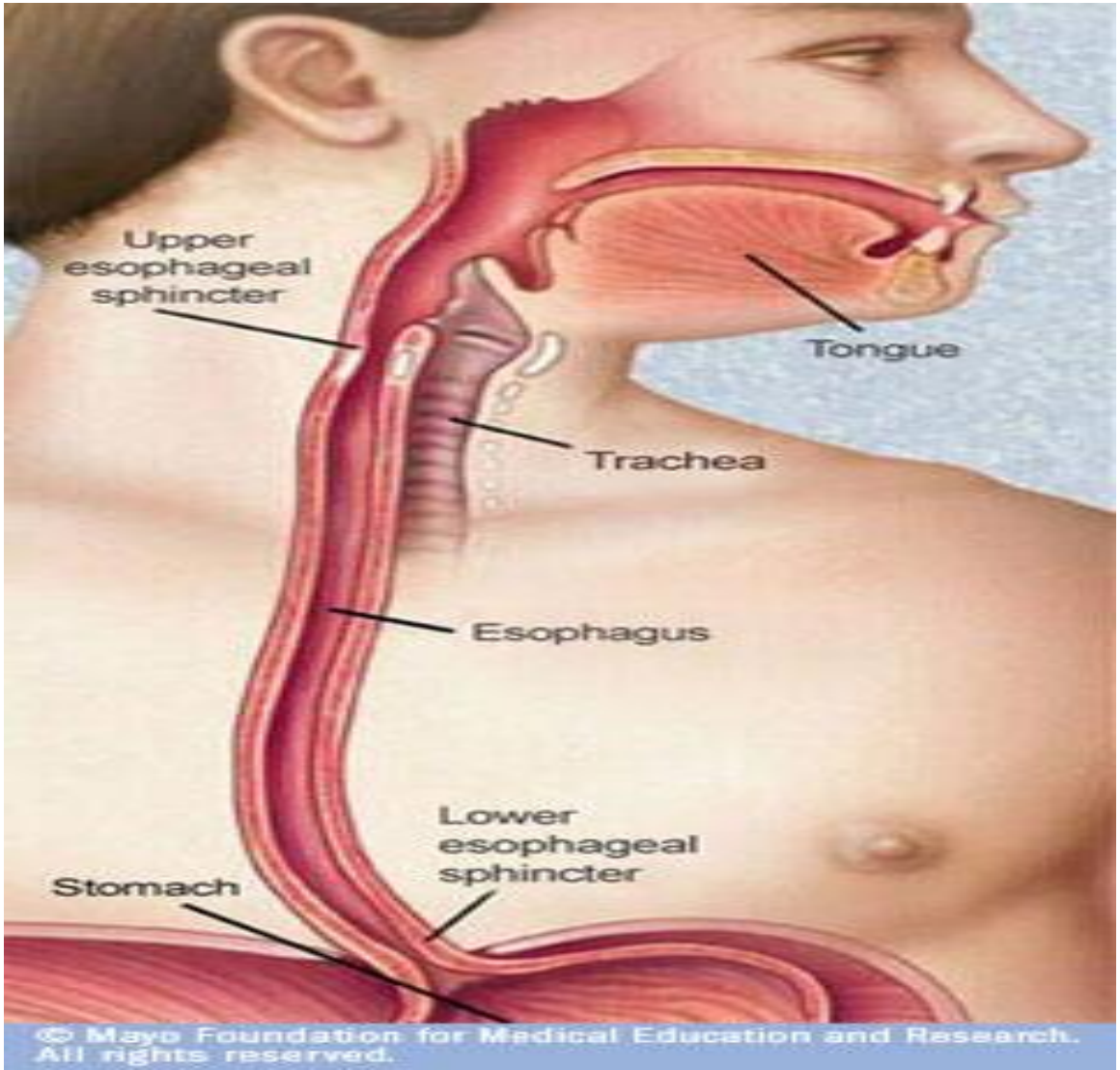
Anatomy Of Esophagus



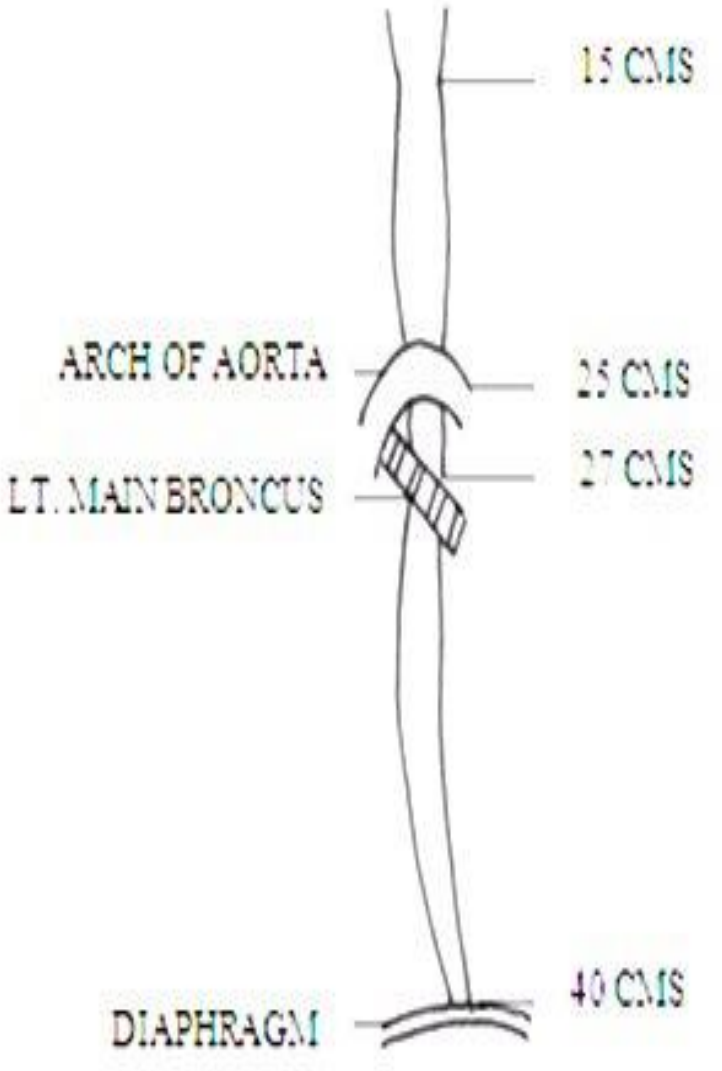
Oesophagus

- A muscular tube; 25 cm in length connecting pharynx to stomach.
- Guarded at both ends by sphincters.
  - Collapsed at rest,
  - Flat in upper 2/3 & rounded in lower 1/3

- Commences at the lower border of the cricoid cartilage.(C6).

- Descends along the front of the spine, through the posterior to trachea and the mediastinum, passes through the Diaphragm, and, entering the abdomen, terminates at the cardiac orifice of the stomach, opposite the eleventh dorsal vertebra.
- In the newborn **Upper limit** at the level of 4th or 5th CerVertb and it ends at 9th Dorsal .
  there are three parts of the esophagus: cervical, thoracic and abdominal esophagus

- Oesophagus is the narrowest region of alimentary tract except vermiform appendix. During its course it has three indentations:
  - **At 15 cm** from incisor teeth is **crico-pharyngues sphincter** (normally closed (UES)
  - **At 25 cm** aortic arch and left main bronchus
  - **At 40 cms** where it pierces the diaphrag where a physiological sphincter is sited (LES)



The two sphincters are at the pharyngo-oesophageal junction (upper) & in the region of the oesophageal opening (hiatus) in the diaphragm.

Both have intrinsic & extrinsic components.

Upper intrinsic sphincter

The main function of preventing access of air to the oesophagus & working in conjunction with laryngeal closure during swallowing.

It relaxes on initiation of the swallowing reflex

The superior constrictor extrinsic component contracts to expel food or liquid into oesophagus where a wave of peristalsis carries it downwards

Lower intrinsic sphincter is the circular smooth muscle of the oesophagus.
Its role is to prevent GE regurgitation & it is normally closed but relaxes in response to the swallowing wave.

The intrinsic sphincter is supplemented by the striated muscle of the right crus, which splits to embrace the lower end of the oesophagus (keeping GEJ closed when intra-abdominal pressure is significantly increased).

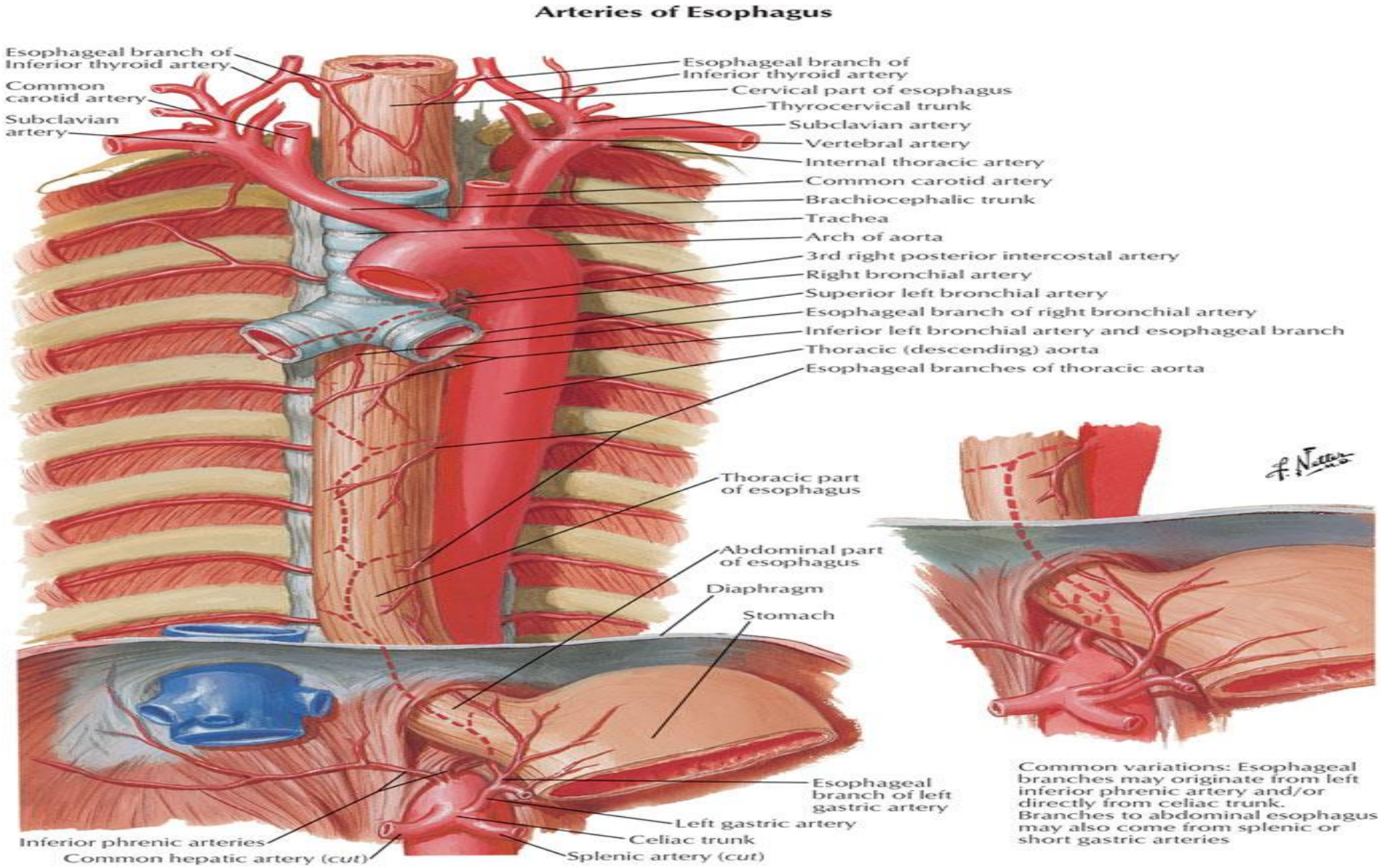
Another factor which prevents reflux from the stomach is the acute angle of insertion of the oesophagus into the stomach which brings the gastric and oesophageal walls in contact when intra-abdominal pressure rises.

Anatomical disorders at the diaphragmatic hiatus reduce the efficacy of the intrinsic sphincter

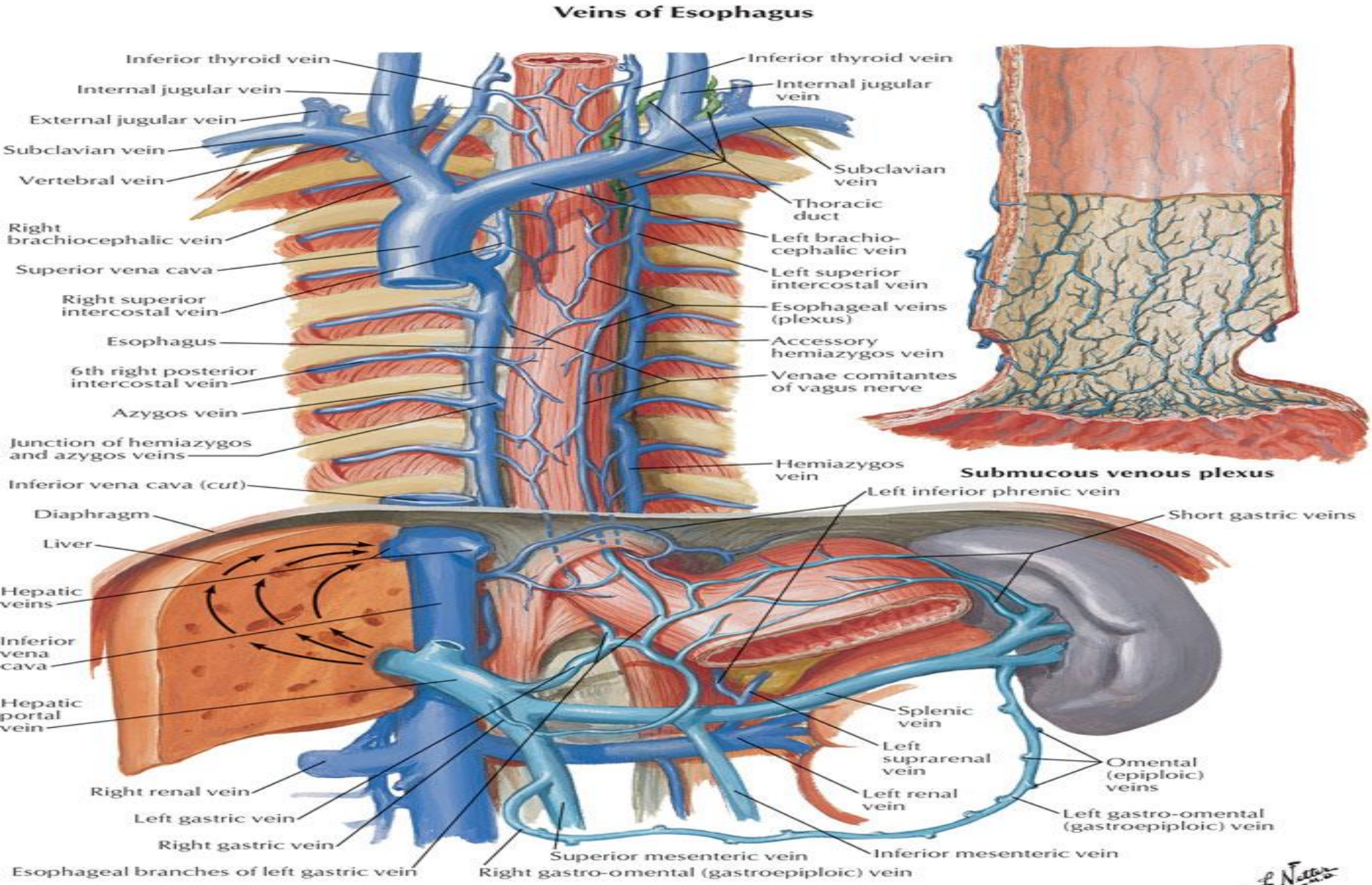
Anatomy of esophagus

- It consists of three layers :
  - mucosa,
  - submucosa
  - muscular layer (circular and longitudinal layer)
- arterial blood supply from:
  - inferior thyroid artery
  - descending aorta
  - left gastric artery
  - inferior phrenic artery
- venous drainage into the superior caval vein portal vein

