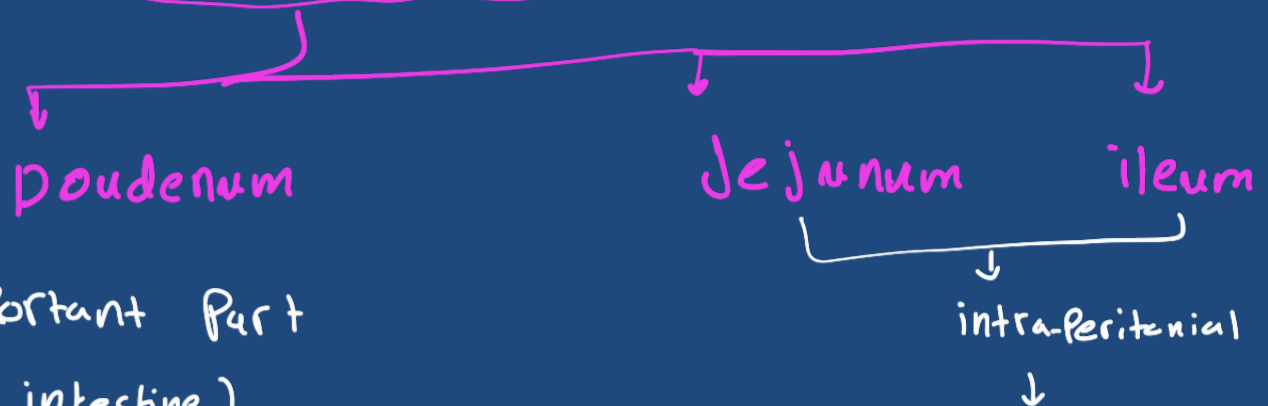


[click here](#)

Done by : ميس قشوع

The small intestine



(The most important part of small intestine)

↳ because it is retroperitoneal organ and it is fixed on the posterior wall of the abdomen

They have mesentery and they move inside the abdomen

* Mesentery → two folds of peritoneum in the free edge of mesentery

Starts from posterior abdominal wall

DOUDENUM



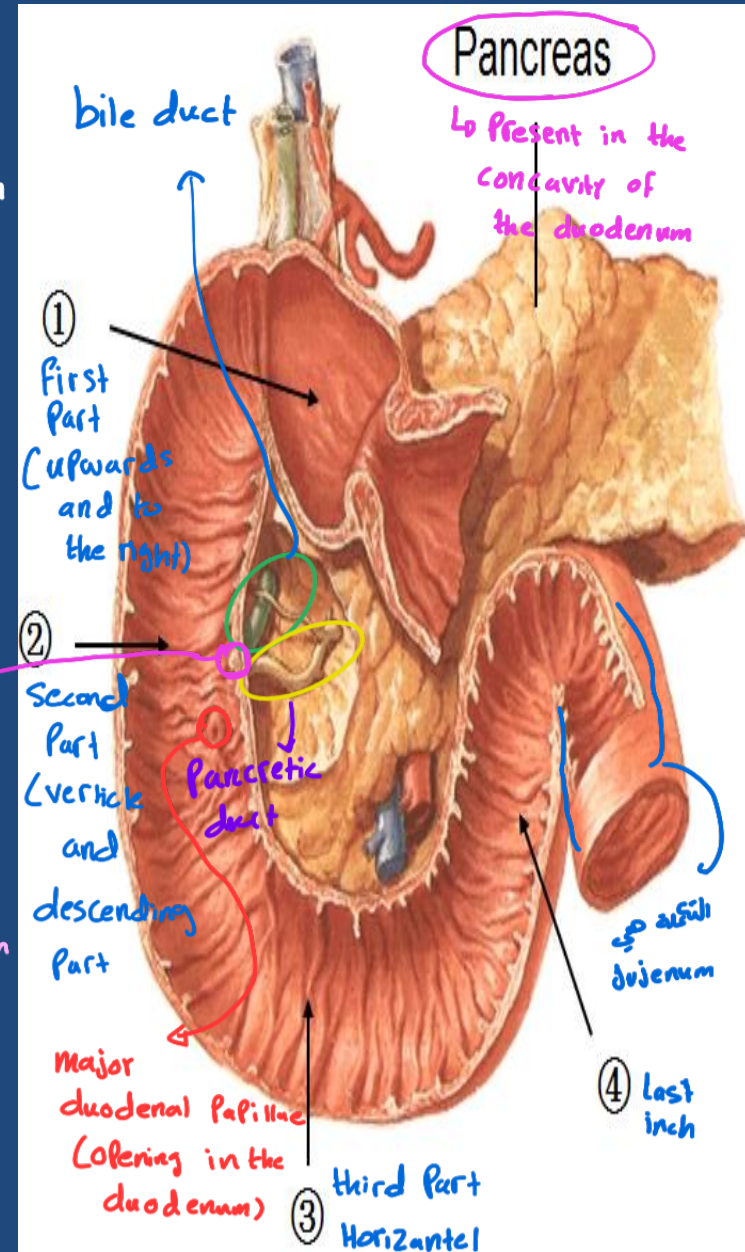
#bile duct of the liver and ^{gall bladder} duodenum and Pancretic duct They

have a single hole that opens into the second part of duodenum

- The duodenum is a c-shaped
- Concave tube backward to the left
- About (10" in) length. ^{→ 25 cm} but the length of small intestine is 6m.
- 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.

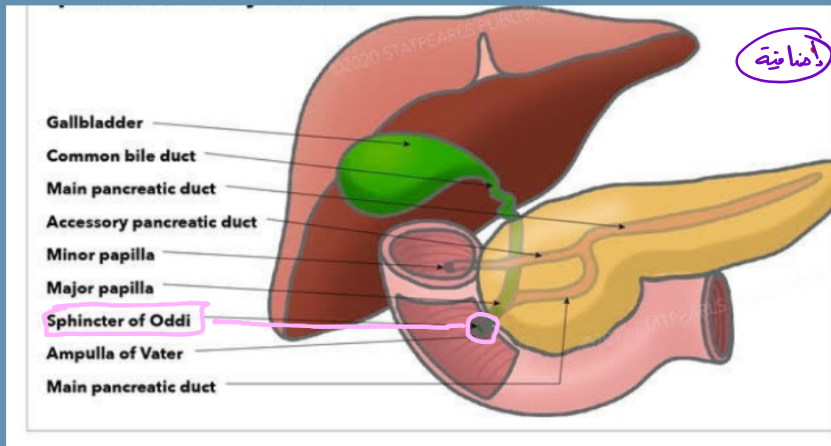
→ This opening makes bulging on the concavity of duodenum → (Ampulla of Vater)

Opening for common bile duct and Pancretic duct.



There is a sphincter called sphincter of oddi keeps the opening always closed and opens it when there is release of secretion from gallbladder or Pancreas.

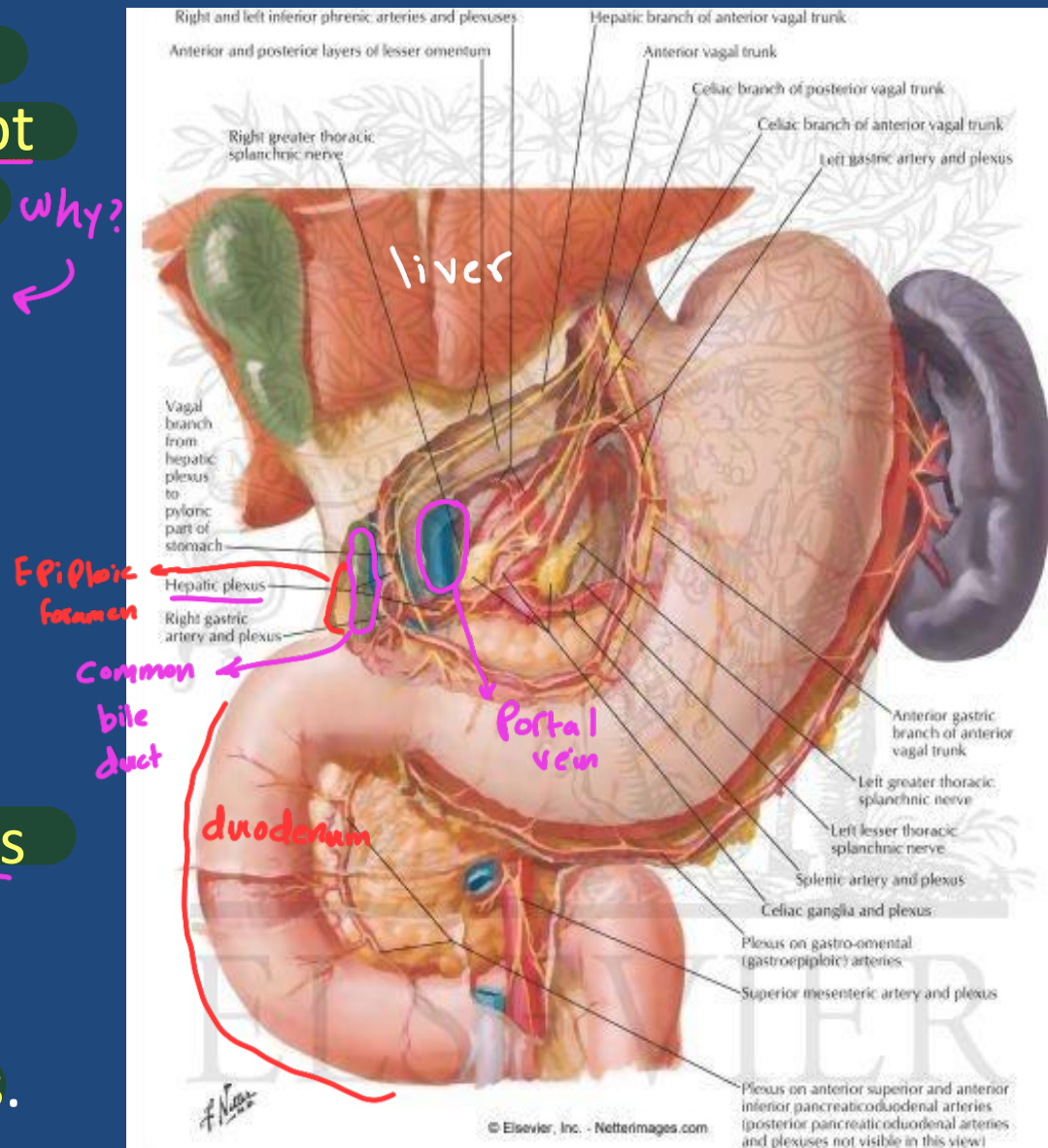
This sphincter is surrounded by circular smooth muscle

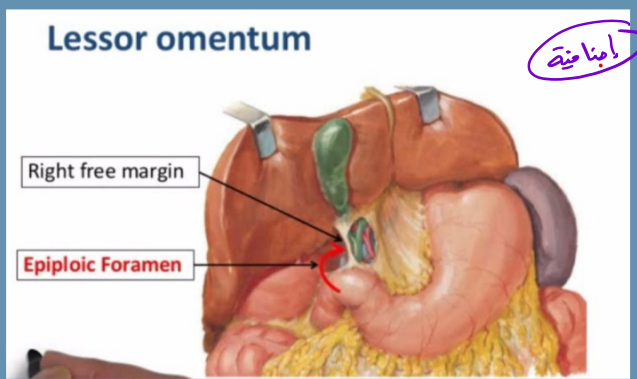


sphincter of oddi is a muscular valve surrounding the exit of the bile duct and pancreatic duct into the duodenum. The sphincter is normally closed, opening only in response to a meal so that digestive juices can enter the duodenum and mix with food for digestion

duodenum...cont

- Most of the duodenum is retroperitoneal except the 1st inch & last inch *why?*
- 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.





☆ why first inch of duodenum and last inch are intra peritoneal?

first inch → because it comes after Pylorus of stomach which is intraperitoneal organ so there is an extension covers the first Part and hold the lesser and greater omentum.

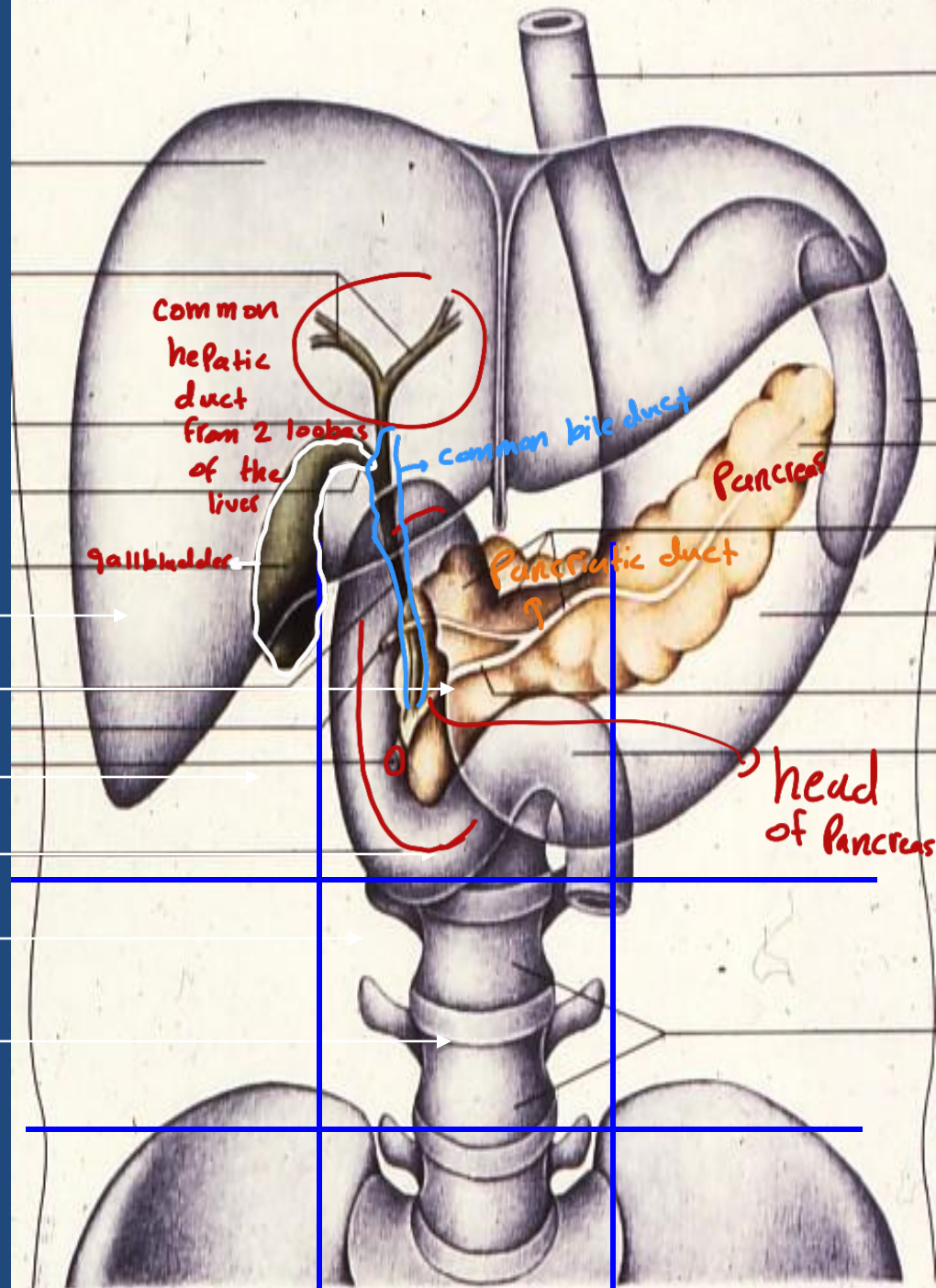
last inch → the jejunum comes after last inch and it's a intraperitoneal organ and it has an extension cover the last inch .

