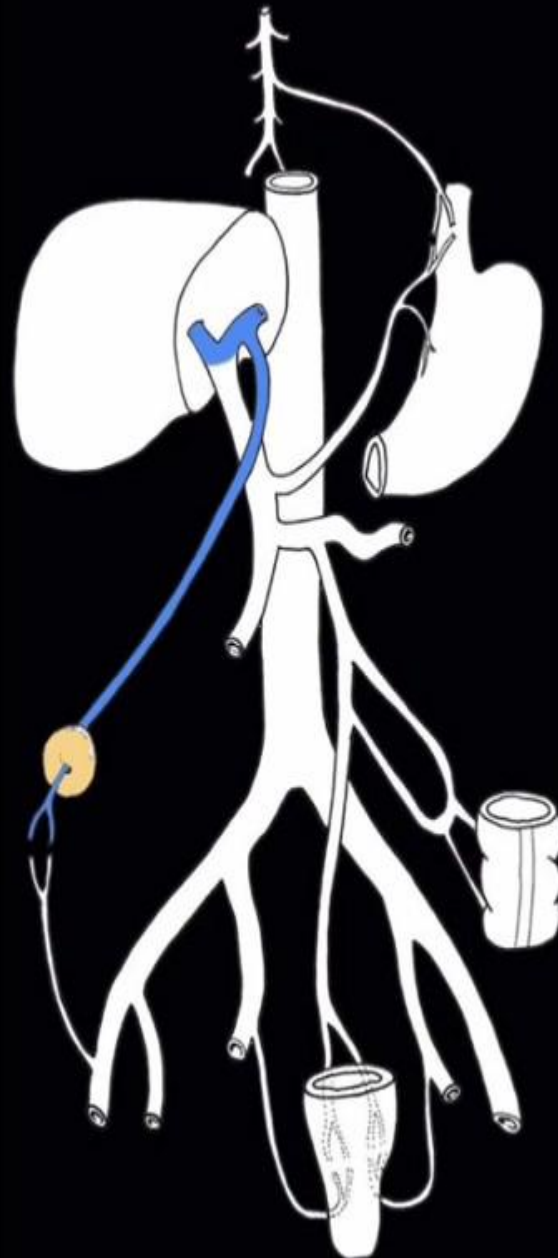




Porto-Caval Anastomoses

3. Ant abdominal wall (portal drainage)

Periumbilical veins
Hepatic portal vein



Porto-Caval Anastomoses

3. Ant abdominal wall (caval drainage)

Superficial epigastric veins

Femoral vein

External iliac vein

Common iliac vein

IVC

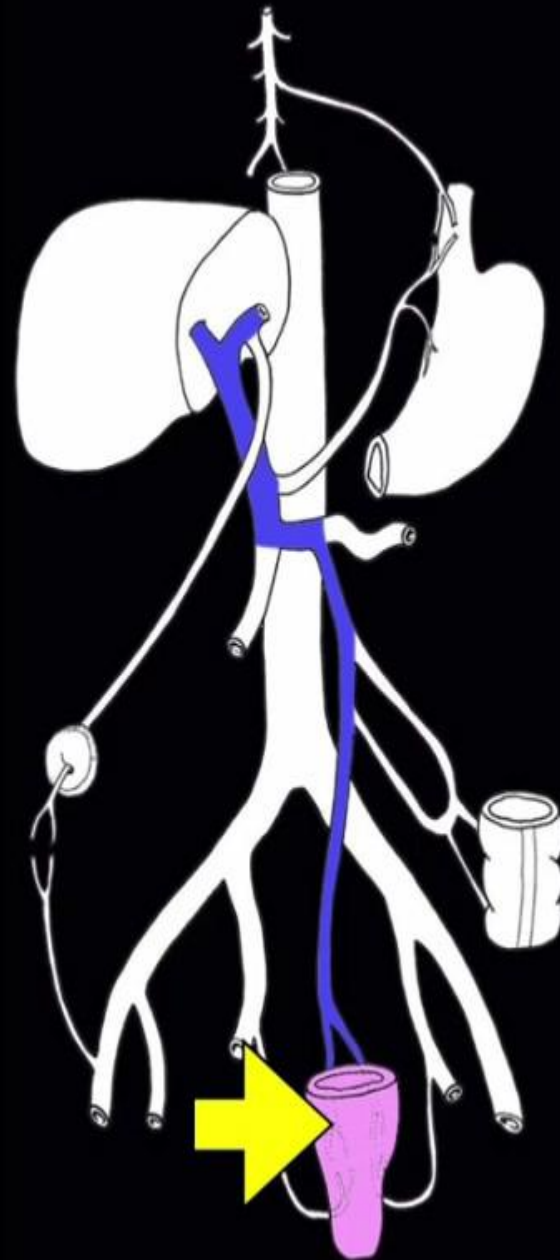




Porto-Caval Anastomoses

2. Rectum (portal drainage)

Superior rectal vein
Inf mesenteric vein
Splenic vein
HPV



Porto-Caval Anastomoses

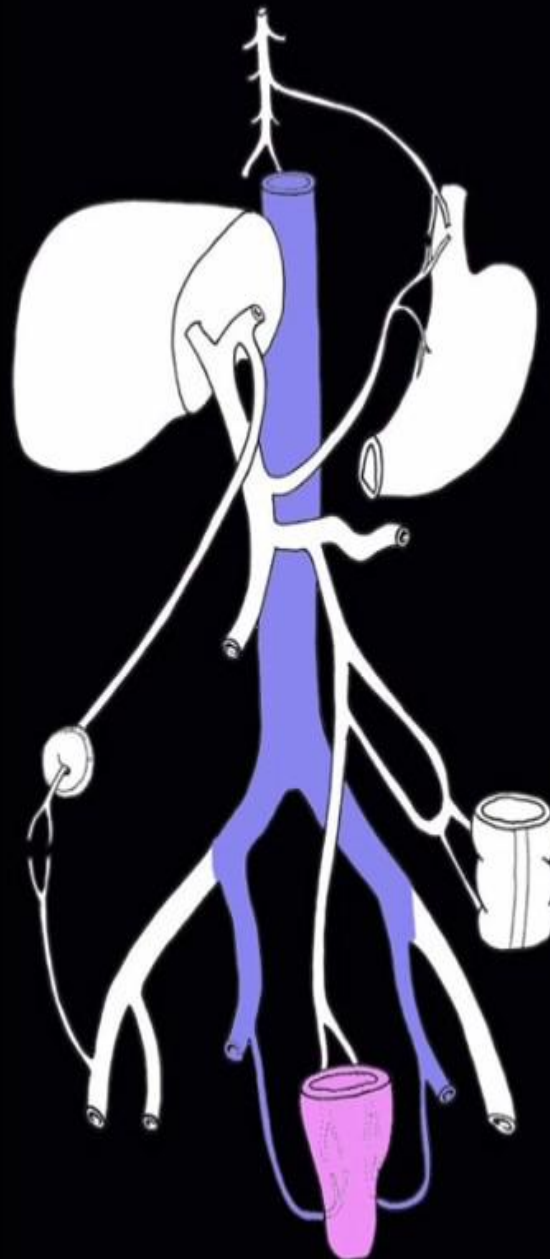
2. Rectum (caval drainage)