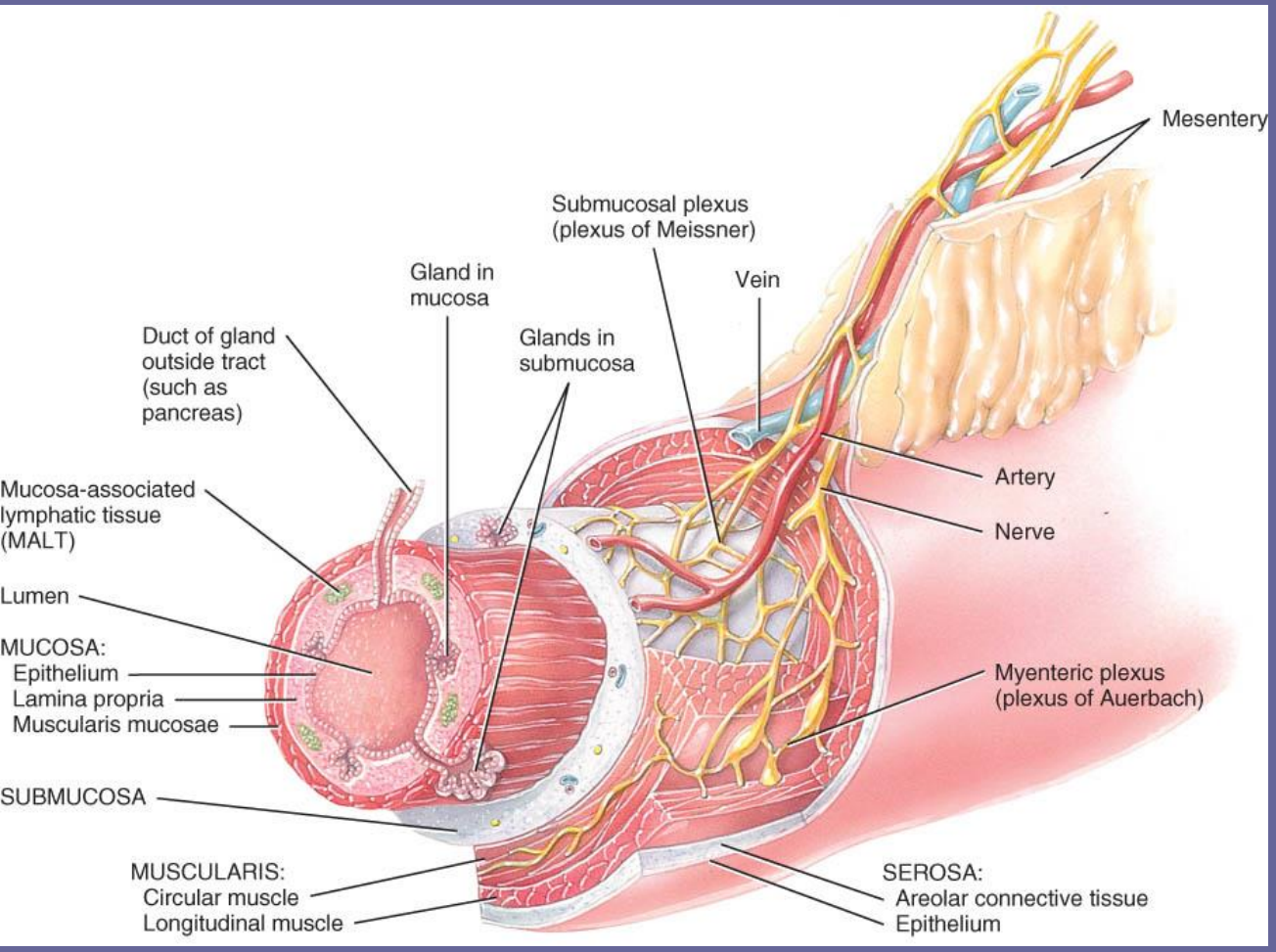
Anatomy Of Esophagus



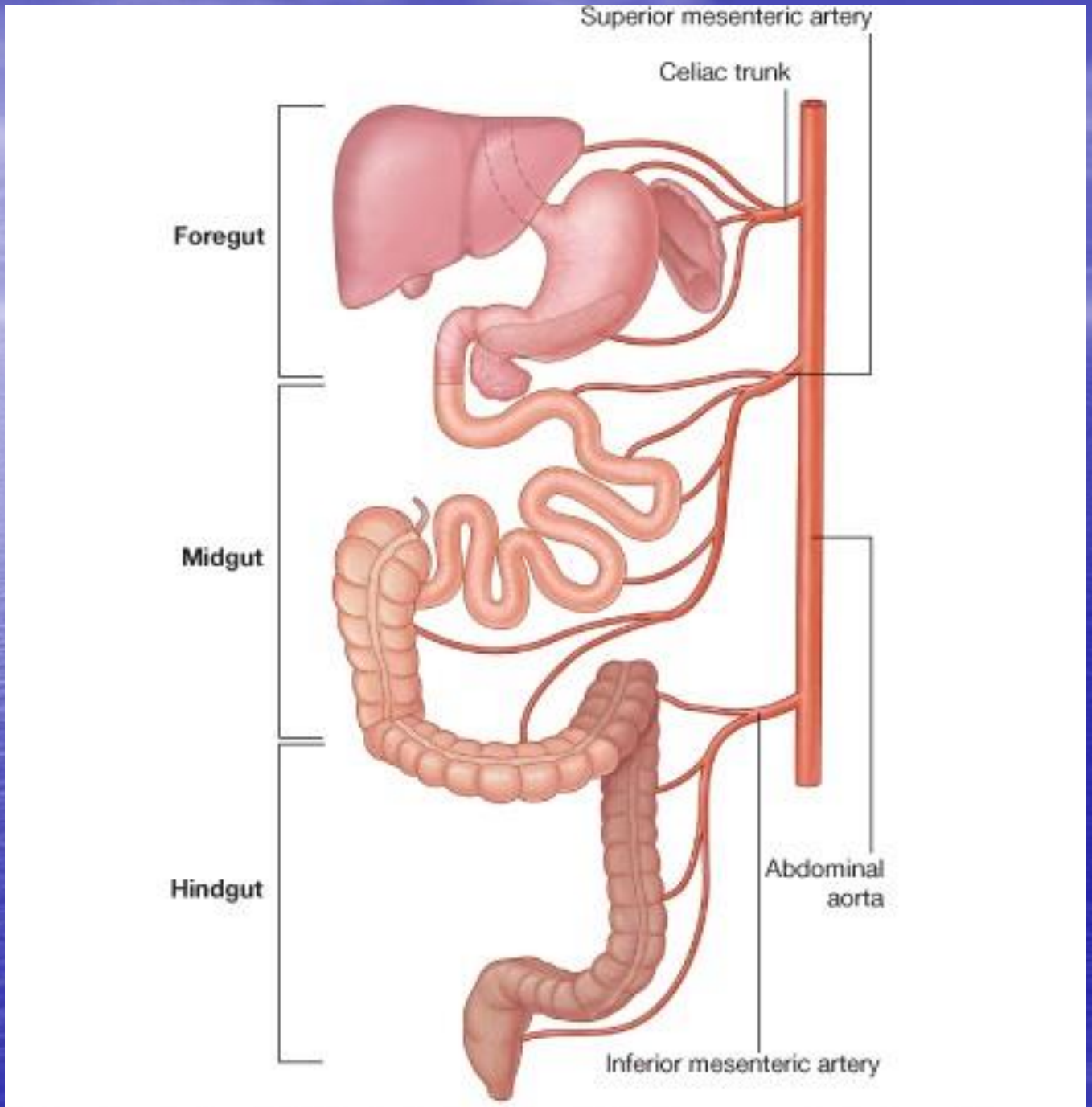
Anatomy Of Esophagus



Layers of the GI Tract

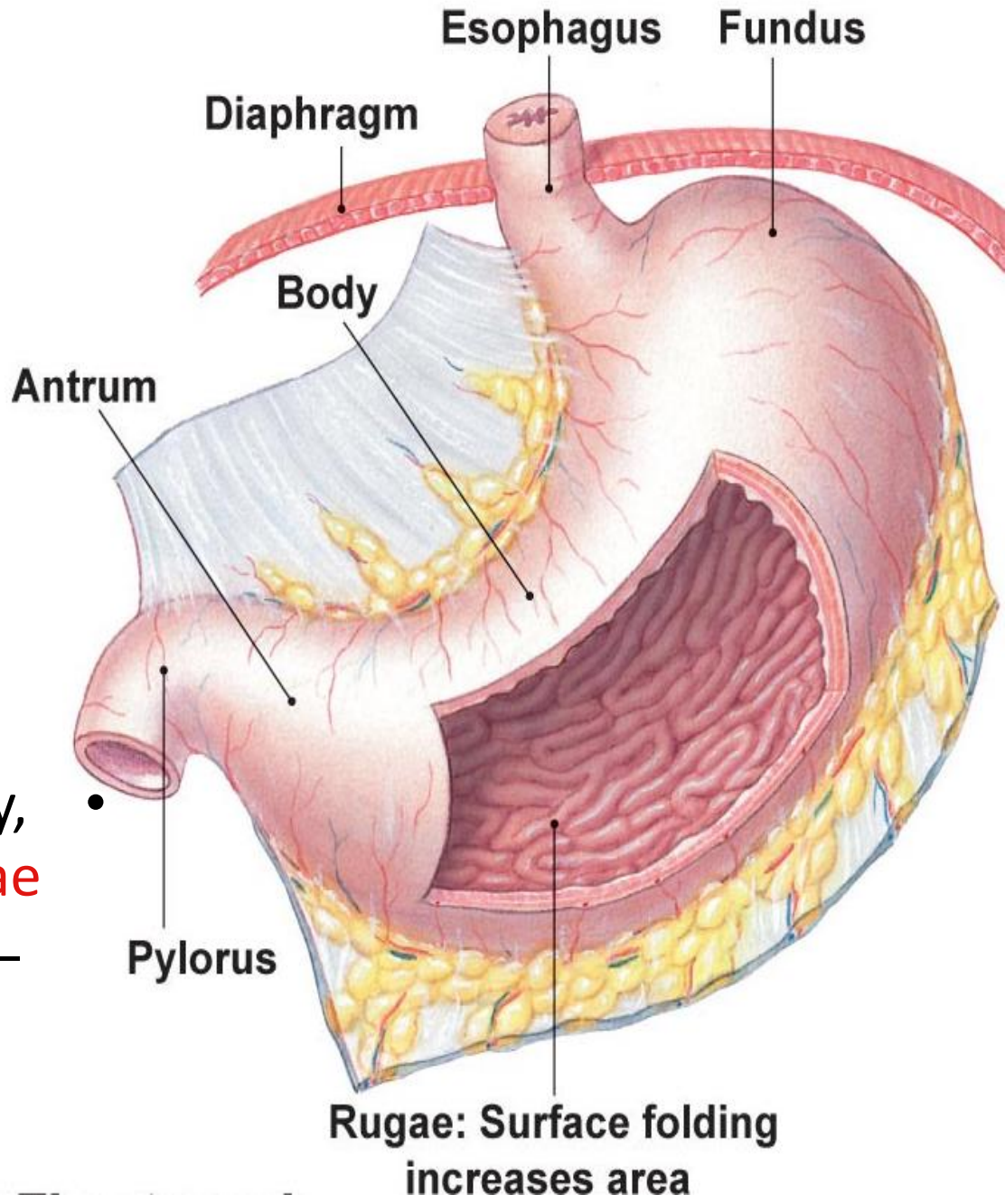


1. Mucosal layer
2. Submucosal layer
3. Muscularis layer
4. Serosa layer

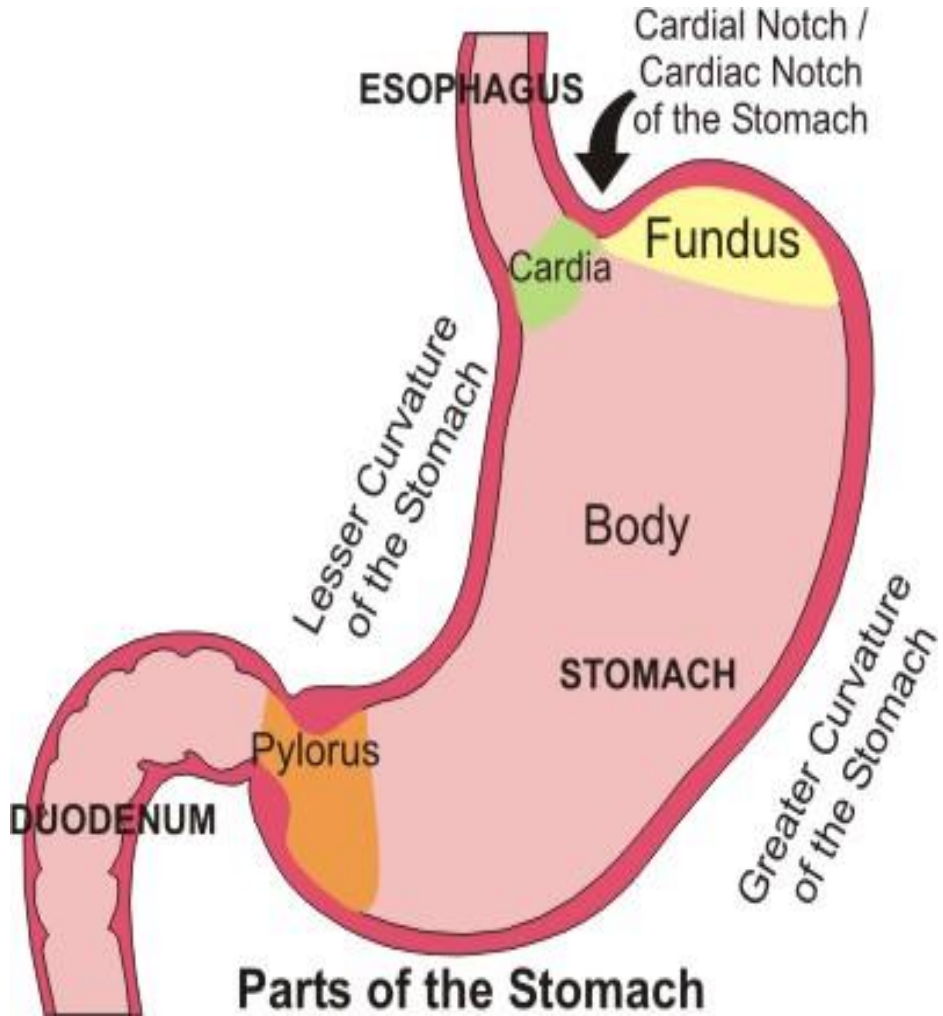


Stomach

- The stomach is divided into the 3 regions: the fundus, the body and the antrum and is able to hold up to **2 liters of** food and fluid when completely filled
- When the stomach is empty, the mucosa folds into rugae when filled, the expanded – wall of the stomach causes these folds to disappear (flatten)