Site of duodenum

- The duodenum is situated in the epigastric and umbilical regions
- for purposes of description, is divided into four parts

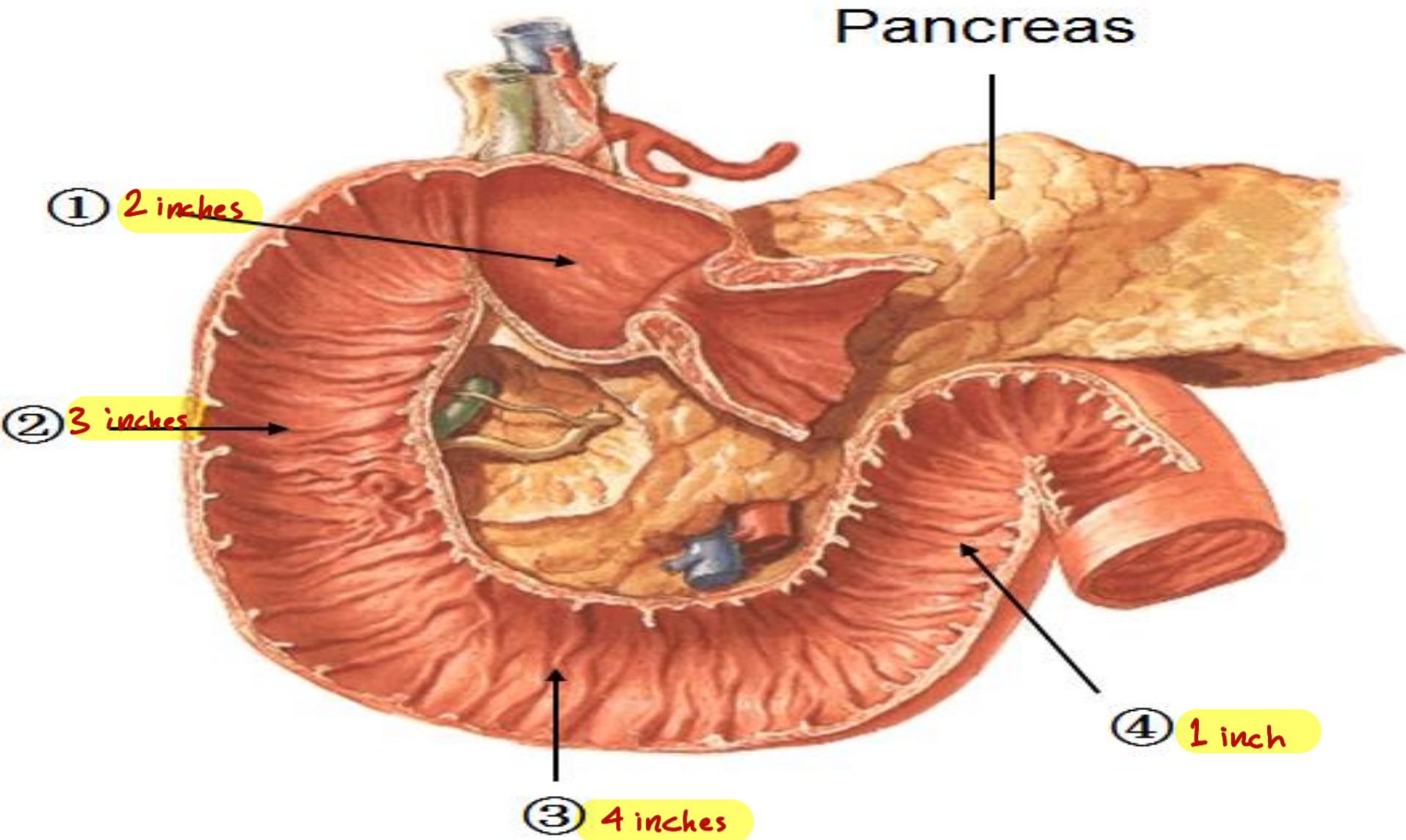
Right lobe of liver
Falciform ligament
Gallbladder
Pancreas
Duodenum
L-3

* Stomach → Epigastric

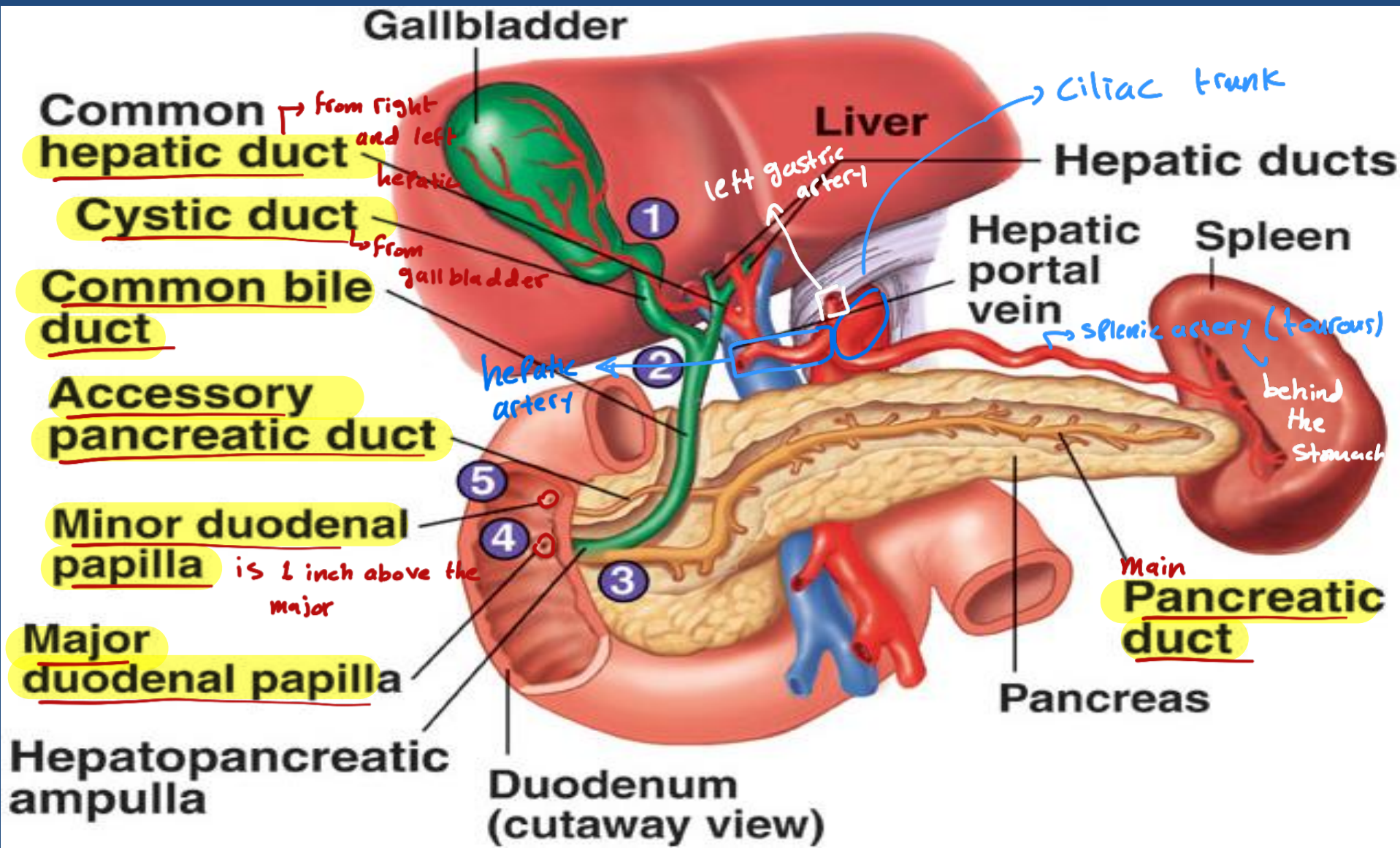


Parts of the duodenum & Their relations

↳ 4 Parts (10 inches)



Parts of the duodenum & Their relations



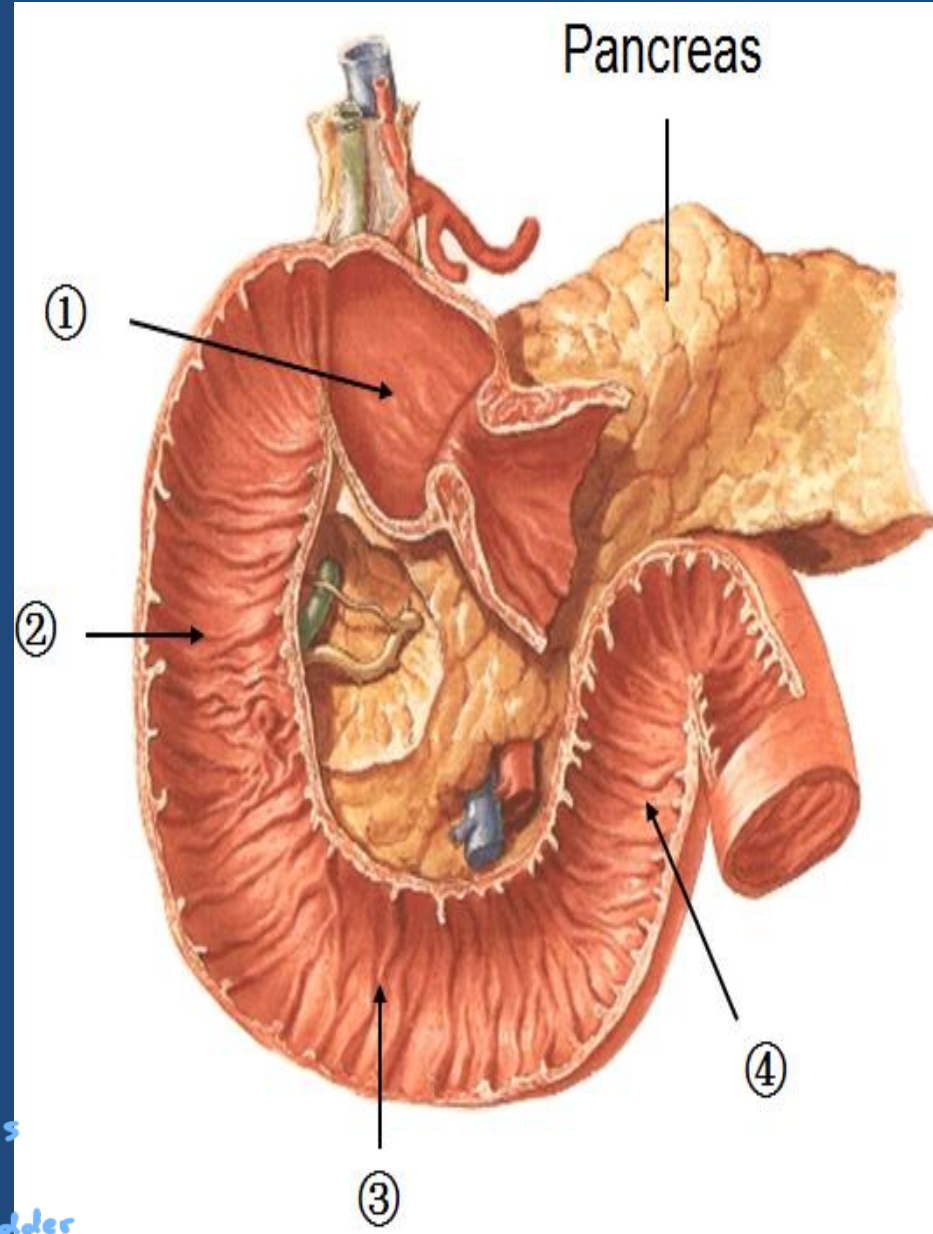
☆ The importance of duodenum is that it receives the bile and bile salts from the liver and receives the enzymes from Pancreas.

- The bile duct descends posterior to the first part of duodenum and penetrates the head of pancreas and opens in major duodenal papillae .

This papillae is important in completing the digestion of fat .

1st part of Duodenum

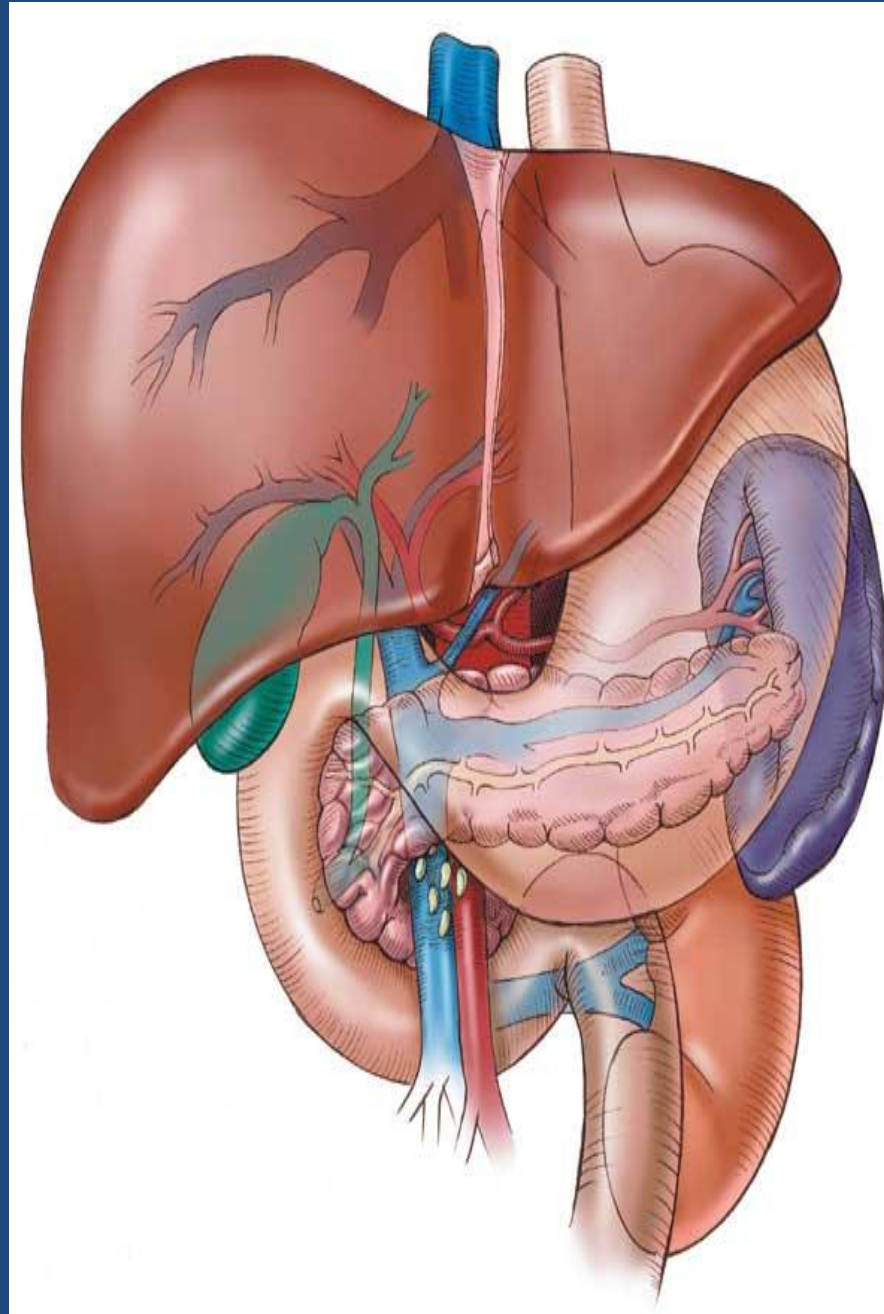
- The first part is 2 inches long.
- It begins from the pyloduodenal junction
- At the level of the transpyloric line *L1 to the right*
- Runs upward and backward at the level of the 1st lumbar vertebra
1 inch to the right. *and reaches the neck of gall bladder*



Relations of 1st part of doudenum

Ant.

