The small intestine

DOUDENUM

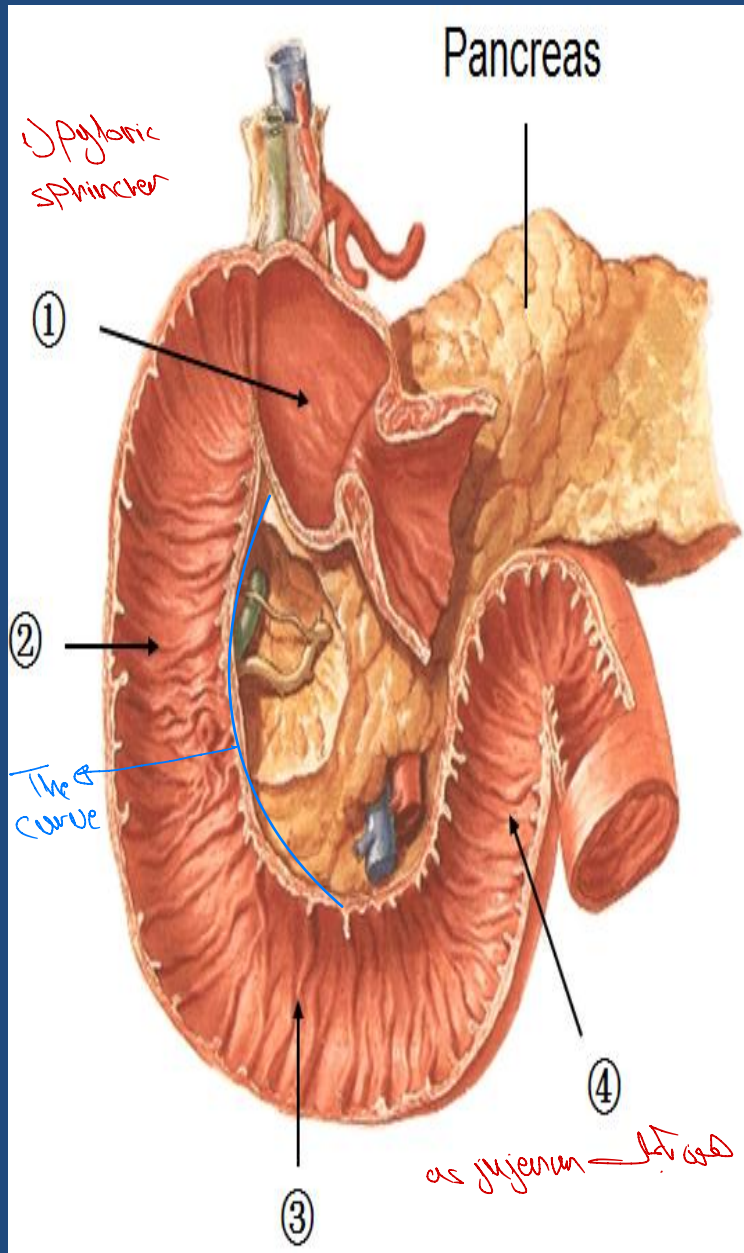
- The length of whole small intestine is 6 m

duodenum

⇒ The first part of small intestine

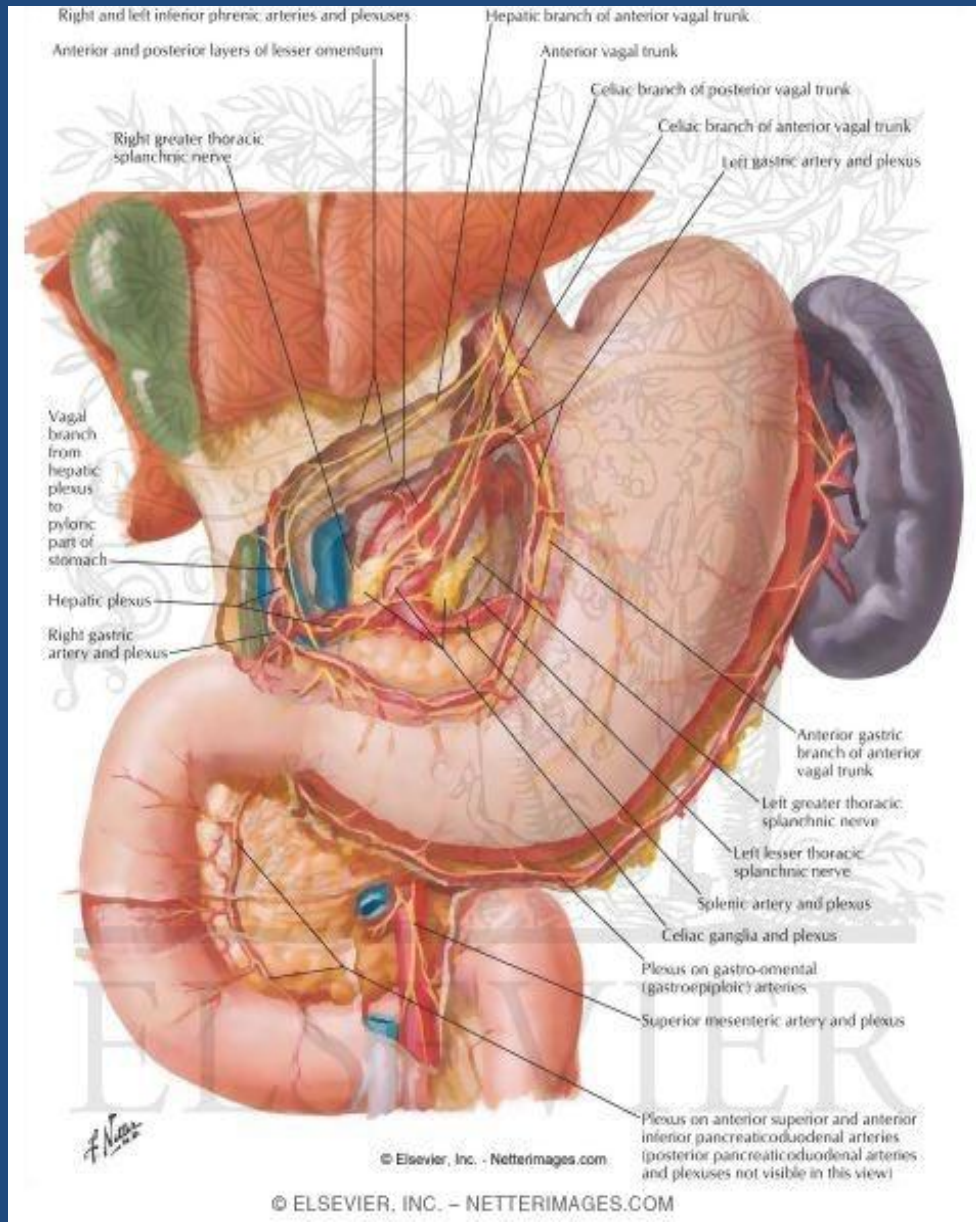
- The duodenum is a c-shaped
  - ↳ Devided into 4 parts
- Concave tube
- About 10” in length. 25 cm
- It joins the stomach to the jejunum.
- It curves around the head of the pancreas to the left and backwards.
- It is important because it receives the opening of the bile and pancreatic ducts. by major duodenal papillea

- The bulge (at the site of ducts enter) on the wall of duodenum called ampulla of vater (on the 2nd part)



duodenum....cont

- Most of the duodenum is retroperitoneal except the 1st inch & last inch
- This short segment(1st inch) has the lesser omentum on its upper border, the greater omentum on its lower border, and the lesser sac posterior to it
- The duodenum extends from the pylorus to the jejunum
- It is divided into 4 parts.



* ليش الـ 1st and last inch ما كانوا intraperitoneal ؟

1) لأنّ الـ 1st inch امتداد من الـ Stomach واللي هي intra ، حلو ؟

حبيب ضيف عليها كمان ⇐ الـ 1st inch ماسك فيها بـ upper part الـ lesser omentum وماسك بـ lower part الـ greater omentum

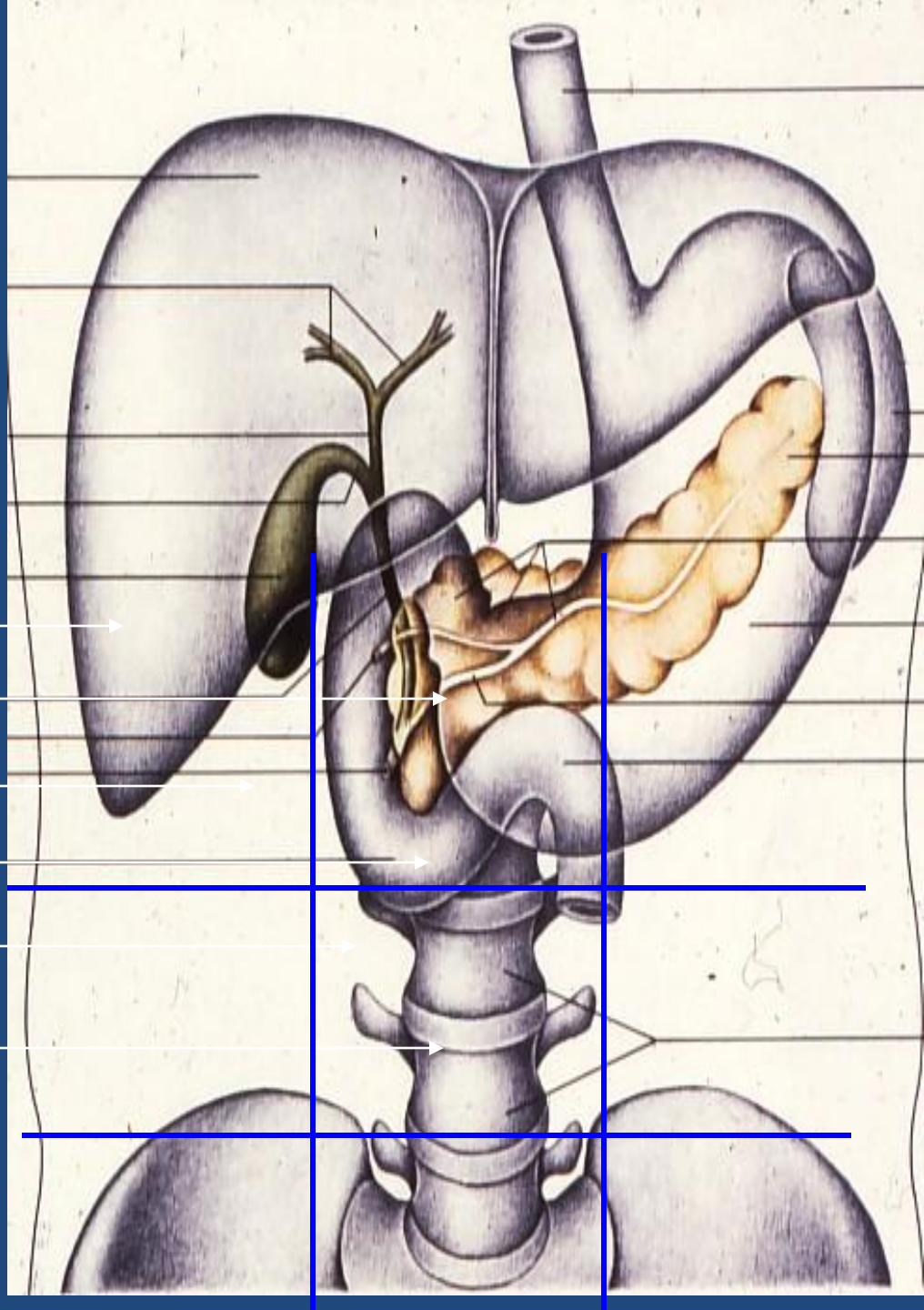
وزي ما بنذكر انه بين 2 omentums عبارة عن intraperitoneal

2) بالنسبة للـ last inch (4th part) فهو بده يكمل ع شكل الـ Jujenum واللي هي intraperitoneal

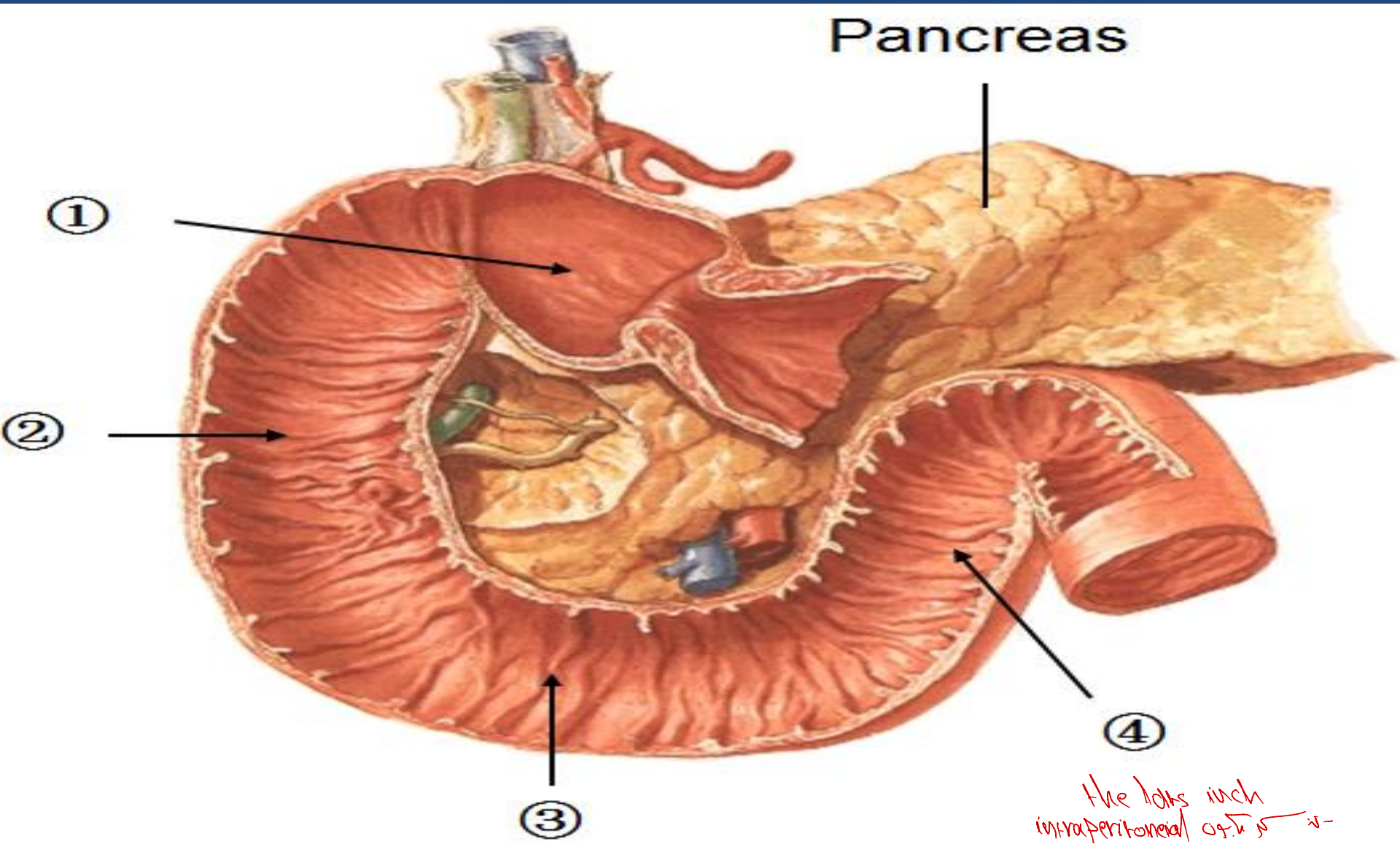
* انت كل ما خلوص من الحاجات اللي ذاكت في ⇐ free edge of lesser omentum بتوجد على ⇐ portal vein and hepatic Artery, bile duct ⇐ نزل، الـ duct بتنزل behind the 1st part of duodenum and peirce the head of pancreas and open through (Major duodenal papillea) on the 2nd part.