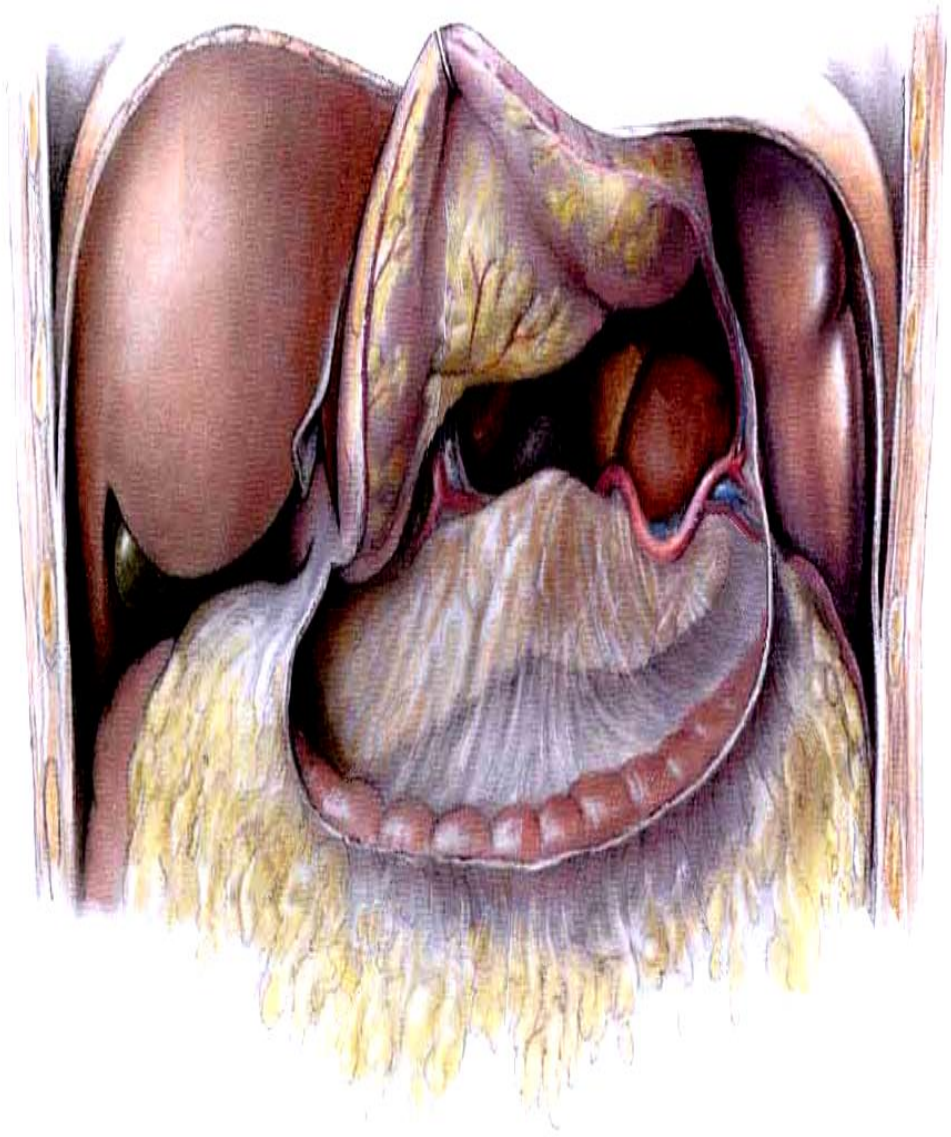
Anatomically, the stomach is divided into



- cardiac part,
- fundus,
- body
- pyloric part (pyloric antrum and pyloric canal)

Relations of the stomach

- **Anteriorly**:
  - Live (right part)
  - Diaphragm (left upper part)
  - Anterior abdominal wall (left lower part)
- **Posteriorly**—separated by peritoneum of lesser sac from the following ("**stomach-bed**")
  - Pancreas
  - Left suprarenal gland
  - Left kidney
  - Spleen
  - Transverse colon and transverse mesocolon



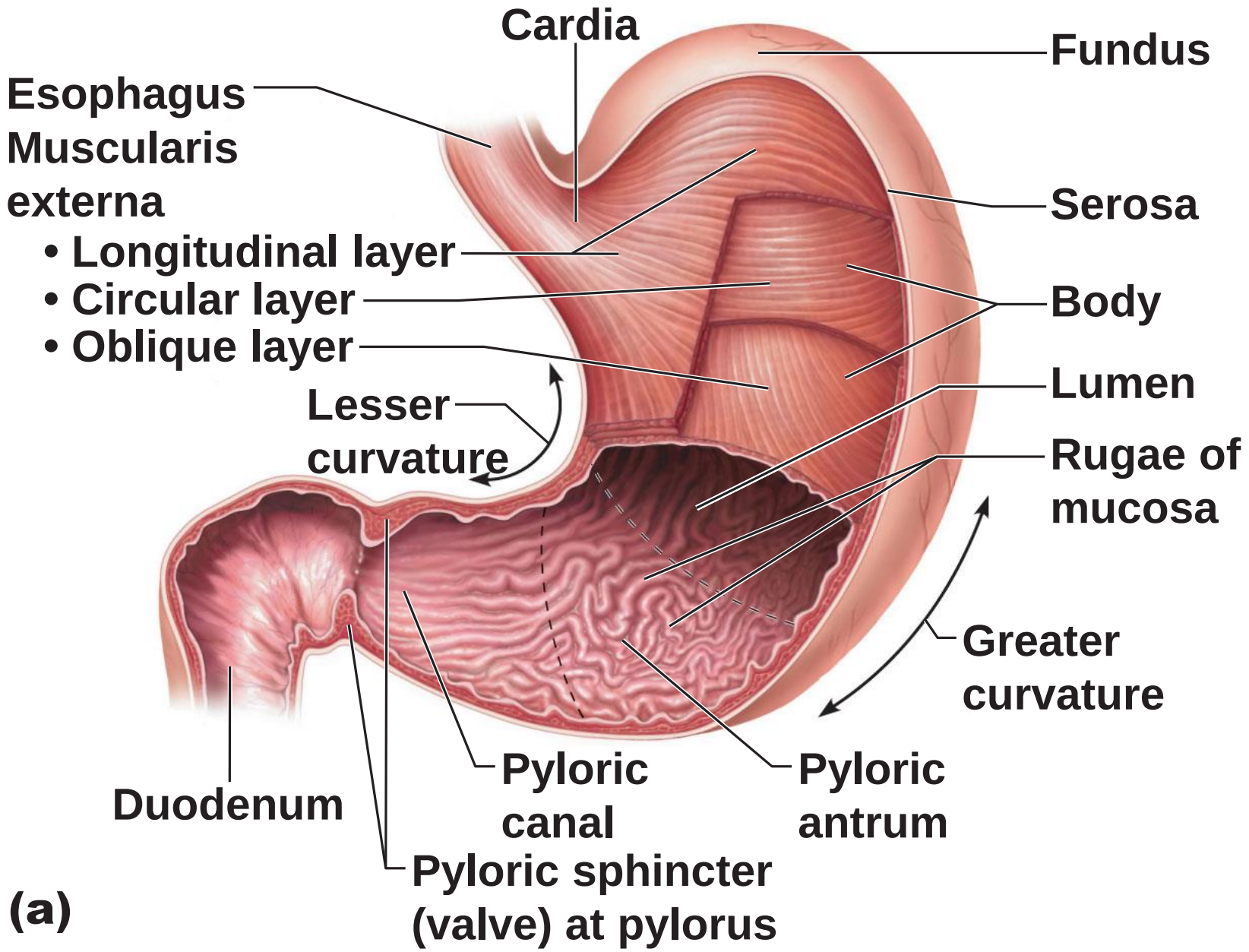
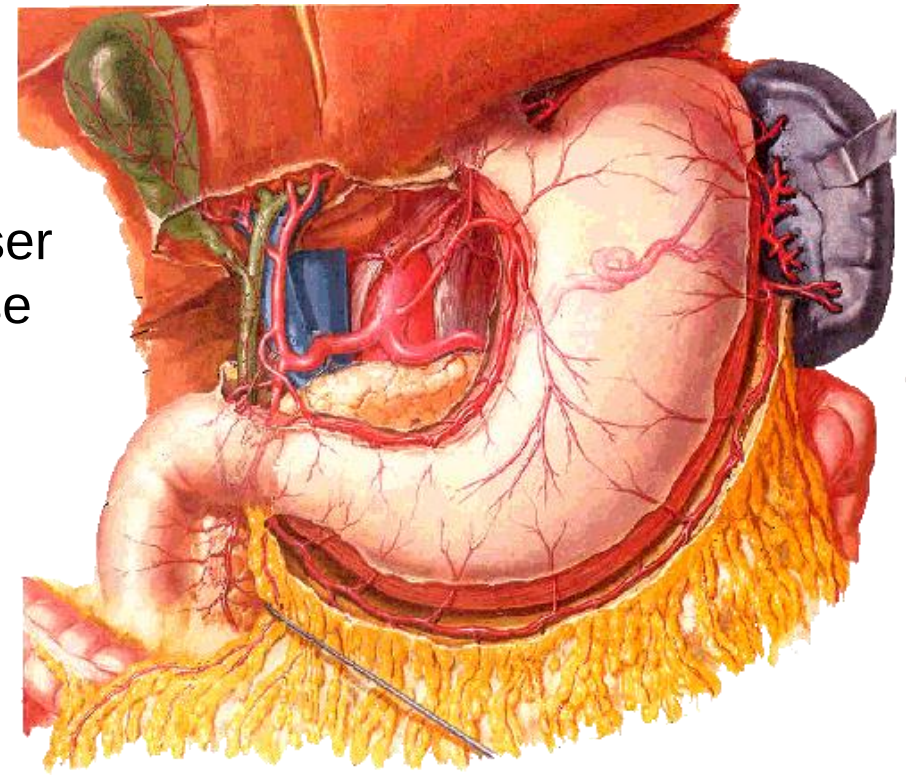


Figure 23.14a

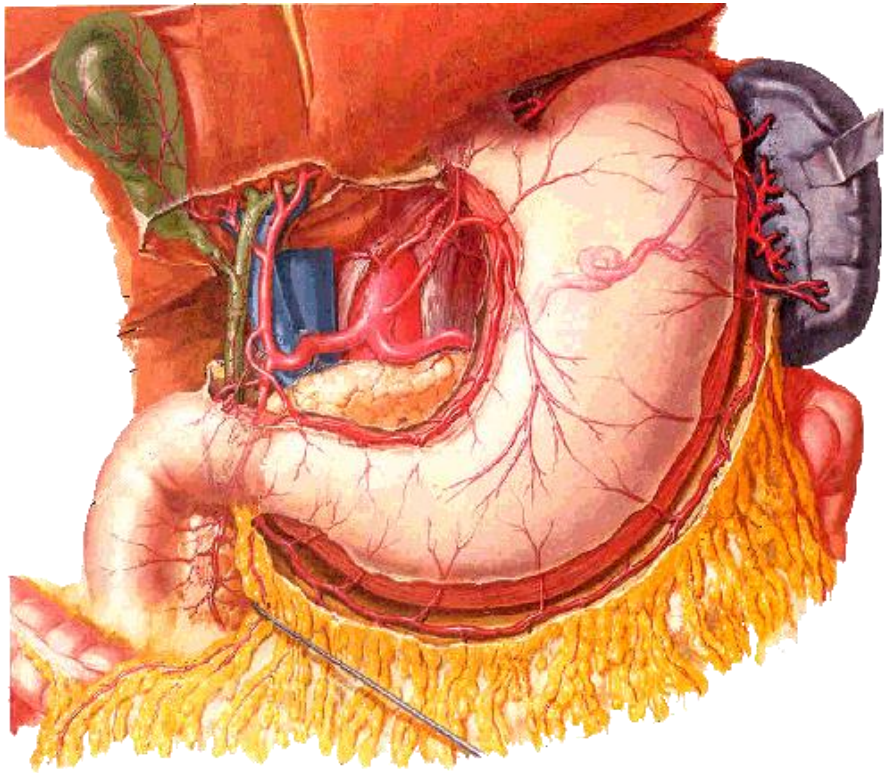
Arteries of stomach

- **Left** and **right gastric arteries**
  - Arise from celiac trunk and proper hepatic artery, respectively.
  - These two vessels run in lesser omentum along lesser curvature , and anastomose end-to-end.



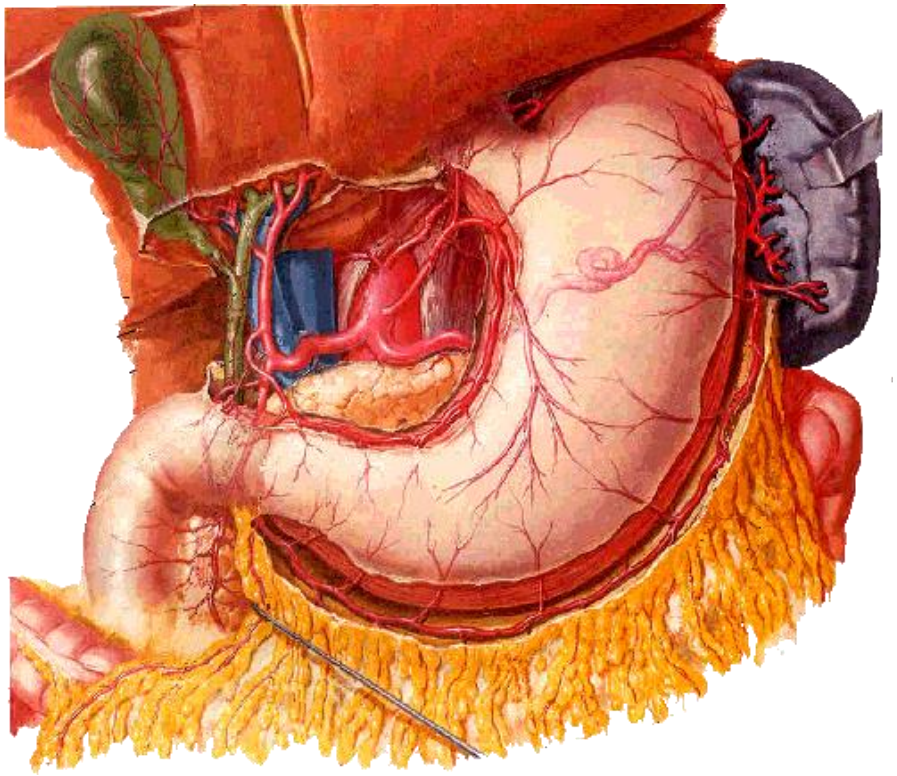
Arteries of stomach

- **Right** and **left gastroepiploic arteries**
  - Arise from the gastroduodenal and splenic artery, respectively.
  - These two vessels pass into the greater omentum, run parallel to the greater curvature, and anastomose end-to-end.