- The liver (quadratus lobe)
- gall bladder



Relations of 1st part of duodenum.....cont

Sup.

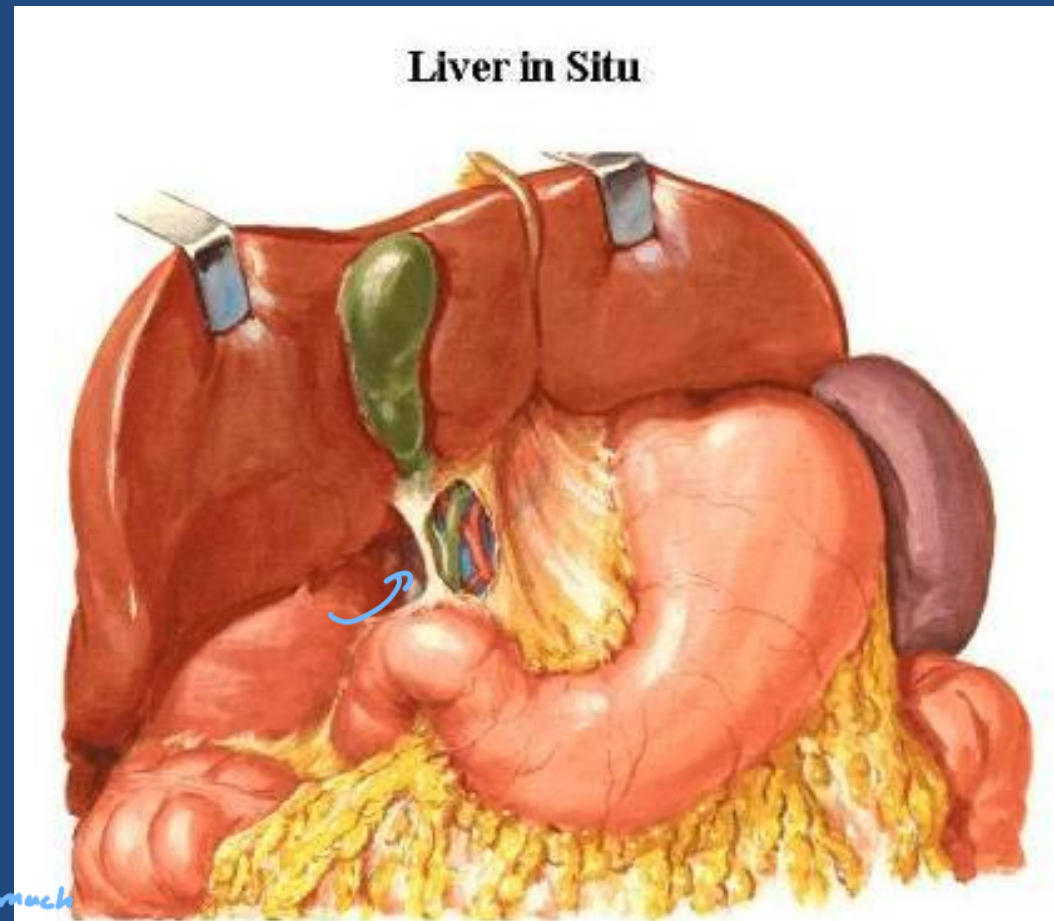
- the epiploic foramen

Foramen of Winslow

↳ We can clamp it to prevent bleeding in the liver and it is the entrance to the lesser

Sac and structures behind the stomach

it lies in front of stomach bed organs



Relations of 1st part duodenum.....cont

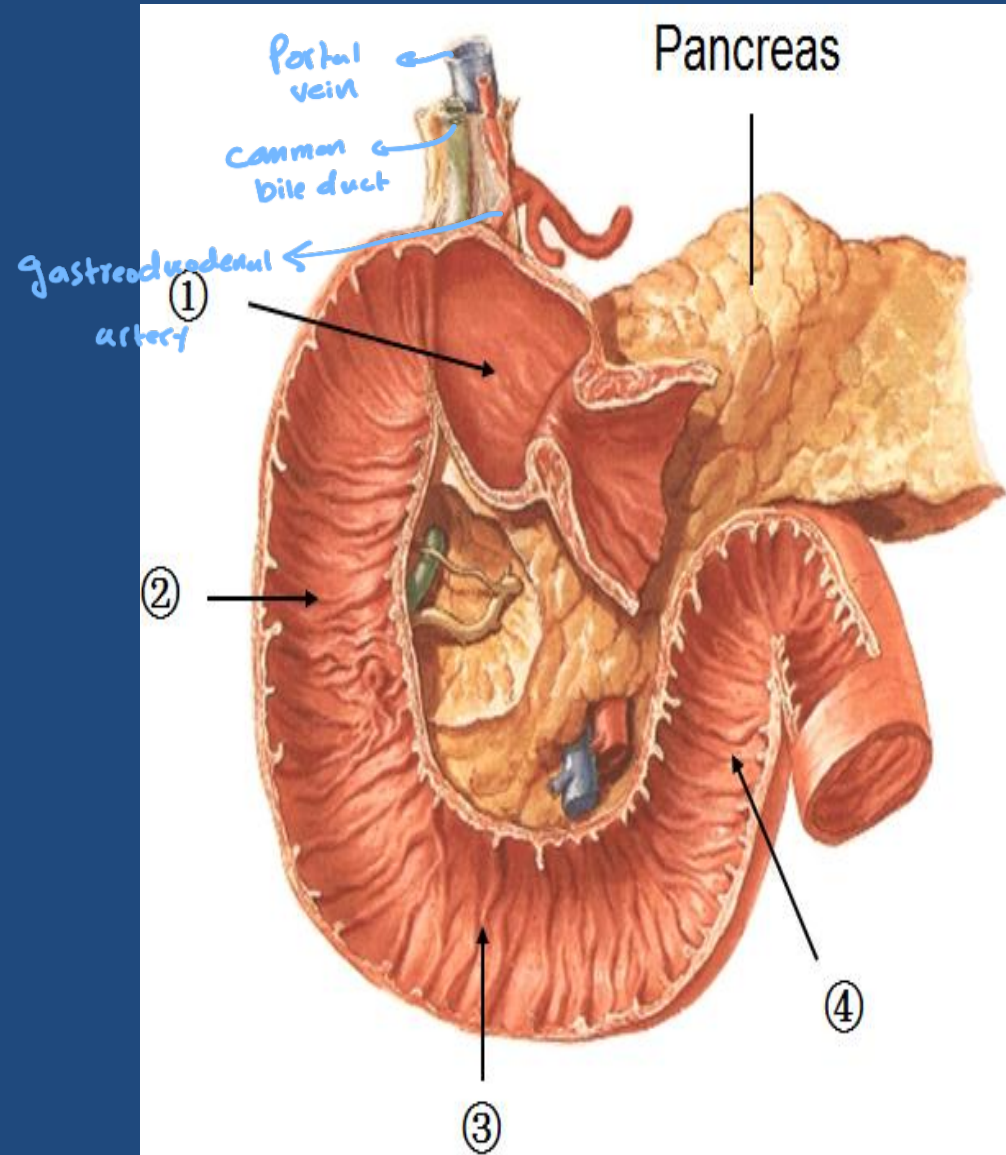
☆ if there was a peptic ulcers in the posterior wall of the first inch, perforation may occur and causing bleeding to the gastroduodenal Artery.

post.

- The lesser sac
- gastroduodenal Artery
- the Bile duct
- portal vein
- I.V.C (Inferior Vena Cava)

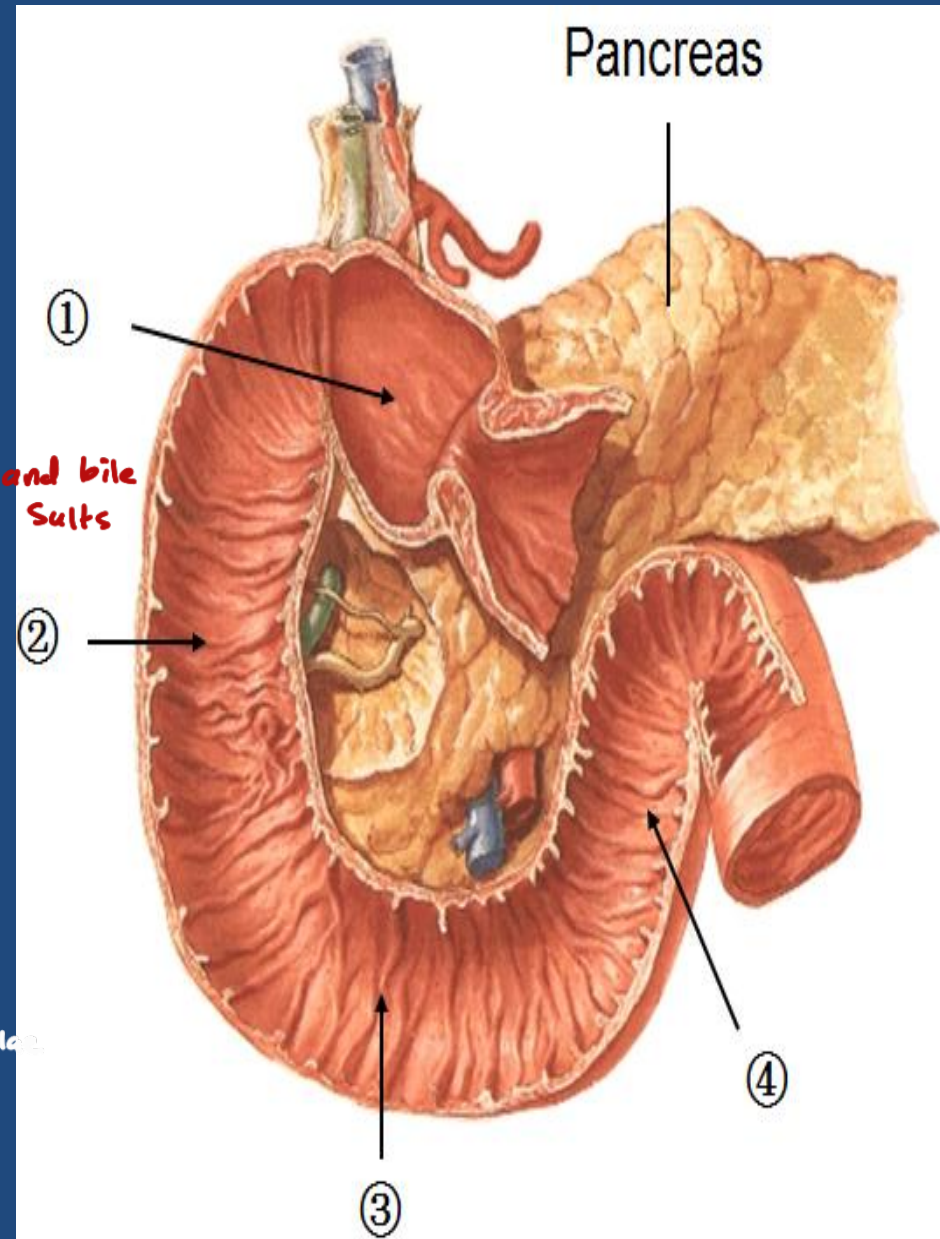
Inf.

- The head of the pancreas.



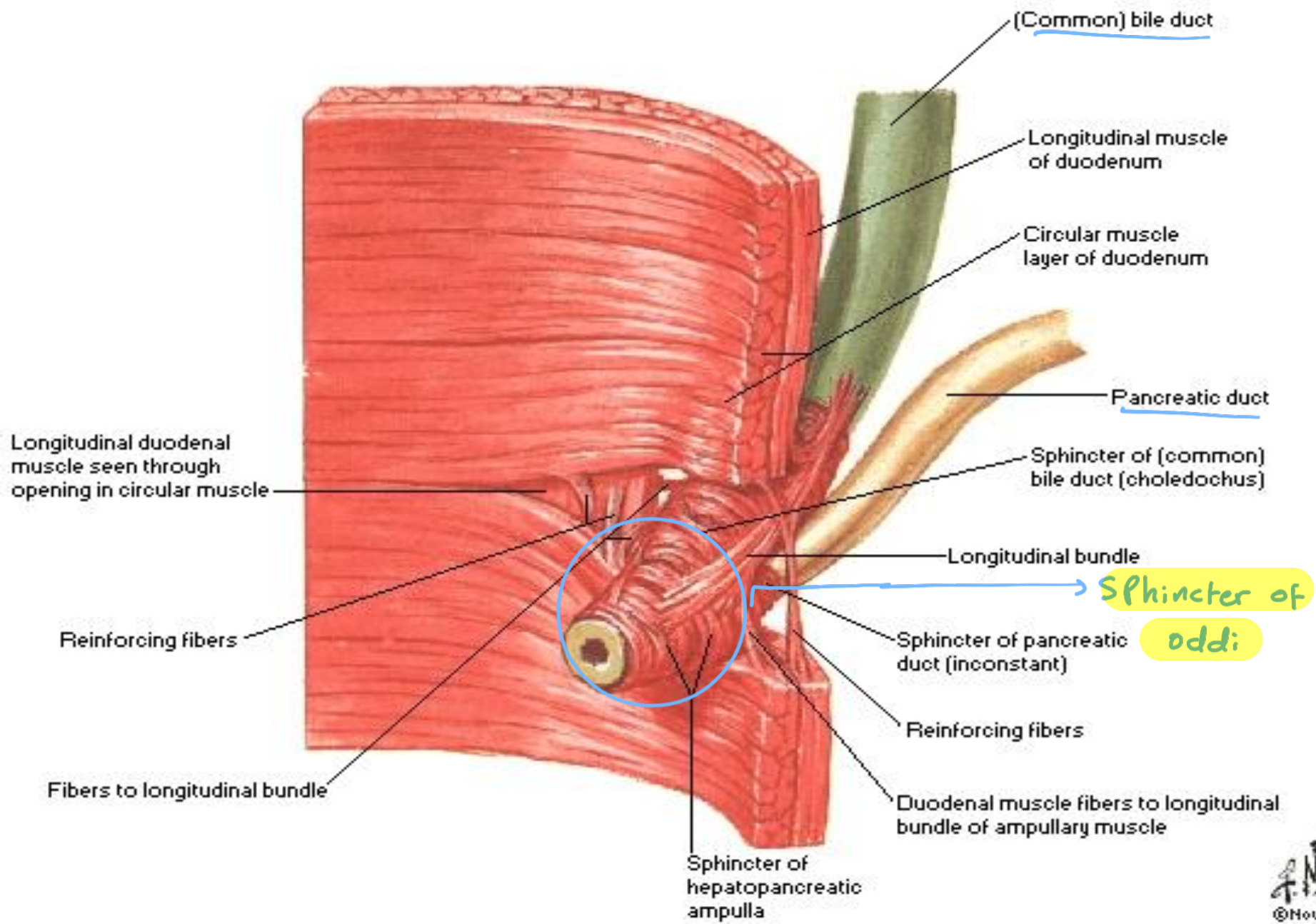
2nd part of duodenum

- It is 3" (3 inch) long
- runs downward vertically on the right side
- 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** *from outside* *2nd part receives the bile and bile ducts* *from inside*
- The accessory pancreatic duct (if present) opens in the **minor duodenal papilla** more superiorly *1 inch above the major papilla*



Junction of Bile Duct and Duodenum

Dissection



sphincter of oddi is always contracted and closing the opening, why?

because once the secretion comes through bile duct (when the opening is closed) the bile will back to the galbladder and the gallblader concentrates it.