Site of duodenum

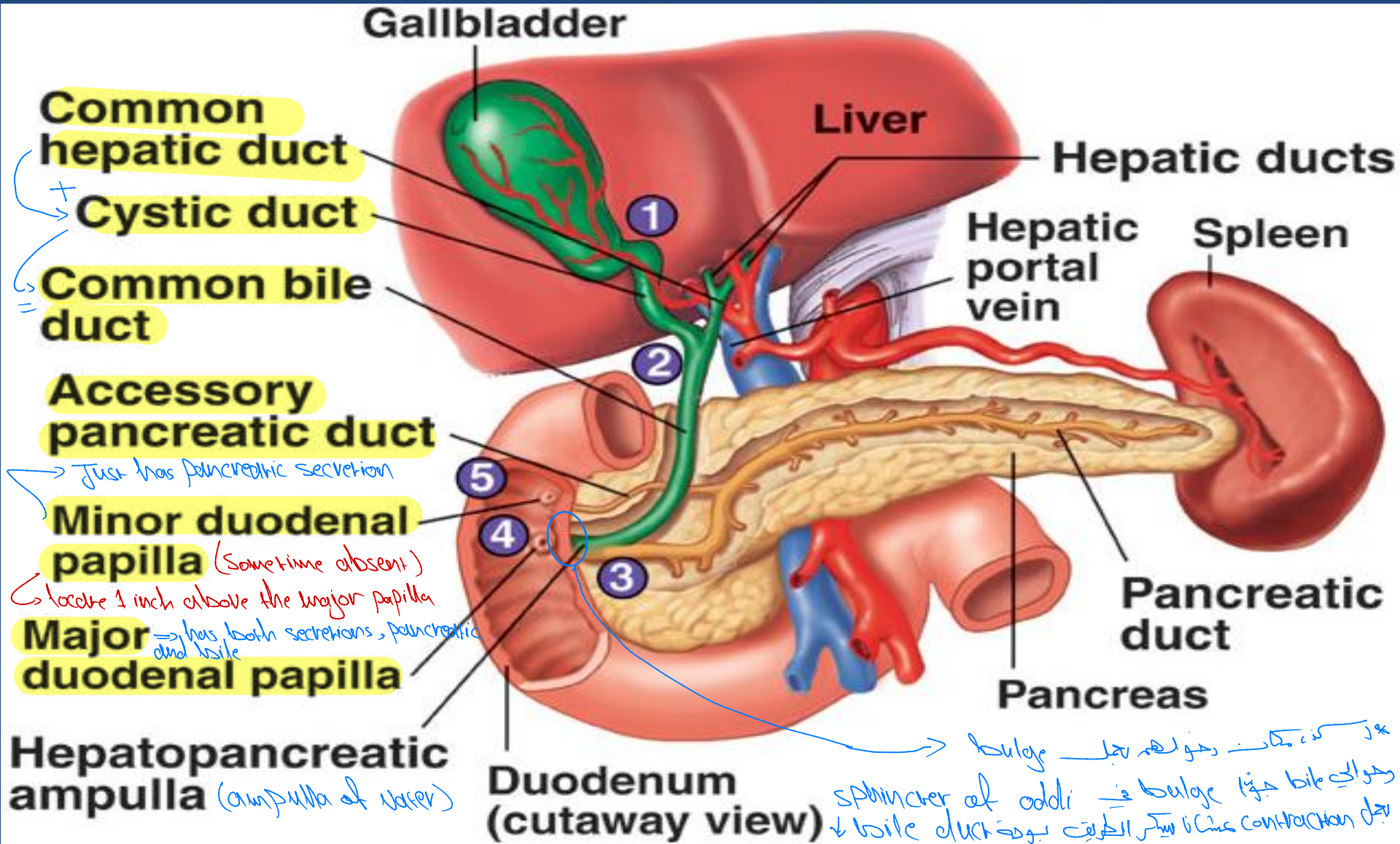
- The duodenum is situated in the **epigastric and umbilical regions**
  - with the stomach
  - with small intestine.
- for purposes of description, is divided into four parts



Parts of the duodenum & Their relations

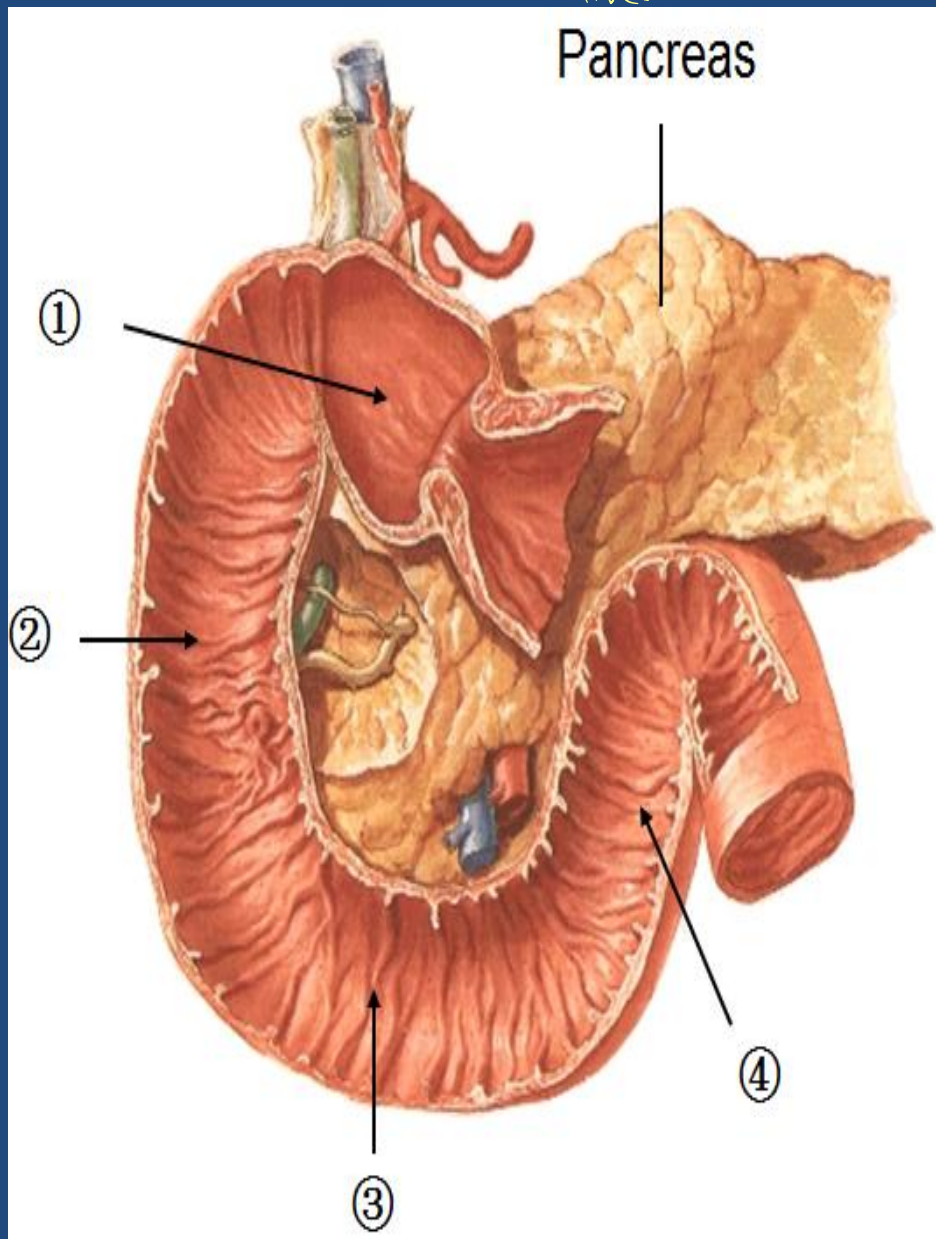


Parts of the duodenum & Their relations



1st part of Duodenum

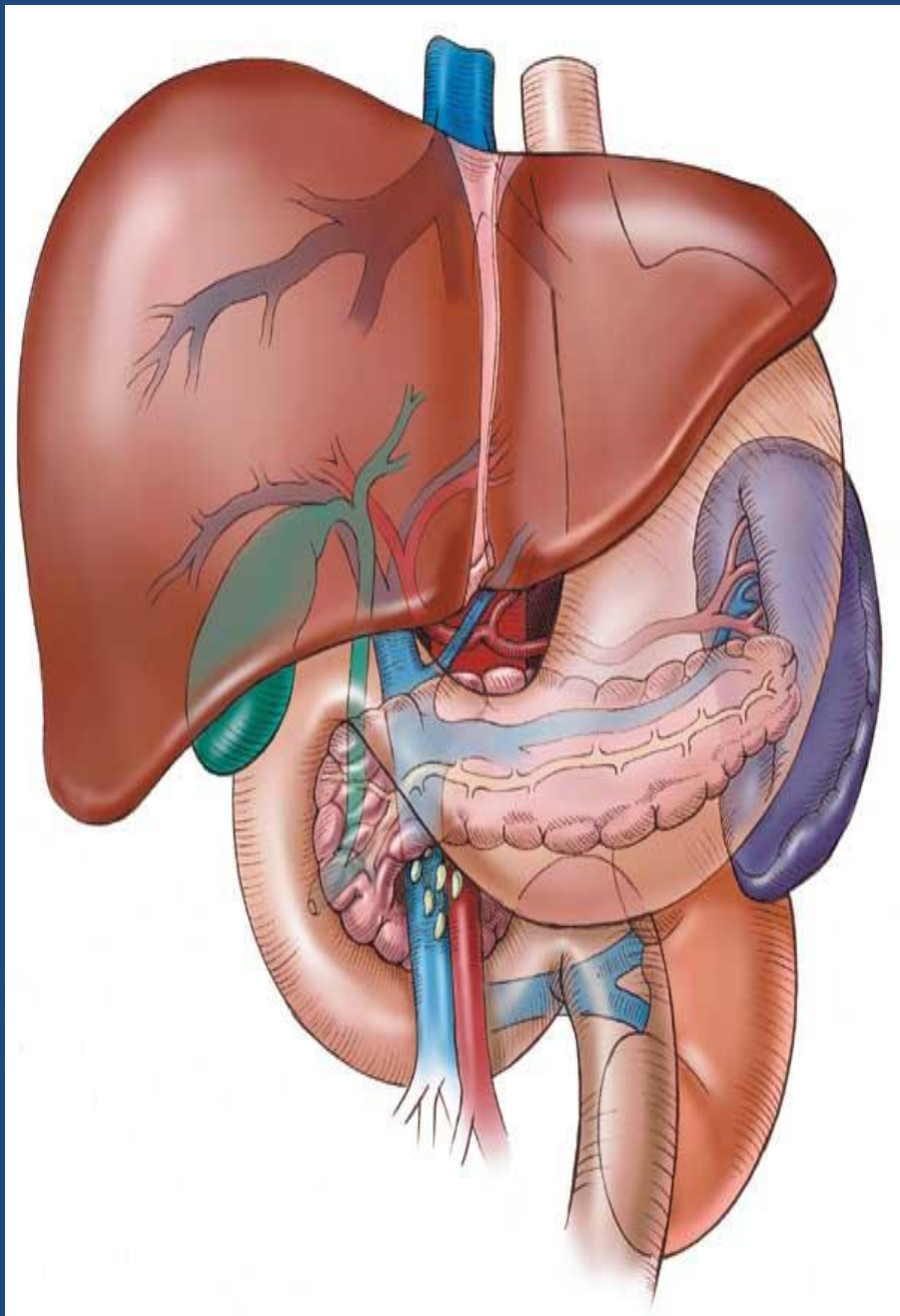
- The first part is 2 inches long.
- It begins from the pyloduodenal junction
- At the level of the transpyloric line
- Runs upward and backward at the level of the 1st lumbar vertebra 1 inch to the right.



Relations of 1st part of doudenum

Ant.

- The liver (quadratus lobe)
- gall bladder



Relations of 1st part of duodenum……cont

Sup.

