

ARTERIAL SUPPLY OF GUT

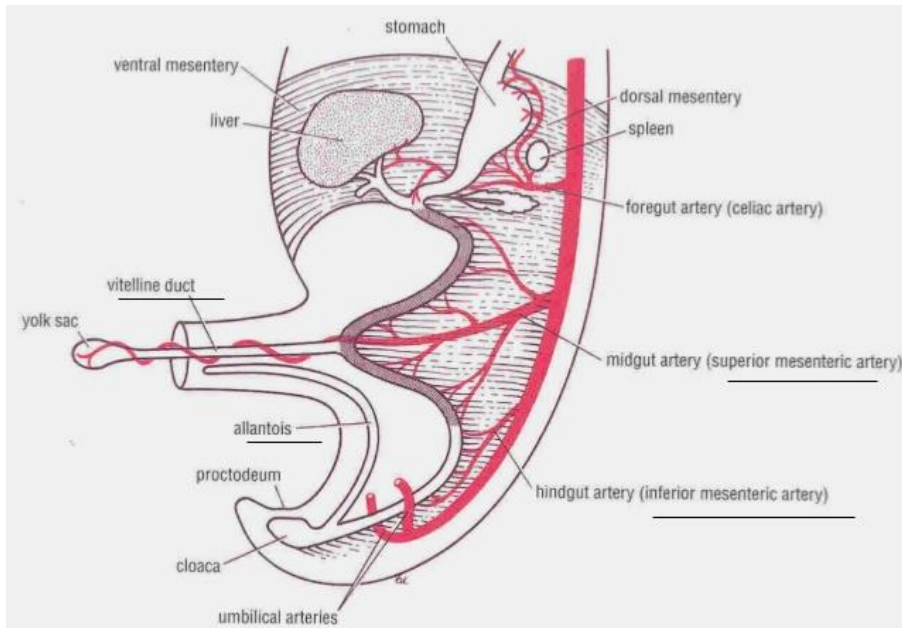
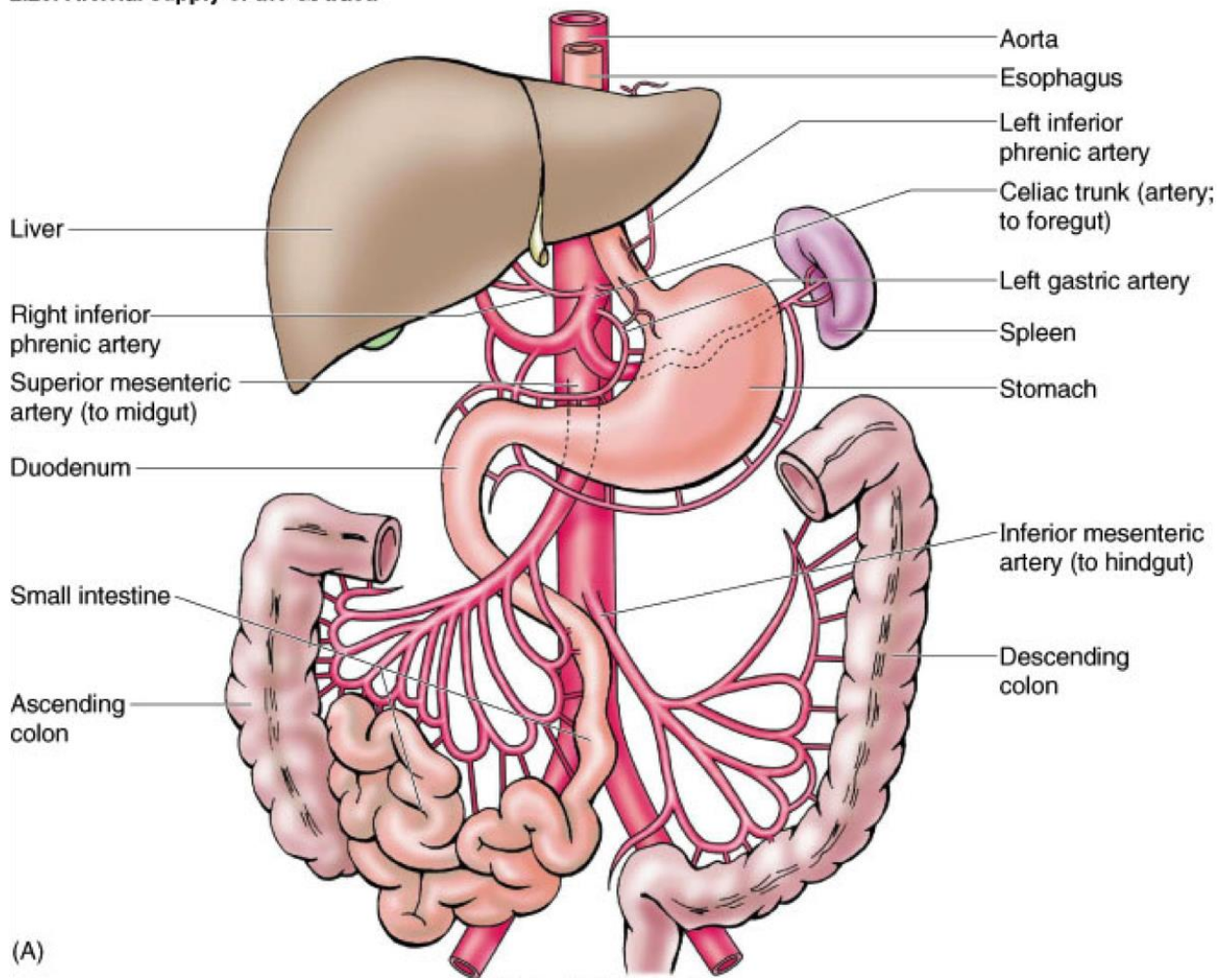


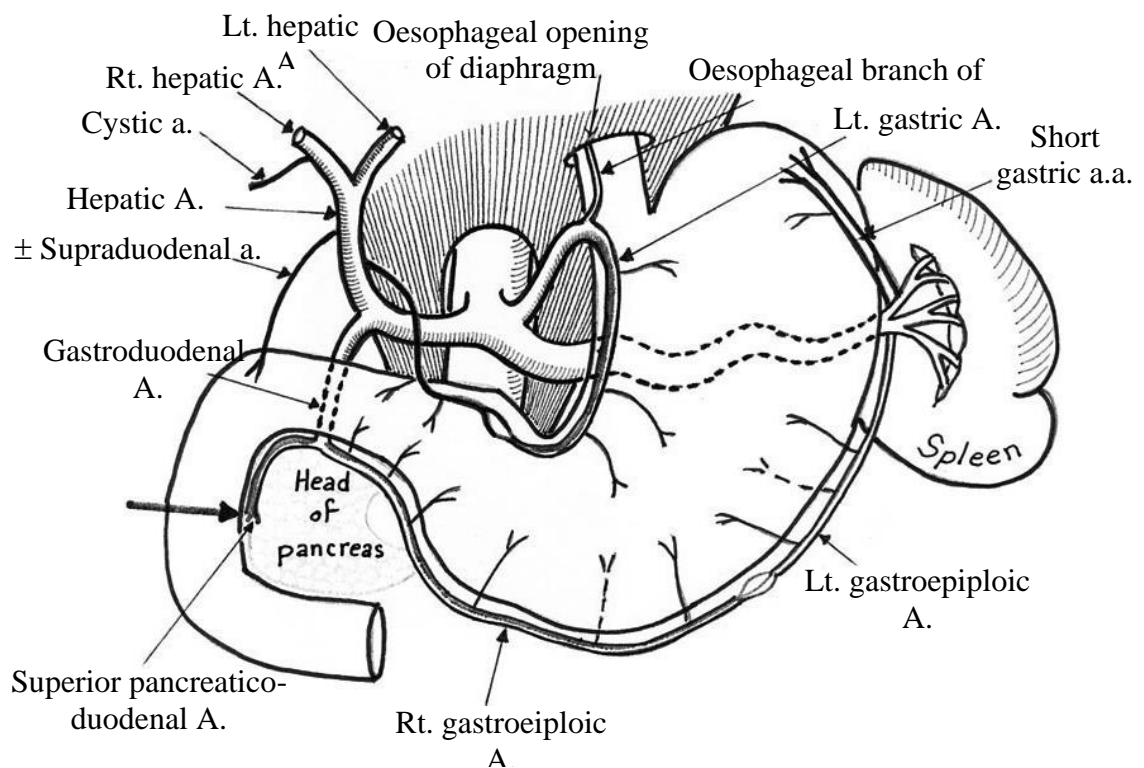
Figure 5-46 Formation of the midgut loop (*shaded*). Note how the superior mesenteric artery and vitelline duct form an axis for the future rotation of the midgut loop.