The secretoin of liver is diluted so if the Person ate a meal rich with fat instead of liver secretion we use gallbladder secretion (bile) because it facilitates the digestion.

□ There is a new technique, ERCP (endoscopic retrograde cholangio pancreatography) where an endoscope is placed through the mouth and proceeds retrogradely from oral cavity to the sphincter , and then may enter to common bile duct or pancreatic duct.

□ This technique is used in the treatment of stones that form in the common bile duct and block it causing obseective jaundice (yellow sclera, yellow, and itchy skin), when you find the stone with the endoscope, you use a basket and remove the stone, leaving it in the duodenum & it gets out with the stool.

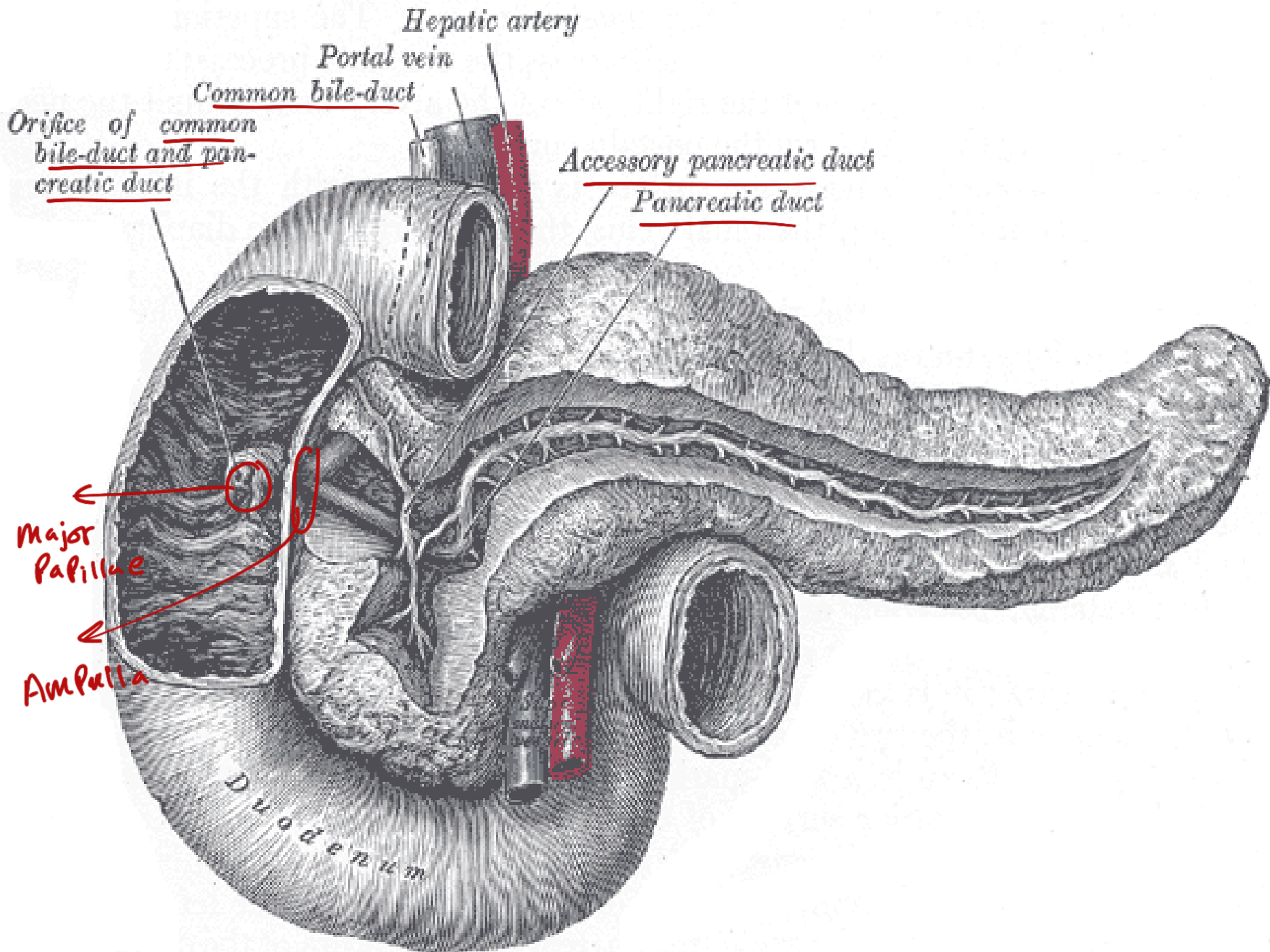
□Also, pancreatitis is treated with ERCP.

Hepaticopancreatic ampulla (Ampulla of Vater)

* These foldings
of duodenal
mucosa is
called

(Plicae circularis)





Relations of 2nd part of duodenum

الارتباطات
للجزء الثاني من
Relations ☺

Ant.

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

Post.

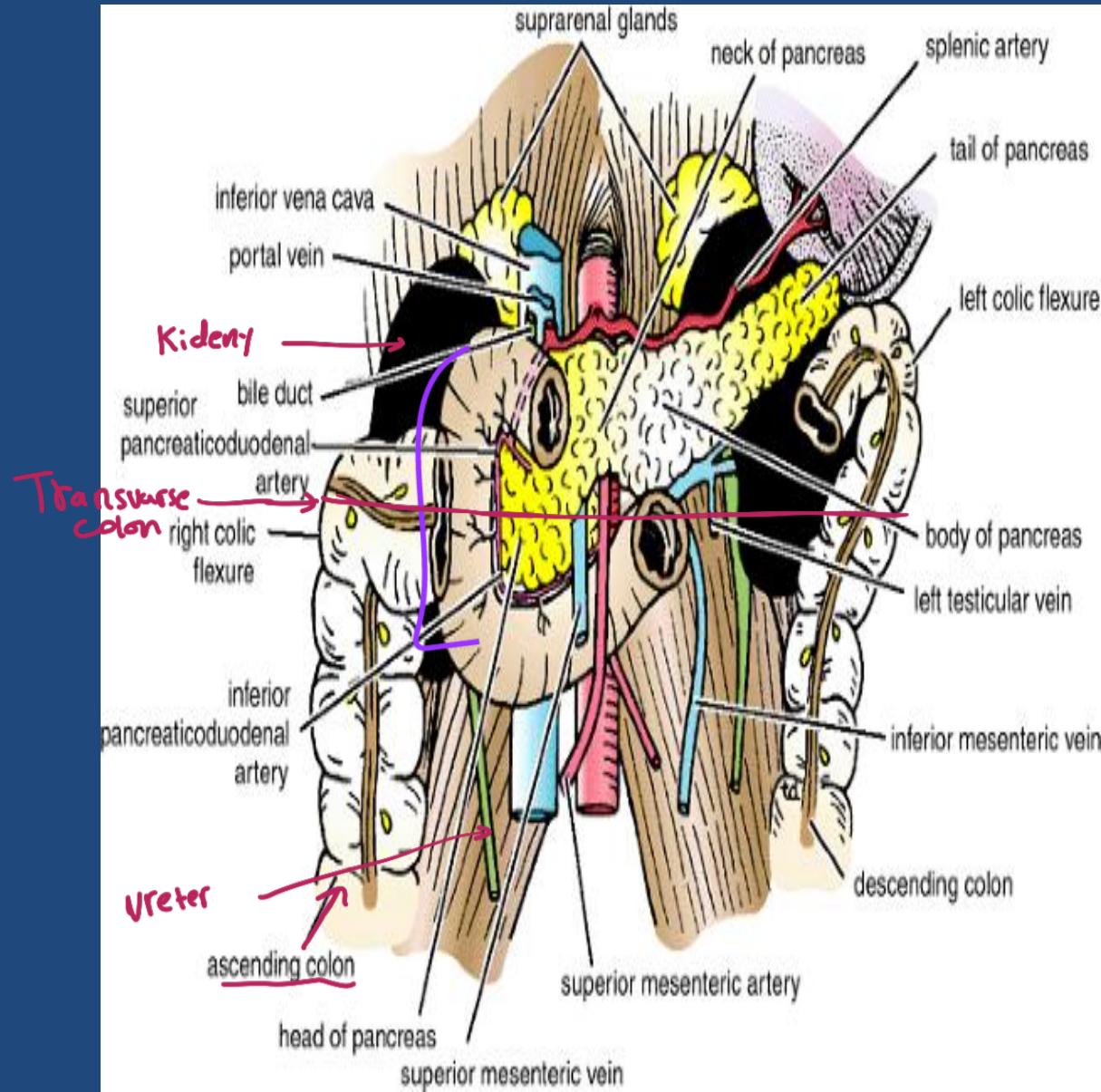
- Hilum of Rt. Kidney
- Rt. Ureter.

Lateral. (Right side)

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

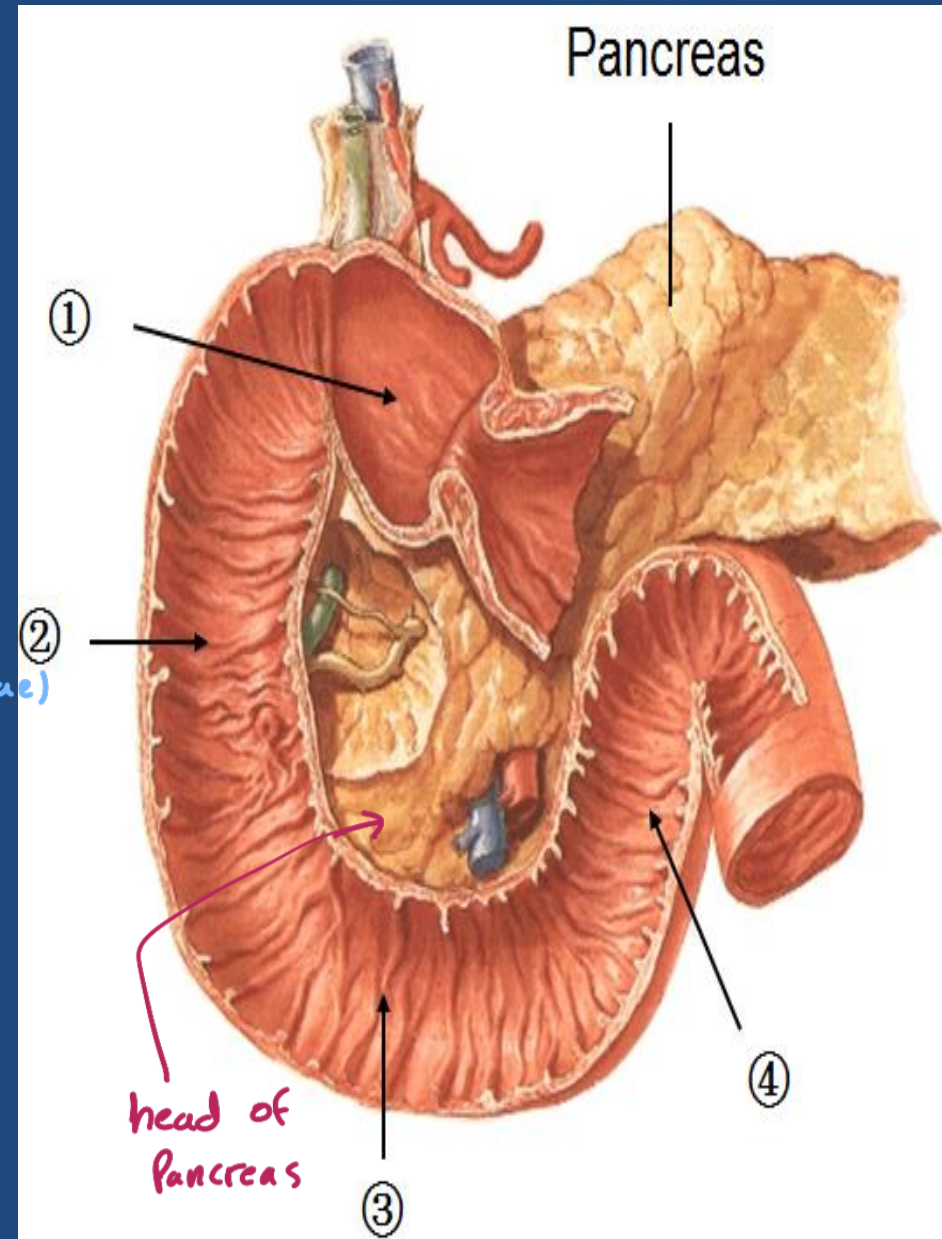
Medial. (left side)

- 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 (lumber vertebrae)
- 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:

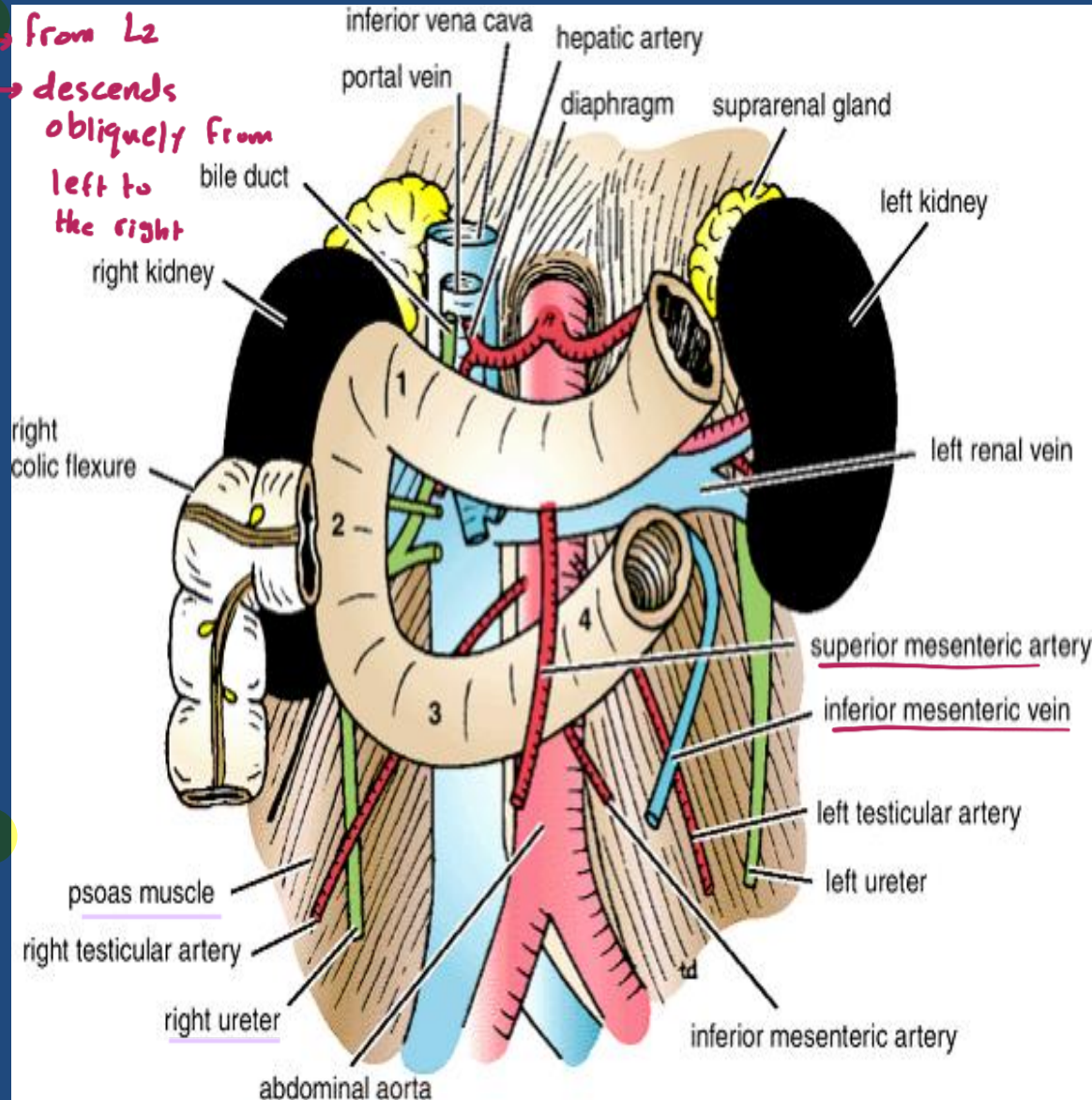
- The right ureter
- the right psoas muscle
- the inferior vena cava
- the aorta -

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).

important junction between duodenum and jejunum because jejunum is intraperitoneal while most of duodenum is fixed except the last part.

Relation of 4th part of duodenum

Ant.

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

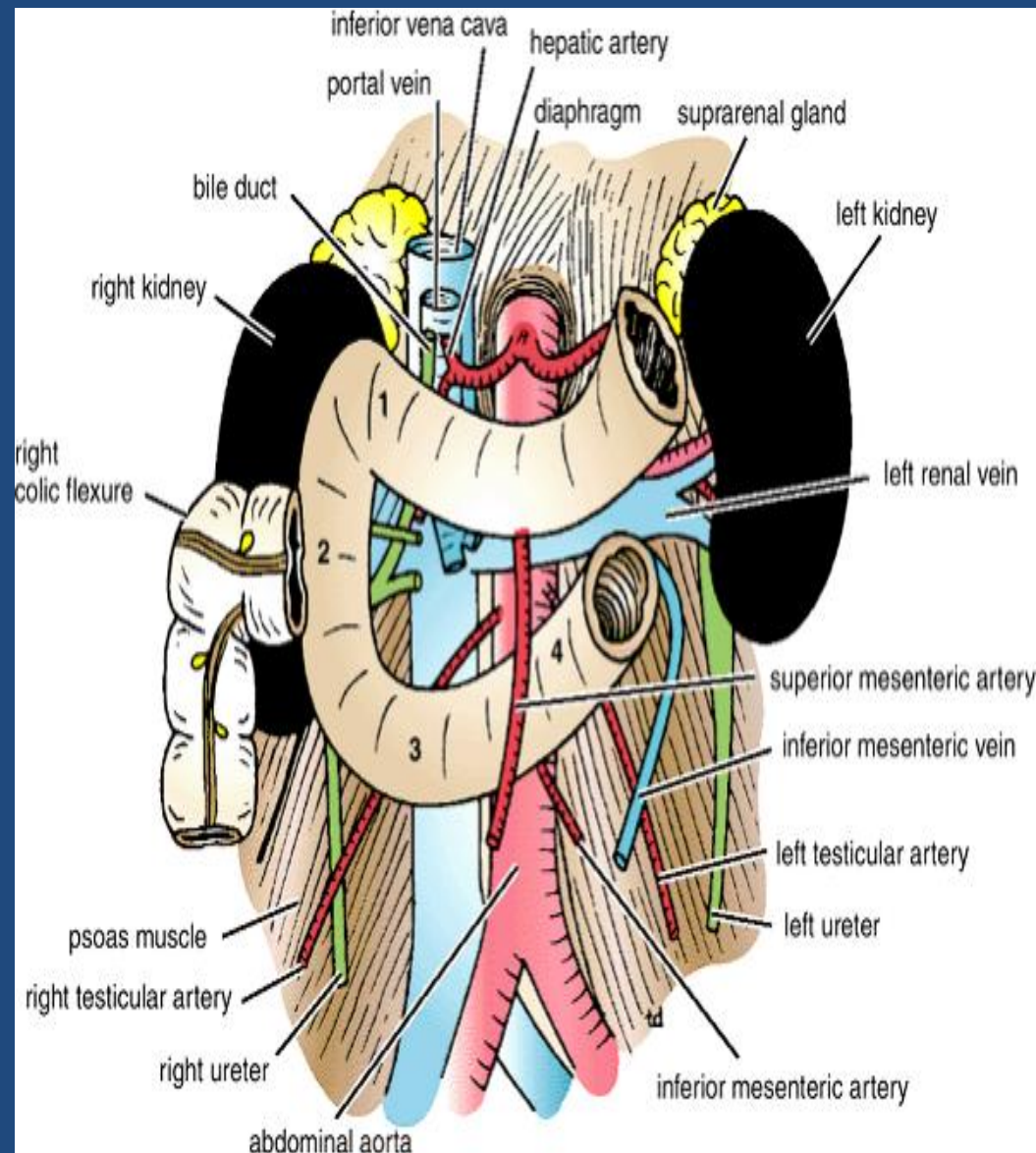
Post.

- Lt. psoas major
- the sympathetic chain
- left margin of the aorta.

Sup.

- Uncinate process of the pancreas.

↪ extension from the head of Pancreas to the left side



Blood supply of duodenum

- Arteries

it follows foregut

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

from hepatic
from celiac
trunk

2- The lower half (lower 1/2 of 2nd part + 3rd + 4th part) is supplied by the inferior pancreaticoduodenal artery, a branch of the superior mesenteric artery

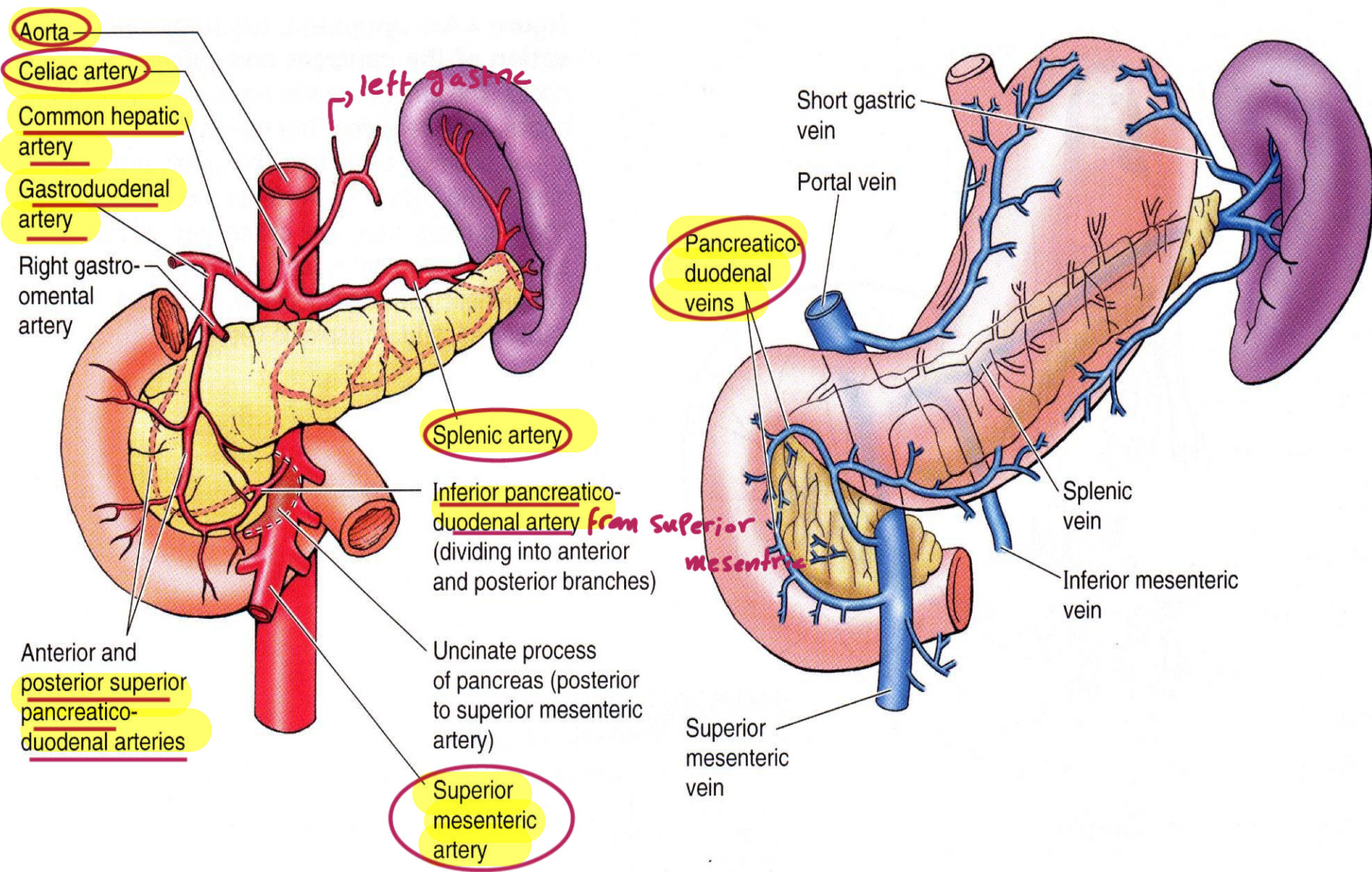
it follows
midgut

□ GIT is divided into 2 part upper and lower half, because in embryology the origin of half of duodenum follows the foregut (stomach) and the another half follows the midgut (small intestine and Part of large intestine).

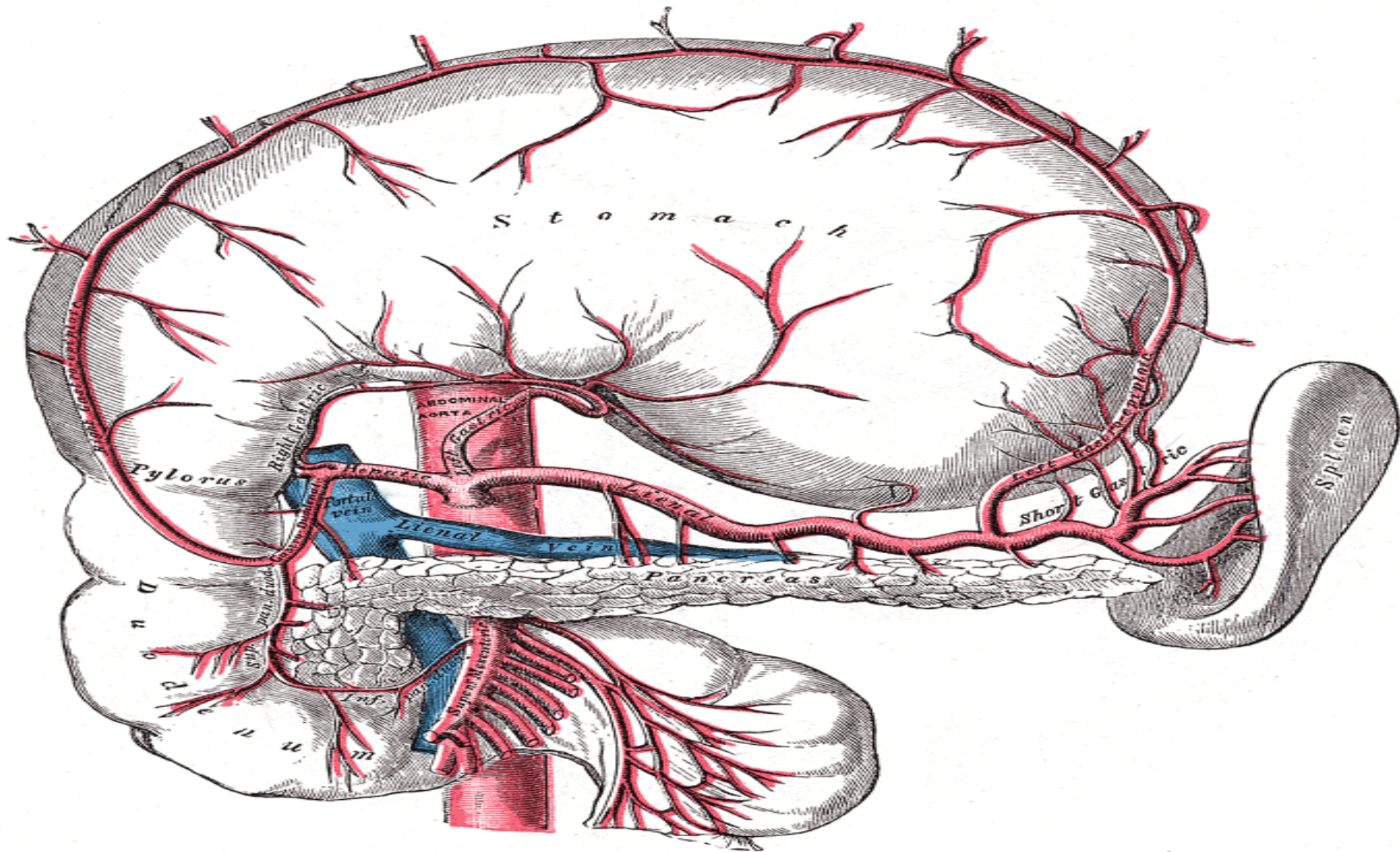
□ Foregut is supplied from celiac trunk , midgut from superior mesenteric artery and hindgut from inferior mesenteric artery.