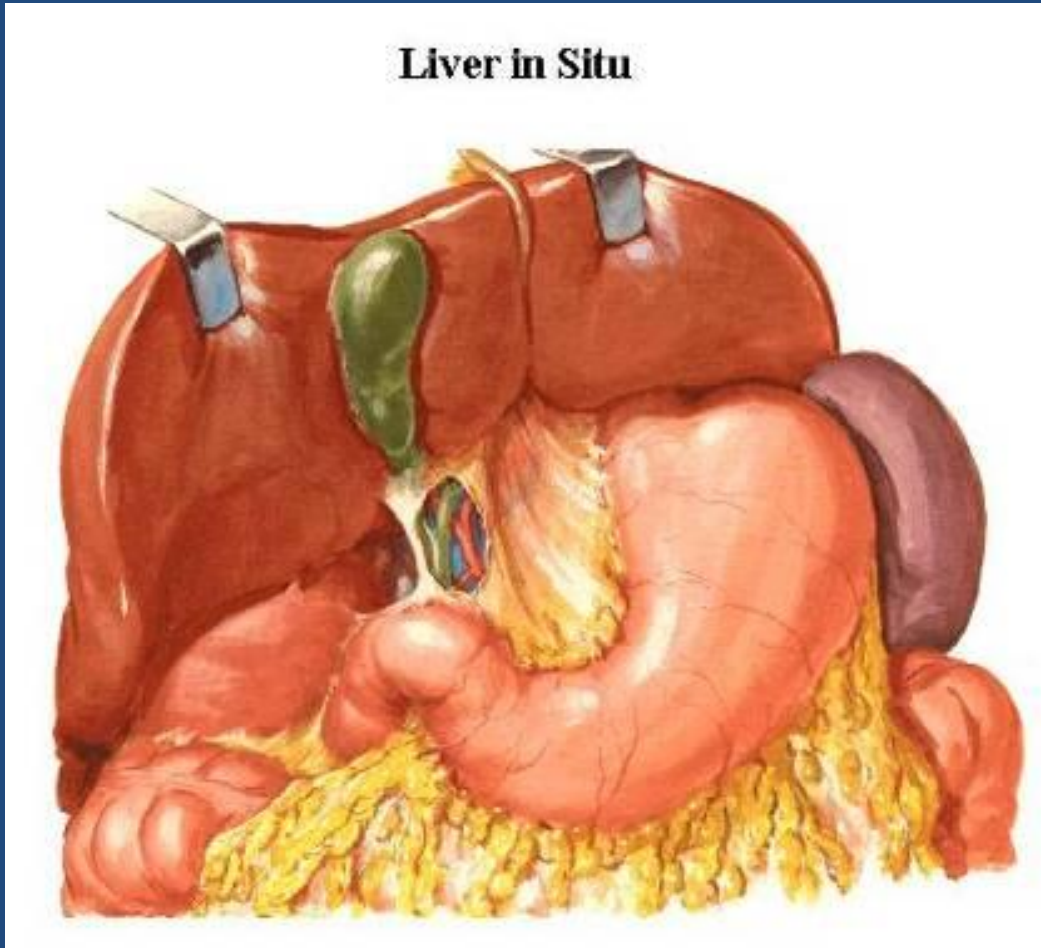
- the epiploic foramen

(contain the 3 structures)

1) Bile duct from liver

2) Hepatic A. to liver

3) Portal vein to liver



Relations of 1st part duodenum……cont

*Clinical note :-
the ulcer may be cause injury for this artery if perforation occurs which cause bleeding
one of the complications

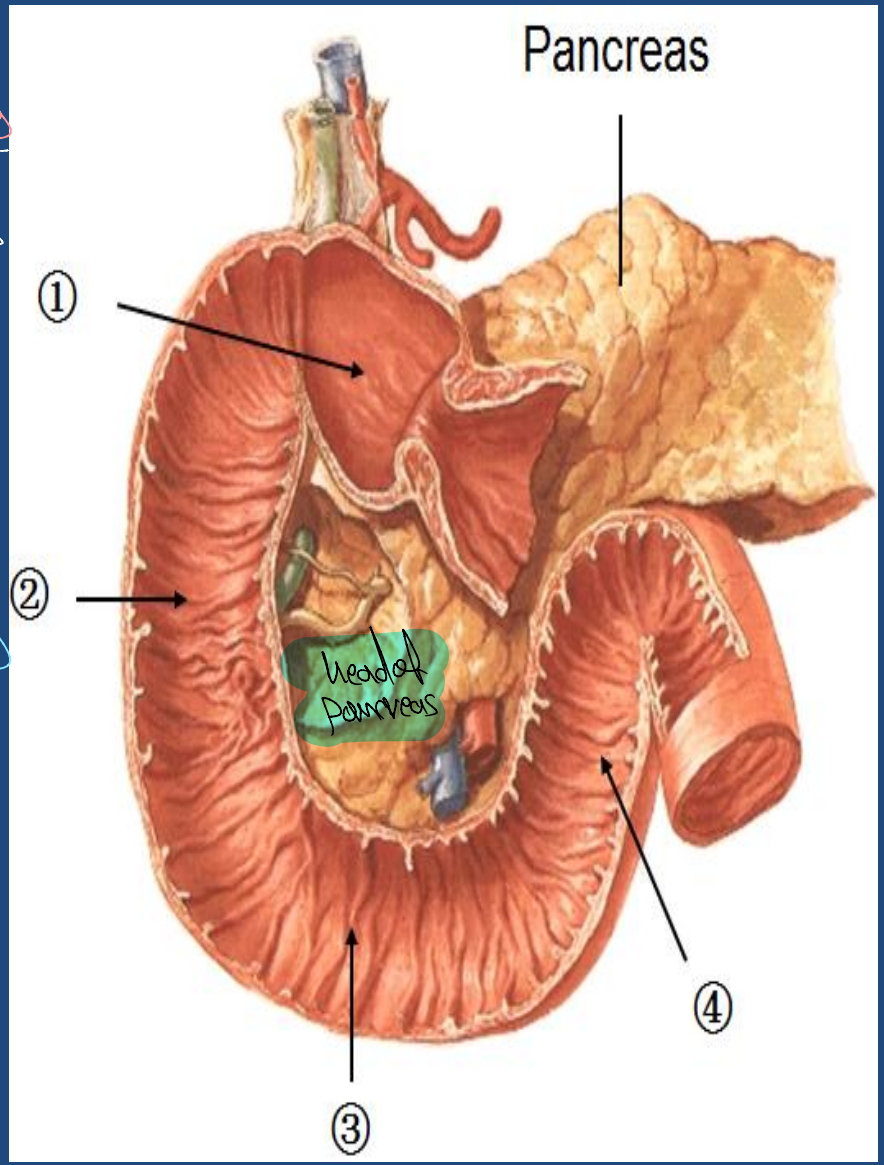
post.

- The lesser sac
- gastroduodenal Artery
  - branch from hepatic A
- the Bile duct
- portal vein
- I.V.C

* All of the following posterior to the 1st part of duodenum except

Inf.

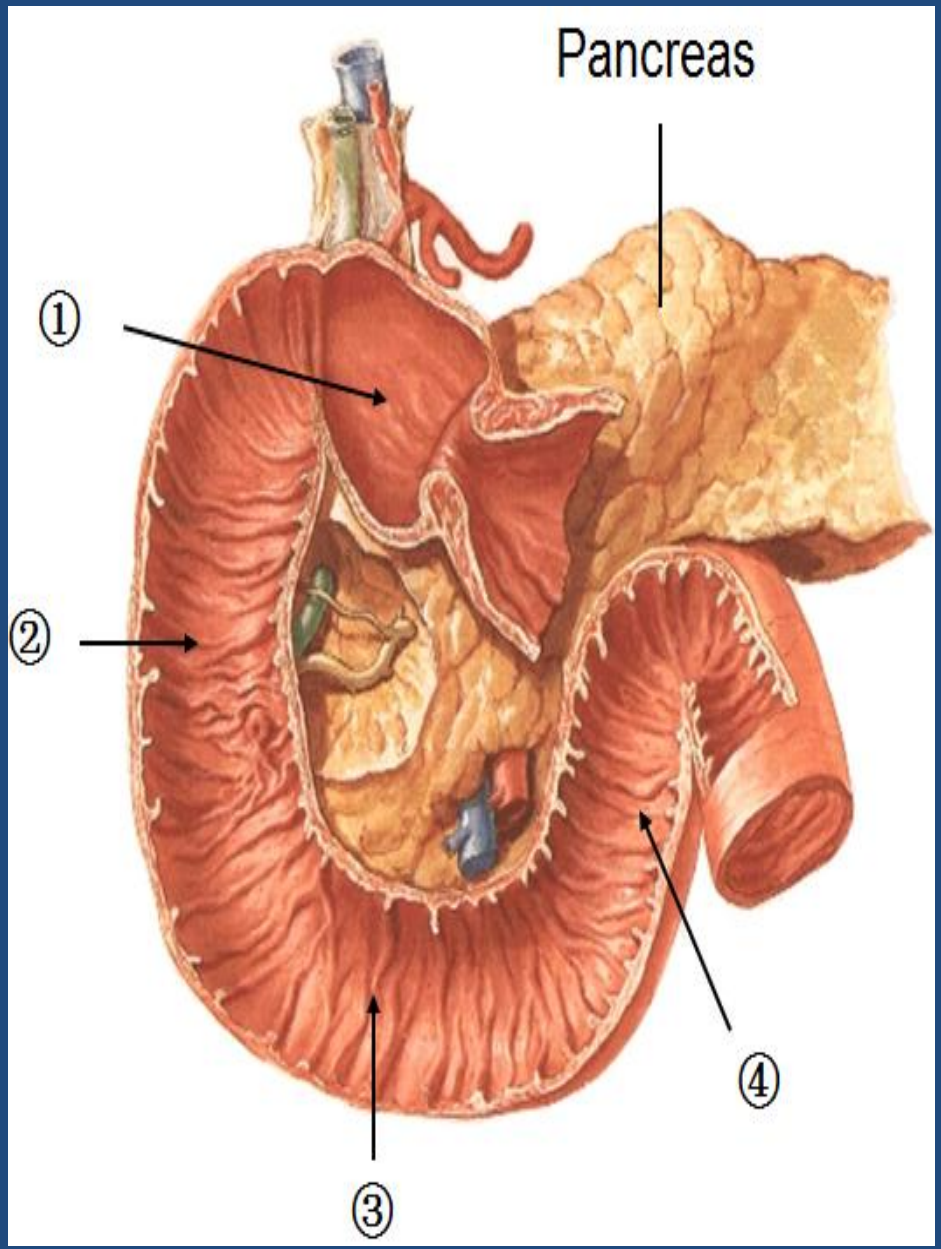
- The head of the pancreas.



2nd part of duodenum (vertical part)

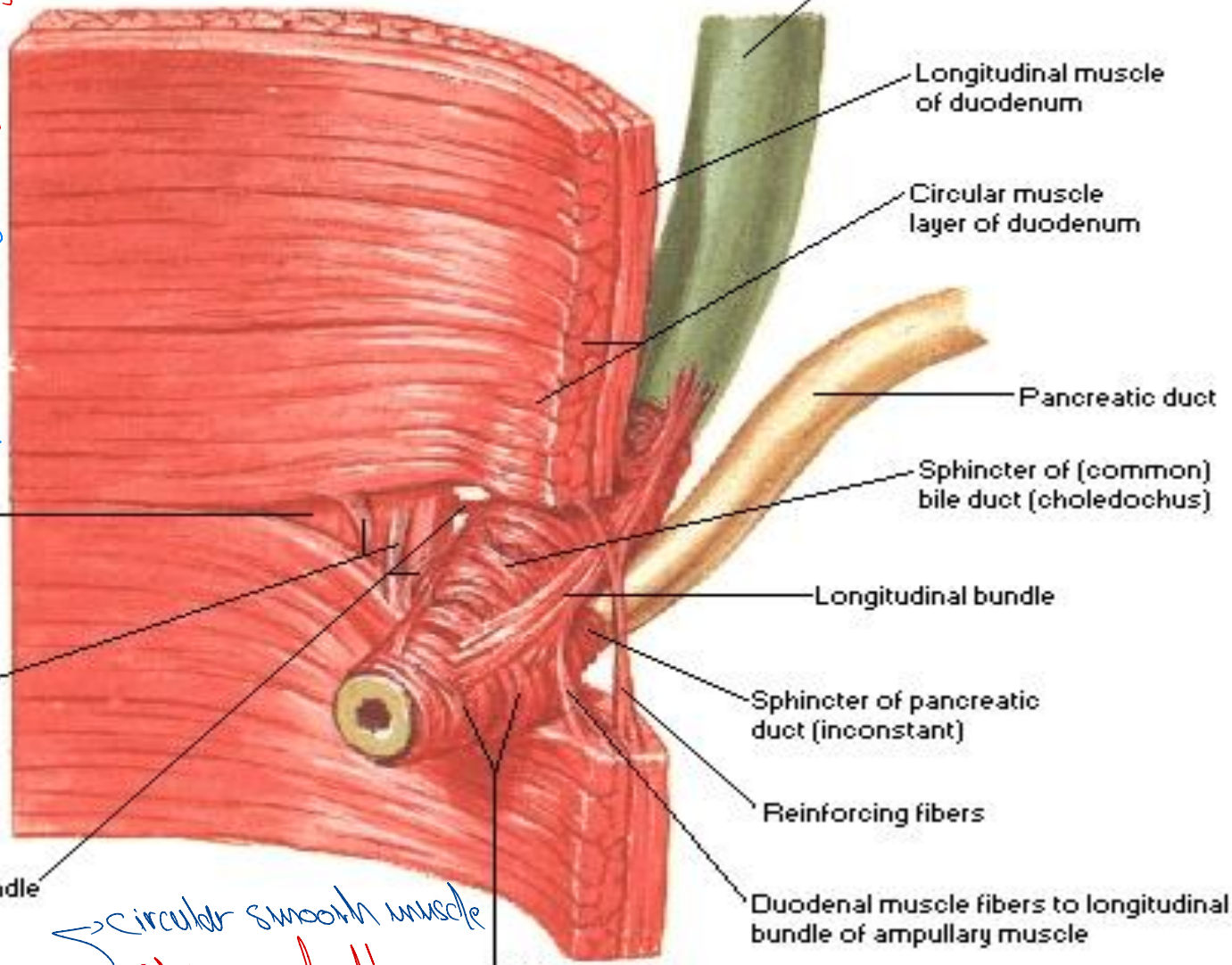
- It is 3”(3 inch) long
- runs downward vertically on the right side → posterior يعني جنبي الها
- In front of the Rt.kidney
- next to the 3rd and 4th lumbar vertebrae.
- halfway of it, The bile duct and the main pancreatic duct pierce the medial wall, and then form the **ampulla** that opens in the major **duodenal papilla**.
- The accessory pancreatic duct (if present) opens in the **minor duodenal papilla** more superiorly.