2.28. Arterial supply of the GI tract.



1. COELIAC TRUNK

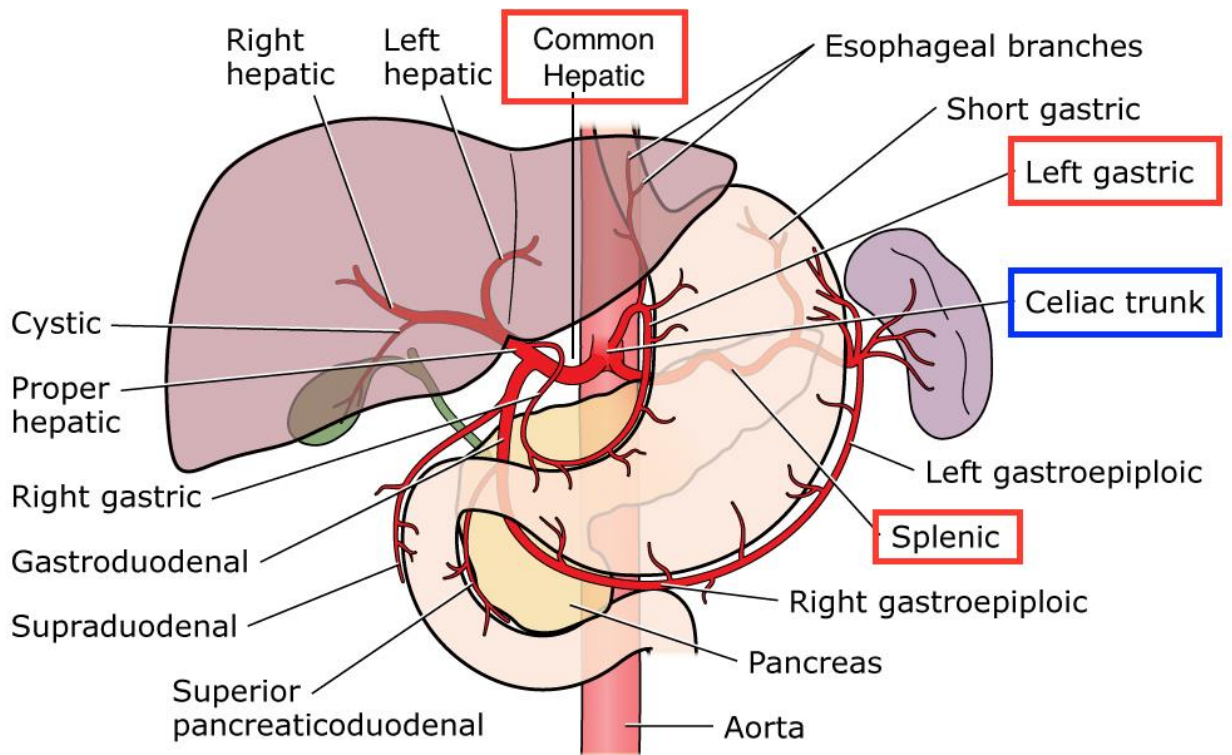
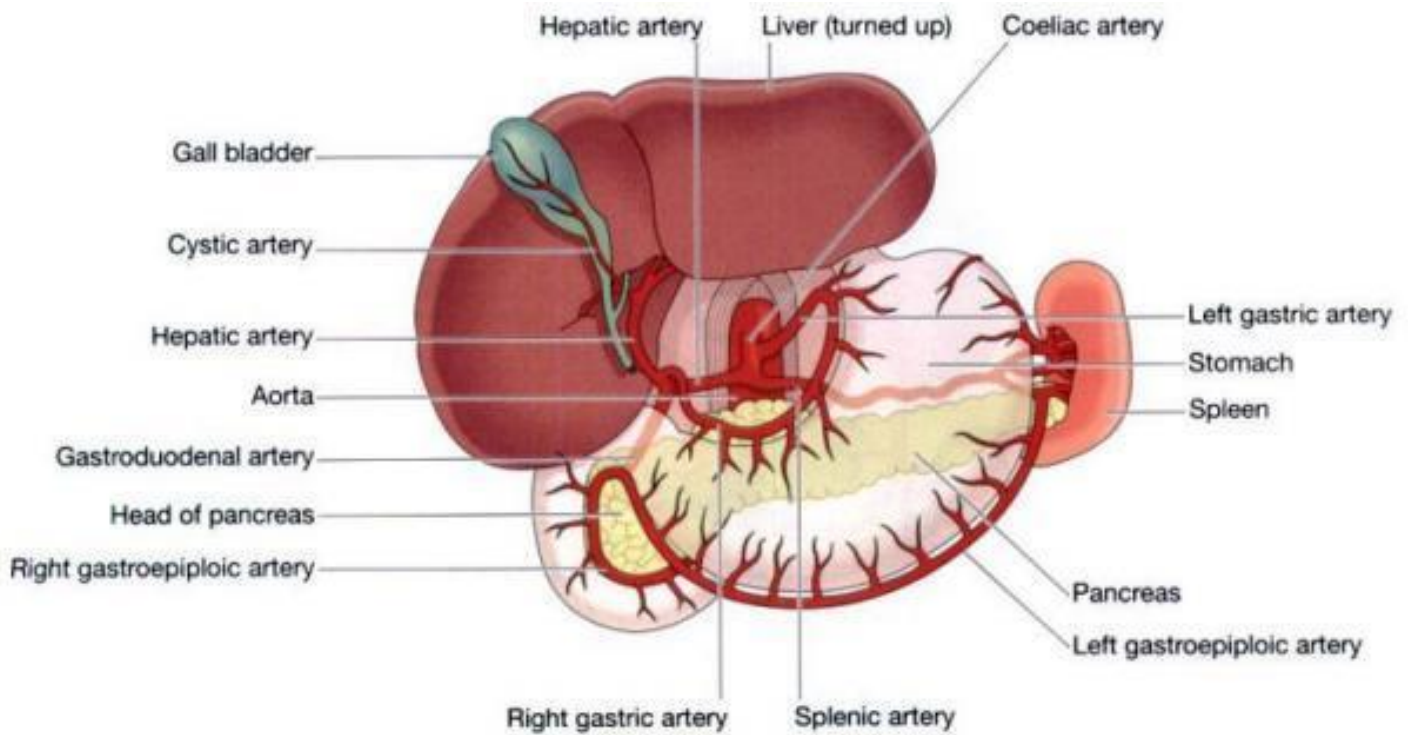
- * **It arises** from front of aorta at level of upper border of L1, passes forwards for 1/2 inch then it **ends** by dividing into 3 terminal branches.
- * It is the artery of **foregut**.
- * On each side it is related to caeliac ganglion & a crus of diaphragm.
- * **Anterior relations:** it is related to cavity of lesser sac.
- * **Inferiorly** it is related to upper border of body of pancreas.