□ (hindgut (Part of large intestine to the rectum

Arterial supply and venous drainage of the duodenum



Blood supply for duodenum

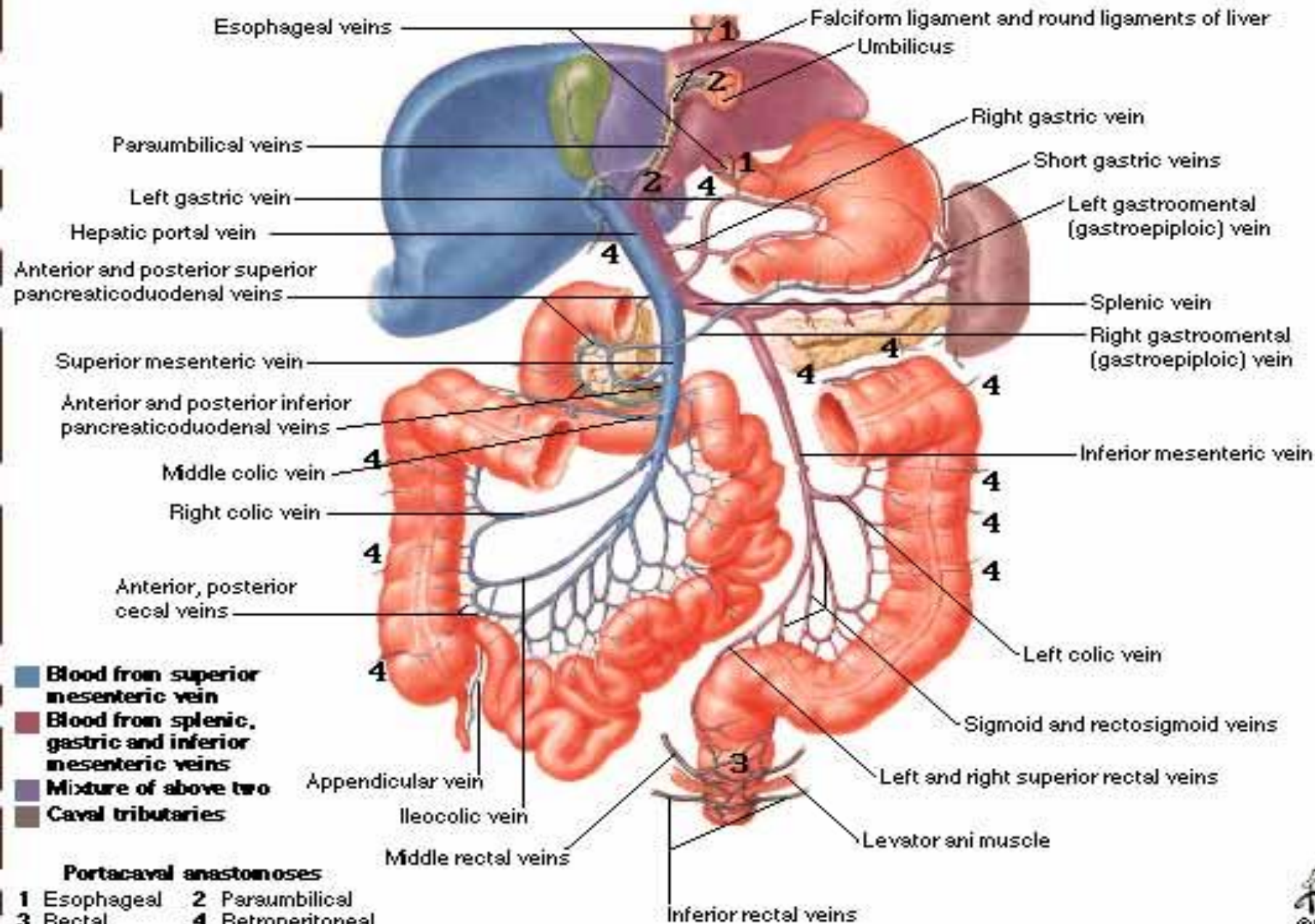


Veins of duodenum

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

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 *related to foregut.*
- drain downward → via pancreaticoduodenal nodes → the superior mesenteric nodes around the origin of the superior mesenteric artery.

Nerve supply

- ↳ from sympathetic ganglion (Splanchnic nerve) and synapses with
 - Sympathetic nerve
 - ↳ its origin from Vagus nerve
 - parasympathetic nerves from:
 - 1- The celiac plexus
 - 2- Superior mesenteric plexus.
- 

Jejunum and Ileum

Location and Description

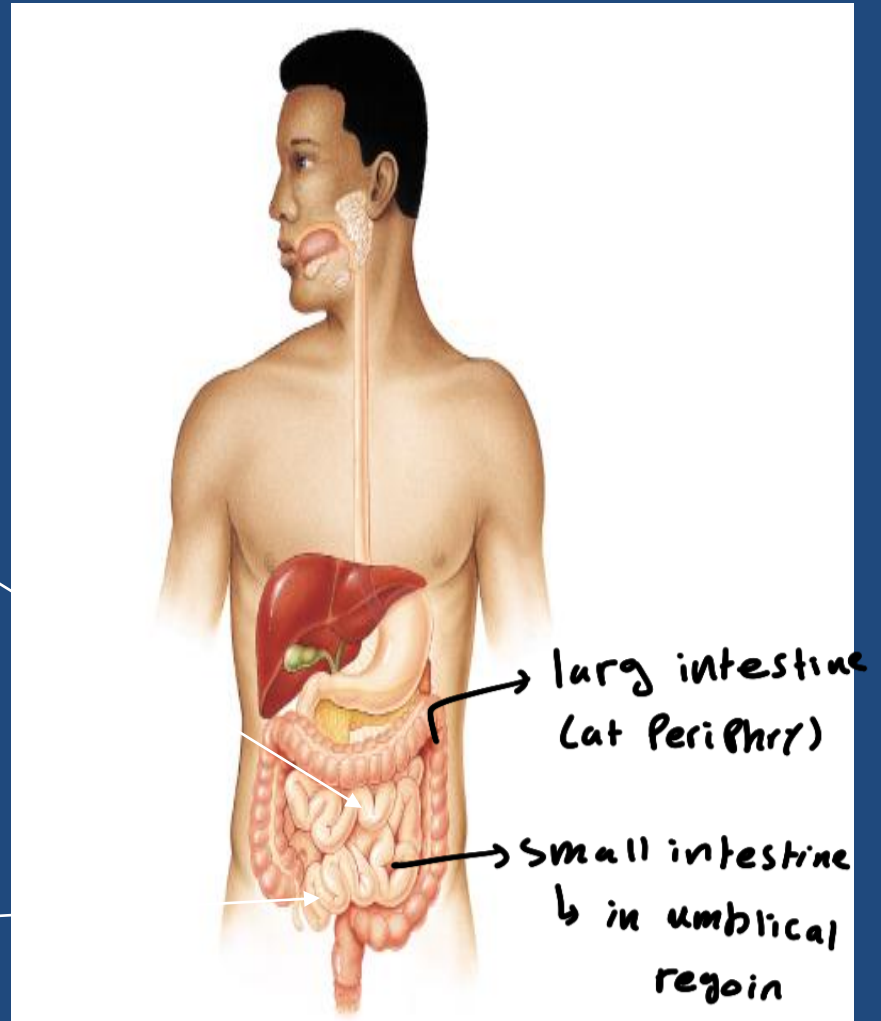
- The jejunum and ileum measure about 20 ft (6 m) long
- the upper two fifths is the jejunum & the lower 3/5 is the ileum There is no sharp demarcation
- Each has distinctive features
- there is a gradual change from one to the other
- The jejunum begins at the duodenojejunal flexure
- the ileum ends at the ileocecal junction. ileum ends as a cecum
- 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