*فضّلنا فيها

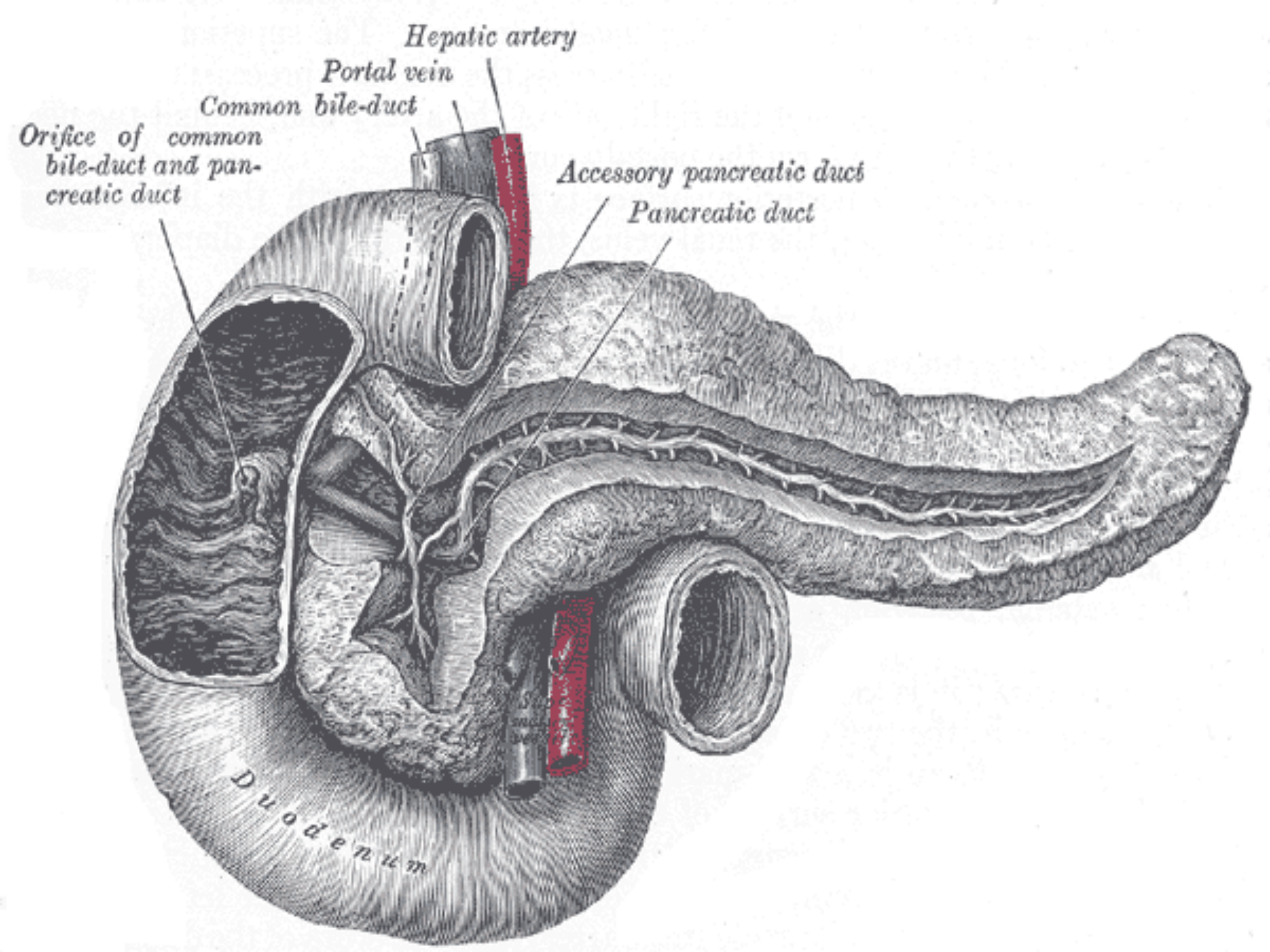


Junction of Bile Duct and Duodenum

Dissection



Hepaticopancreatic ampulla (Ampulla of Vater)


Hepatic artery
Portal vein
Common bile-duct
Orifice of common bile-duct and pancreatic duct
Accessory pancreatic duct
Pancreatic duct
Duodenum

Relations of2nd part of duodenum

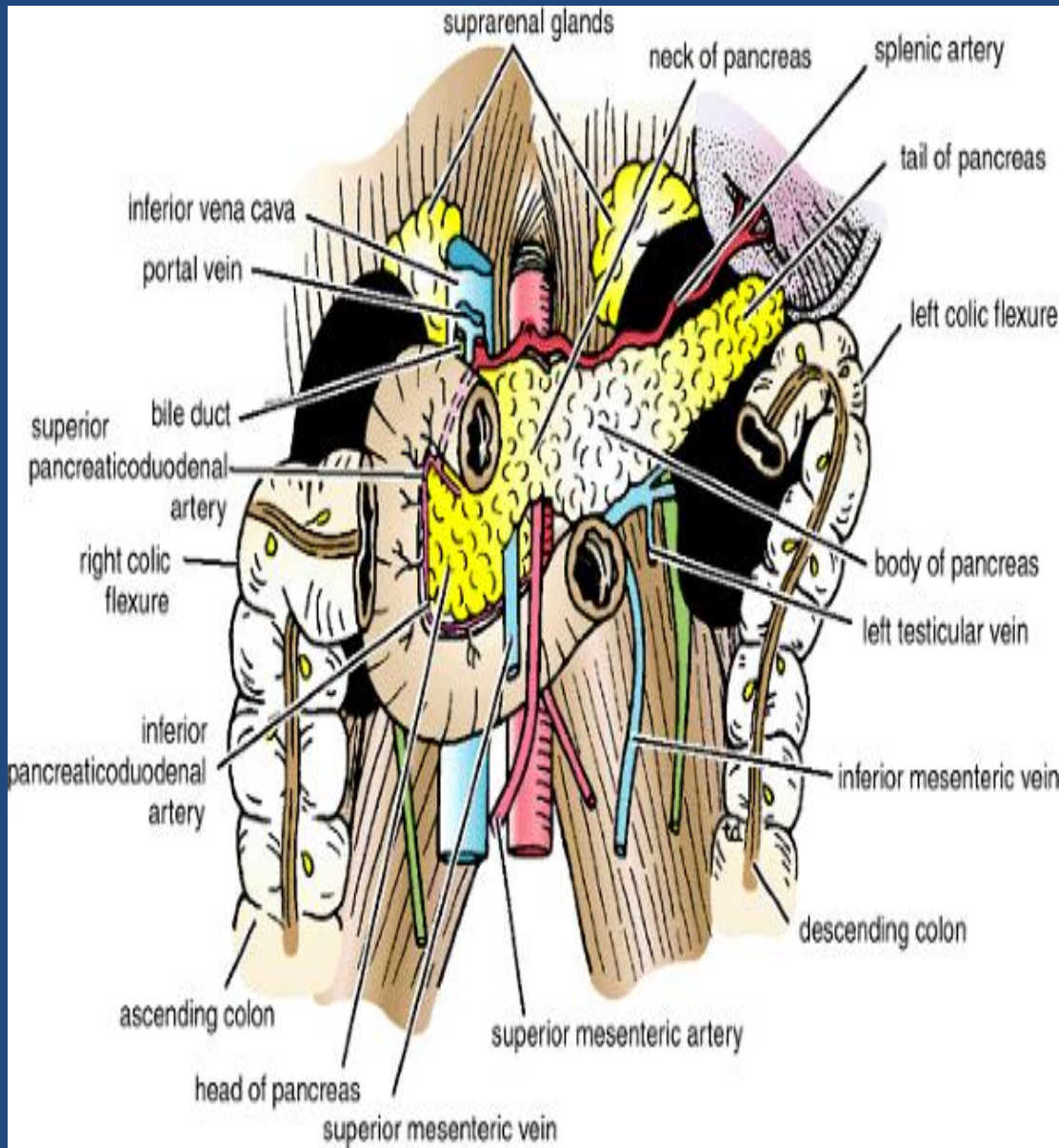
* هم بقرن تحدهم ع الصوره

Ant.
- The gallbladder (fundus)
- Right lobe of the liver
- Transverse colon
- coiled of small intestine.

Post.
- Hilum of Rt. Kidney
- Rt. Ureter.

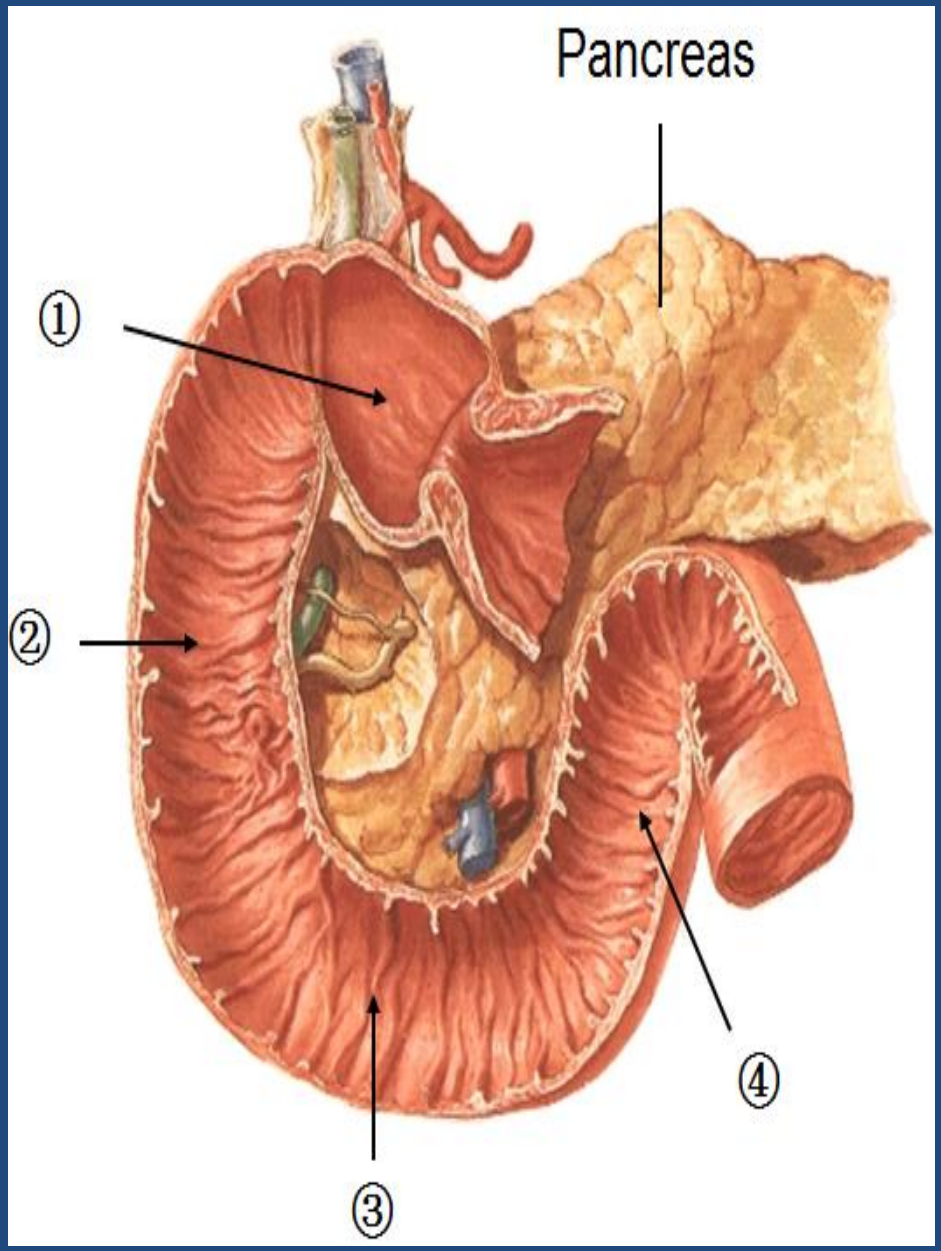
Lateral.
- Right colic flexure
- Ascending colon
- Right lobe of the liver.

Medial.
- Head of pancreas
- Bile and pancreatic ducts.



3rd part of duodenum

- 4” long
- Runs horizontally to the left
- On the subcostal plane.
- Runs in front of the vertebral column
- Under the lower margin of the head of pancreas
- Above the coils of the jejunum.



Relations of 3rd part of duodenum

Anteriorly:

- The root of the mesentery of the small intestine
- the superior mesenteric vessels contained within the mesentry
coils of jejunum -

Posteriorly:

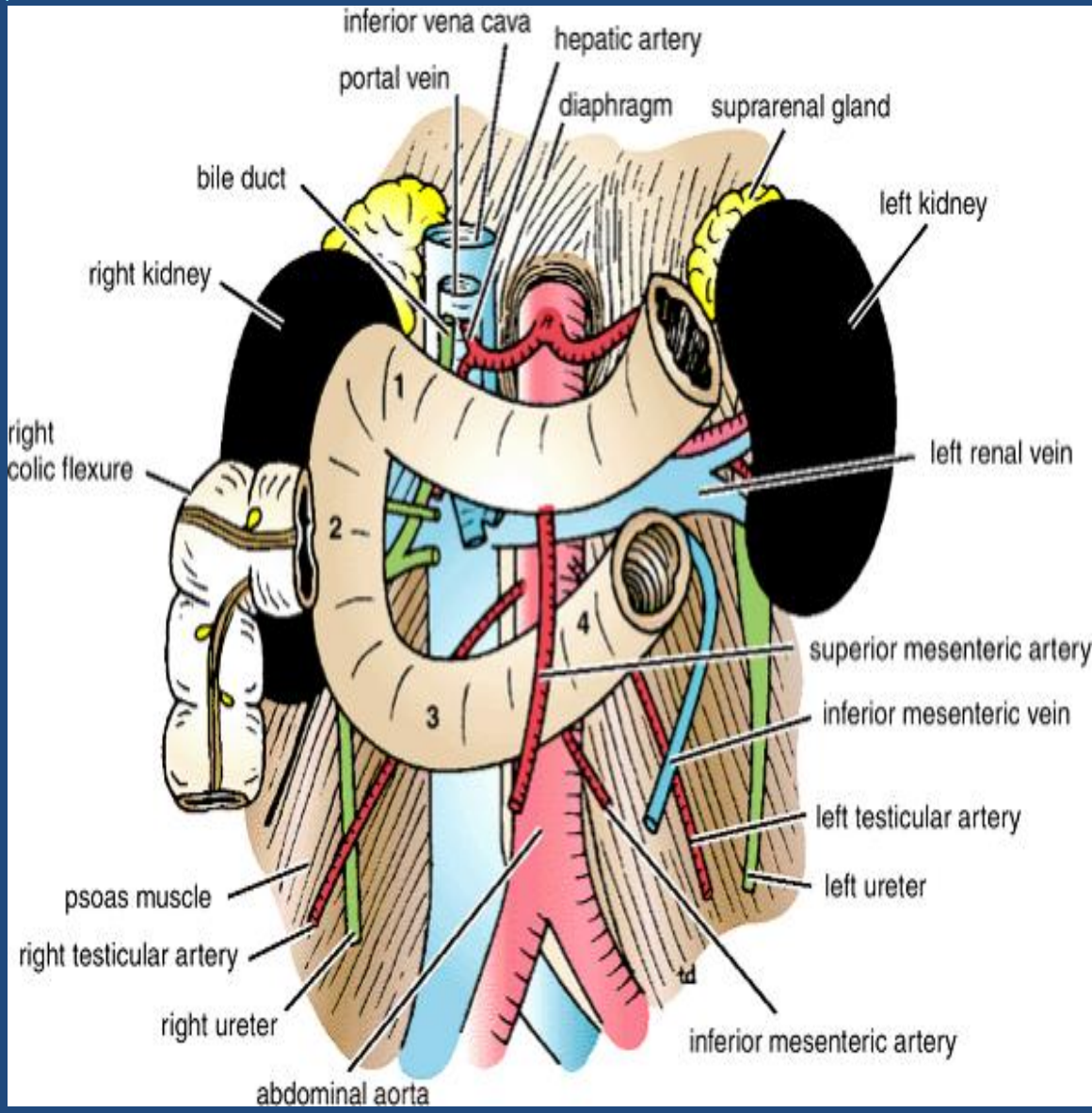
The right ureter-
the right psoas muscle-
the inferior vena cava -
the aorta -

Superiorly:

The head of the pancreas

Inferiorly:

Coils of jejunum



4th part of duodenum.....cont

- 1" long
- Runs upward to the left
- End in the duodejejunal junction at the level of the 2nd lumbar vertebrae 1" to the left.
- The junction (flexure) is held in position by the **ligament of Treitz**, which is attached to the right crus of the diaphragm (duodenal recess).

Relation of 4th part of duodenum

Ant.