* Coeliac Trunk and its Branches *

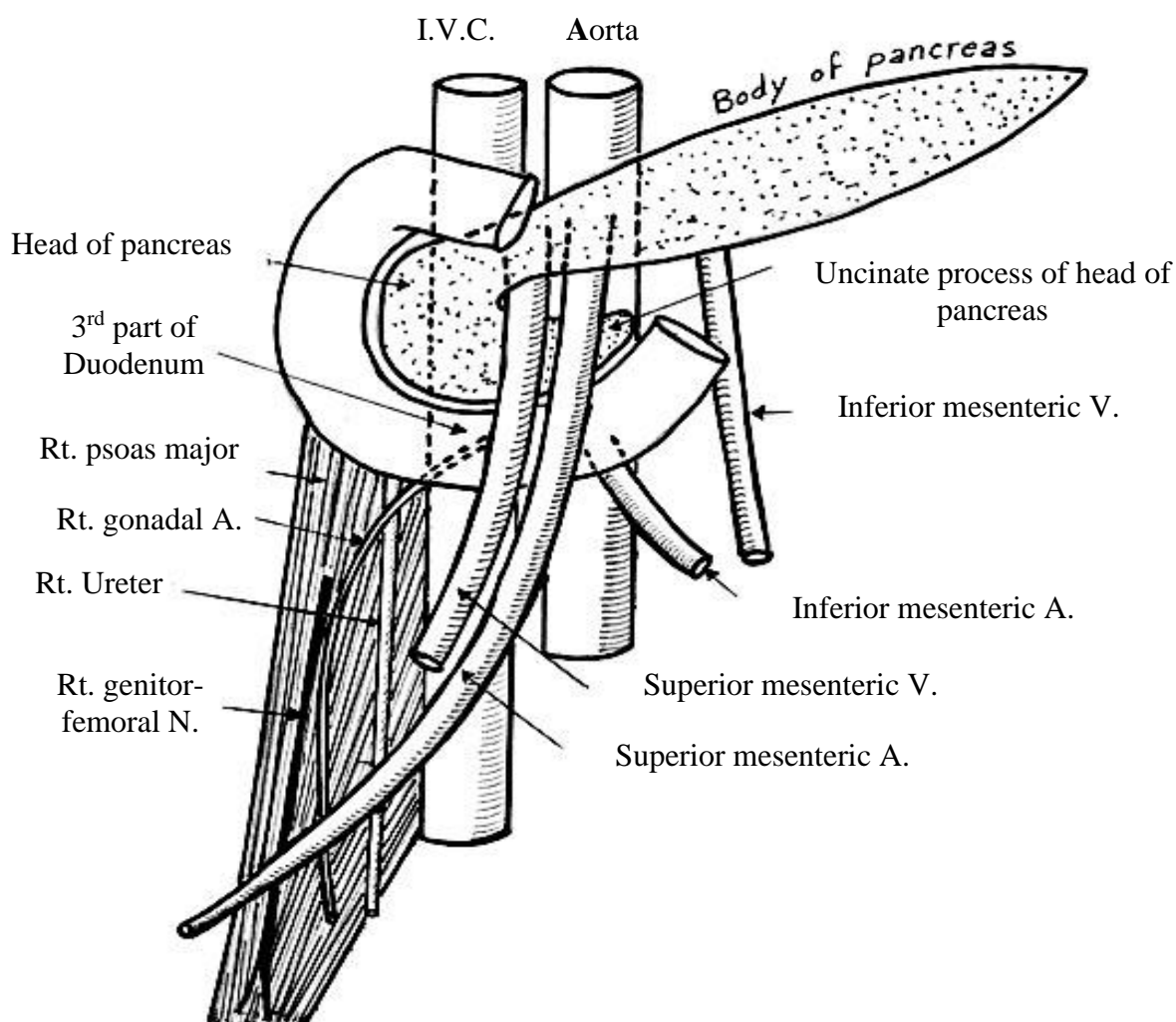
- * **Branches:**
 - a) **Left gastric artery** : which gives oesophageal & gastric branches.
 - b) **Splenic artery** : Tortuous, runs above body of pancreas, gives pancreatic branches, short gastric, Lt. gastroepiploic & splenic branches.
 - c) **Hepatic artery** : Passes in the free border of lesser omentum in front of portal vein and on the left side of C.B.D. It gives right gastric artery, gastroduodenal artery (gives sup. pancreatico-

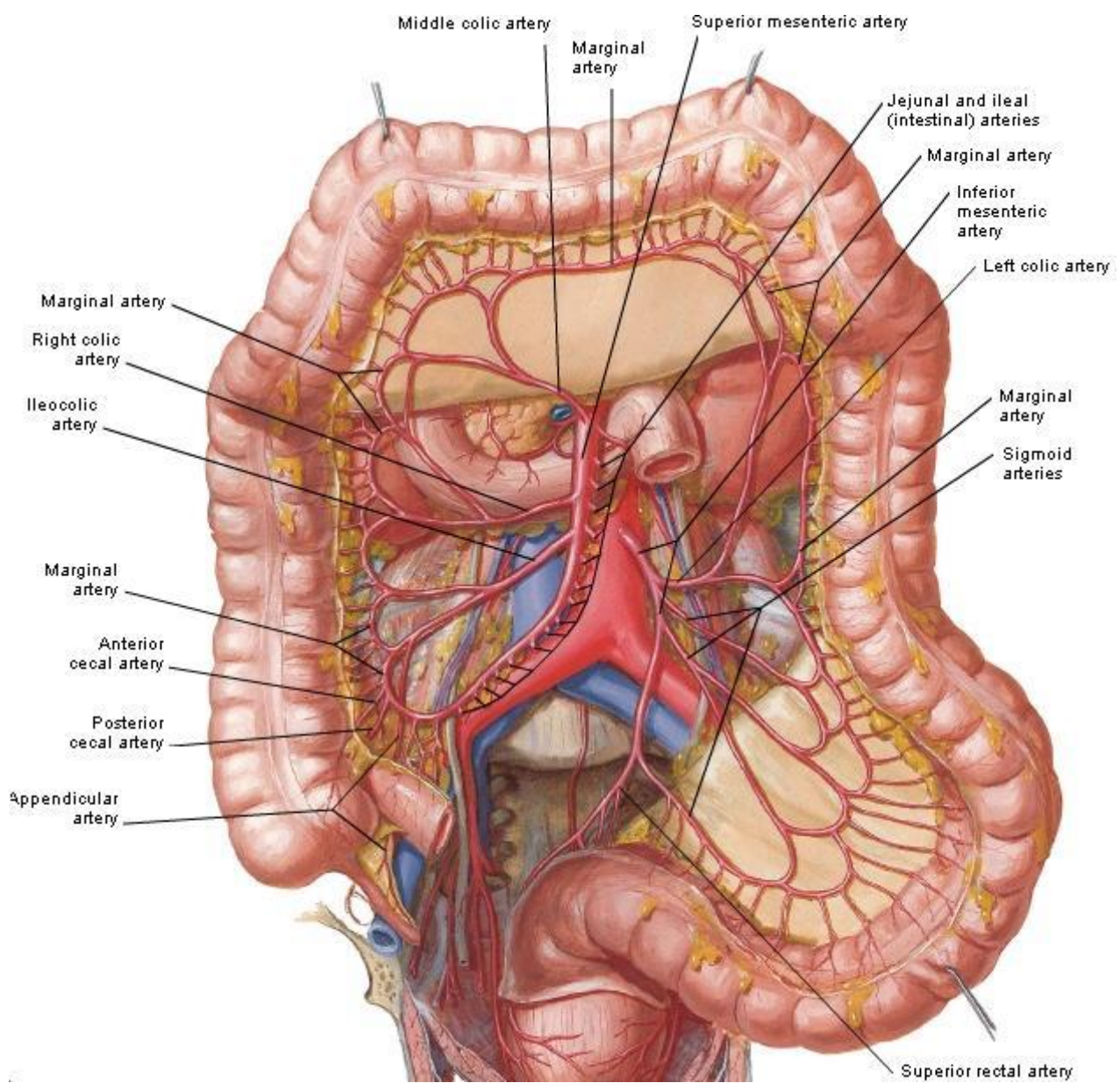
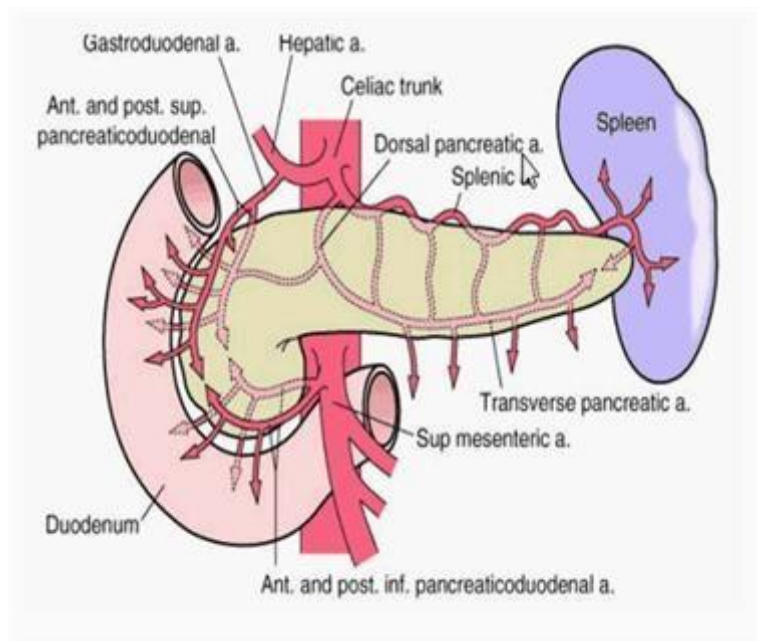
duodenal & right gastro-epiploic arteries) and right & left terminal branches to liver.