ذكريات
أول
المعاصرة

SMALL INTESTINES ANATOMY

jejunum

ileum



Small Intestine

Stomach

Duodenum

Jejunum

**Ascending
colon**

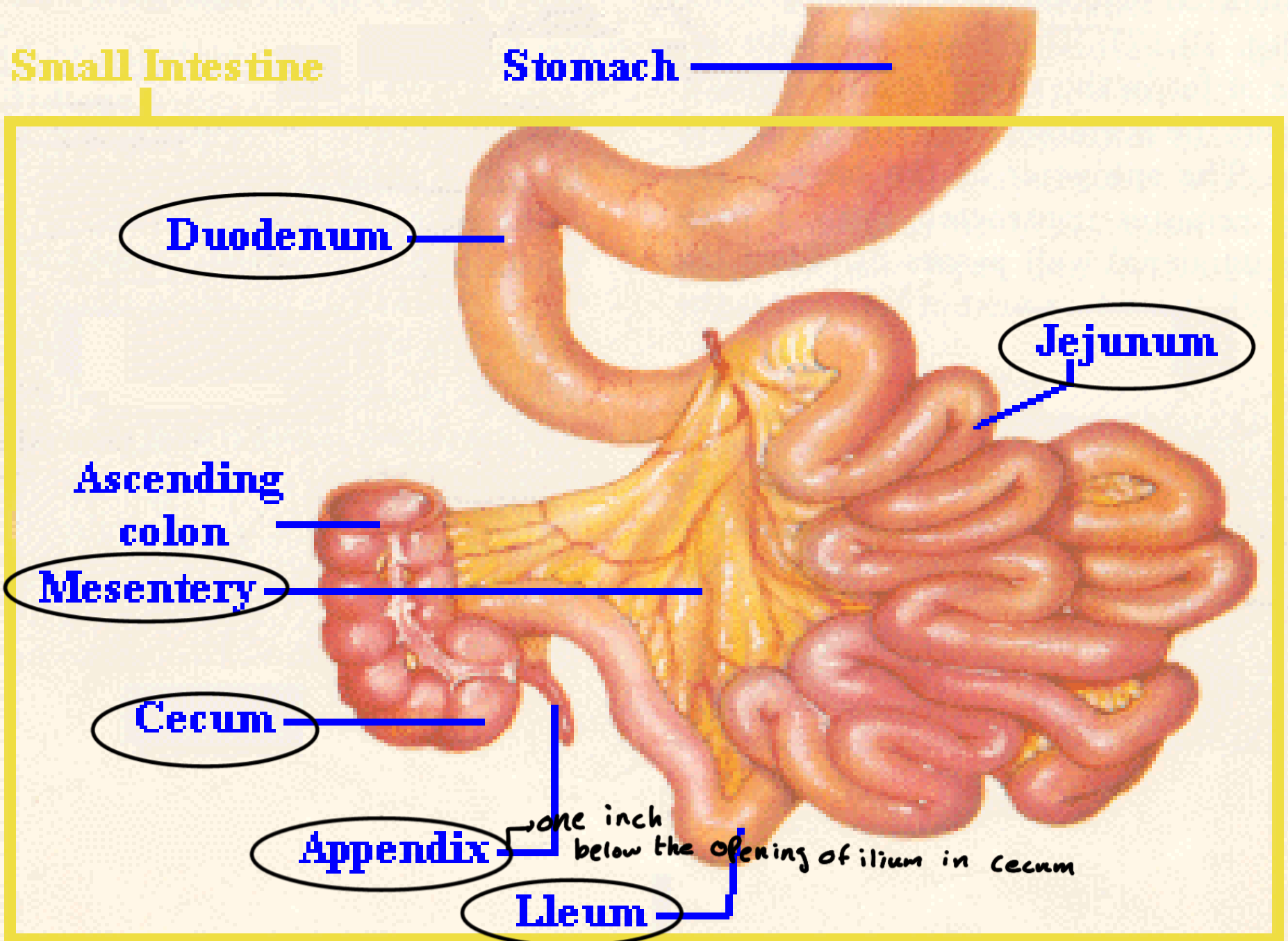
Mesentery

Cecum

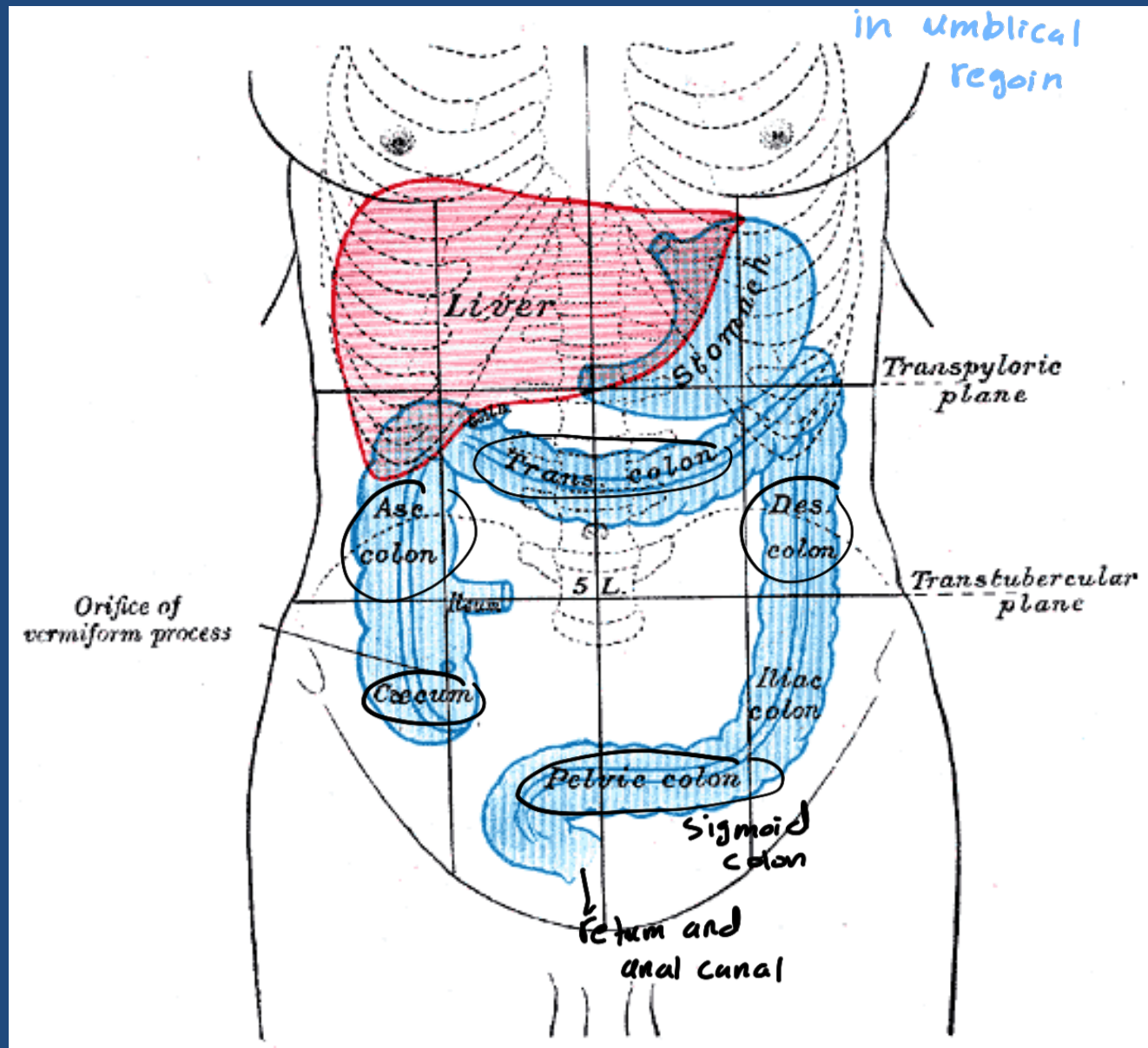
Appendix

Ileum

one inch
below the opening of ilium in cecum

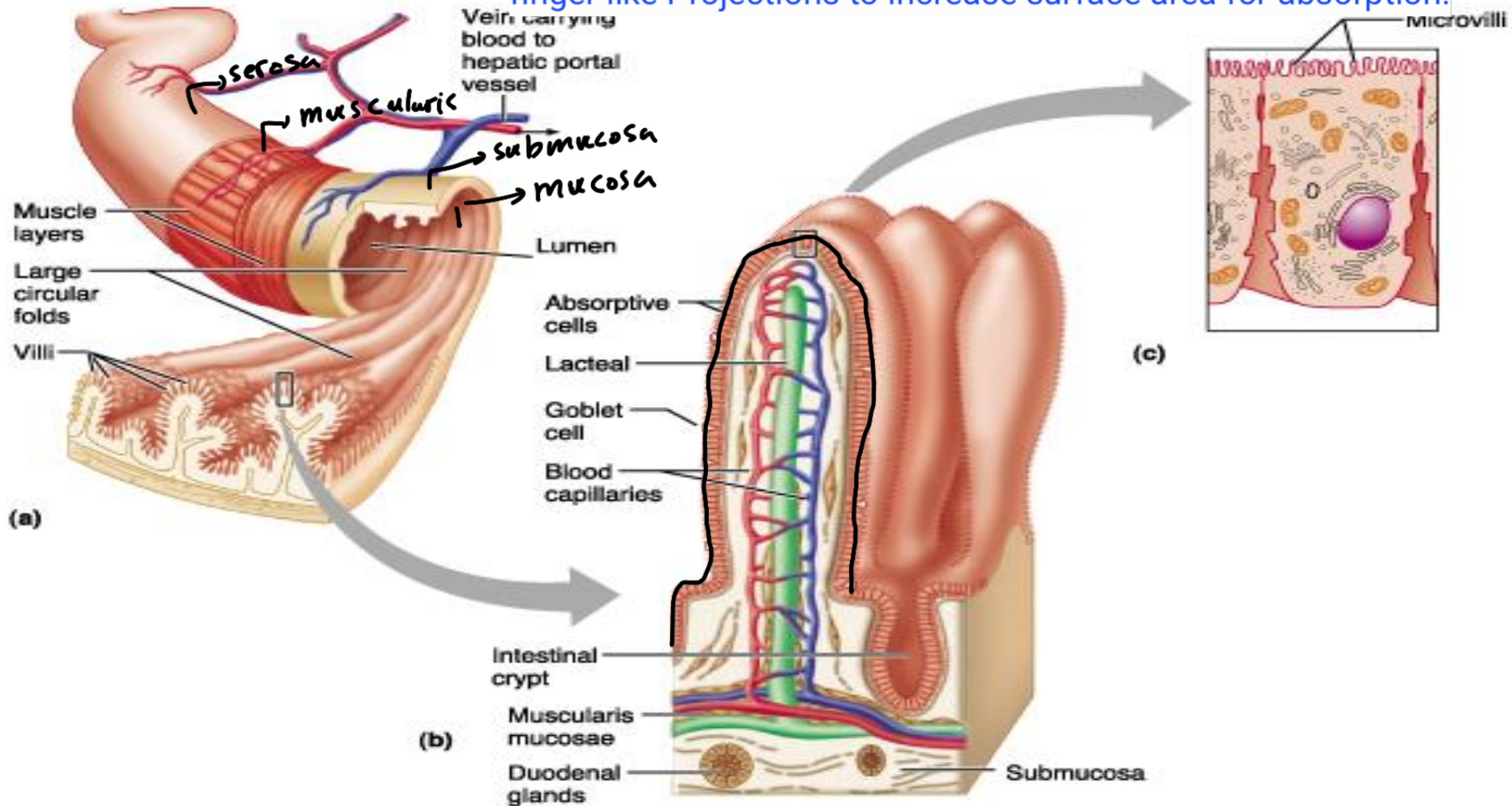


Anatomical position of small intestine



Structure of the Villi in the Small Intestine

finger like Projections to increase surface area for absorption.



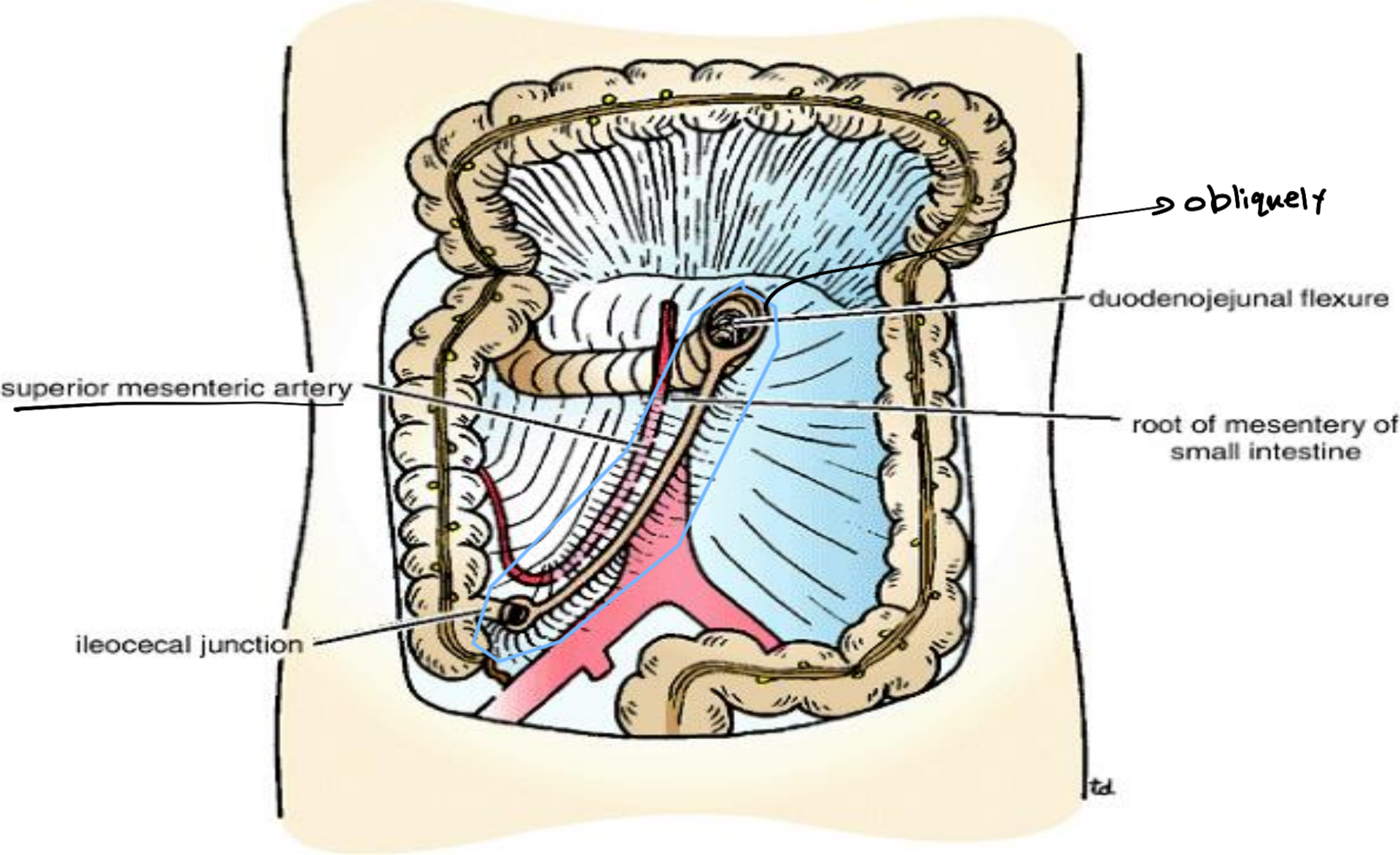
mesentery of the small intestine

It contains blood vessels (superior mesenteric artery and vein), nerve, lymph nodes and fat.

- 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

grossing all Posterior abdominal wall like right and left Psoas muscles, ureter, IVC and branches of vessels.

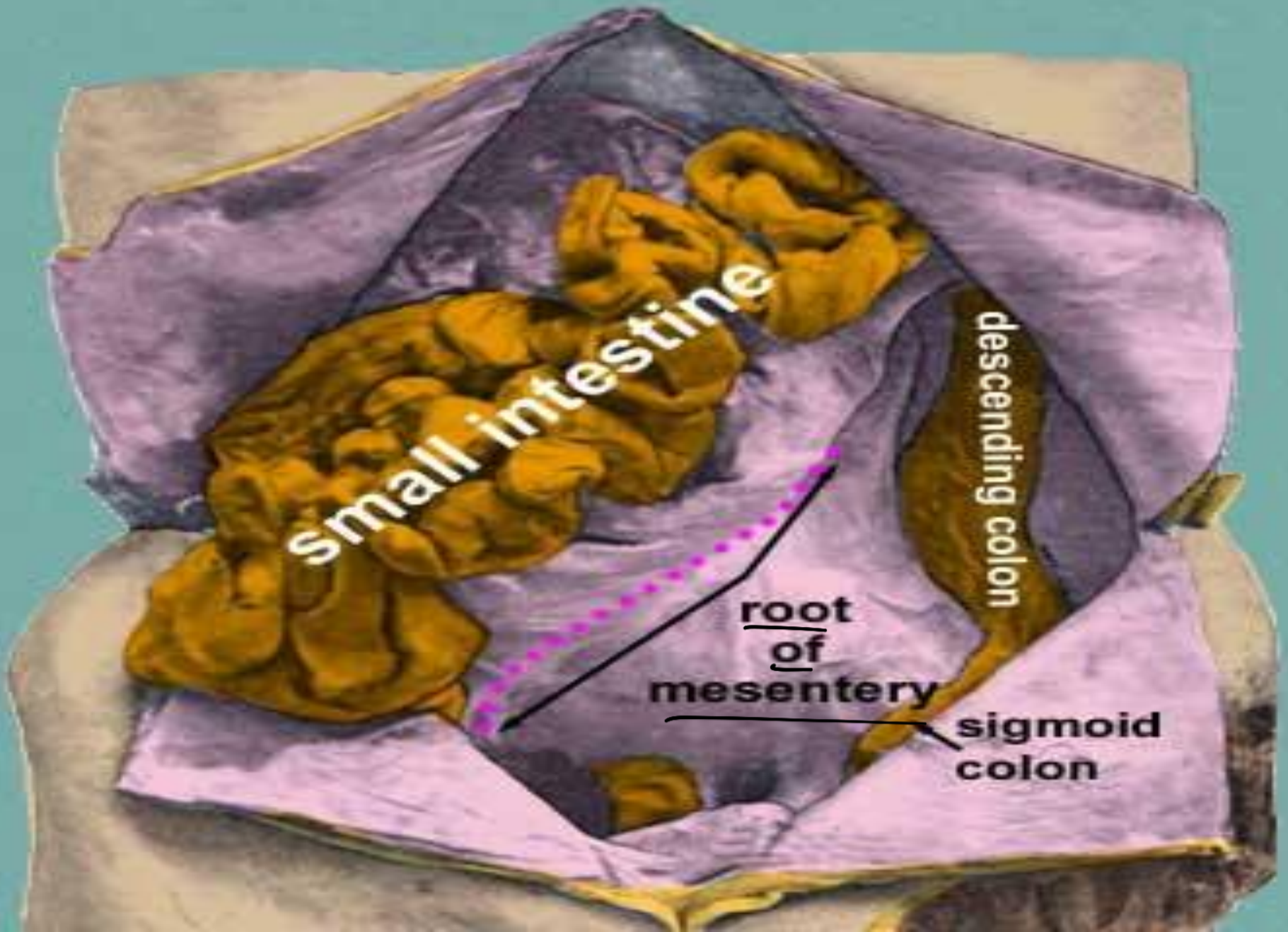


small intestine

descending colon

root
of
mesentery

sigmoid
colon



Contents of the mesentery

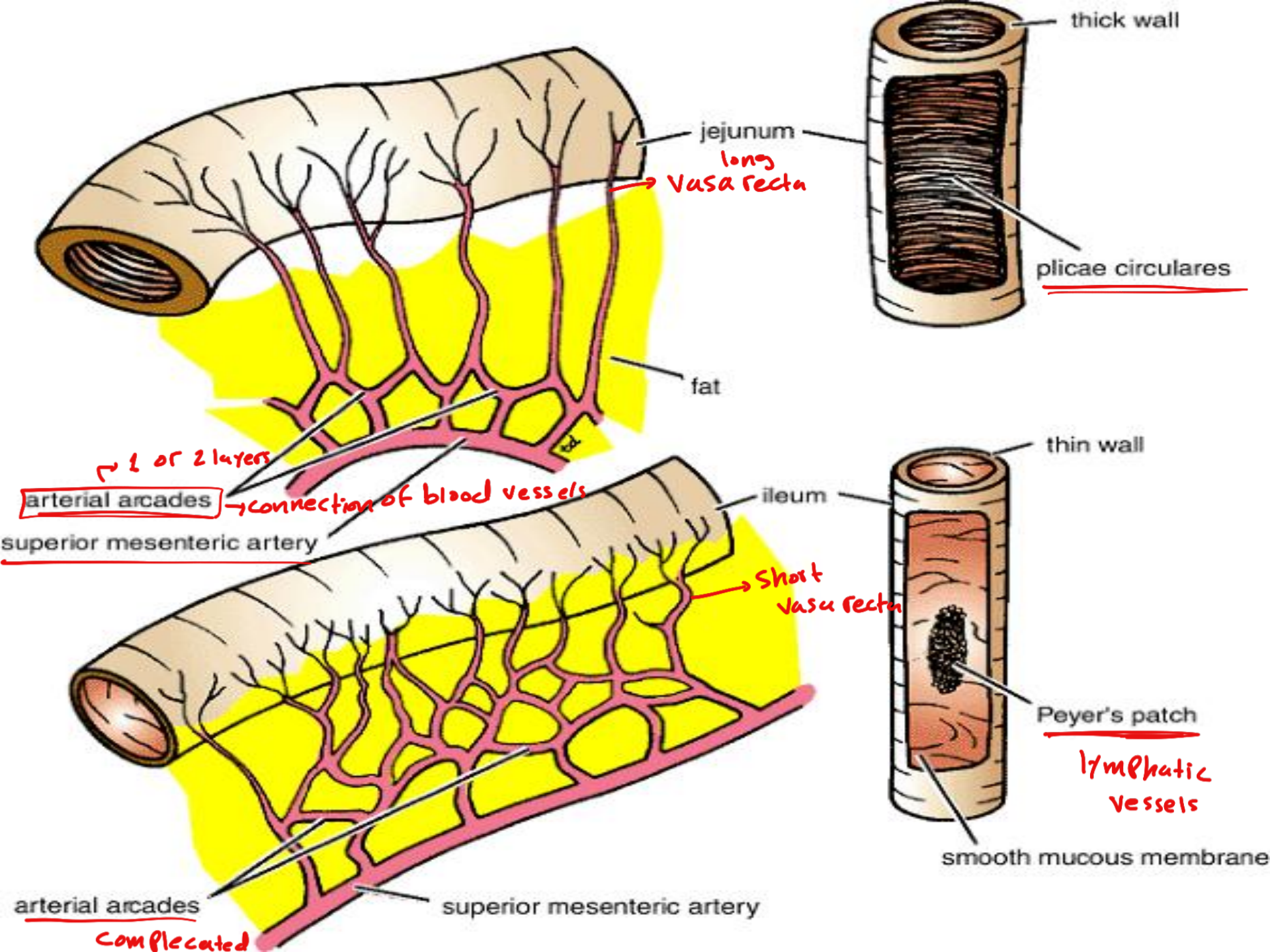
- The branches of the superior mesenteric artery and vein
- Lymphatic vessels & lymphatic nodes
- nerves