- The beginning of the root of the mesentery
- coils of the jejunum.

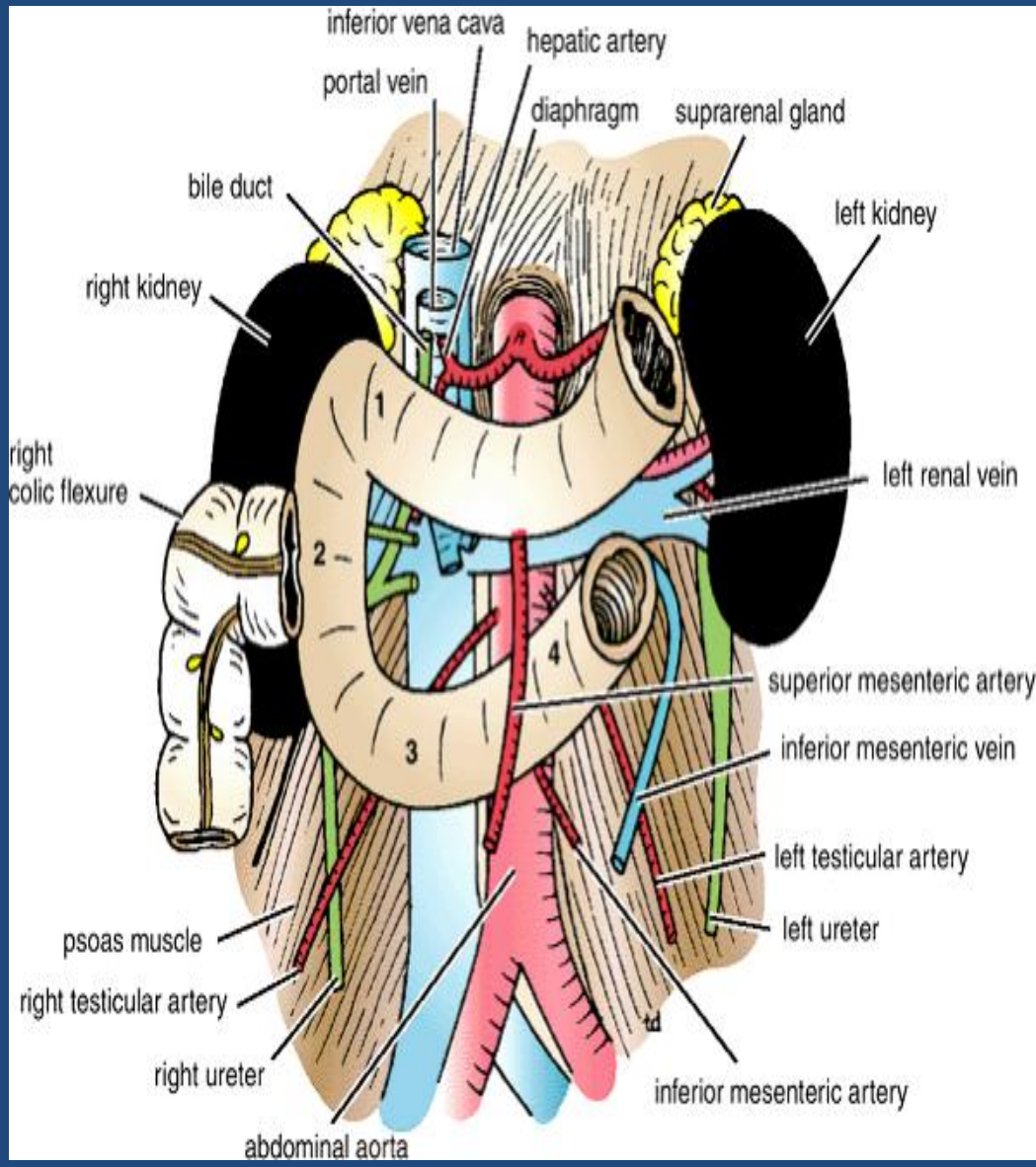
Post.

- Lt. psoas major
- the sympathetic chain

left margin of the aorta.

Sup. Head of pancreas which

⇒ - Uncinate process of the pancreas.



Blood supply of duodenum

* The umbilical division divides it into two halves:-

- **Arteries**

(Foregut in embryo) → the stomach, esophagus and upper half of duodenum

1- upper half **(1st part + upper1/2 of 2nd part)** is supplied by the **superior pancreaticoduodenal artery**, a branch of the gastroduodenal artery. (branch from celiac trunk)

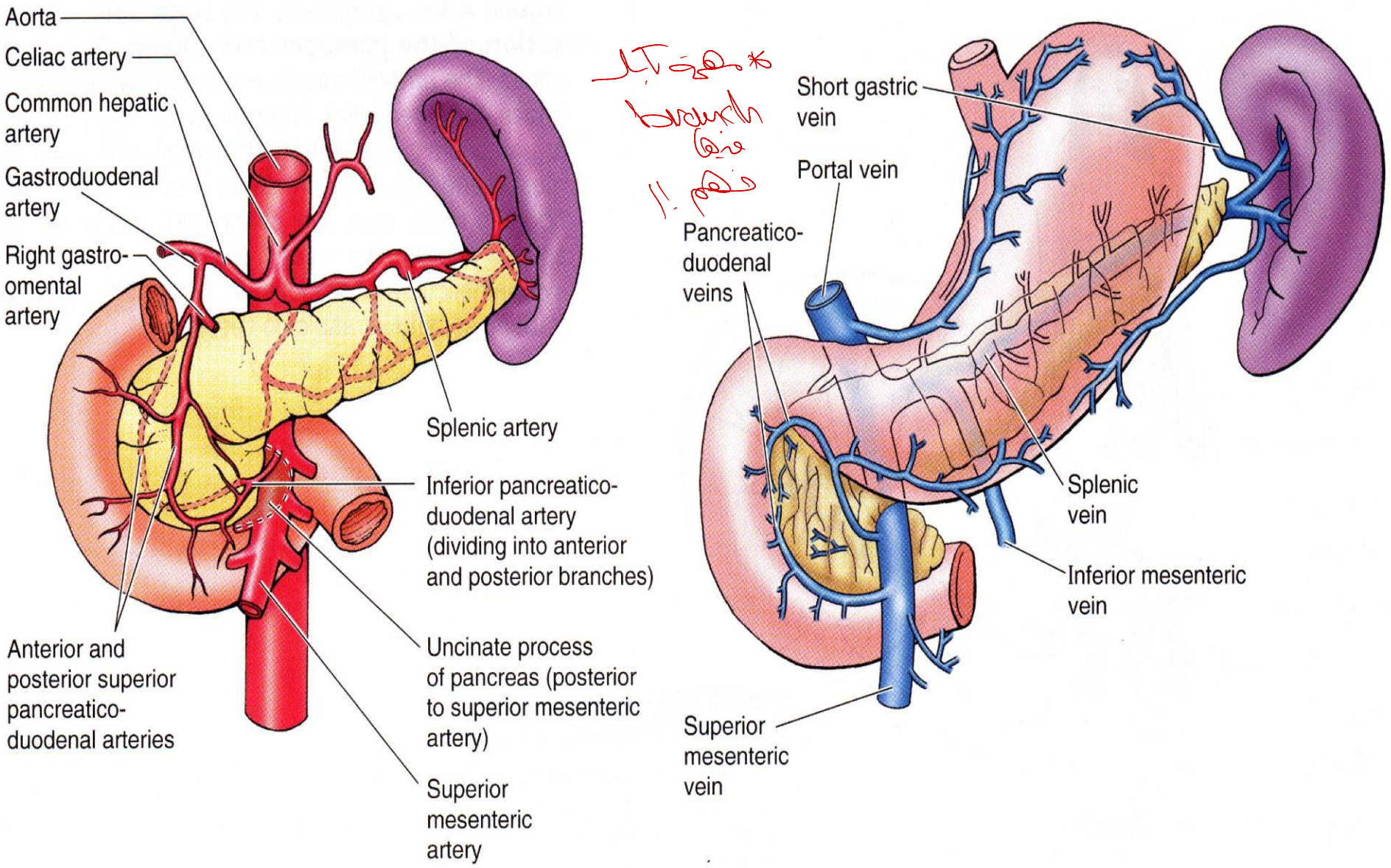
(Midgut)

2- The lower half **(lower ½of 2nd part +3rd+4th part)** is supplied by the **inferior pancreaticoduodenal artery**, a branch of the superior mesenteric artery

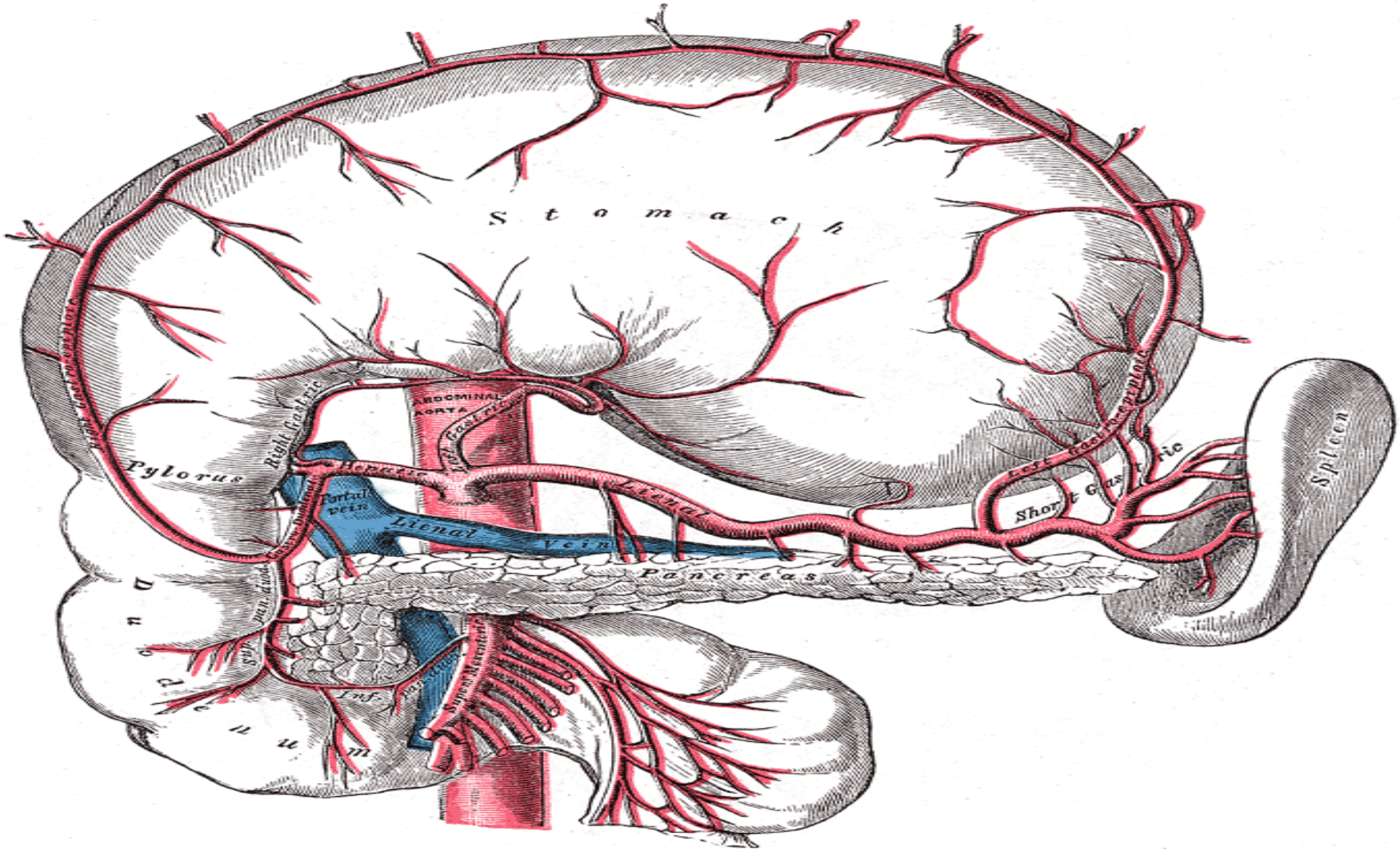
→ lower half of duodenum, jejunum and ileum.
large intestine (until the distal third of transverse colon) ↓

- The hind gut ⇒ distal third of transverse colon and until the upper part of anal canal ⇒ supplied by inferior mesenteric artery

Arterial supply and venous drainage of the duodenum



Blood supply for duodenum



Veins of duodenum

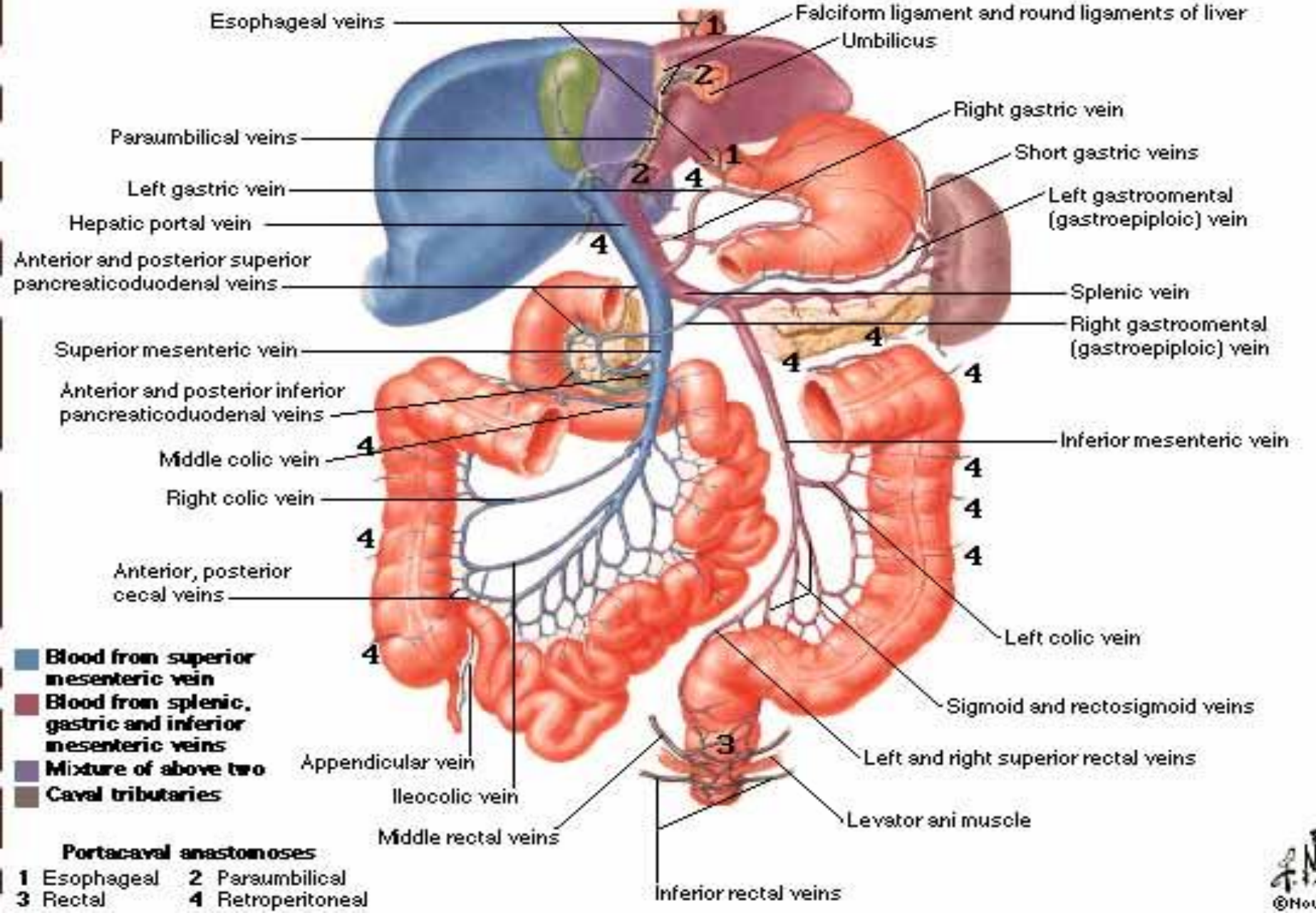
- The superior pancreaticoduodenal vein drains into the portal vein
- The inferior vein joins the superior mesenteric vein .