2. SUPERIOR MESENTERIC ARTERY.

- * **It arises** from front of aorta at level of lower border of L₁ & **passing** downwards and to the right to **ends** in the right iliac fossa by anastomosing with ileo-colic artery .
- * It is the artery of **midgut**.
- ***Branches:** Inferior pancreatico-duodenal , jejunal & ileal , ileo-colic , right colic & middle colic arteries .
- * **Relation:** It arises behind body of pancreas on the left side of its vein then both pass in front of left renal vein , uncinete process of pancreas , 3rd part of duodenum, then enters the root of mesentery of small intestine.

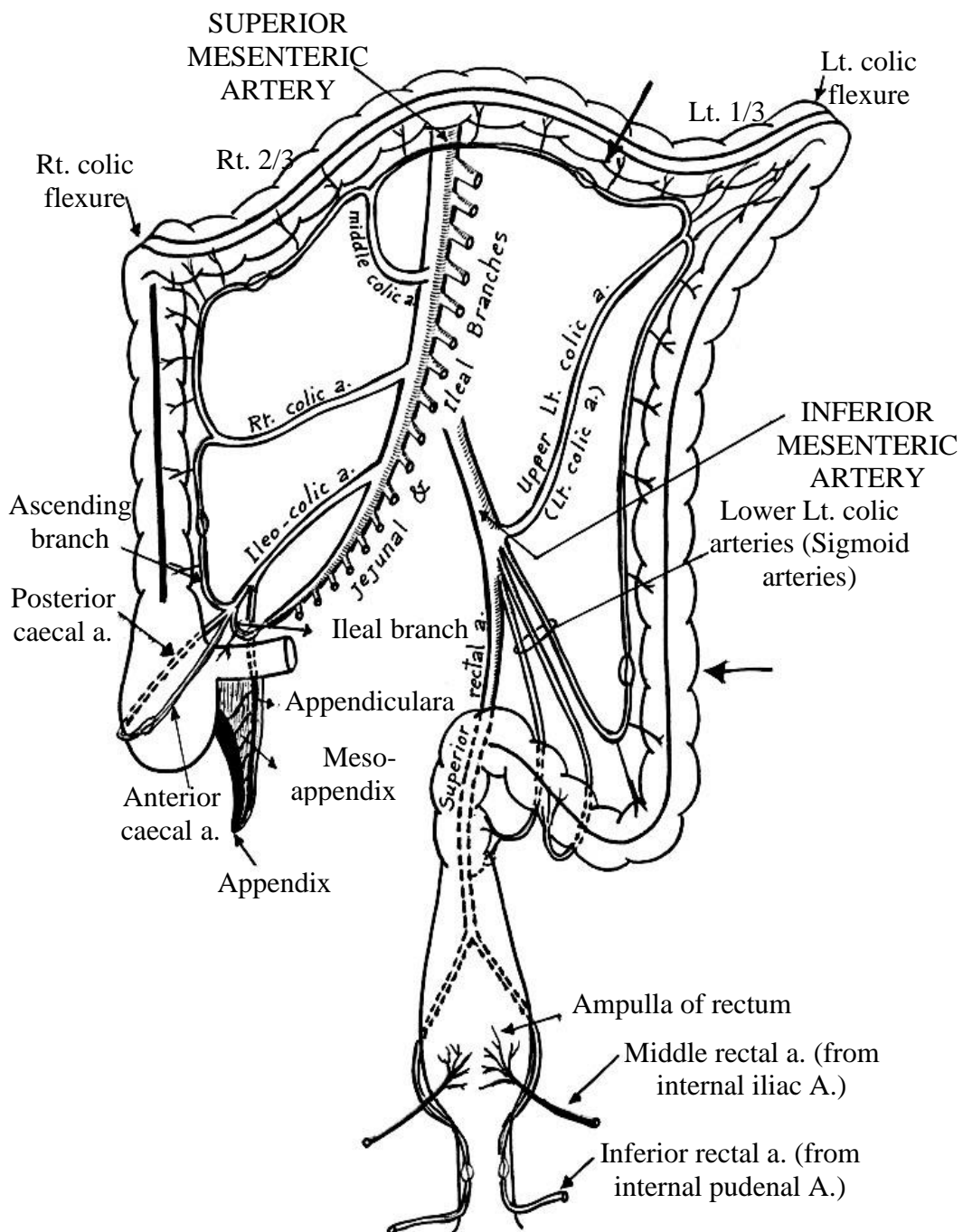




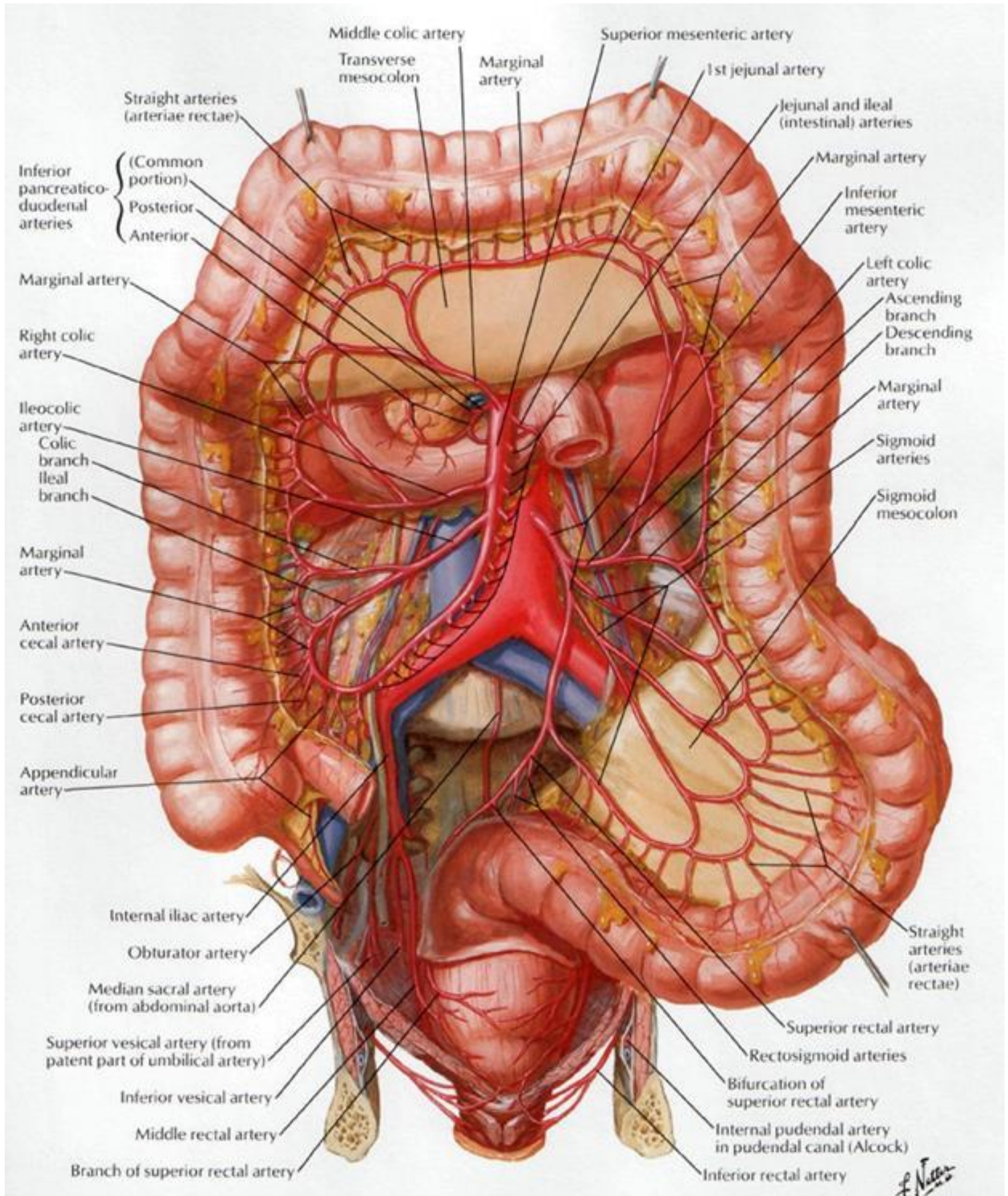
***Superior and Inferior Mesenteric Arteries ***

3. INF. MESENTERIC ARTERY.

- * *It arises* from front of aorta at level of L₃ behind 3rd part of duodenum.
- * *It ends* by entering the pelvis, by crossing middle of left common iliac artery as superior rectal artery.
- * It is the artery of **hindgut**.
- * **Branches:** Superior left colic artery, inferior left colic arteries (sigmoid arteries). superior rectal artery (main arterial supply to rectum & upper half of anal canal).



* **Branches of Sup. & Inf. Mesenteric artery** *



- * **N.B.:** Anastomosis along the medial aspect of ascending & descending colon and mesenteric border of transverse colon, forms the marginal artery which gives the vasa recta. The latter are the terminal arterial branches to the colon.