Arteries of stomach

- **Short gastric arteries**
  - Branches of splenic artery
  - Course through the gastrosplenic ligament
  - Supply the fundus of stomach.
- **Posterior gastric artery** (72%)
  - Arise from the splenic artery
  - Course through the gastrophrenic ligament and supply the posterior wall of fundus of stomach.



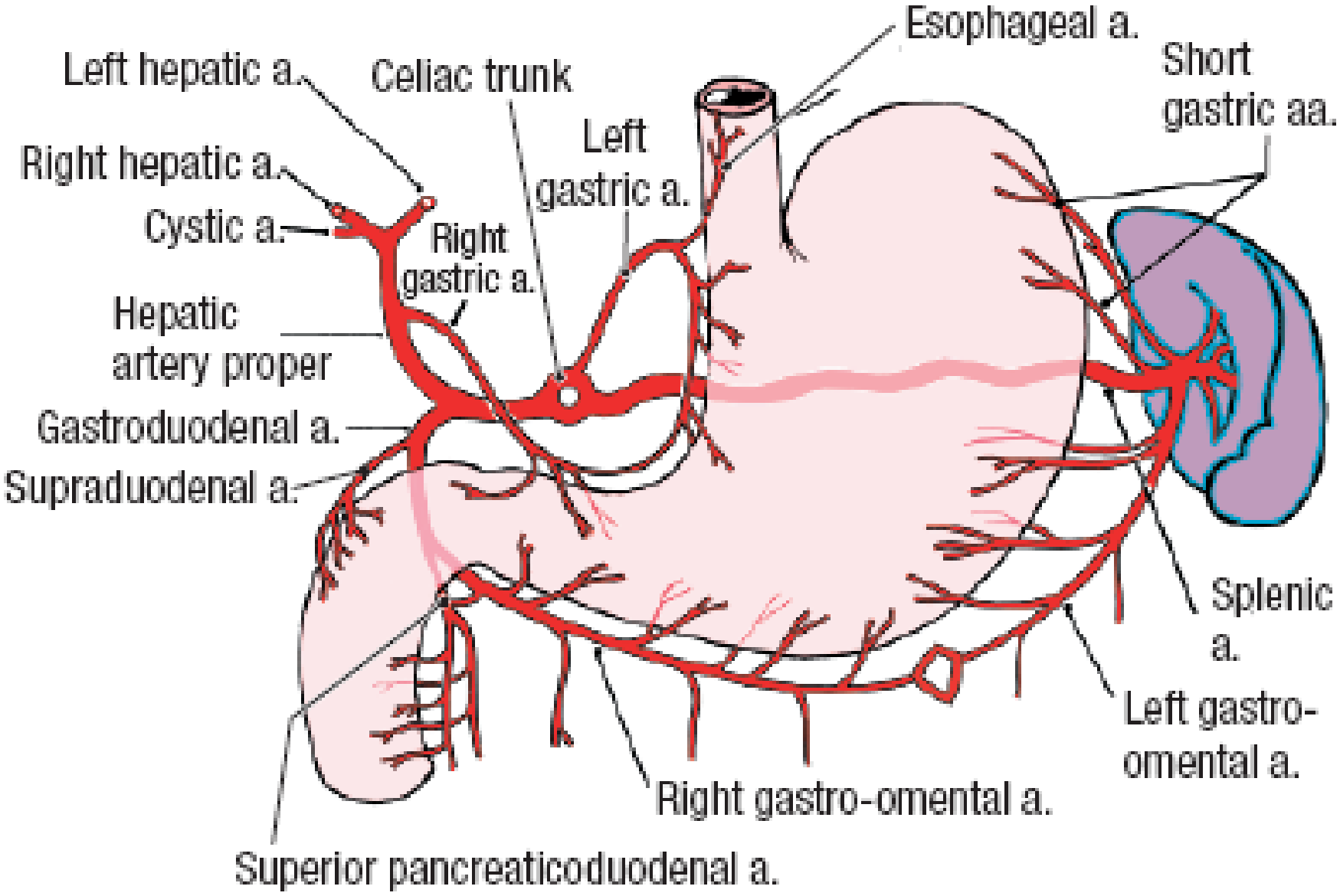
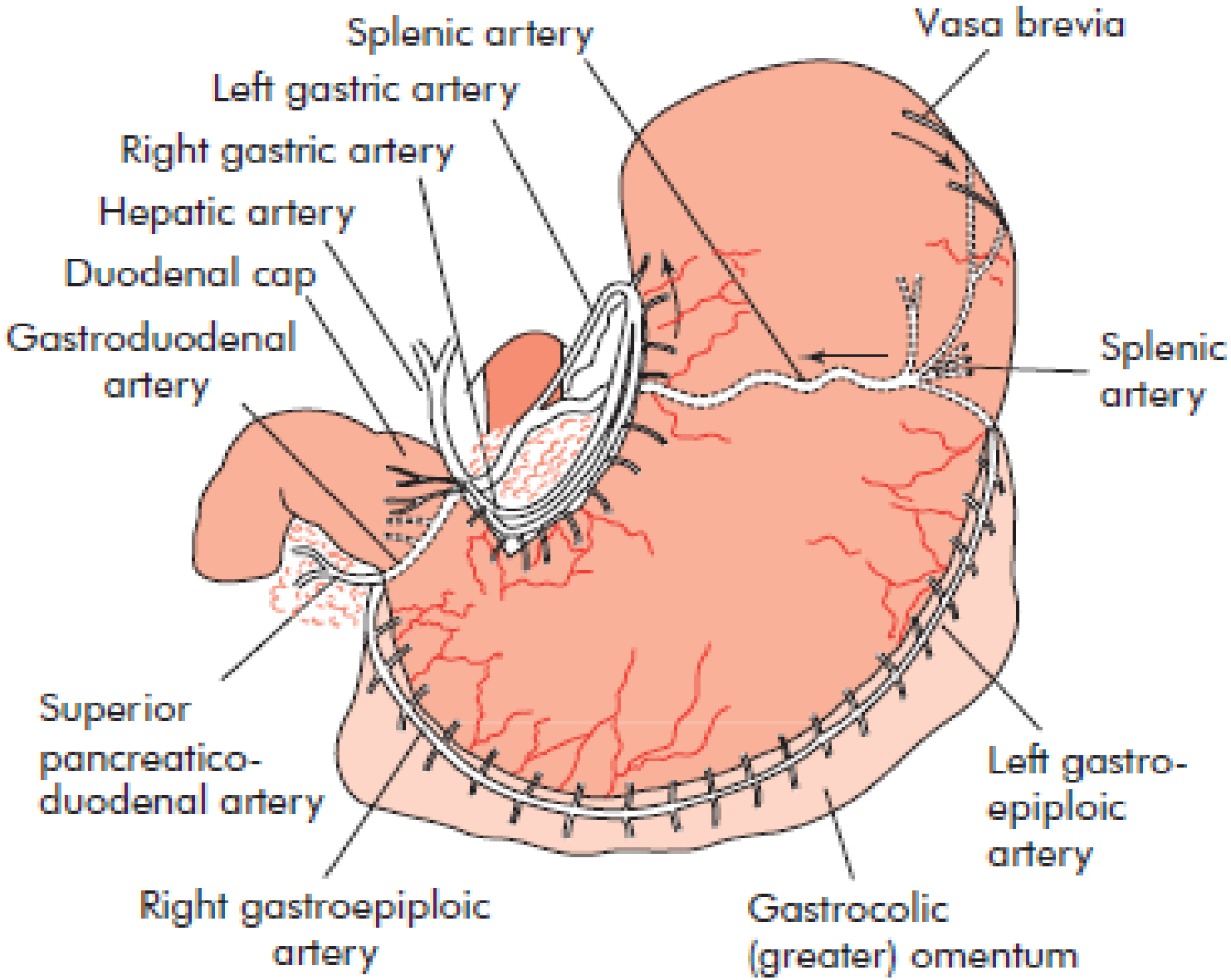
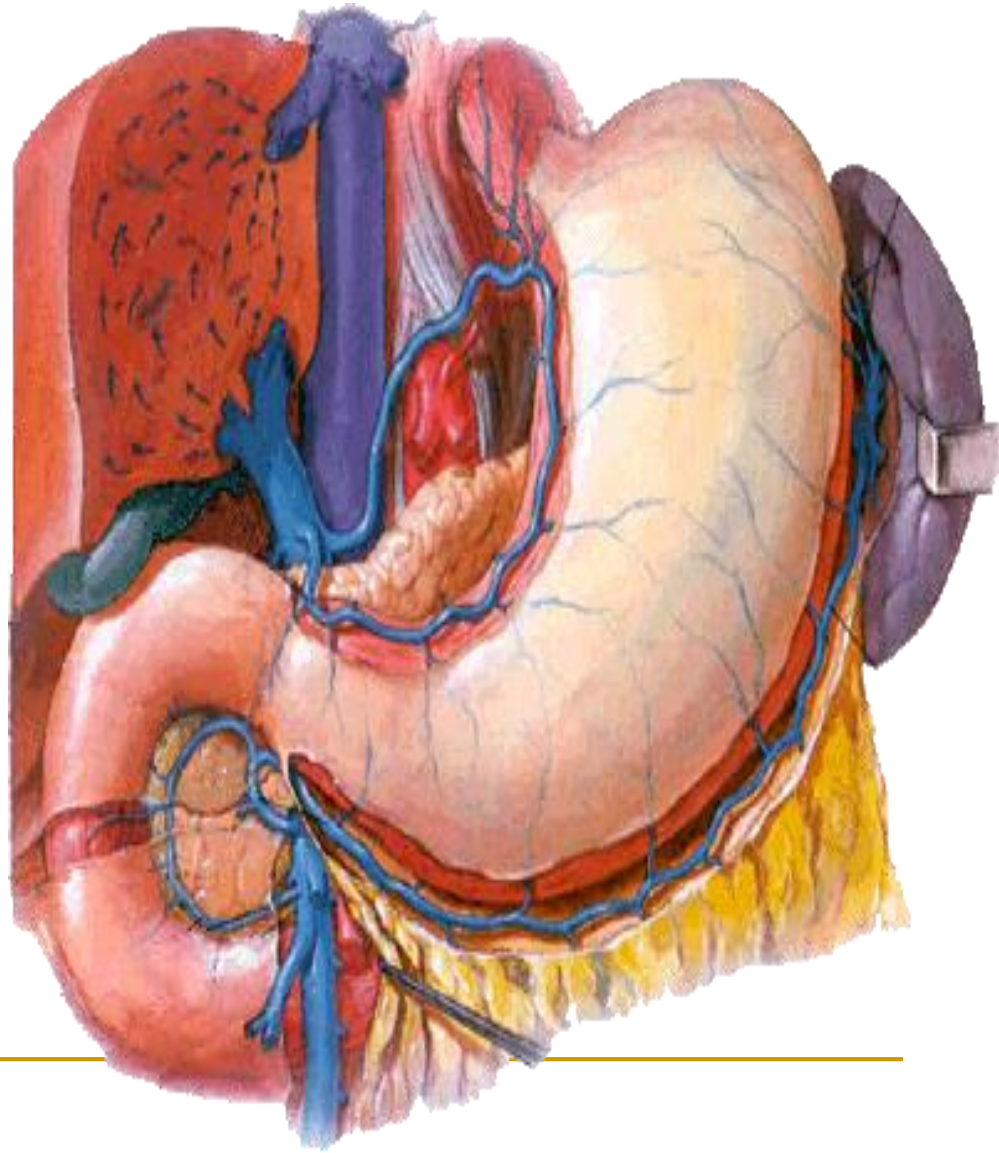


Figure 4.29. Schematic drawing of the branches of the celiac trunk.


Splenic artery
Vasa brevia
Left gastric artery
Right gastric artery
Hepatic artery
Duodenal cap
Gastroduodenal artery
Splenic artery
Superior pancreatico-duodenal artery
Left gastro-epiploic artery
Right gastroepiploic artery
Gastrocolic (greater) omentum

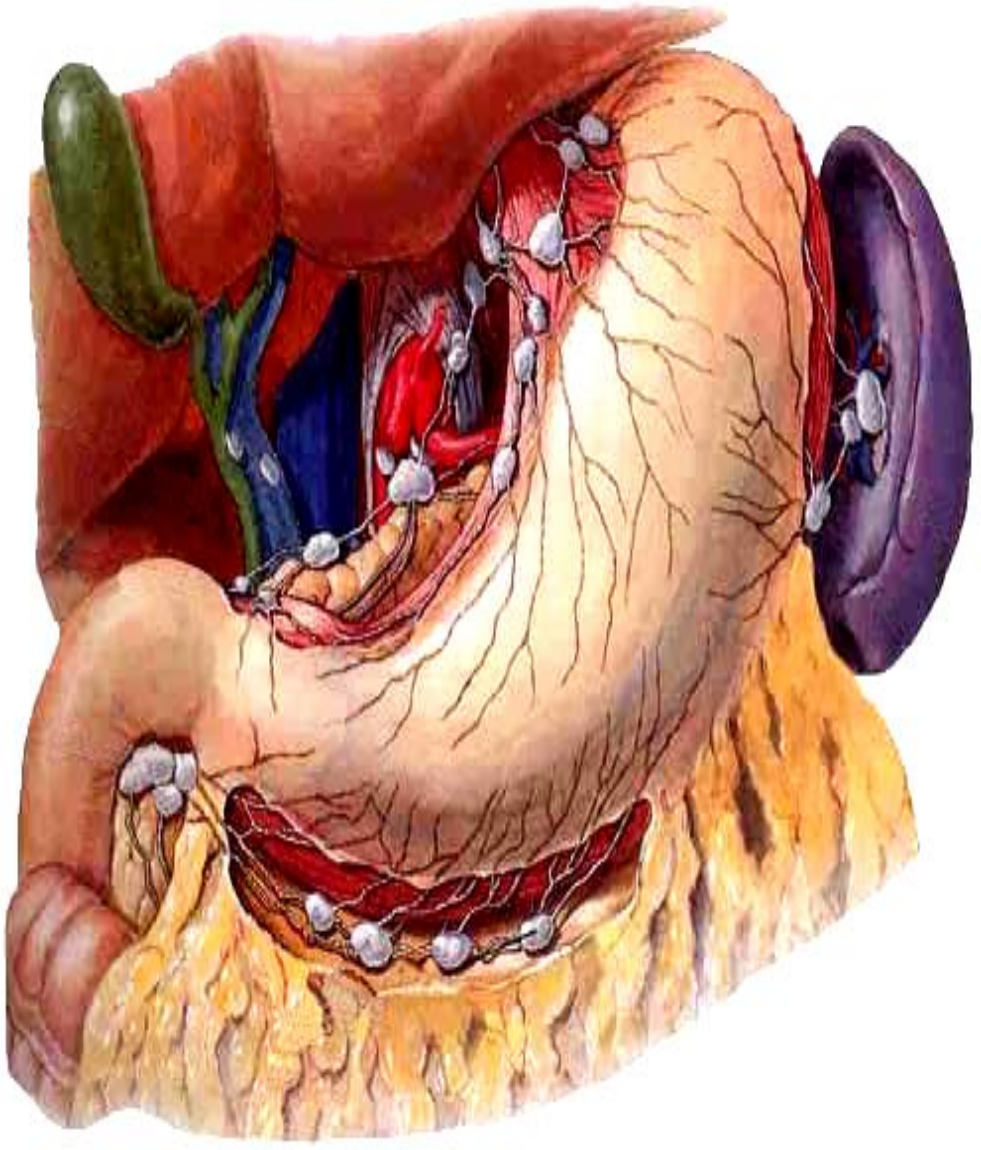
Venous drainage of stomach

- **Right and left gastric veins** empty directly into hepatic portal vein.
- **Left gastroepiploic** and **short gastric veins** drain into hepatic portal vein via the splenic vein.
- **Right gastroepiploic vein** drain into superior mesenteric vein.