*superior mesentric + splenic = portal vein

*بالنهاية كله بروح لـ liver عن طريق
الـ portal vein

Hepatic Portal Vein Tributaries

Portocaval Anastomoses



Lymphatic drainage

- The lymph vessels follow the arteries
- **drain upward** → via pancreaticoduodenal nodes → the gastroduodenal nodes → the celiac nodes around the celiac trunk
- **drain downward** →via pancreaticoduodenal nodes→ the superior mesenteric nodes around the origin of the superior mesenteric artery.

Nerve supply

- Sympathetic nerve
- parasympathetic nerves from:
  1- The celiac plexus
  2- Superior mesenteric plexus.

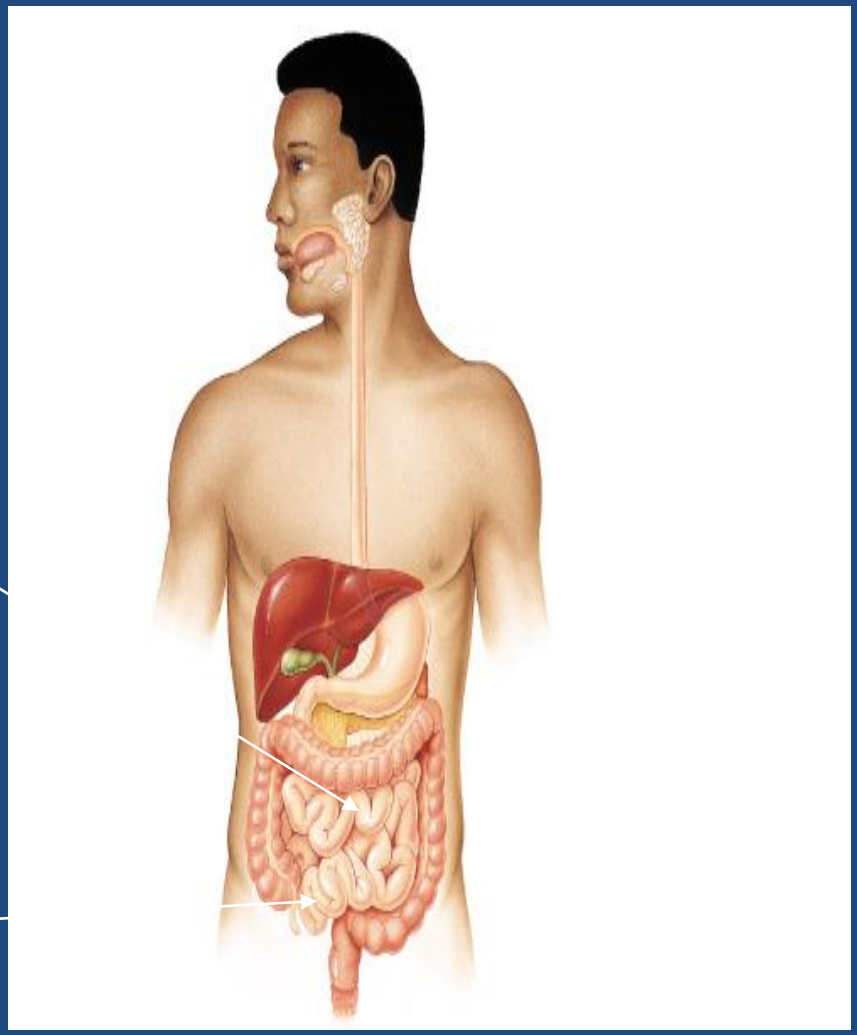
- intraperitoneal organs
- locate in the free edges of mesentery

Jejunum and Ileum
Location and Description

- The jejunum and ileum measure about 20 ft (6 m) long
- the upper two fifths is the jejunum & the lower 3/5 is the ileum ⇒ There is no sharp mark between them
- Each has distinctive features
- there is a gradual change from one to the other
- The jejunum begins at the duodenojejunal flexure
- the ileum ends at the ileocecal junction.
- The coils of jejunum and ileum are freely mobile and are attached to the posterior abdominal wall by a fan-shaped fold of peritoneum known as the mesentery of the small intestine

- Jejunum ⇒ larger diameter and more reddish
- ileum ⇒ small diameter and less reddish

SMALL INTESTINES ANATOMY

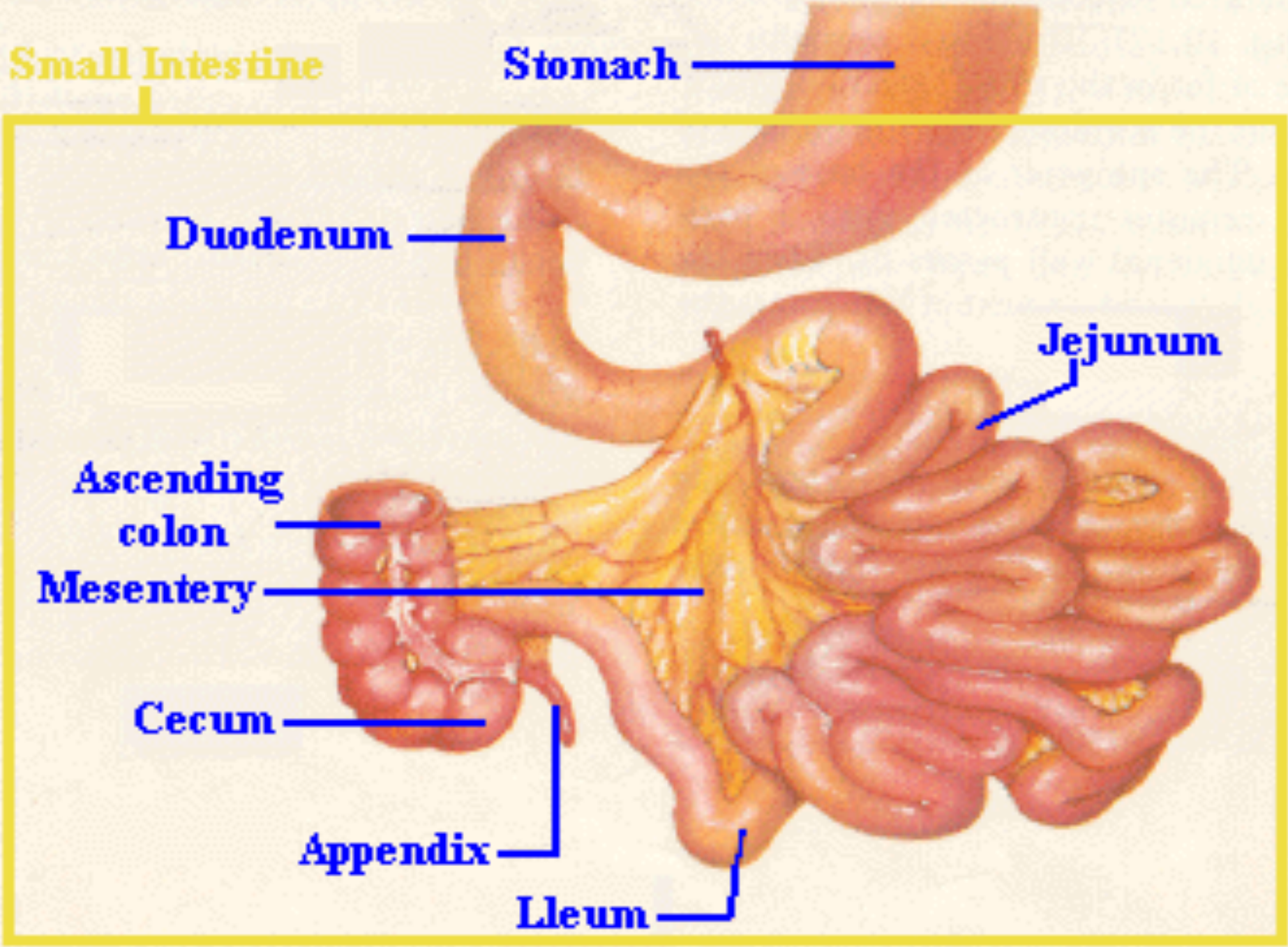


jejunum

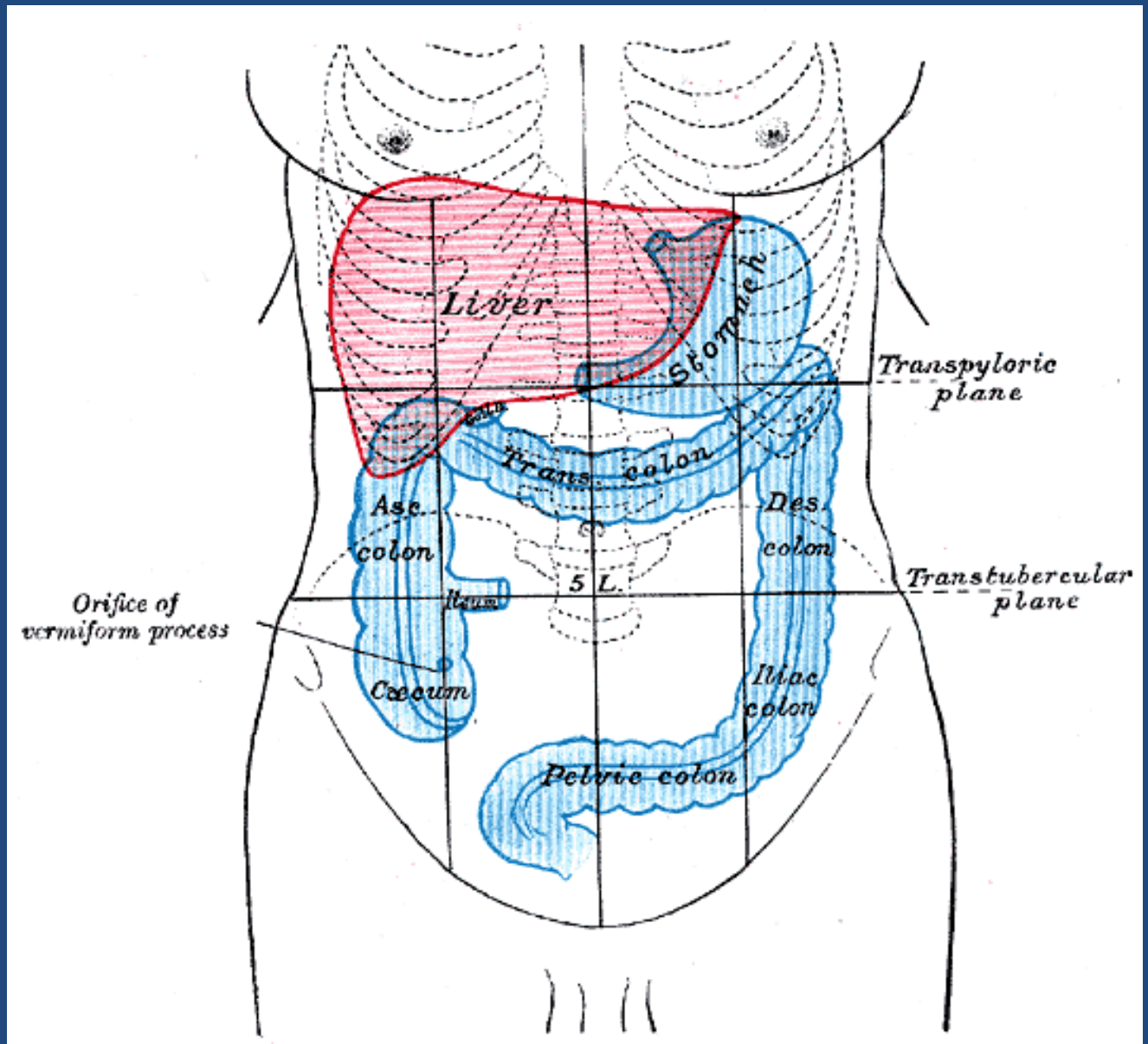
↳ has a plicae circulares in mucosa.