- This marginal artery has a great surgical importance as it can maintain the viability of a long segment of the colon after division of a major colic branch.
- According to blood supply, the colon is divided to 4 surgical segments:
 1. **1st segment:** include terminal 10 inches of ileum, caecum, ascending colon, right colic flexure & right 1/3 of transverse colon.
 2. **2nd segment:** Middle 1/3 of transverse colon.
 3. **3rd segment:** left 1/3 of transverse colon and descending colon.
 4. **4th segment:** Sigmoid colon.
- * **Lymphatic drainage** of colon follows arterial supply to the following lymph nodes in sequence:
 1. **Epicolic nodes** on the bowel wall.
 2. **Paracolic nodes** between the marginal artery and the bowel.
 3. **Intermediate nodes** on the main vessels along the colic arteries.
 4. **Central nodes** alongside the superior and inferior mesenteric vessels.

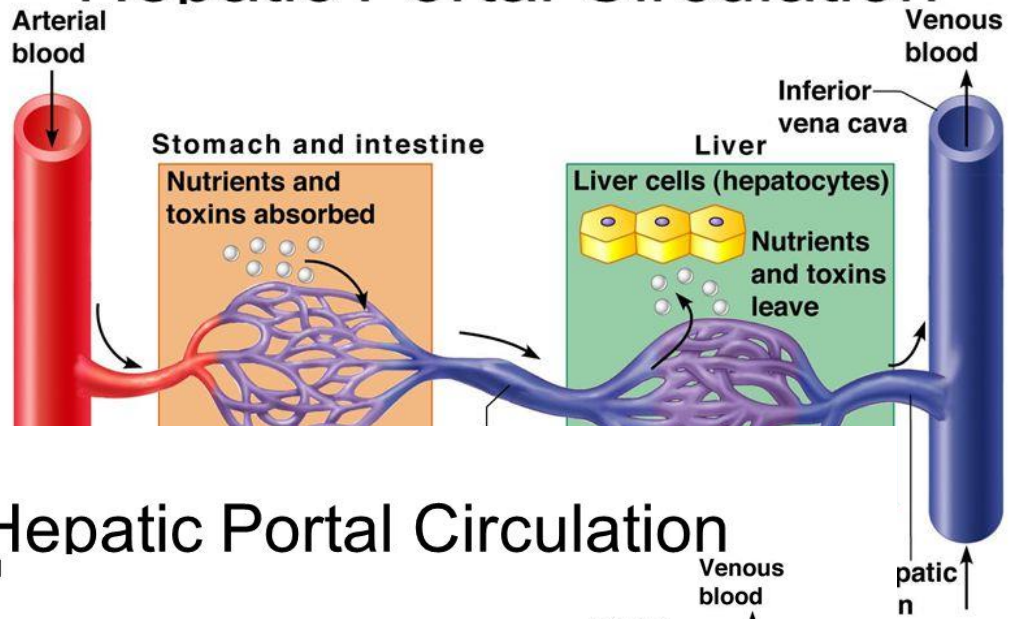
Portal circulation

* It begins & ends by capillaries. It has no valves.

* **Difference between the portal and systemic circulation.***

Portal circulation	Systemic circulation
1- Formed by the portal vein and its tributaries	1- Formed by the I.V.C. & S.V.C. and their tributaries.
2- Has no valves.	2- May contain valves.
3- Starts by tributaries and ends by branches.	3- Starts by tributaries and ends in large vein .