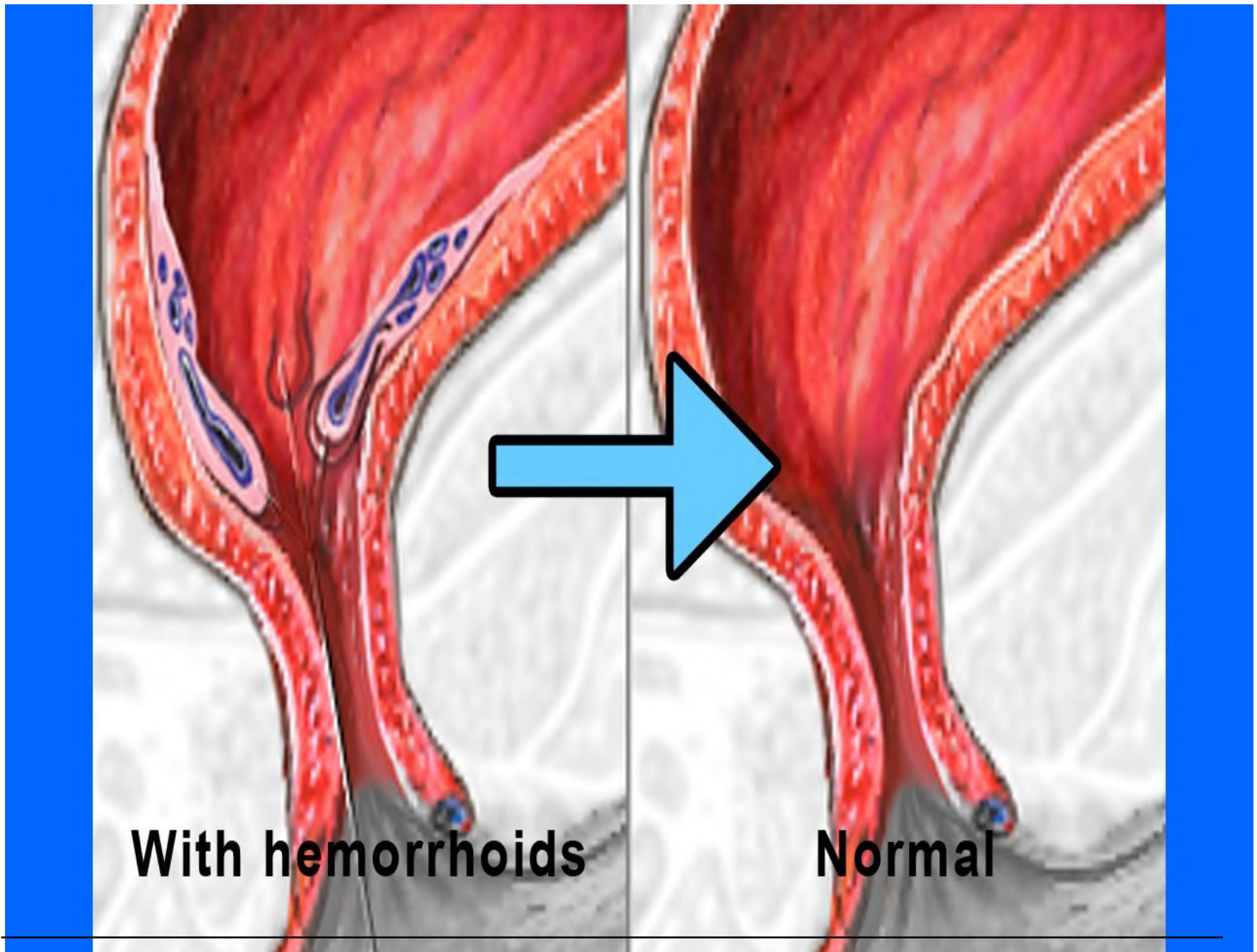
Middle and inferior rectal veins

Internal iliac vein

Common iliac vein

IVC



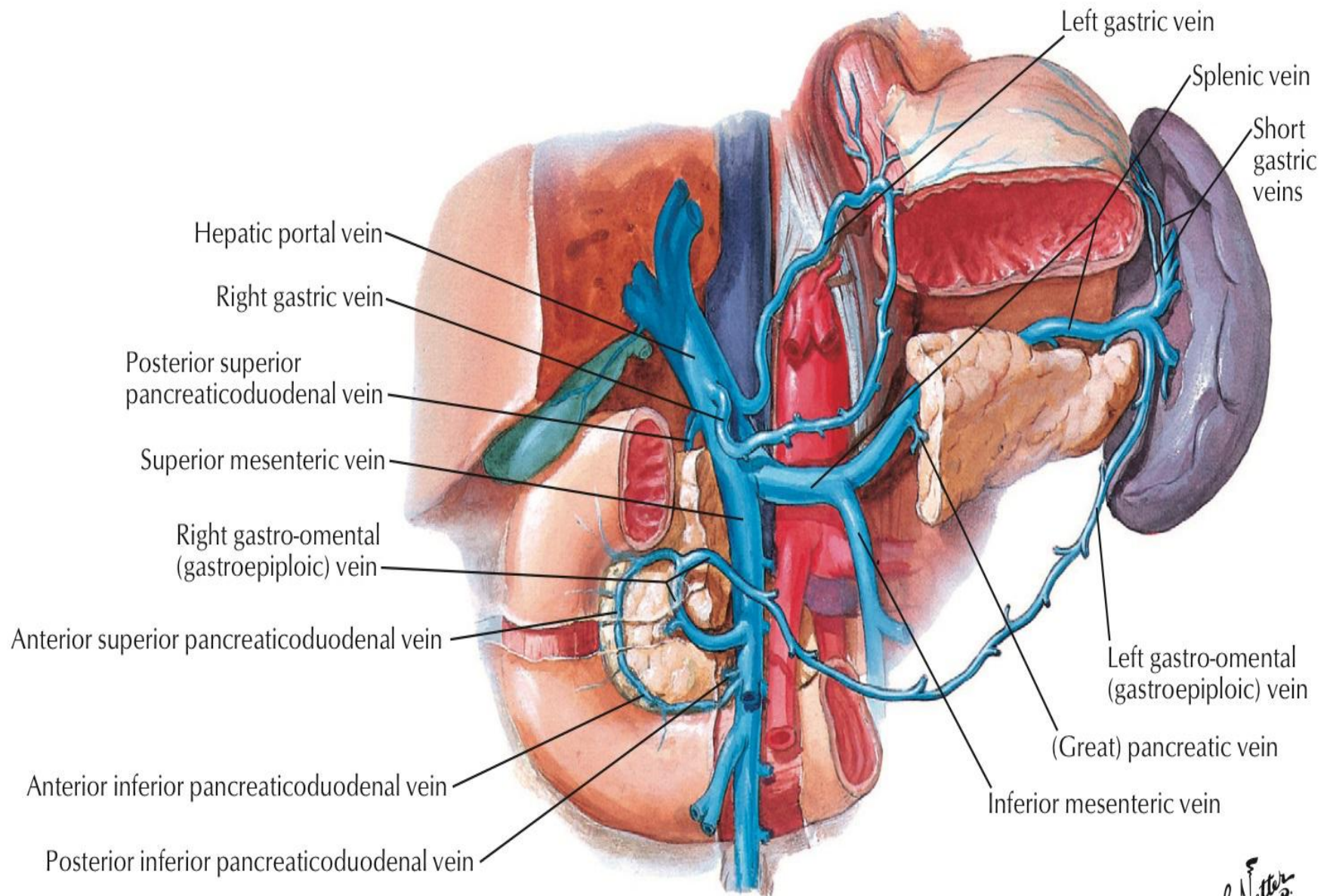


With hemorrhoids

Normal