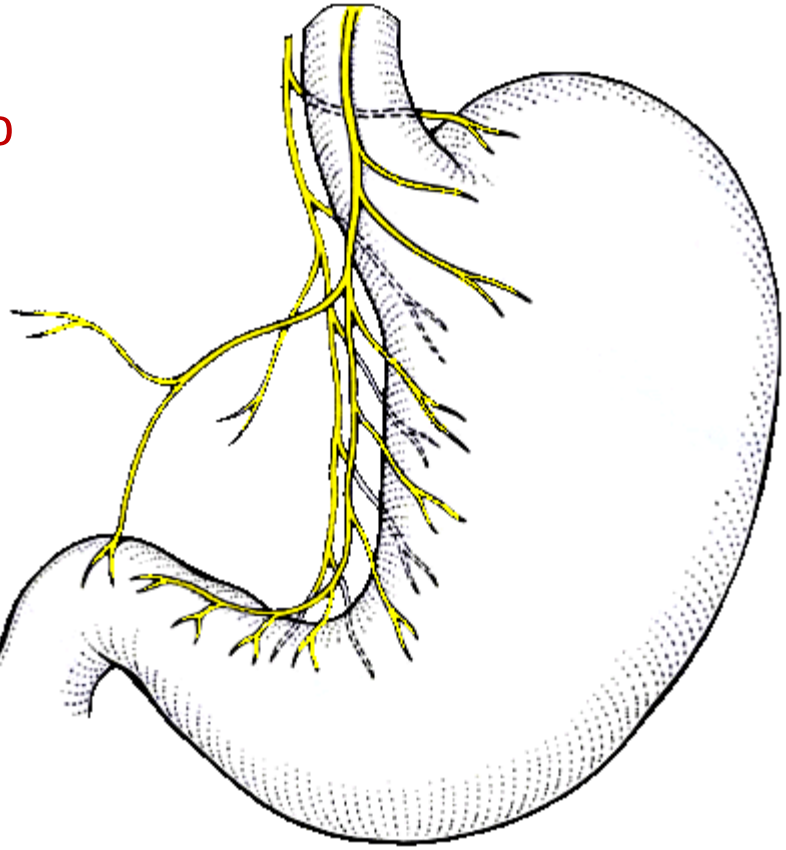
Lymph drainage of stomach

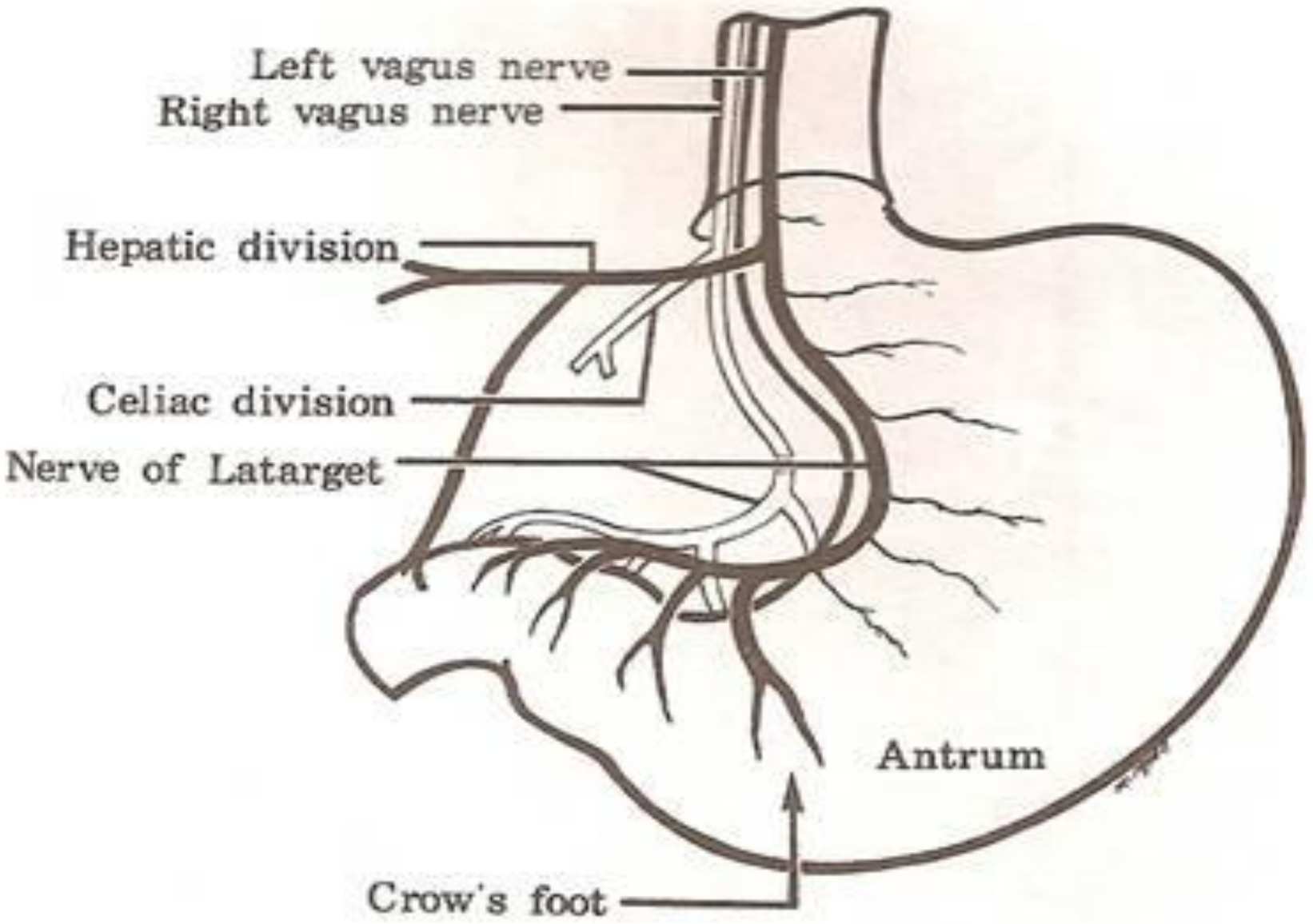
- **Right** and **left gastric ln.** lie along the same vessels and finally to the celiac ln.
- **Right** and **left gastroomental ln.** lie along the same vessels, the former drain into subpyloric ln., the latter drain into splenic ln
- **Suprapyloric** and **subpyloric ln.** receive lymphatics from pyloric part and finally to the celiac ln.
- **Splenic ln.** receive lymphatics from fundus and left third of stomach, and finally to the celiac ln.



Nerve supply of stomach

- **Parasympathetic innervation**
  - The **anterior vagal trunk** divides into **anterior gastric** and **hepatic branches**
  - The **posterior vagal trunk** divides into **posterior gastric** and **celiac branches**
  - The anterior and posterior gastric branches descend on the anterior and posterior surfaces of the stomach as a rule about 1 to 2 cm from the lesser curvature and paralle to it in the lesser omentum as far as the pyloric antrum to fan out into branches called "**crow's foot**" to supply the pyloric part
- **Sympathetic innervation**
  - Mainly from **celiac ganglia**
  - Afferent and efferent fibers derives from thoracic segments (T5 —L1)

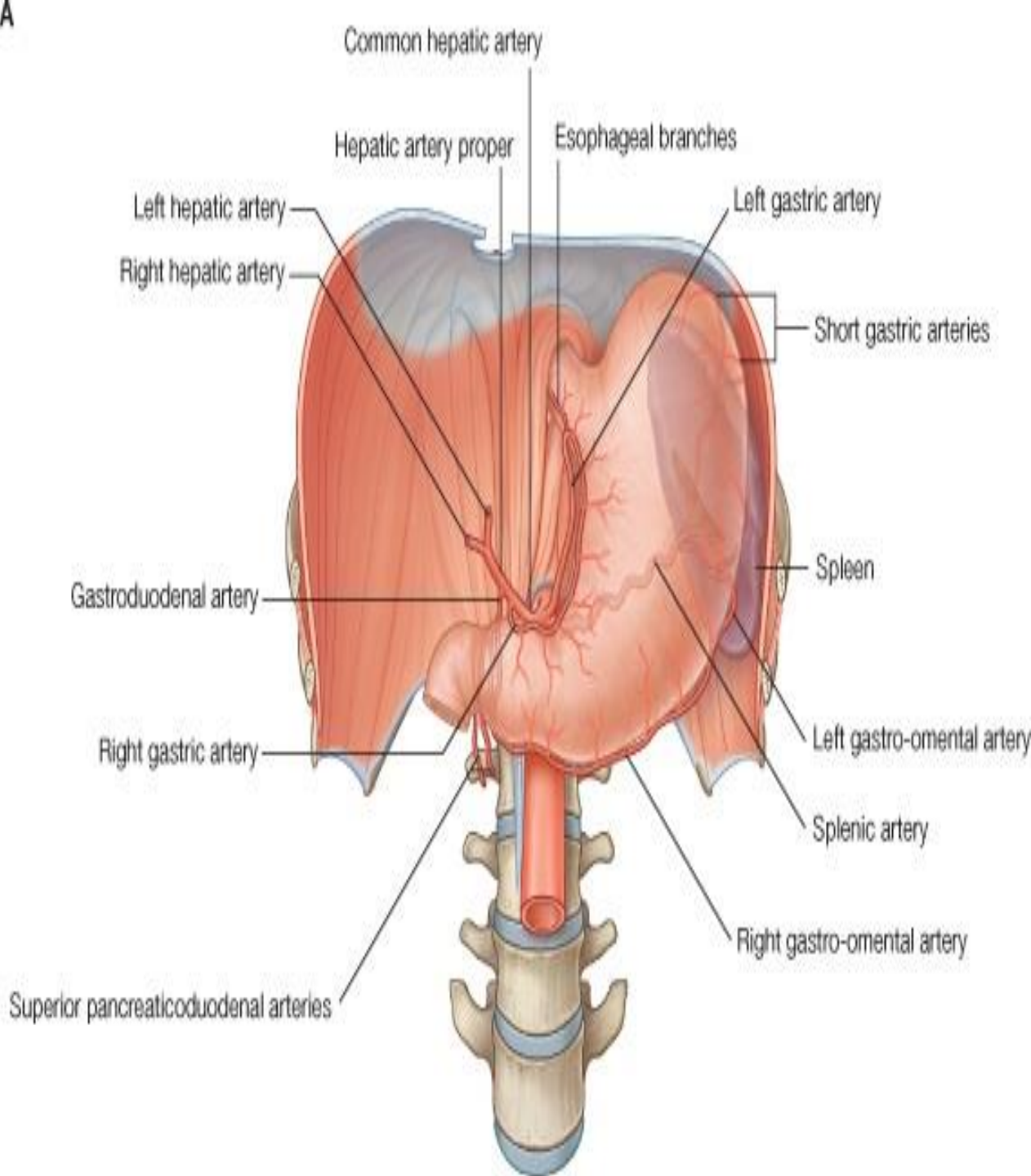



Left vagus nerve
Right vagus nerve
Hepatic division
Celiac division
Nerve of Latarget
Antrum
Crow's foot

- **The celiac trunk**

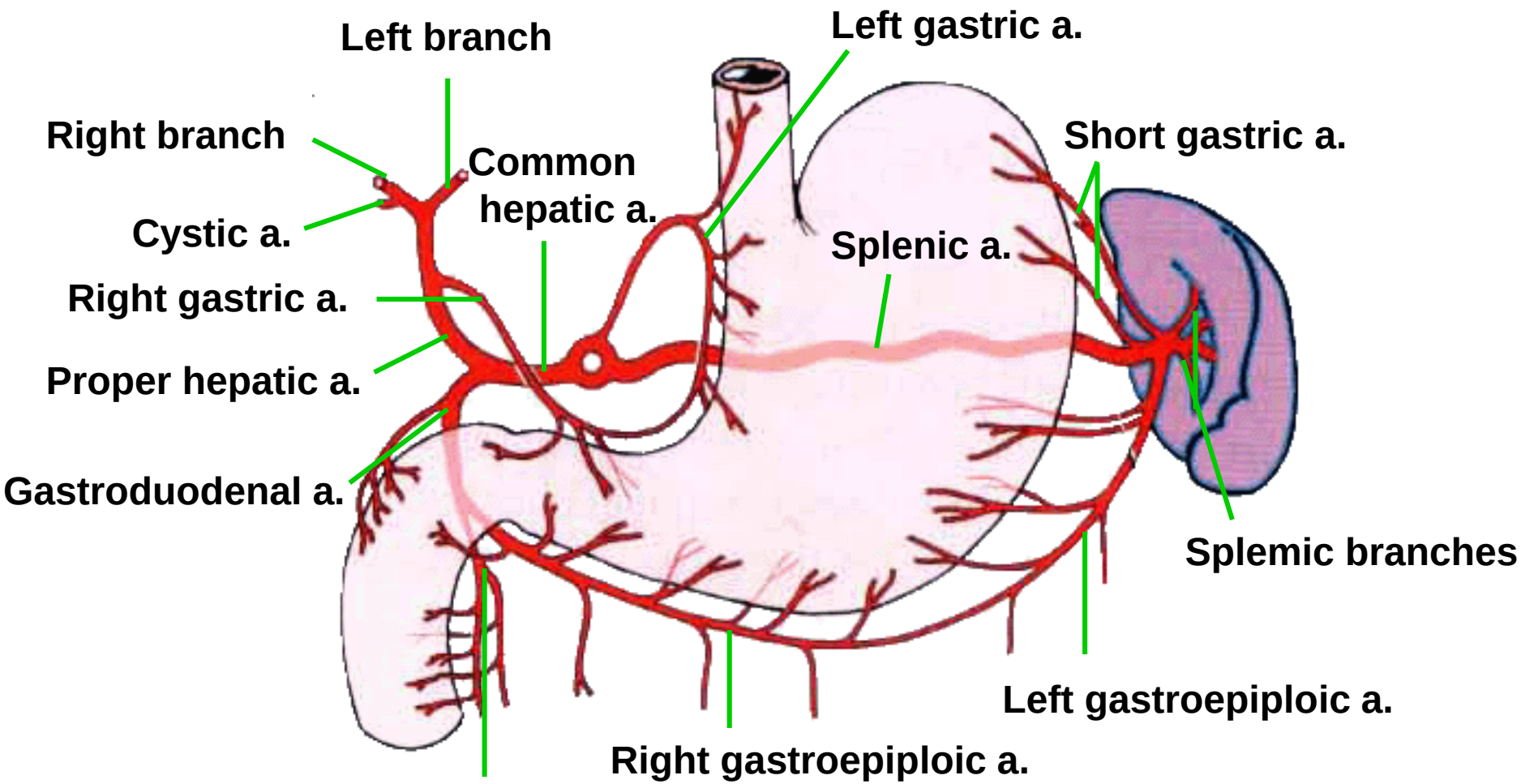
Arises from the abdominal aorta anterio to the upper part of vertebra LI. It divides into:

- **1- Gastric a**
- **2 - Splenic a**
- **3 -Common hepatic arterie**

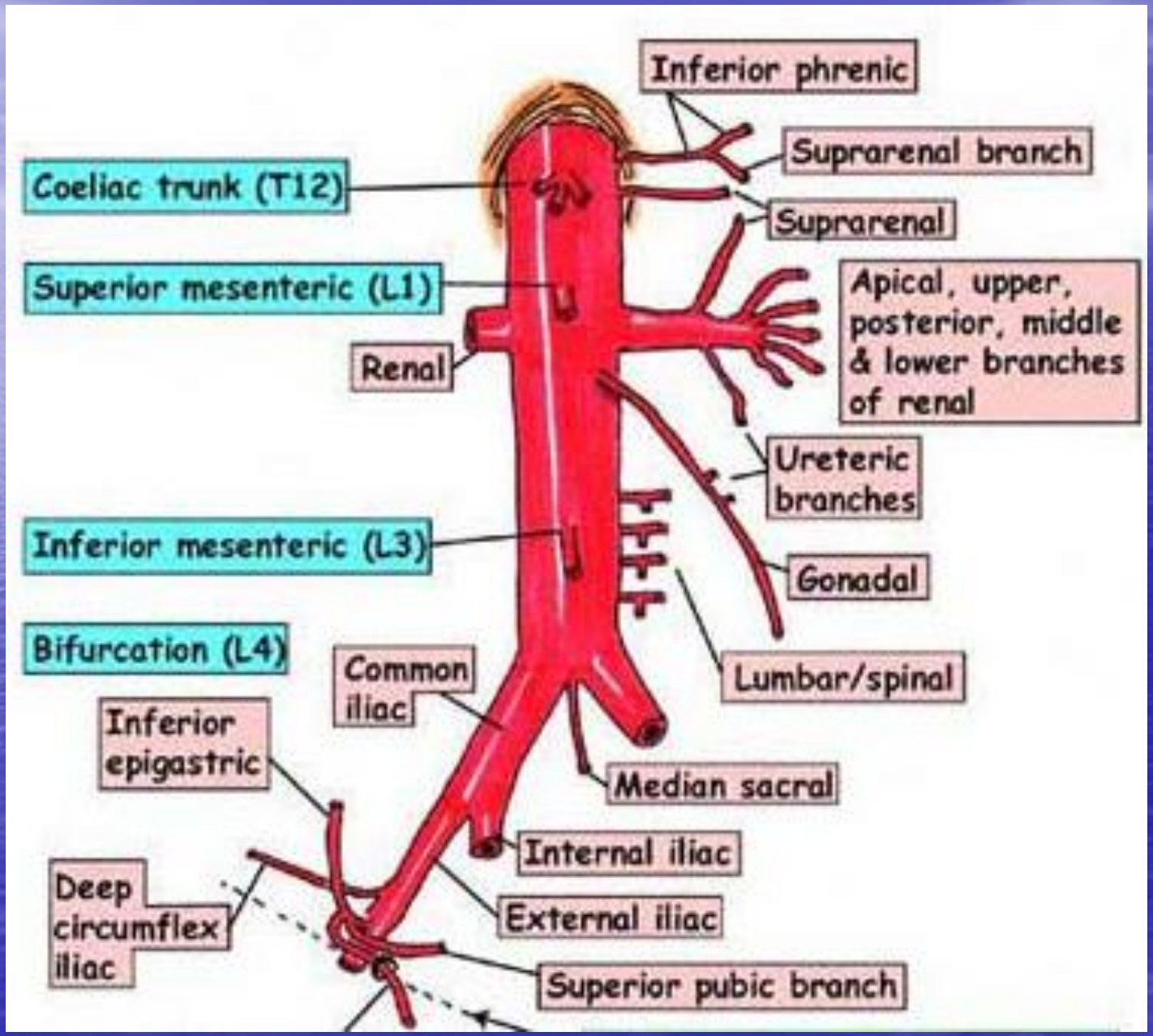


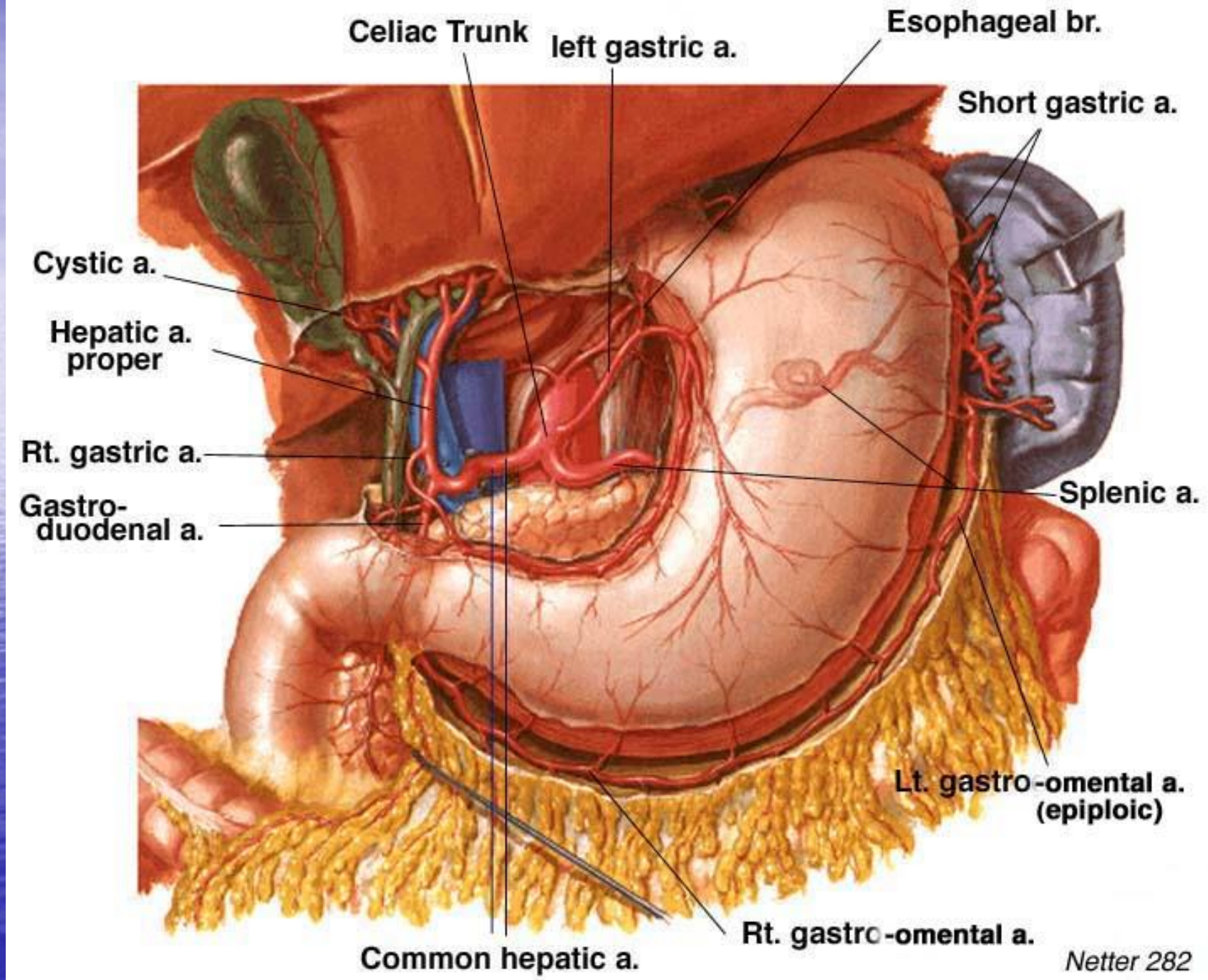
- **The splenic artery :** takes a tortuous course to the left along the superior border of the pancreas .
- The splenic artery gives off
- short gastric arteries
- left gastro-epiploic artery
- **The common hepatic artery :** divides into its two terminal branches,
- **the hepatic artery proper** and divides into the i.right hepatic artery ii.left hepatic artery
- **gastroduodenal artery:**
- right gastro-epiploic(omental)artery
- superior pancreaticoduodenal artery

Celiac trunk

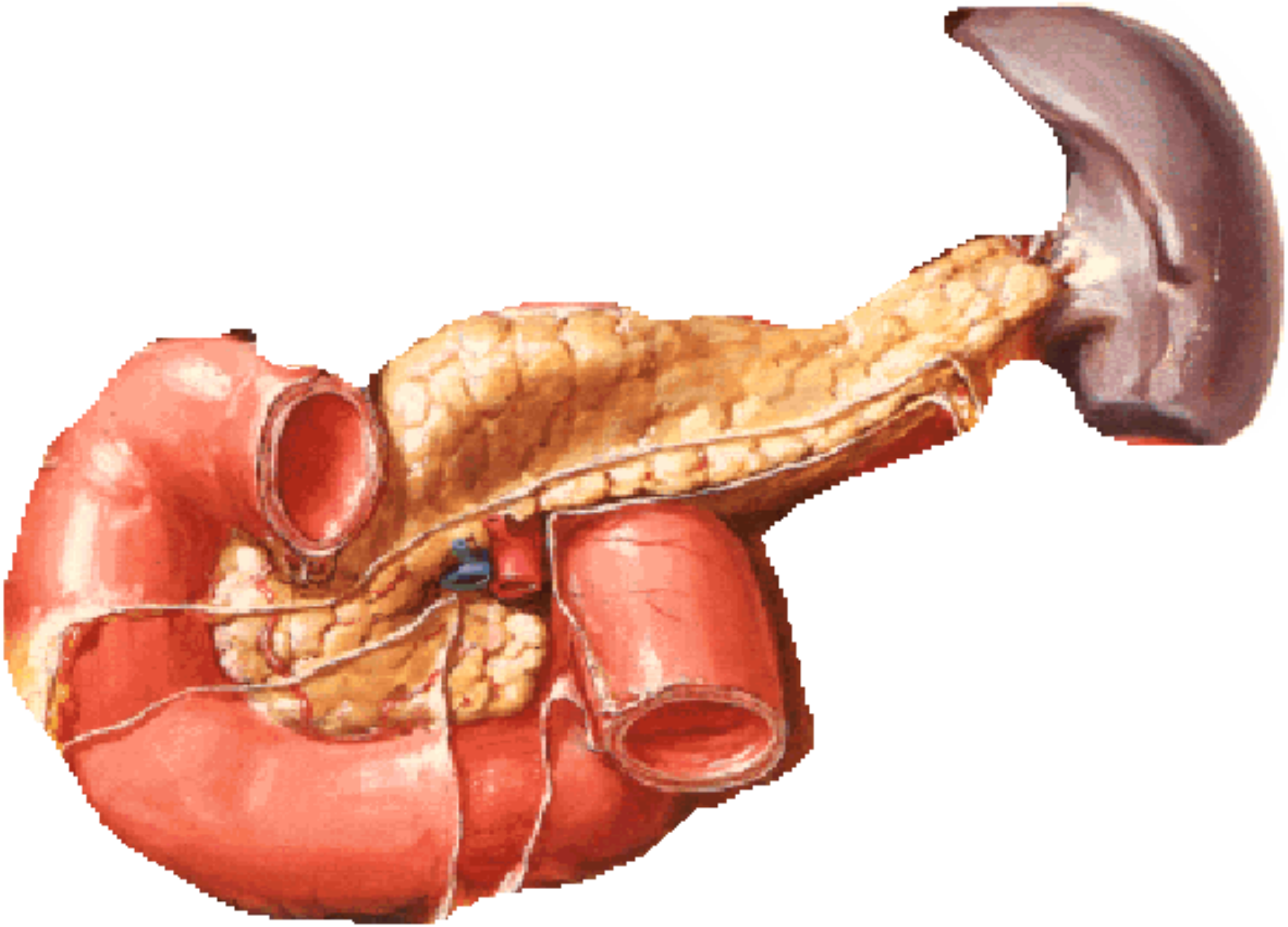


Coeliac Trunk



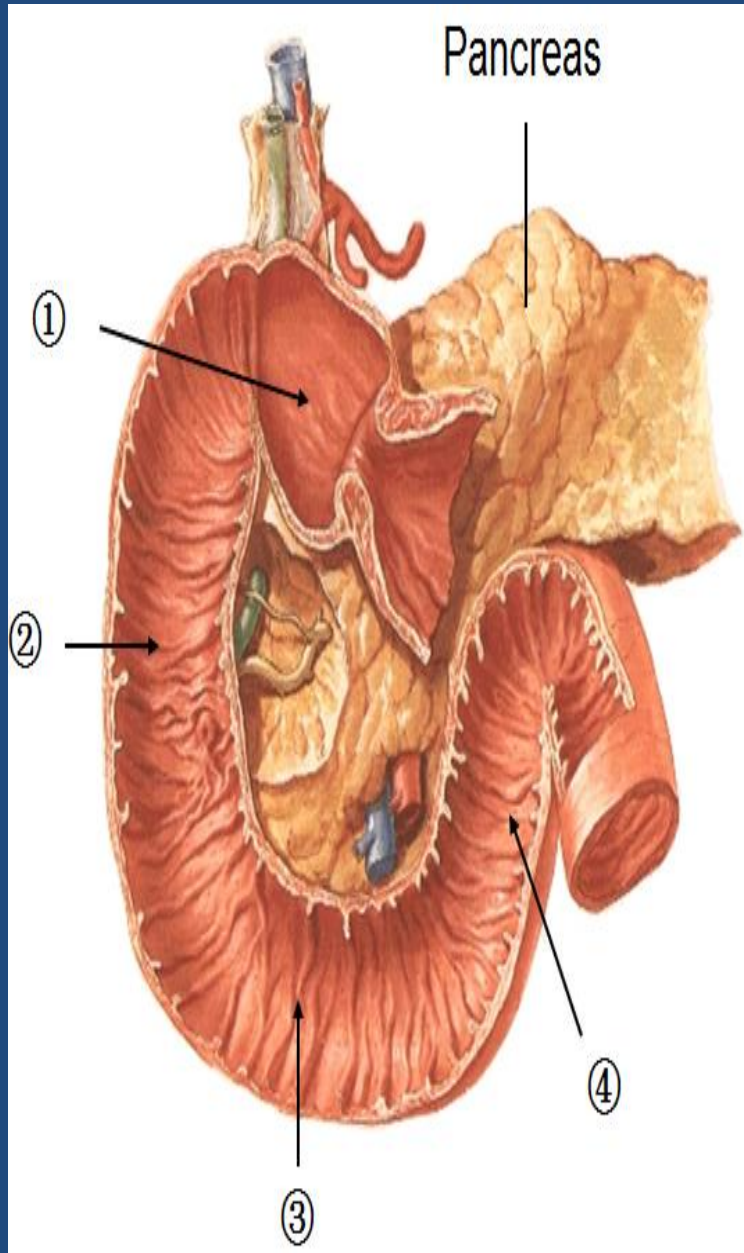

Celiac Trunk
left gastric a.
Esophageal br.
Short gastric a.
Cystic a.
Hepatic a. proper
Rt. gastric a.
Gastro-duodenal a.
Splenic a.
Lt. gastro-omental a. (epiploic)
Rt. gastro-omental a.
Common hepatic a.
Netter 282