Hepatic Portal Circulation



Hepatic Portal Circulation

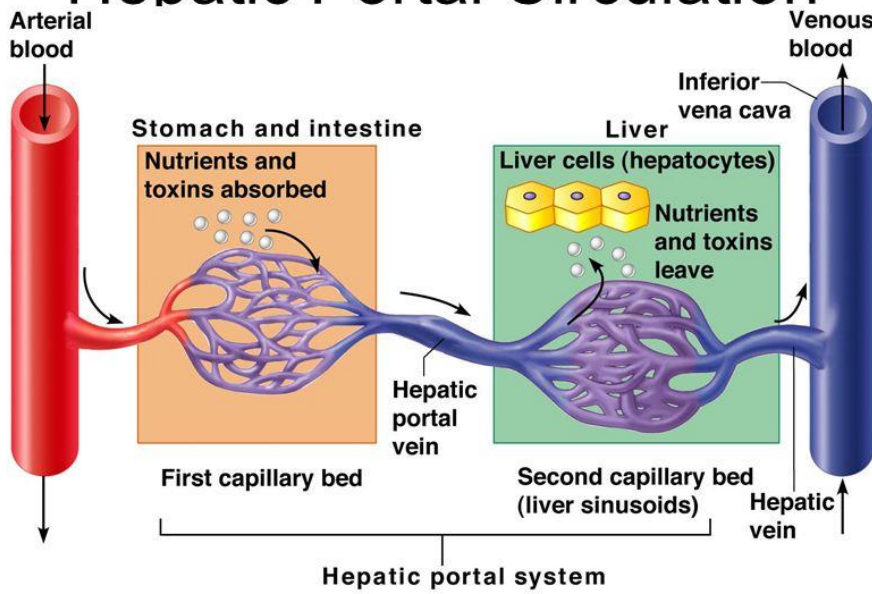
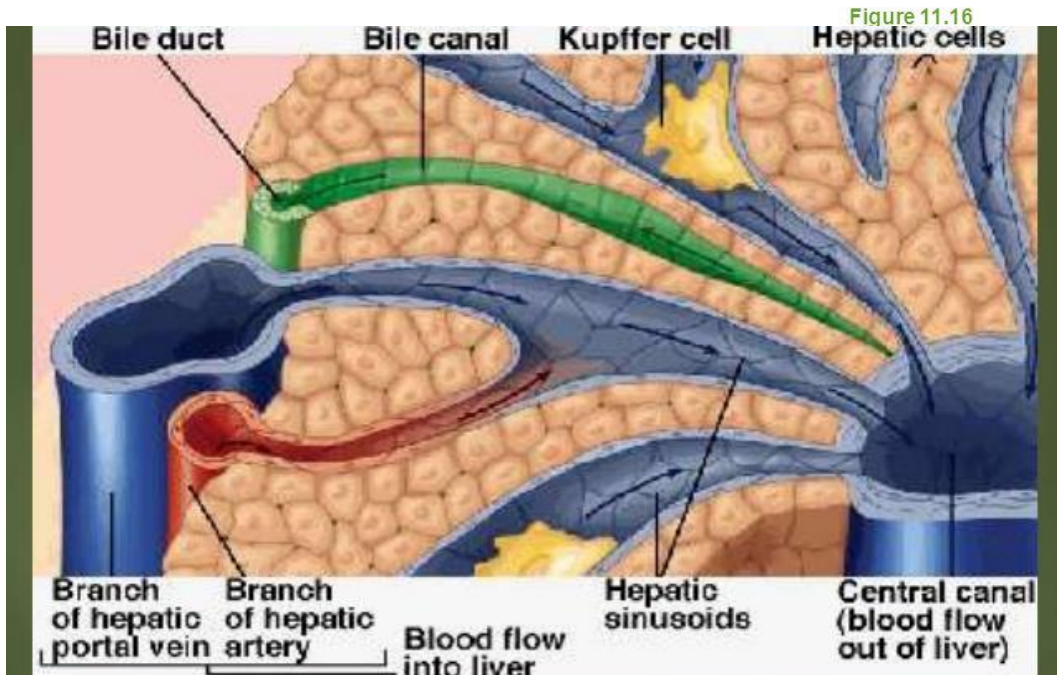
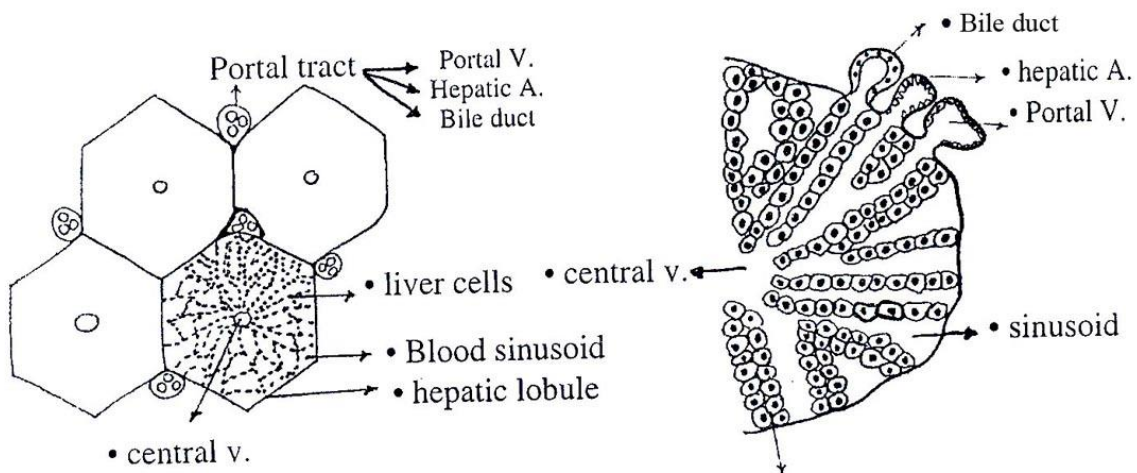


Figure 11.16

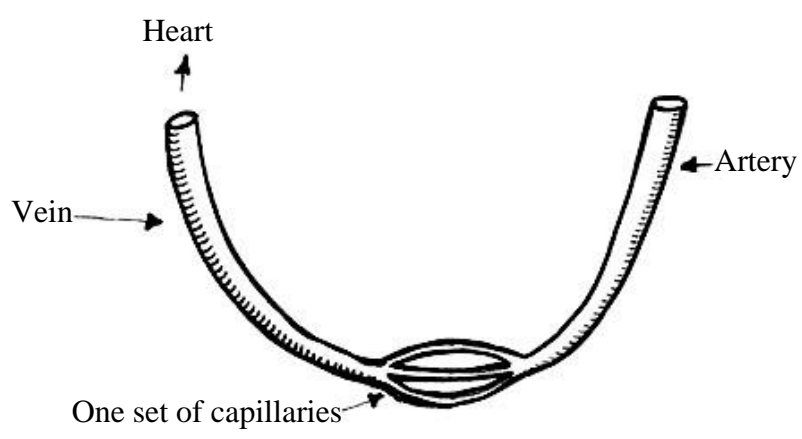


➤ The blood leaves the sinusoids via a central vein, which drains in the hepatic vein.