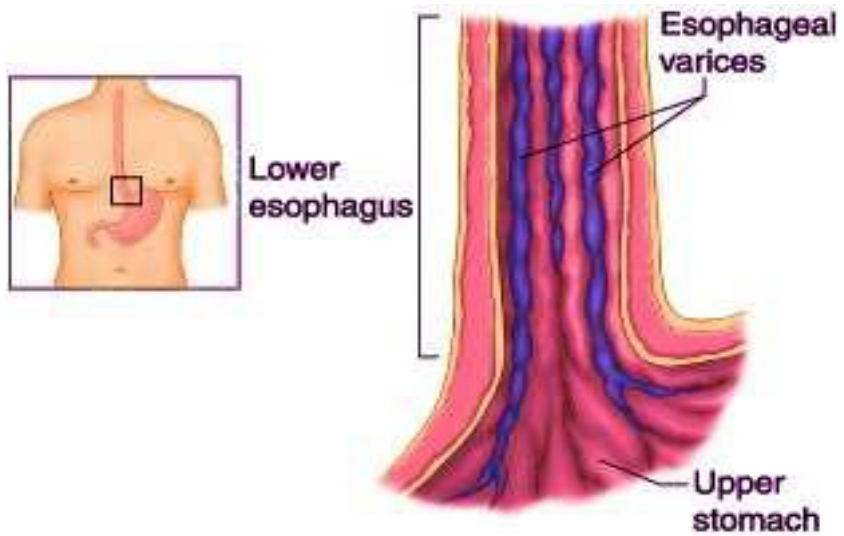
PORTAL HYPERTENSION

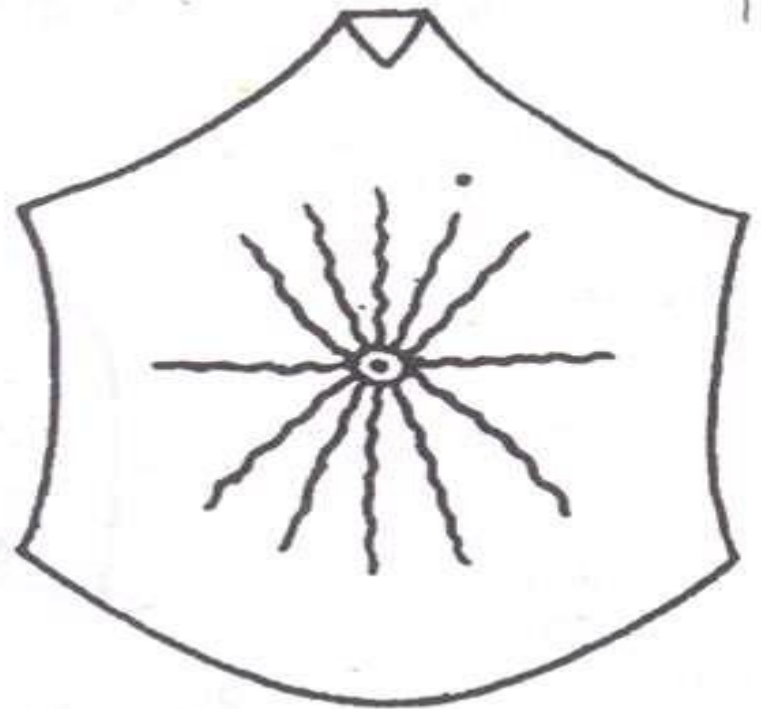
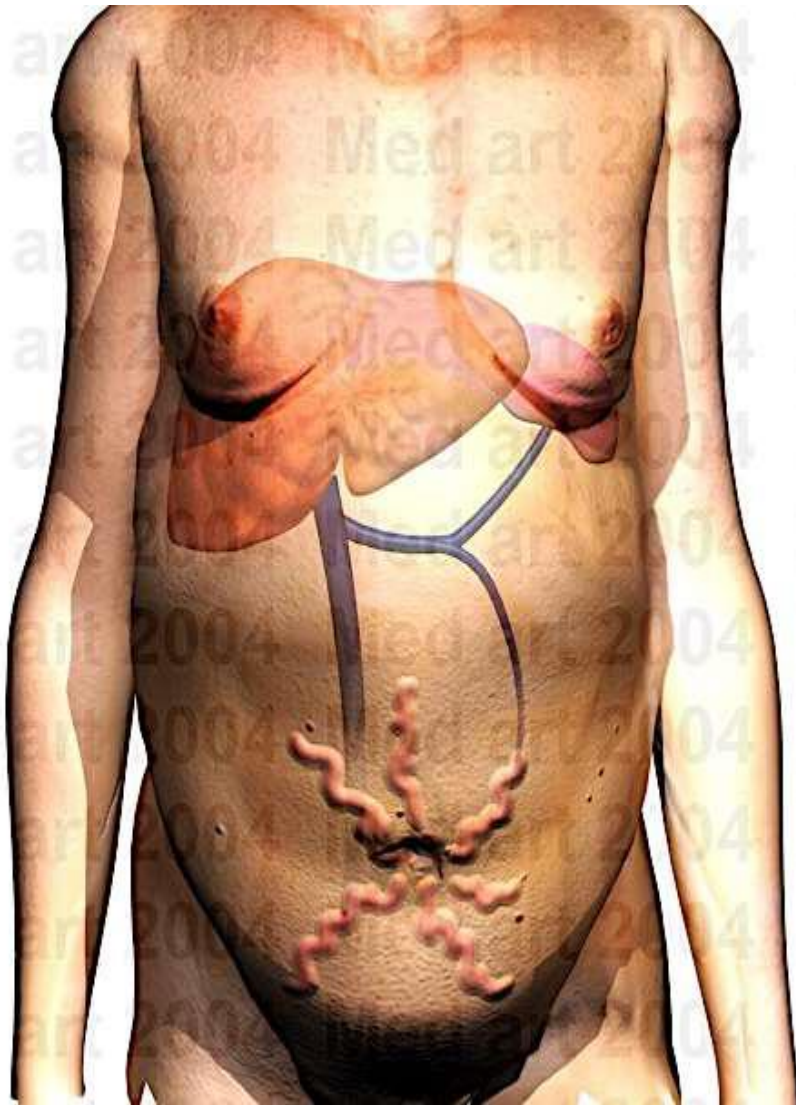
- > 12 mm of Hg
- Causes :
 - Pre hepatic : Thrombosis of portal vein
 - Hepatic: Cirrhosis
 - Post hepatic: Budd-Chiari Syndrome
- Effects: Splenomegaly, Ascites, Collateral circulation through sites of Portasystemic anastomosis