Duodenum

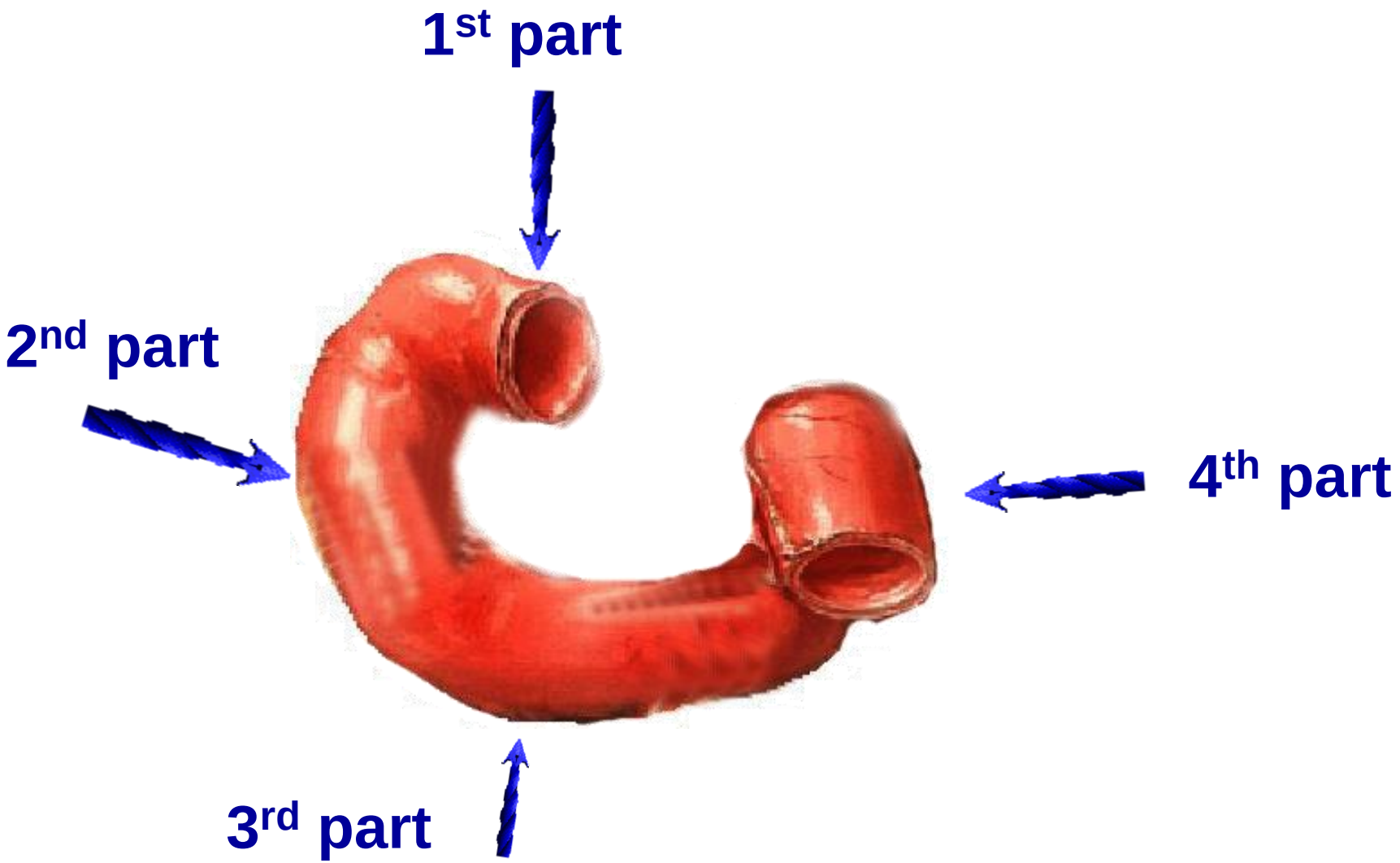


duodenum

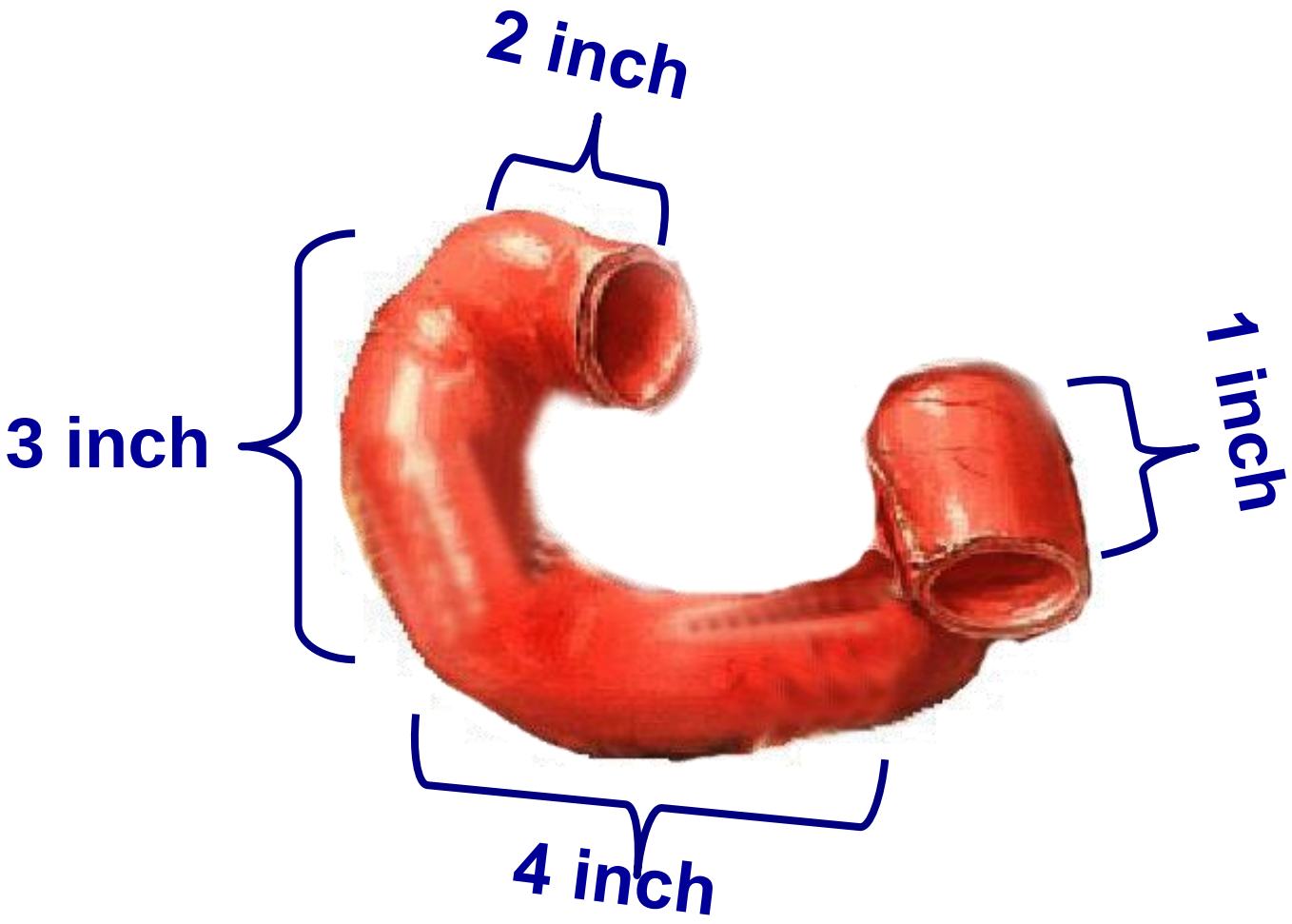
- The duodenum is a c-shaped
- Concave tube
- About 10” in length.
- It joins the stomach to the jejunum.
- It curves around the head of the pancreas to the left and backwards.
- It is important because it receives the opening of the bile and pancreatic ducts.



Parts



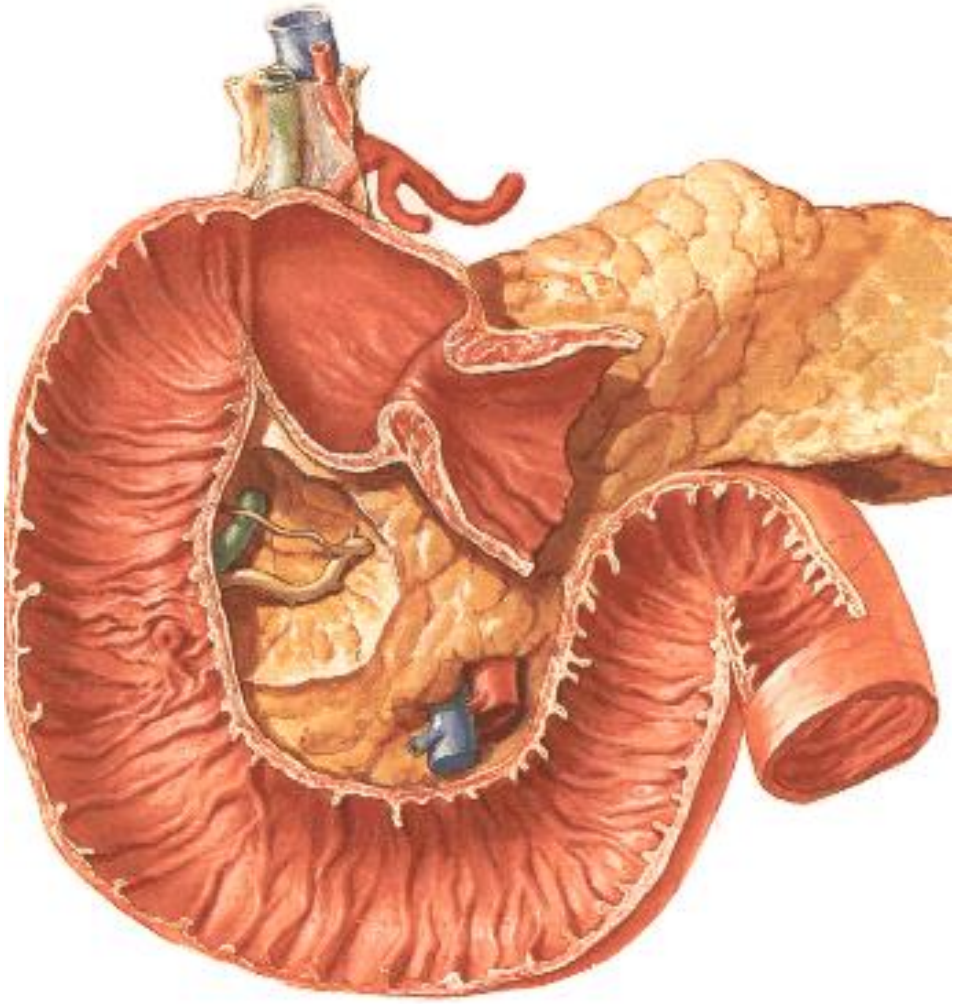
Length



The Duodenum

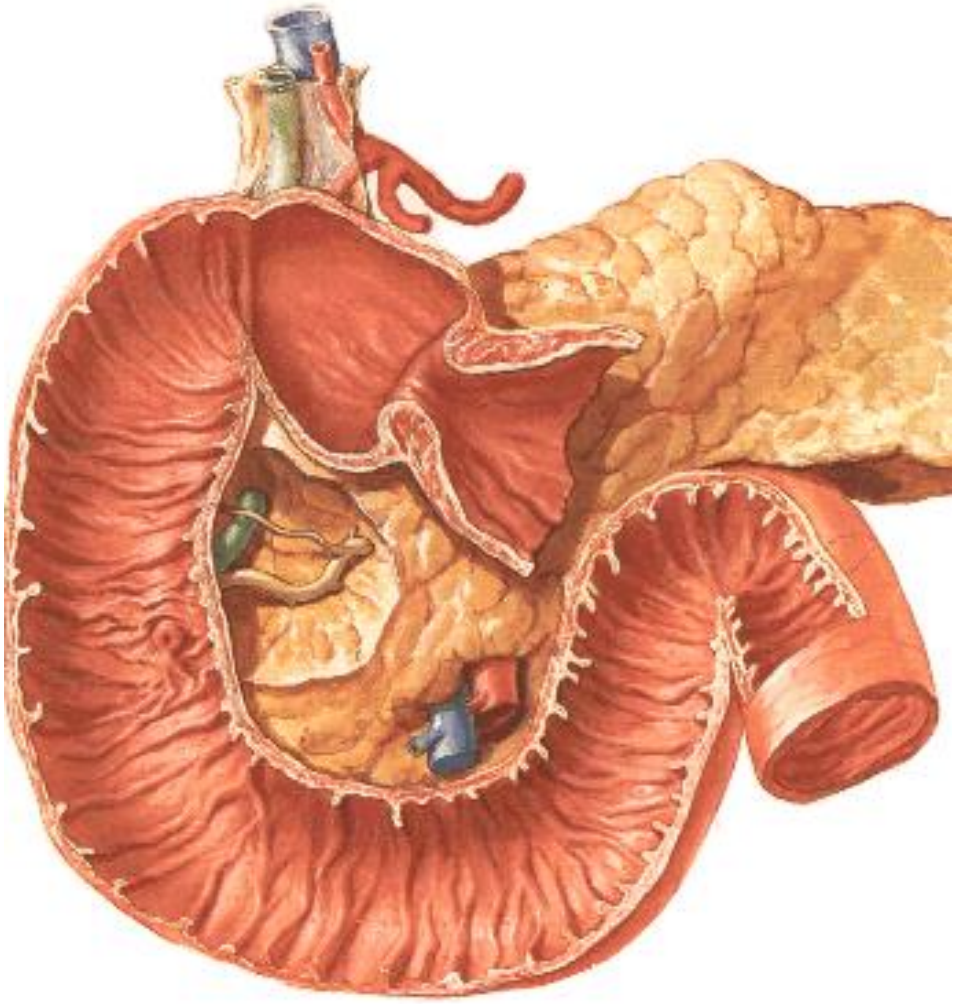
- **Divided into four parts:**
  - Superior- the first
  - Descending- the second
  - Horizontal- the third
  - Ascending- the fourth

  - *Duodenal flexure*



The Duodenum

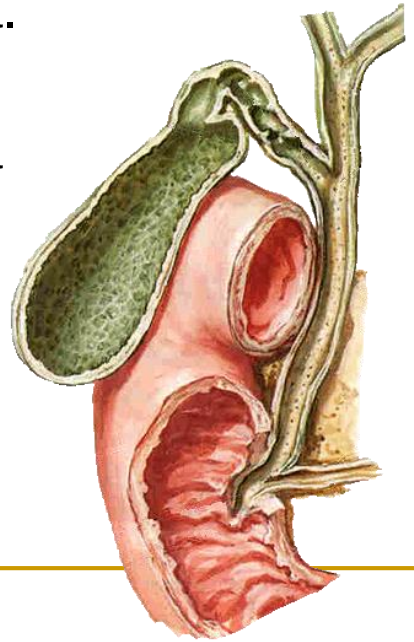
- **Superior part:**
  - Duodenal ampulla or cap
- The first, shortest, widest
  - Forms the inferior margin of the epiploic foramen.
  - Lesser omentum attaches to its upper margin.
  - Greater omentum attaches to its lower margin.