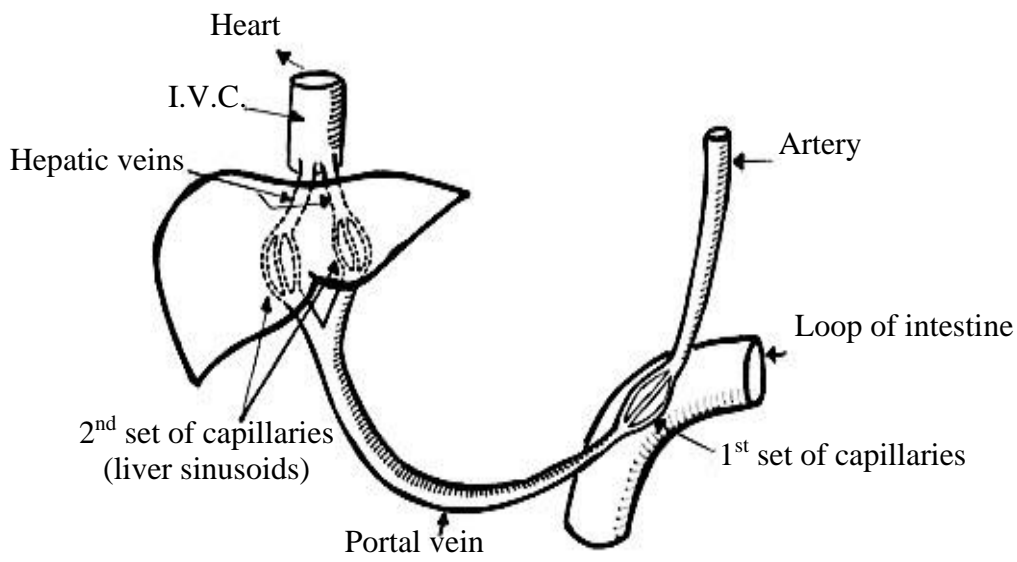


*** Histology of Liver ***

*** Systemic circulation ***

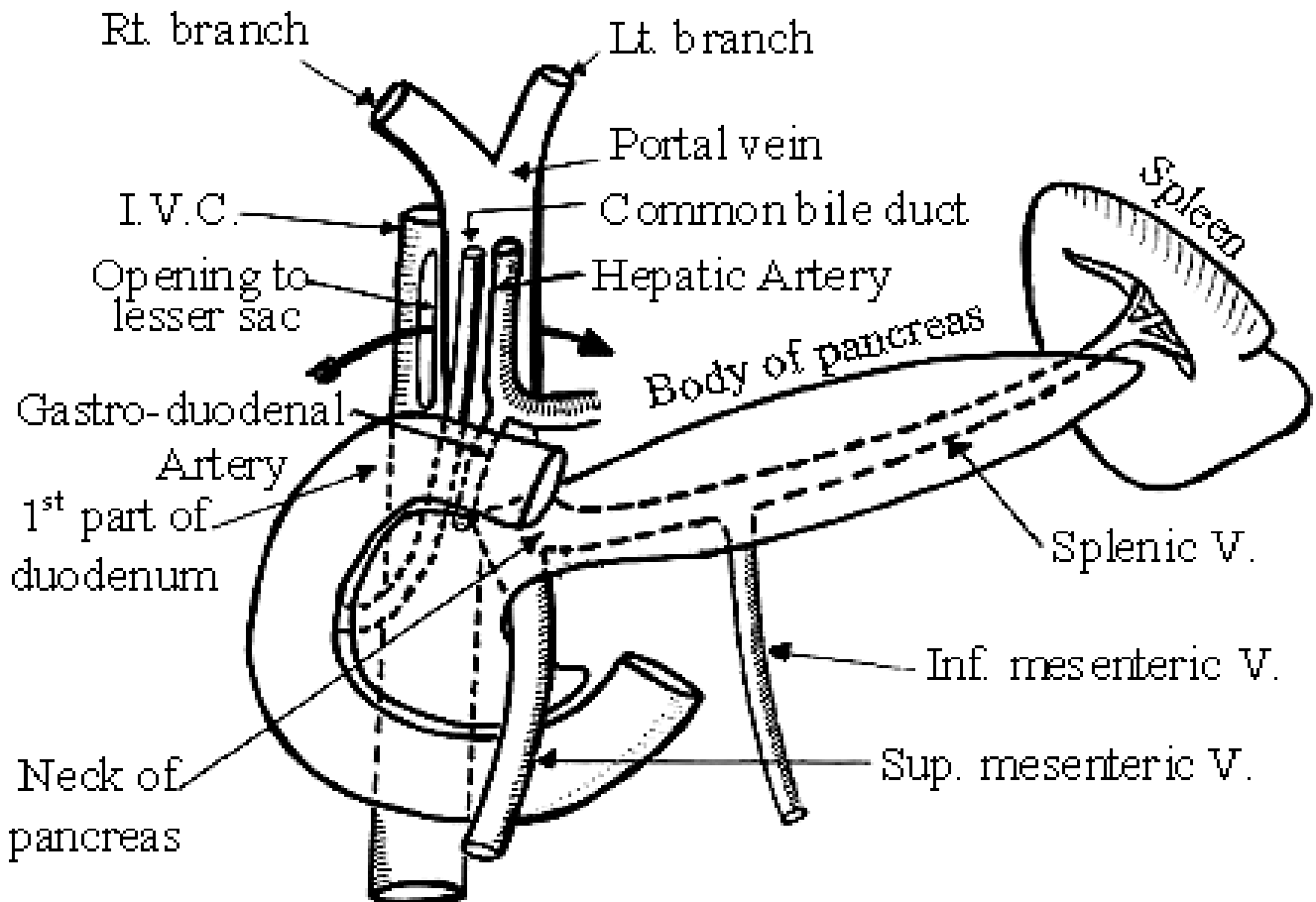


*** Portal Circulation ***



PORTAL VEIN

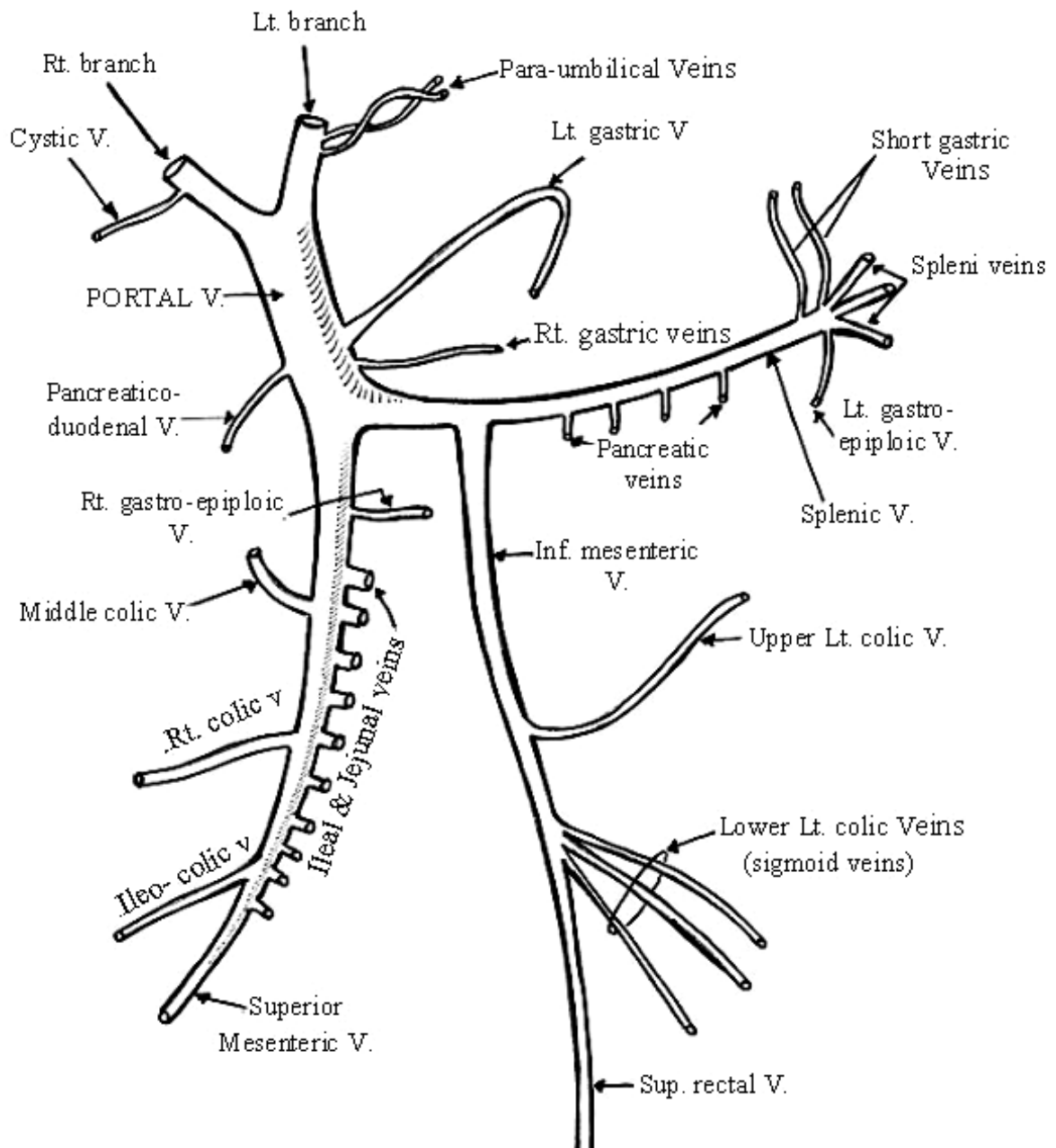
- * **It begins** behind neck of pancreas by union of superior mesenteric vein & splenic vein & **ends** in porta hepatis by dividing into right & left branches.
- * **Course & relation:** It ascends upward & to right in front of I.V.C. & behind the 1st part of duodenum (separated from it by gastroduodenal artery & C.B.D.) Then it ascends in free border of lesser omentum in front of opening to lesser sac & behind hepatic artery & C.B.D.