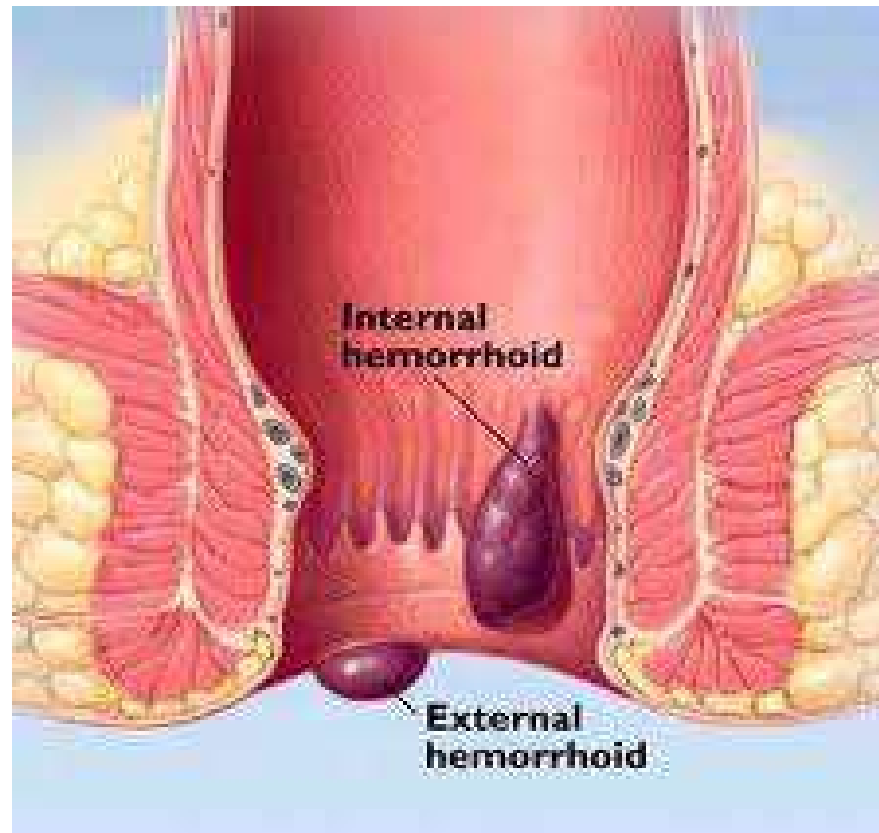


F. Netter M.D.

Site of anastomosis	Veins forming portocaval anastomosis	Clinical signs
Lower third of the esophagus	Left gastric vein ↑↓ Esophageal veins draining into azygos vein	Esophageal varices
Umbilicus	Paraumbilical veins ↑↓ Superficial veins of anterior abdominal wall	Caput medusae
Mid-anal canal	Superior rectal vein ↑↓ Middle and inferior rectal veins	Hemorrhoids