ileum

↳ has payer patches which is a lymphatic tissue

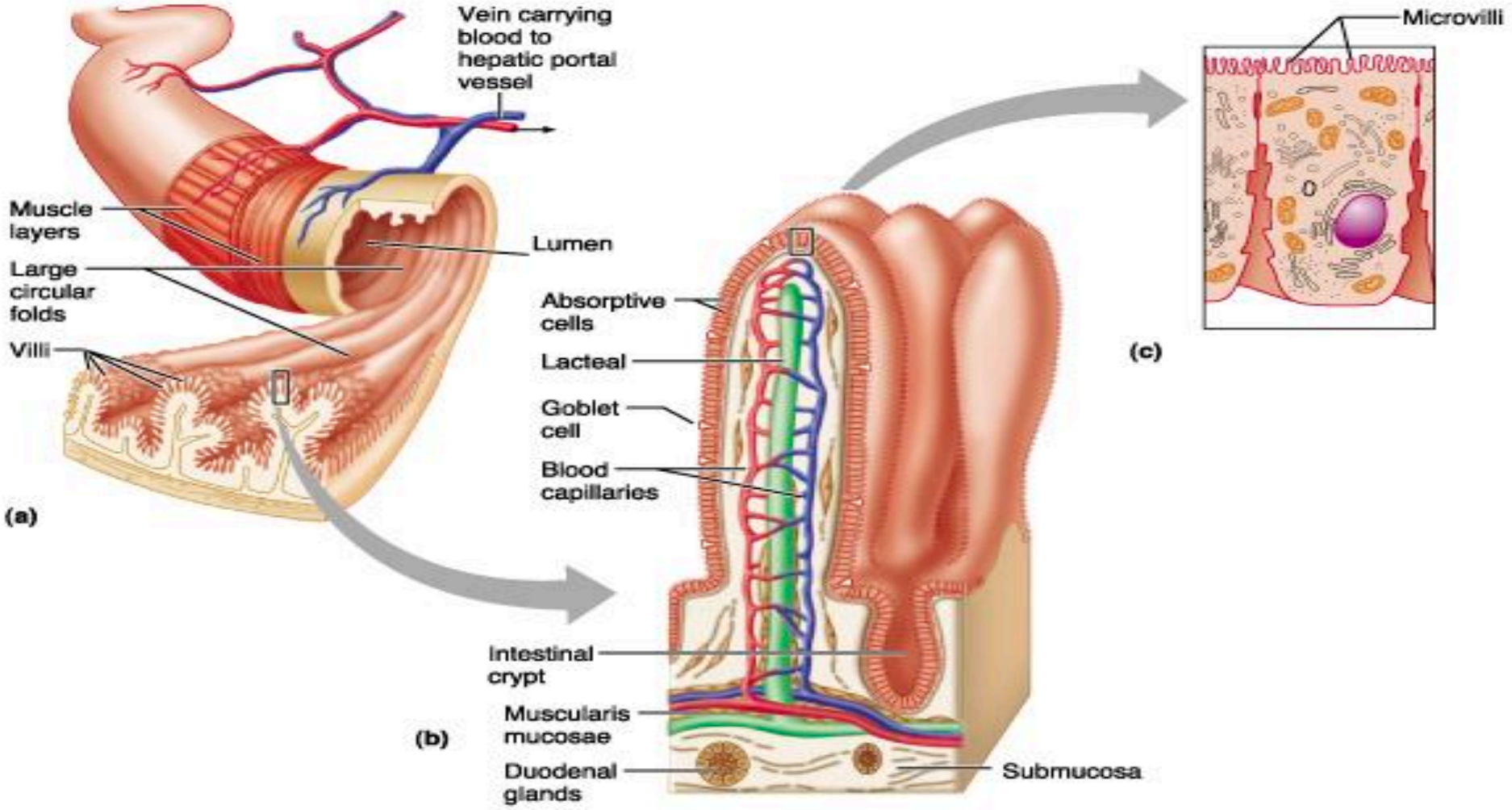

Small Intestine
Stomach
Duodenum
Jejunum
Ascending colon
Mesentery
Cecum
Appendix
Lleum

Anatomical position of small intestine



Structure of the Villi in the Small Intestine

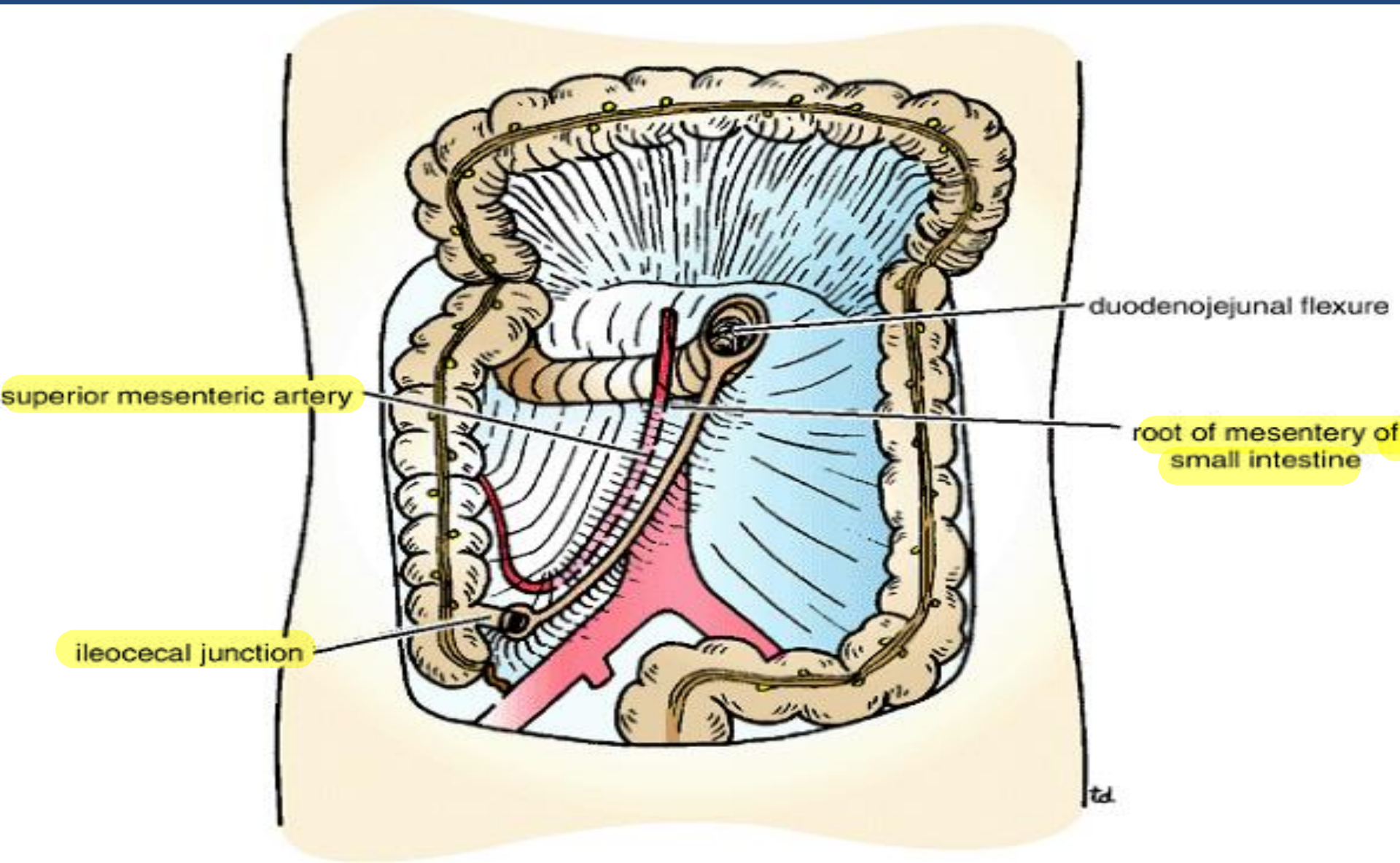
↳ finger like projection to increase the surface for absorption.

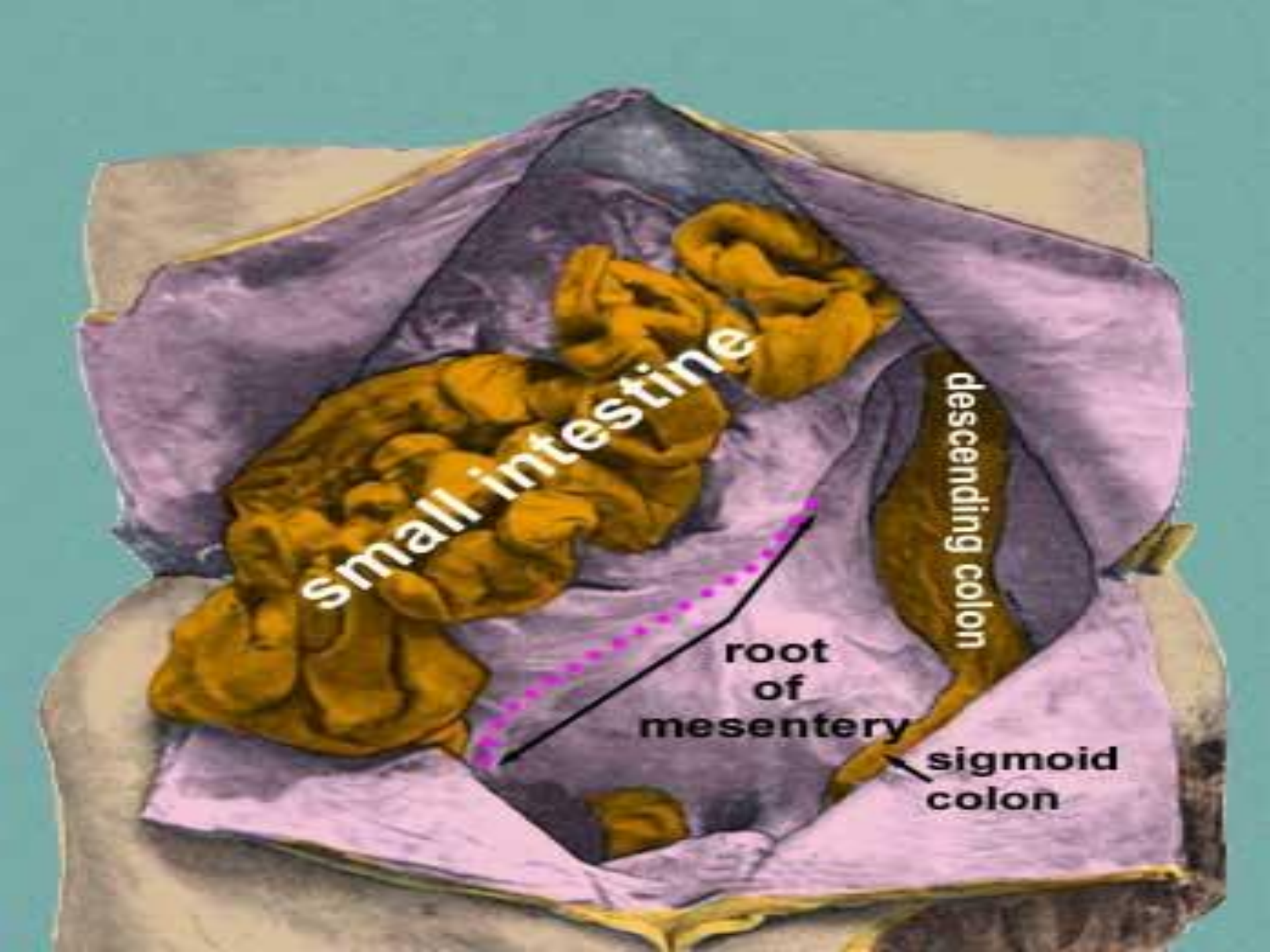


mesentery of the small intestine

- fan-shaped fold of peritoneum
- The long free edge of the fold encloses the mobile intestine.
- The short root of the fold is continuous with the parietal peritoneum on the posterior abdominal wall
- Along a line that extends downward and to the right from the left side of the second lumbar vertebra to the region of the right sacroiliac joint

Root of the mesentery




small intestine
descending colon
root
of
mesentery
sigmoid
colon

Contents of the mesentery

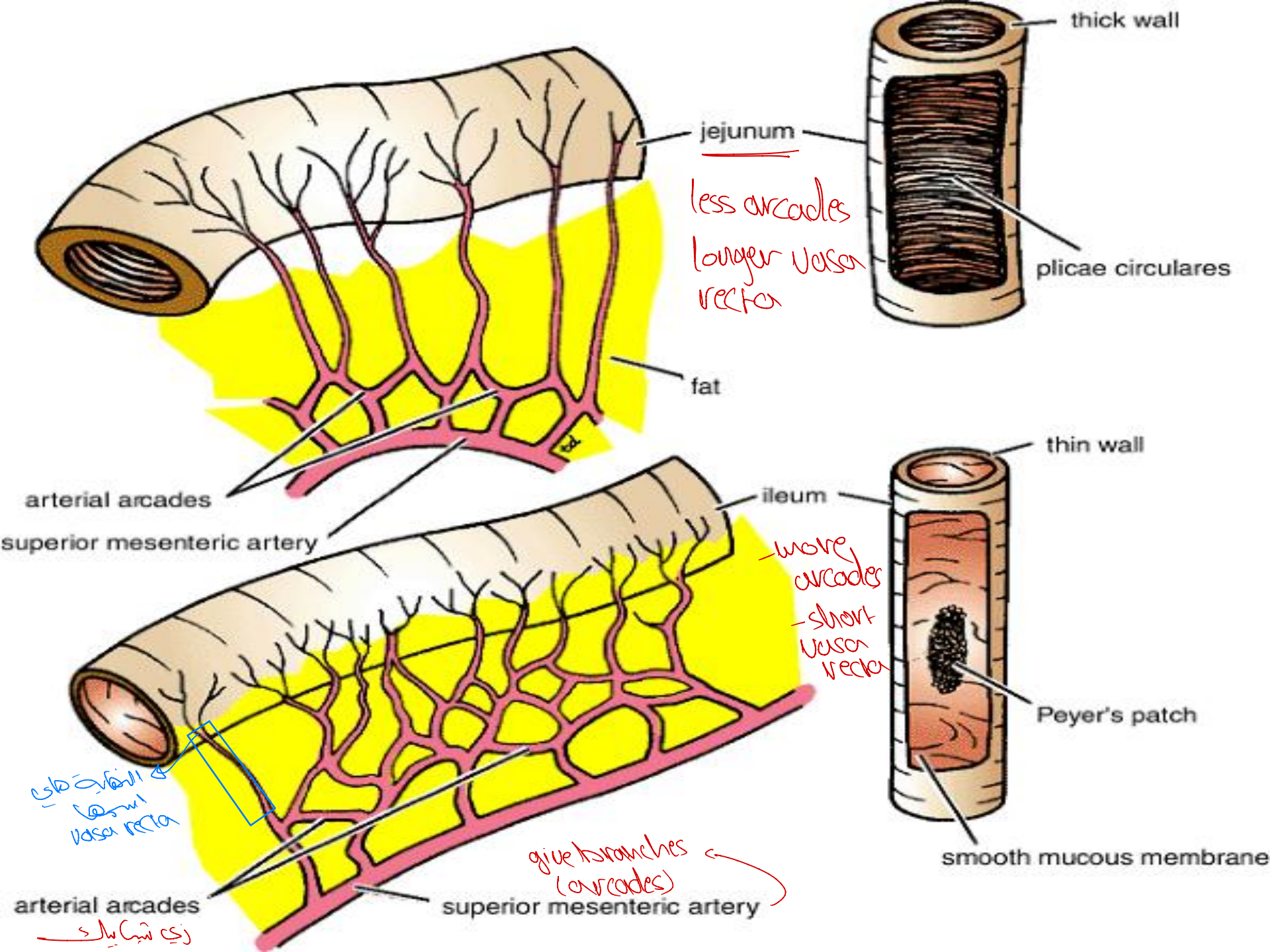
- The branches of the superior mesenteric artery and vein
- Lymphatic vessels & lymphatic nodes
- nerves (sym and para)
- Folds

Difference between Jejunum & Ileum

	jejunum	Ileum
length	Proximal 2/5	Distal 3/5
site	in the upper part of the peritoneal cavity below the left side of the transverse mesocolon	in the lower part of the cavity and in the pelvis
wall	thicker wall& redder	Thinner & less redder
Arcades in mesentery	-simple ,only one or two arcades -with long infrequent branches -Long vase recta	numerous short terminal vessels arise from a series of three or four or even more Arcade - Short vase recta
Fat in mesentery	- the fat is deposited near the root - it is scanty near the intestinal wall - Less in amount →appear window	- the fat is deposited throughout mesentery - Big amount - No window appear