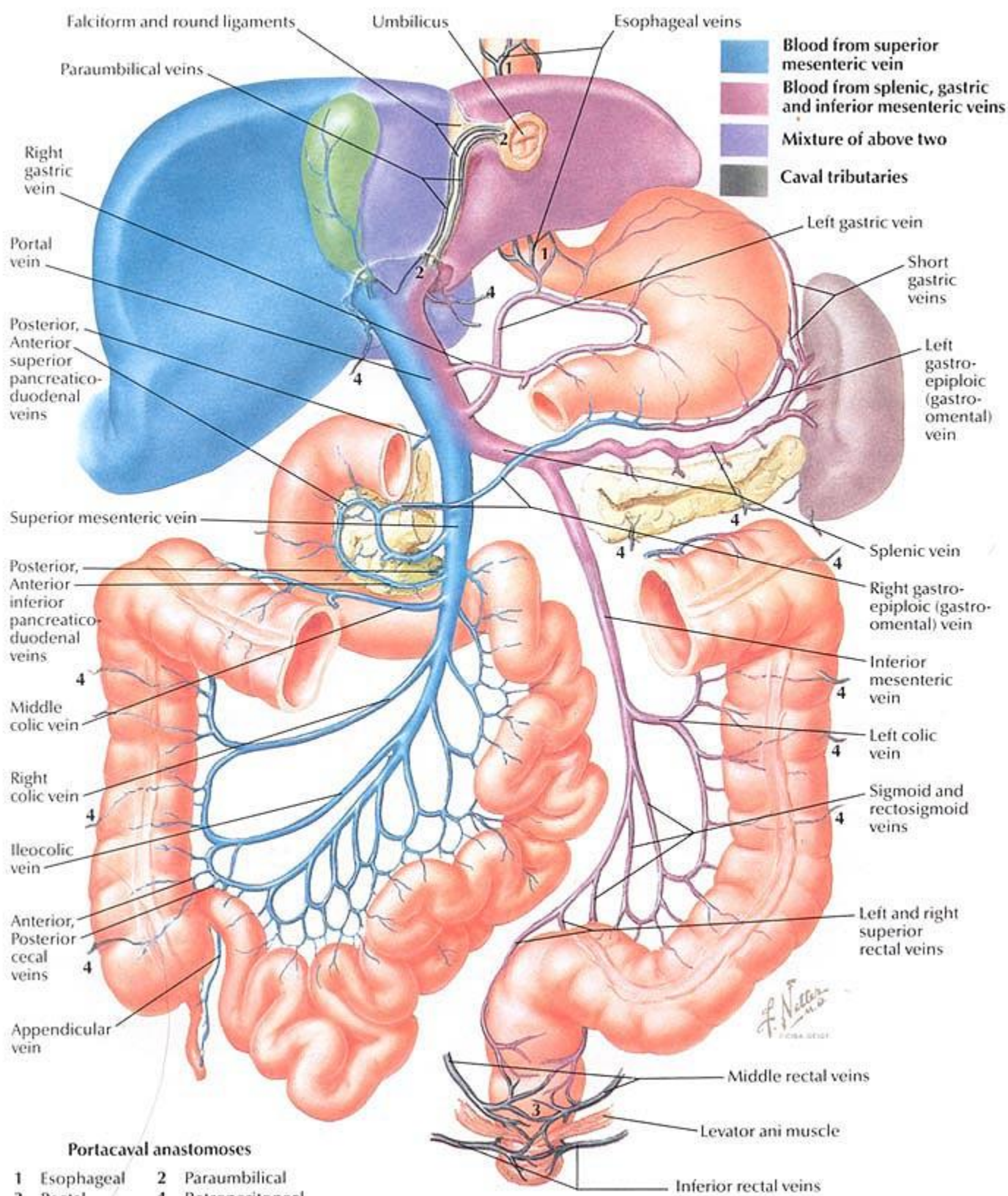
* PORTAL VEIN *

* **Tributaries:**

1. **Splenic vein:** Receive splenic veins, short gastric veins (receives oesophageal veins.) , left gastroepiploic vein , pancreatic veins, inferior mesenteric vein. The latter receive superior rectal vein , inferior left colic & superior left colic veins.
2. **Superior mesenteric vein:** Jejunal, ileal, ileocolic, right colic, middle colic & right gastroepiploic veins.
3. **Right gastric & left gastric veins** (the later receives oesophageal veins).
4. **Para-umbilical veins** drain into the left branch of portal vein (drain skin around umbilicus during infancy then obliterated).
5. **Cystic veins** draining the G.B. passes directly into the portal venules inside liver.



Portal Vein Tributaries: Portacaval Anastomoses



Porto-Systemic Anastomoses

* In portal hypertension anastomoses between the portal and systemic circulations occurs at many sites.

A] Anastomoses at lower part of esophagus between:

- Esophageal veins of left gastric vein & short gastric veins (portal).
- Esophageal veins of vena azygos (systemic).

* *In portal hypertension* opening of this anastomosis, leads to *esophageal varices*. Its rupture leads to haematemesis and melena.

B] Anastomoses at lower end of rectum and upper 1/2 of anal canal between:

- Superior rectal vein (portal).
- Middle and inferior rectal veins (systemic).

* *In portal hypertension* opening of this anastomosis leads to formation of *secondary piles* and bleeding per rectum.

c] Anastomoses around the umbilicus:

- Para- umbilical veins if remain patent (portal).
- Superior & inferior epigastric veins (systemic).

* In portal hypertension opening of this anastomoses leads to dilatation of the veins in a radial direction around the umbilicus, a condition called *caput medusa*.

d] Other areas of anastomoses:

1- At the *bare areas of the liver*:

- * Between capillaries inside the liver (portal) .
- * Phrenic veins of the diaphragm (systemic).

2- At the *posterior abdominal wall*:

- * Between the colic veins (portal).

* Lumbar veins (systemic).