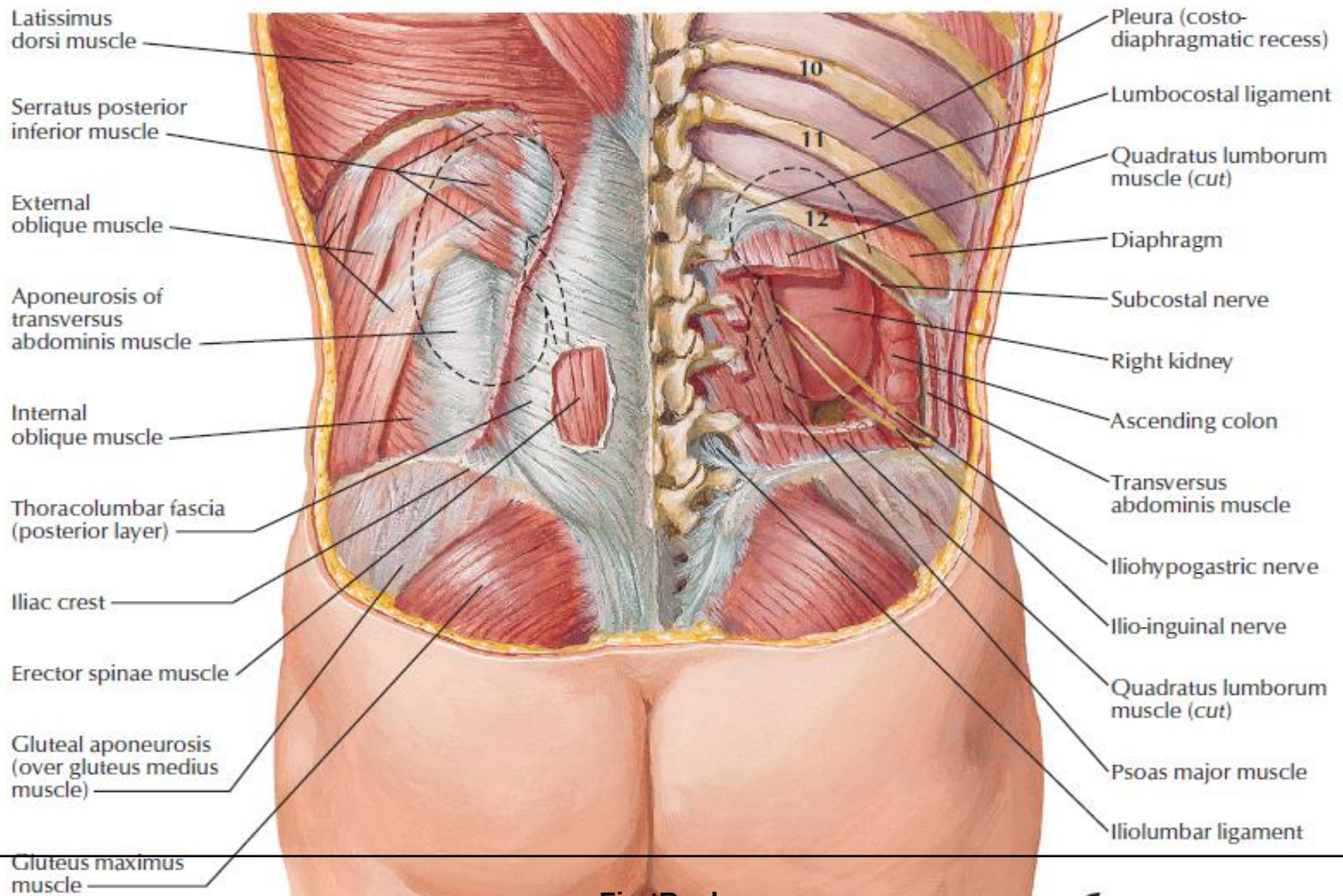






EXPOSURE OF KIDNEY FROM BEHIND

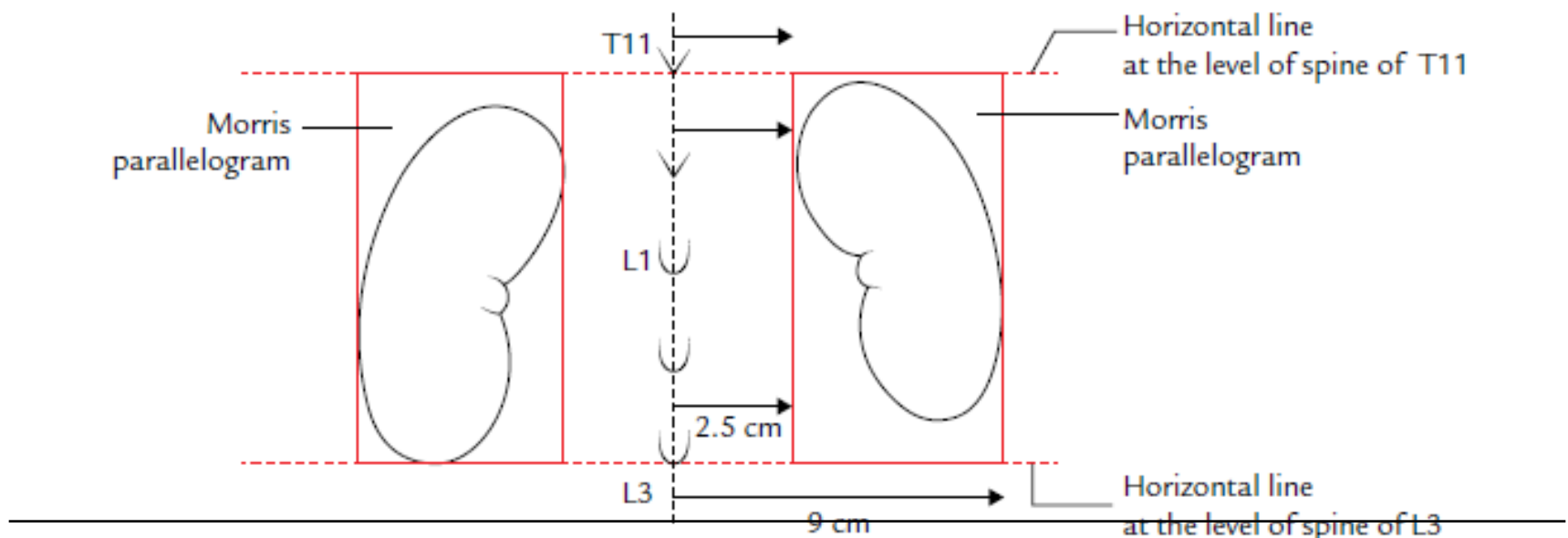
Loin: *It is the region on the back of the trunk, bounded above by the 12th rib, below by the iliac crest, medially by the posterior median line, and laterally by flank.*