Difference between Jejunum & Ileum

	jejunum	Ileum
Diameter	wider	smaller
villi	numerous	Less numerous
Plicae circularis(the permanent enfolding of the mucous membrane& submucosa	They are: 1- larger 2- more numerous 3- closely set	they are: 1- smaller 2- more widely separated 3- in the lower part they are absent .
Lymphatic follicles	No or few	Aggregations of lymphoid tissue (Peyer's patches) are present in the mucous membrane

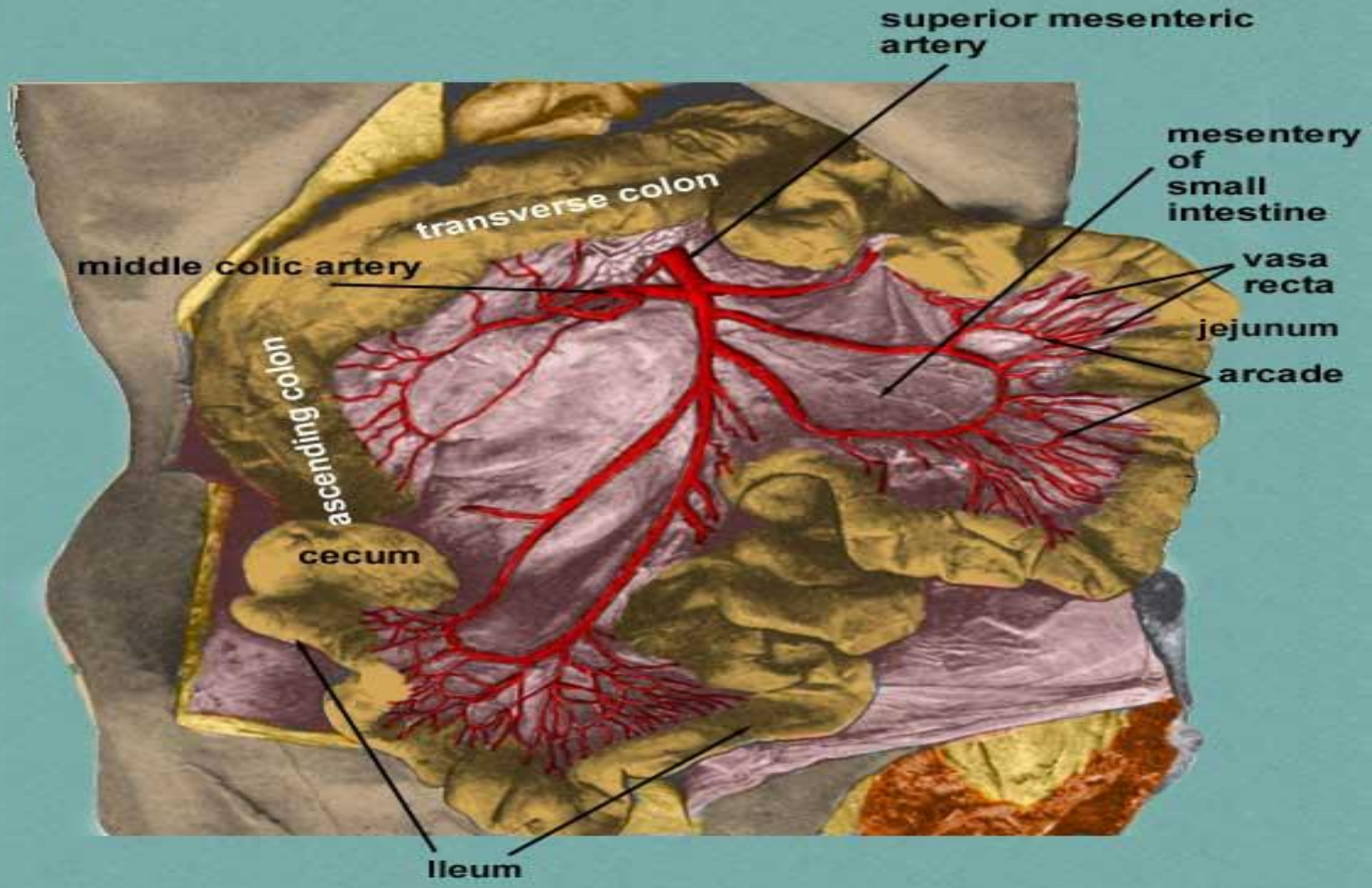

thick wall
jejunum
less arcades
longer vasa recta
plicae circulares
fat
arterial arcades
superior mesenteric artery
thin wall
ileum
more arcades
short vasa recta
Peyer's patch
smooth mucous membrane
give branches (arcades)
arterial arcades
superior mesenteric artery

Blood supply of Jejunum & Ileum

Arteries:

- The arterial supply is from branches of the **superior mesenteric artery** .
- The intestinal branches arise from **the left side** of the artery and run in the mesentery to reach the gut.
- They anastomosis with one another to form a series of **arcades**.
- The lowest part of the ileum is also supplied by **the ileocolic artery.**

Blood supply for jejunum & Ileum



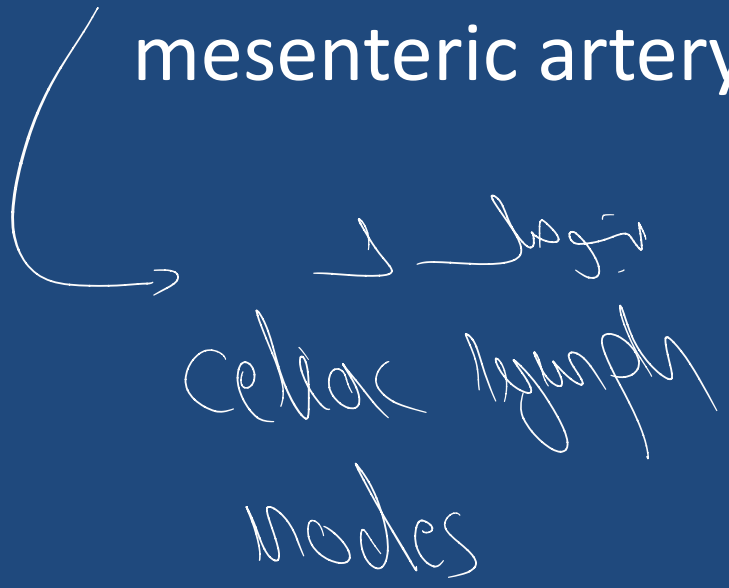
Veins:

- The veins correspond to the branches of the superior mesenteric artery
- Drain into the superior mesenteric vein.

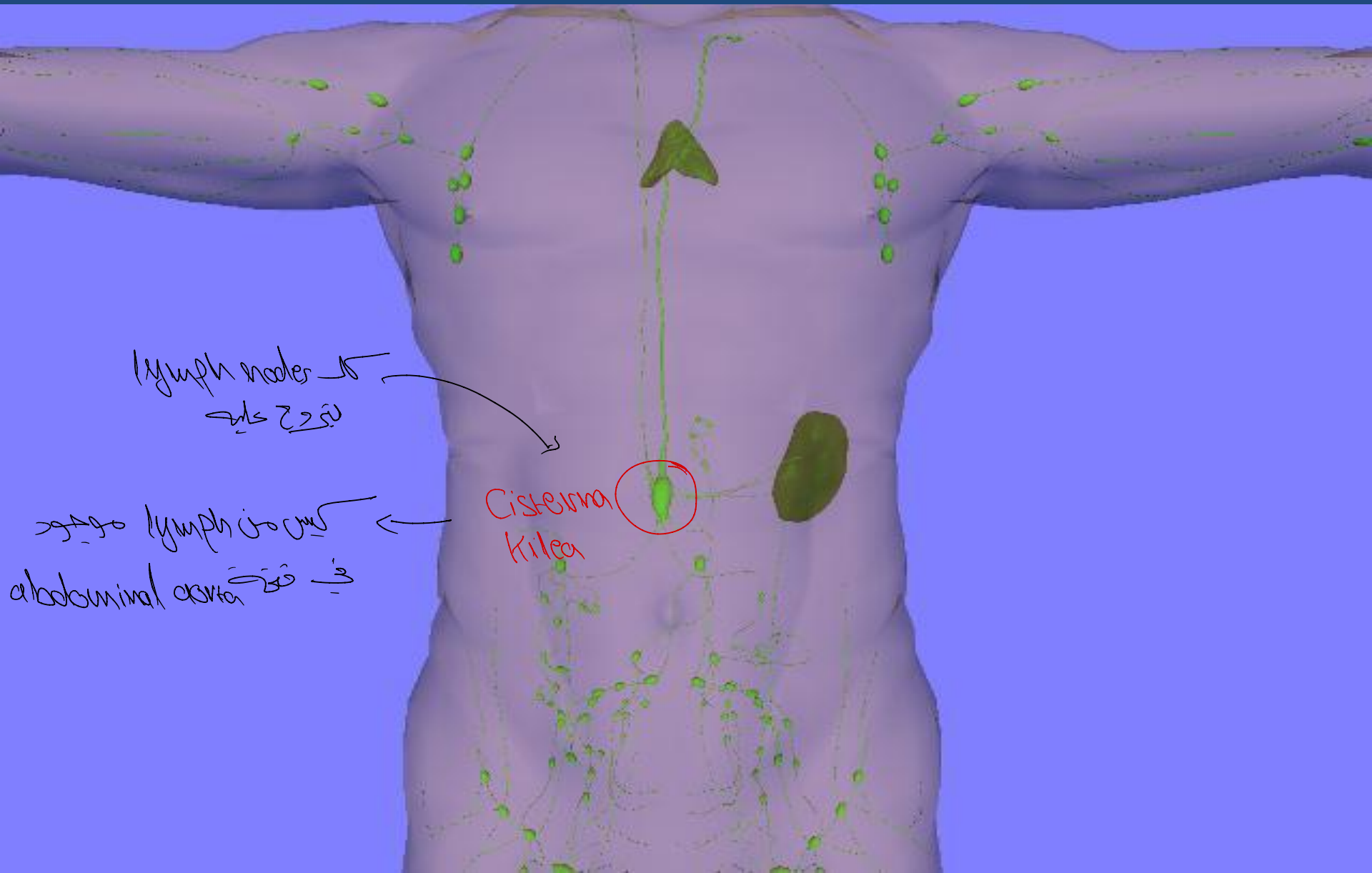
then into splenic into portal

Lymphatic Drainage of jejunum & ileum

- The lymph vessels pass through many intermediate mesenteric nodes
- Finally reach the superior mesenteric nodes→ around the origin of the superior mesenteric artery.



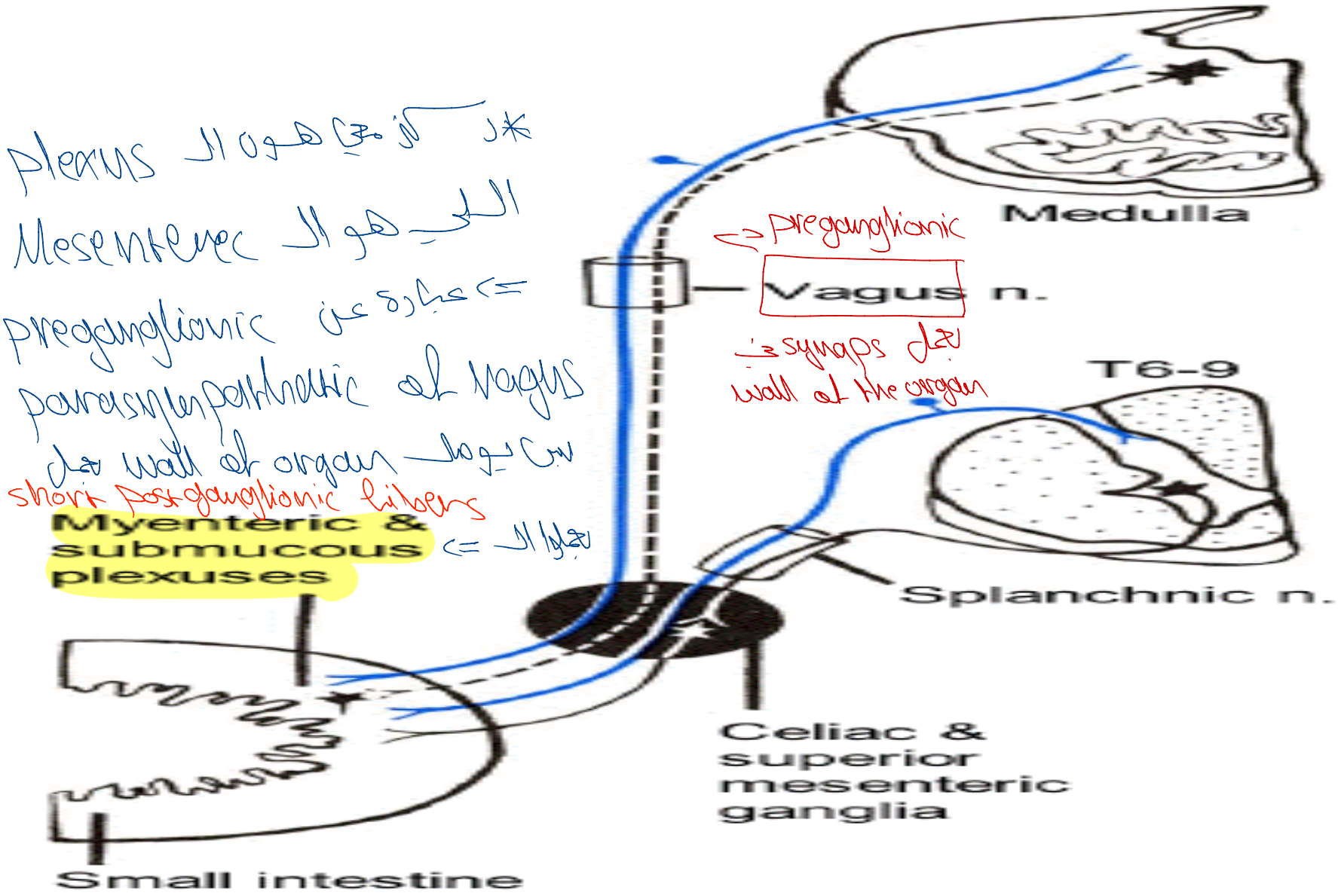
Lymph Drainage of jejunum & ileum



Nerve Supply of jejunum & Ileum

- The nerves are derived from the sympathetic and parasympathetic (vagus)
- Nerves from the superior mesenteric plexus.

Nerve supply for small intestine



Congenital anomaly of small intestine

Meckel's Diverticulum:

- a congenital anomaly of the ileum
- Present in 2% of people
- 2 feet from iliocecal junction
- 2 inch long
- contains gastric or pancreatic tissue
- Remains of vitelline duct of embryo

Meckel's Diverticulum