Difference between Jejunum & Ileum

	<u>jejunum</u>	<u>Ileum</u>
<u>length</u>	<u>Proximal 2/5</u>	<u>Distal 3/5</u>
<u>site</u>	in the <u>upper part of the</u> peritoneal cavity <u>below the left</u> side of the transverse mesocolon	in the <u>lower part of the cavity</u> and in the pelvis
<u>wall</u>	<u>thicker wall& redder</u>	<u>Thinner & less redder</u>
<u>Arcades in mesentery</u>	-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
<u>Fat in mesentery</u>	- the fat is deposited near the root - it is scanty near the intestinal wall - Less in amount → appear <u>window</u>	- the fat is deposited throughout mesentery - Big amount - <u>No window appear</u>

Difference between Jejunum & Ileum

	jejunum	Ileum
<u>Diameter</u>	<u>wider</u>	<u>smaller</u>
<u>villi</u>	<u>numerous</u>	<u>Less numerous</u>
<u>Plicae circularis</u> (the permanent enfolding of the mucous membrane& submucosa مميزات jejunum	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 .
<u>Lymphatic follicles</u>	<u>No or few</u>	Aggregations of lymphoid tissue (<u>Peyer's patches</u>) are present in the mucous membrane

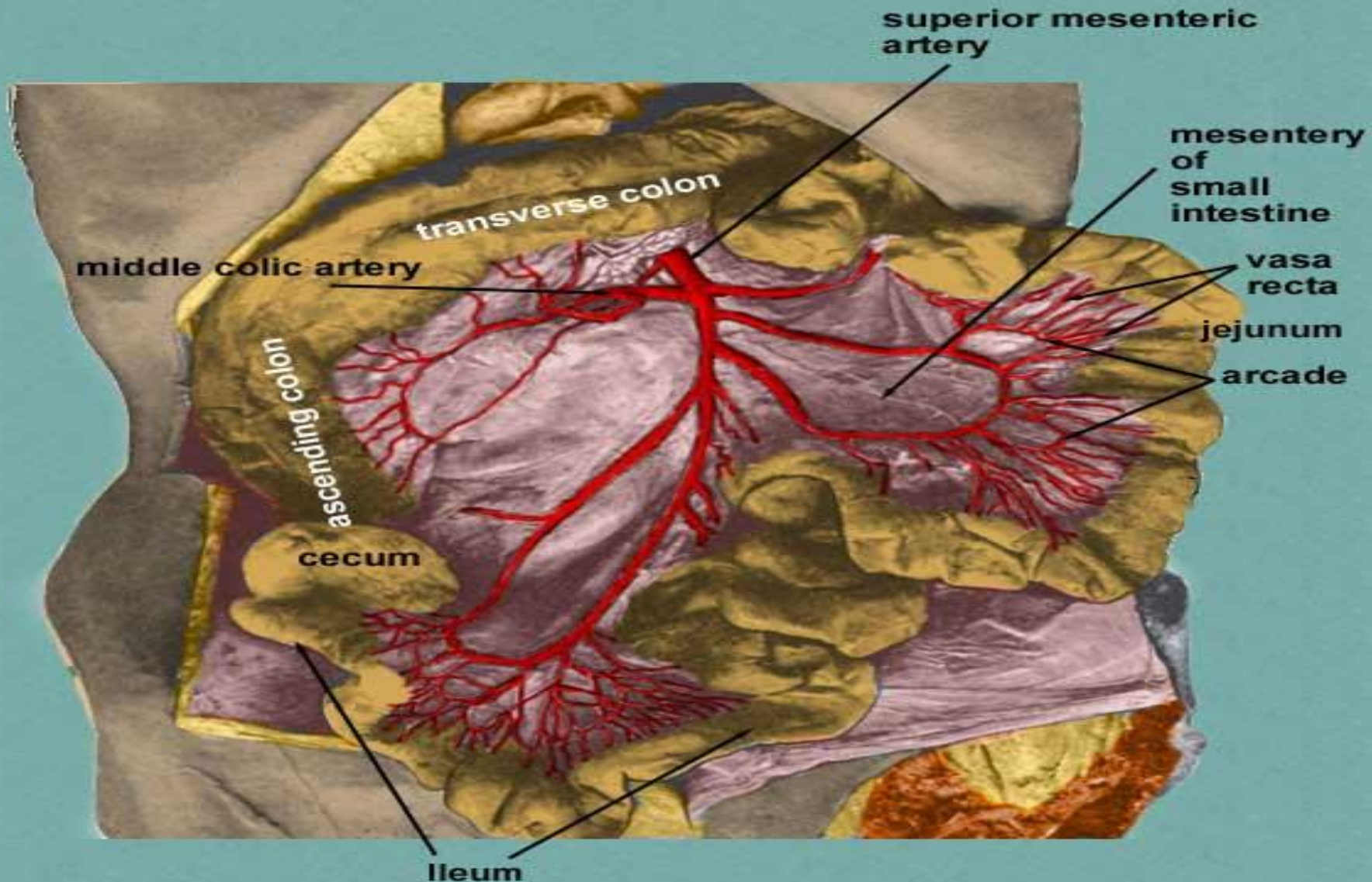


Blood supply of Jejunum & Ileum

Arteries:

- The arterial supply is from branches of the **superior mesenteric artery** . *through arcades and vasa recta*
- 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



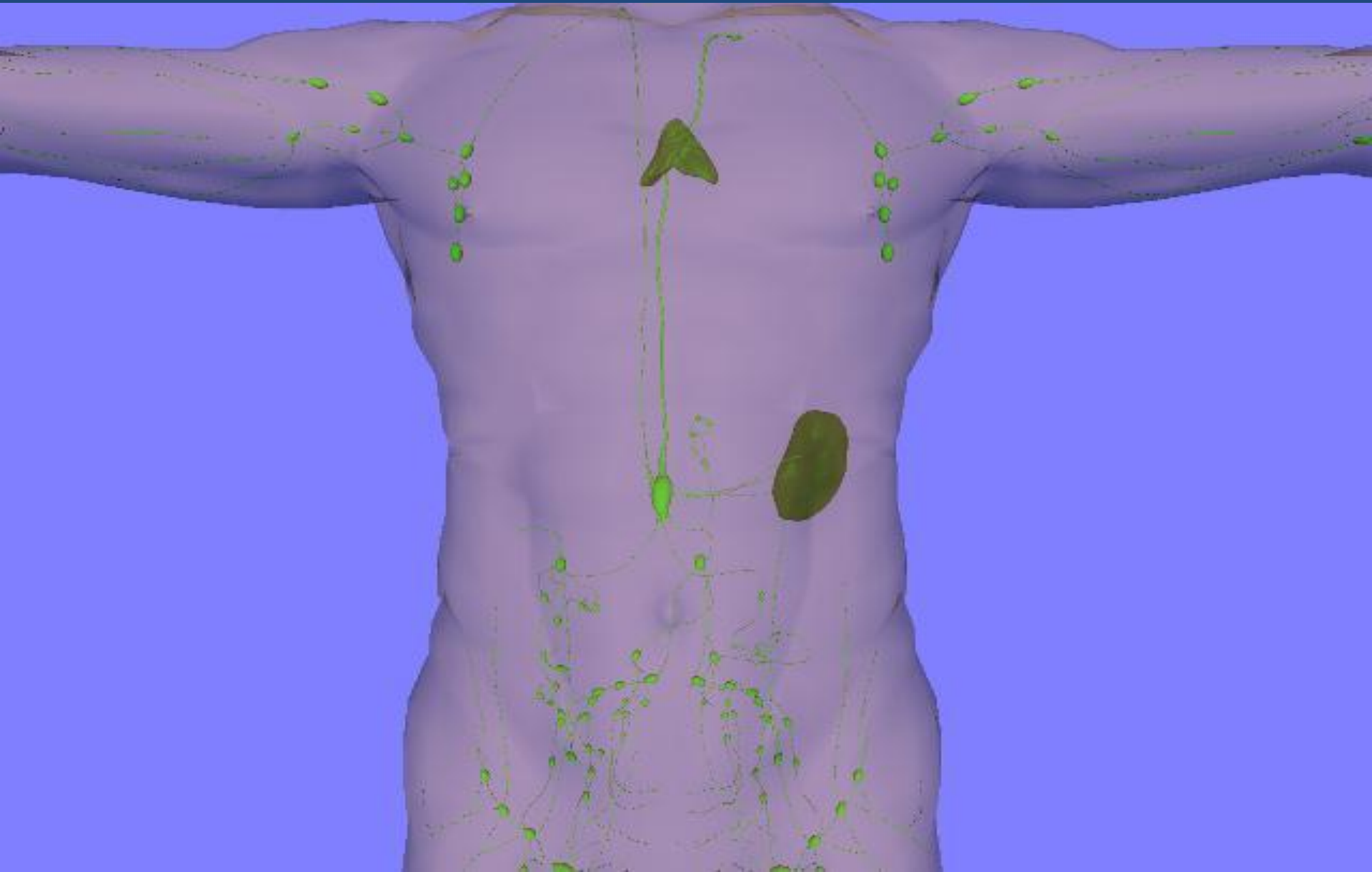
Veins:

- The veins correspond to the branches of the superior mesenteric artery
- Drain into the superior mesenteric vein → Portal vein
↓
liver

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.

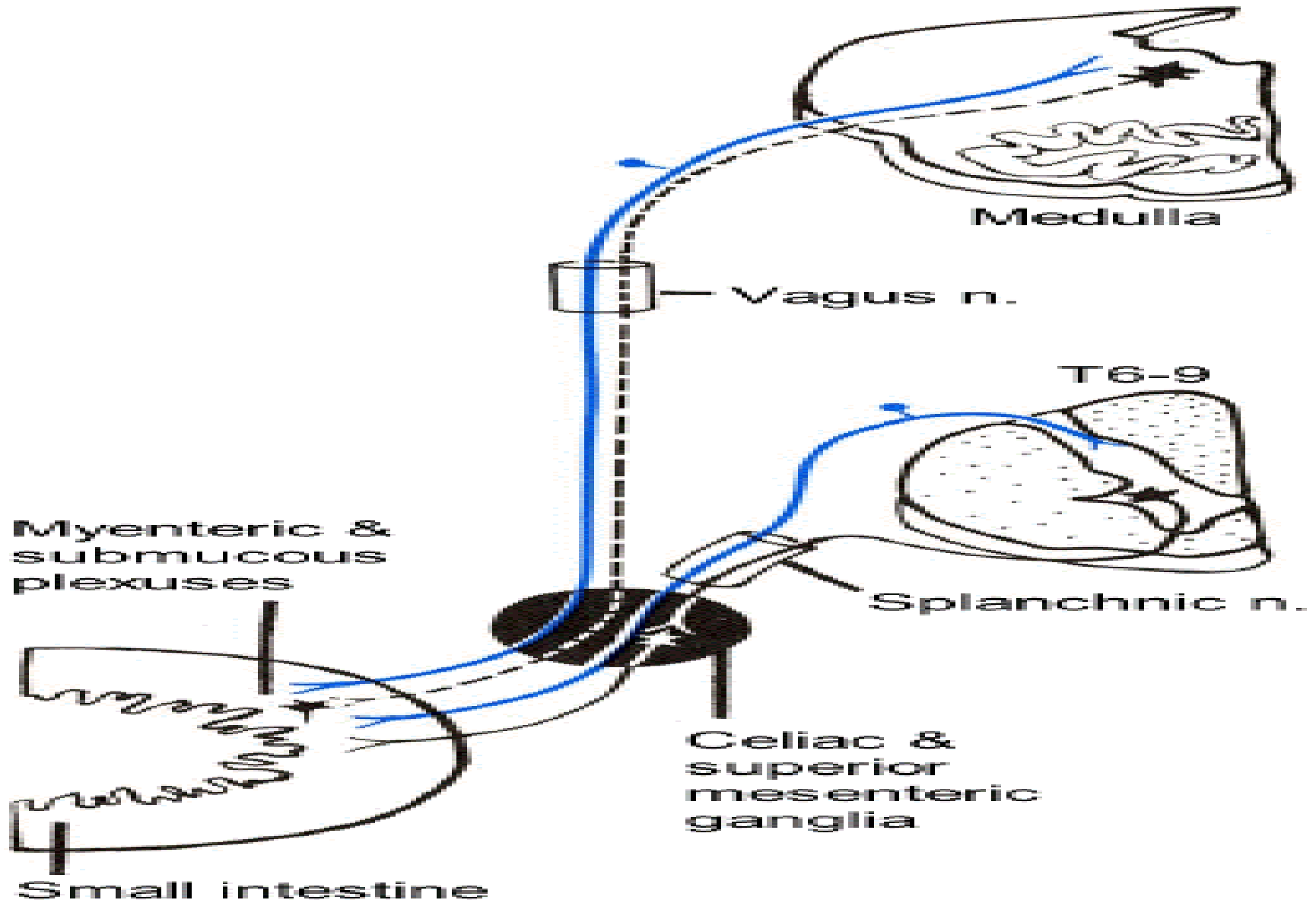
Lymph Drainage of jejunum & ileum



Nerve Supply of jejunum & Ileum

- The nerves are derived from the sympathetic ^{→ celiac ganglia} and parasympathetic (vagus)
- Nerves from the superior mesenteric plexus.

Nerve supply for small intestine



We will talk about it in embryology

Congenital anomaly of small intestine

Meckel's Diverticulum:

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

Meckel's Diverticulum