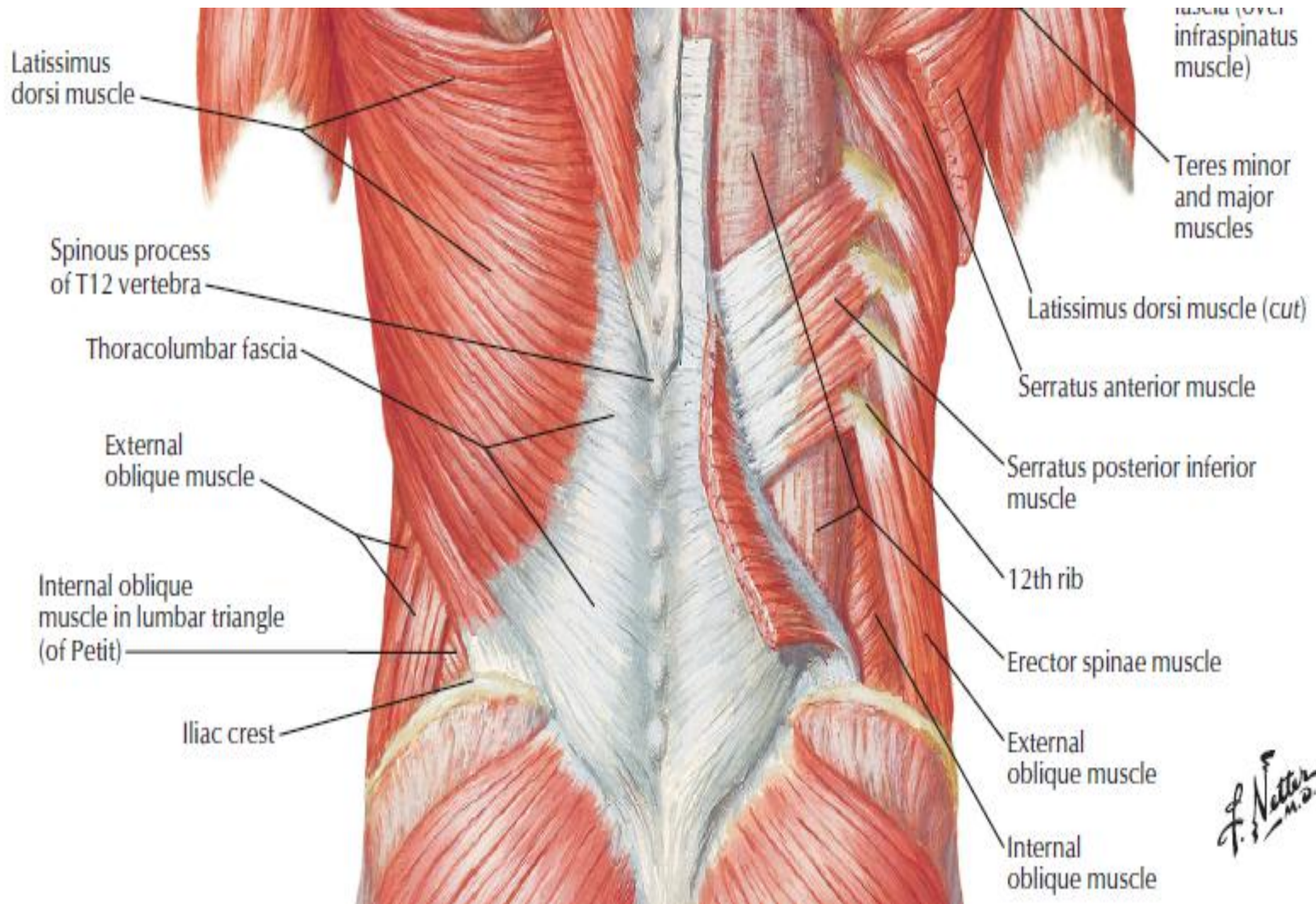


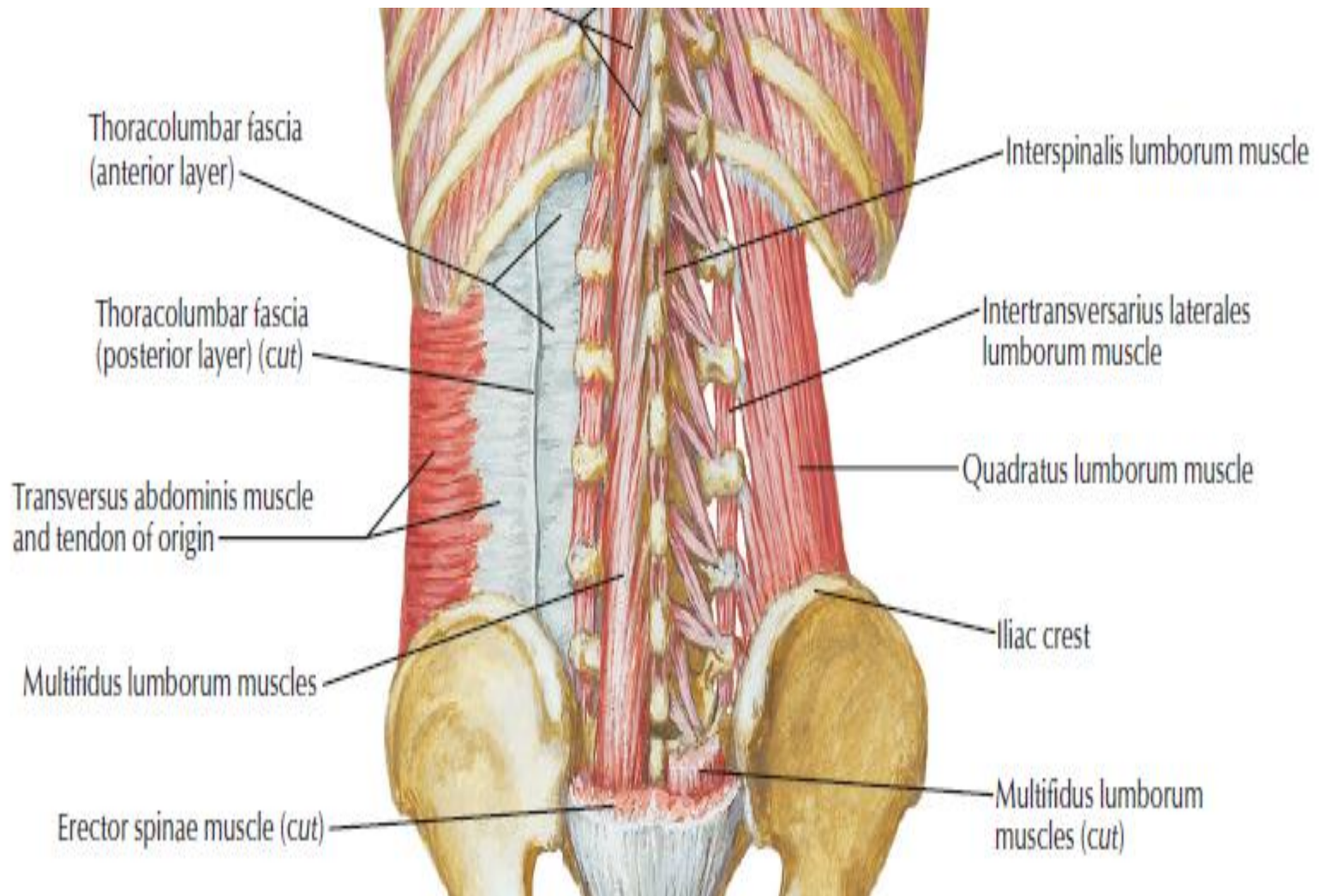
SURFACE MARKING OF KIDNEY FROM BACK

It is done within **parallelogram of Morris** which is drawn in the following way:

1. First two horizontal lines are drawn one at the level of spine of T11 and other at the level of spine of L3.
2. Then two vertical lines are drawn, one 2.5 cm away and other 9 cm away from the posteromedian plane.
3. The centre of hilum of the each kidney lies approximately at the lower border of L1.







Layers to be reflected to reach the Kidney

1. Skin.
2. Superficial fascia.
3. Posterior layer of the thoraco-lumbar fascia with attached latissimus dorsi and serratus posterior inferior muscles.
4. Erector spinae (sacrospinalis) muscles.
5. Middle layer of the thoraco-lumbar fascia.
6. Quadratus lumborum muscle.
7. Anterior layer of the thoraco-lumbar fascia.