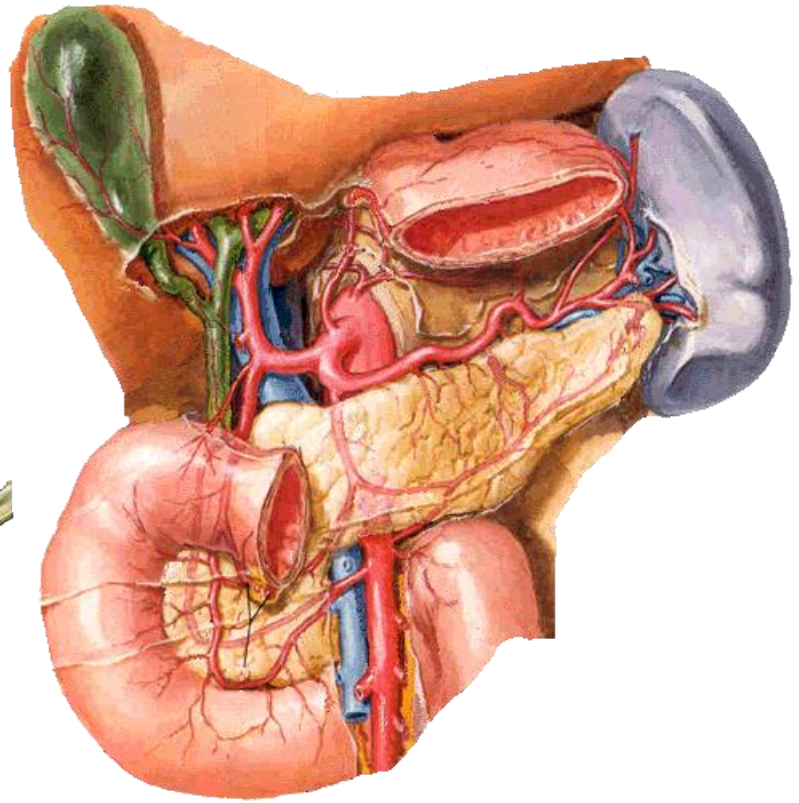


Relations of duodenum

Relations of superior part

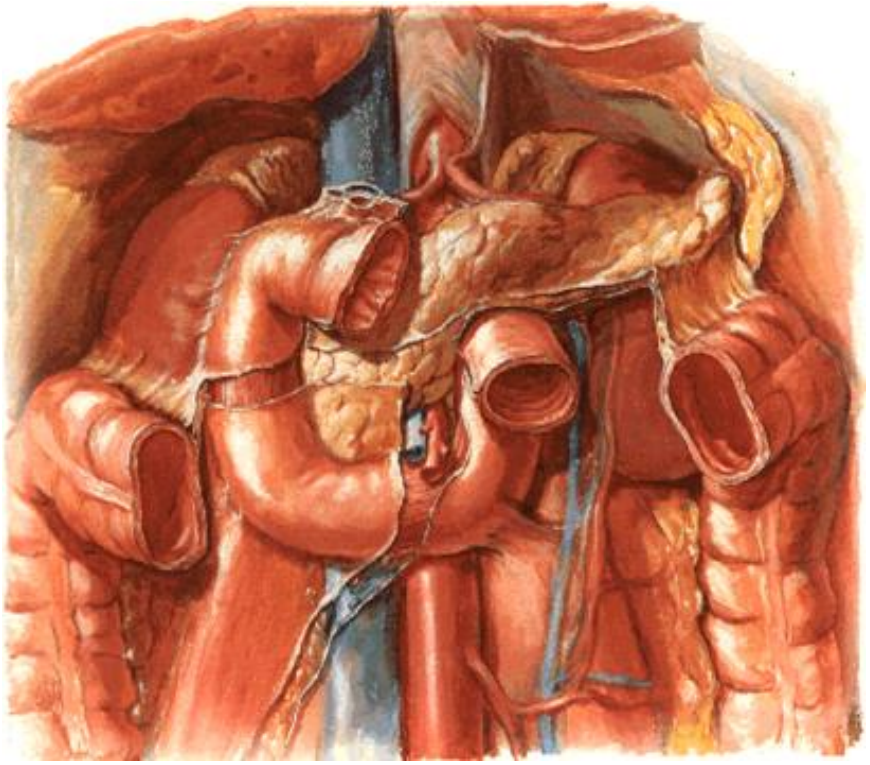
- **Anteriorly**
  - Quadrate lobe of live
  - Gallbladder
- **Posteriorly**
  - Common bile duct
  - Gastroduodenal a.
  - Hepatic portal v.
  - Inferior vena cava
- **Superioely**
  - Omental foramen
- **Inferiorly**
  - Head of pancreas





The Duodenum

- **Descending part:**
  - The anterior surface is covered with peritoneum.
  - The head of the pancreas is in direct contact with it.
  - The common bile duct and the main pancreatic duct open into its lumen.
  - Major duodenal papilla and minor duodenal papilla



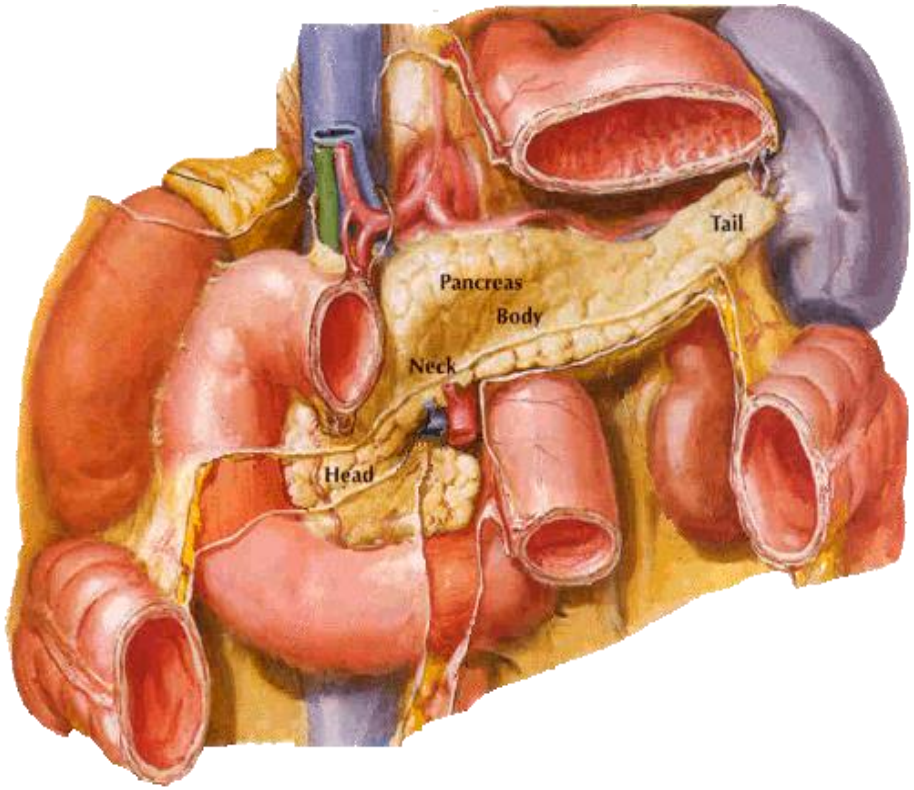
Second part:

Length: three inches long.
Extent: from the neck of gall bladder to L3
Direction: descends vertically.
Peritoneal covering:
covered by the peritoneum only on the anterior surface except the middle part where is crossed by transverse colon.

The Duodenum

Relations of descending part

- **Anteriorly**
  - Liver
  - Transverse colon and transverse mesocolon
  - Loops of small intestine
- **Posteriorly**
  - Right renal hilum and ureter
  - Right renal vessels
- **Medially**
  - Head of pancreas
  - Common bile duct and pancreatic duct
- **Laterally**
  - Right colic flexure

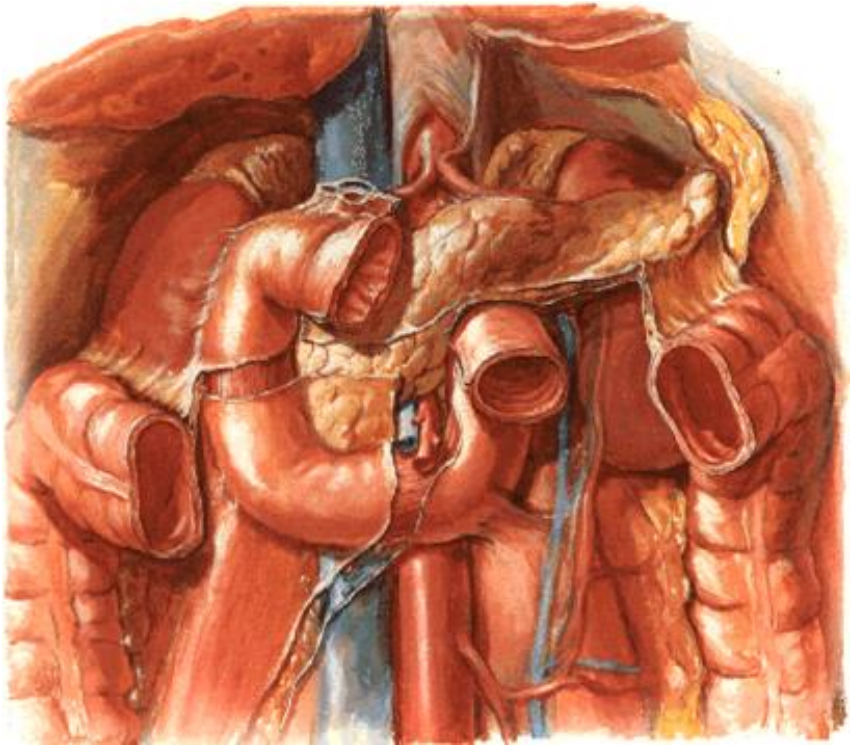


Third part:

Length: four inches
Extent: at the level of the 3rd lumbar vertebra
Direction: horizontal.
Peritoneal covering: is only covered by peritoneum anteriorly and inferiorly except the site of attachment of mesentry.

The Duodenum

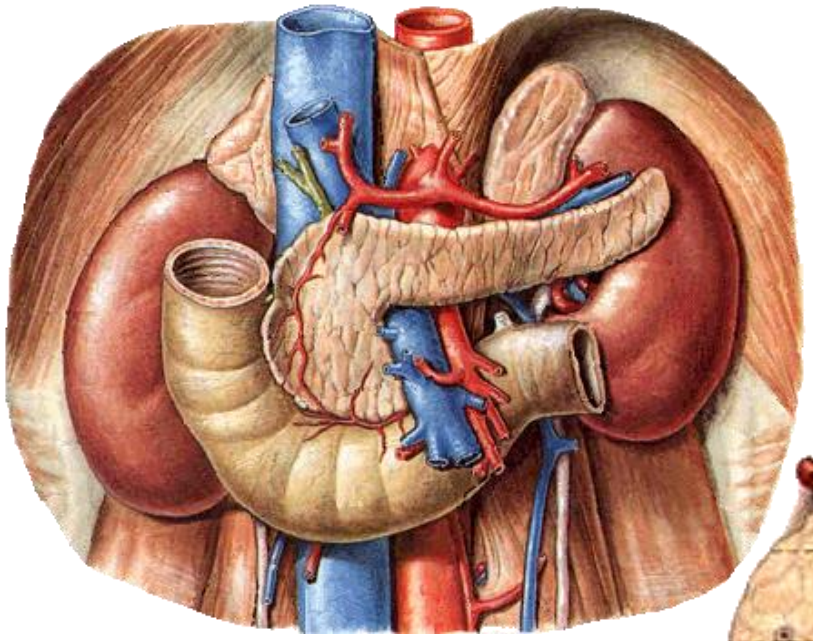
- **Horizontal part:**
  - Crosses to the left in front of.
    - L3 vertebra
    - The inferior vena cava
    - The aorta
    - Continues with the ascending part in front of the aorta.
  - The anterior surface is covered with peritoneum.
    - Except along the attachment line of the mesentery.



The Duodenum

Relations of horizontal part

- **Superiorly**
  - Head of pancreas
- **Inferiorly**
  - Loops of small intestine
- **Anteriorly**
  - Radix of mesentery
  - Superior mesenteric a. and v.
- **Posteriorly**
  - Right ureter
  - Inferior vena cava
  - Abdominal aorta

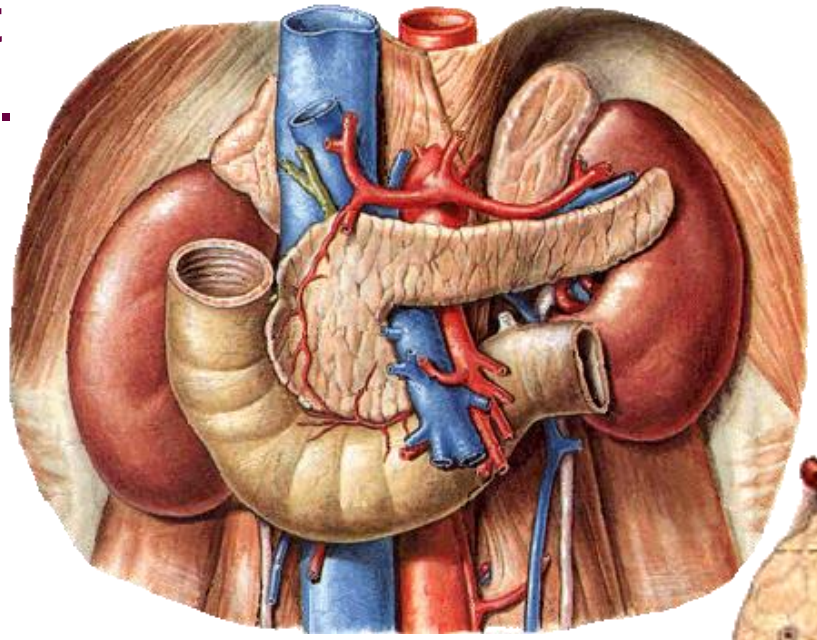


The Duodenum

Relations of horizontal part

- **The superior mesenteric a. / v.**
  - Enters / leaves the root of the mesentery.

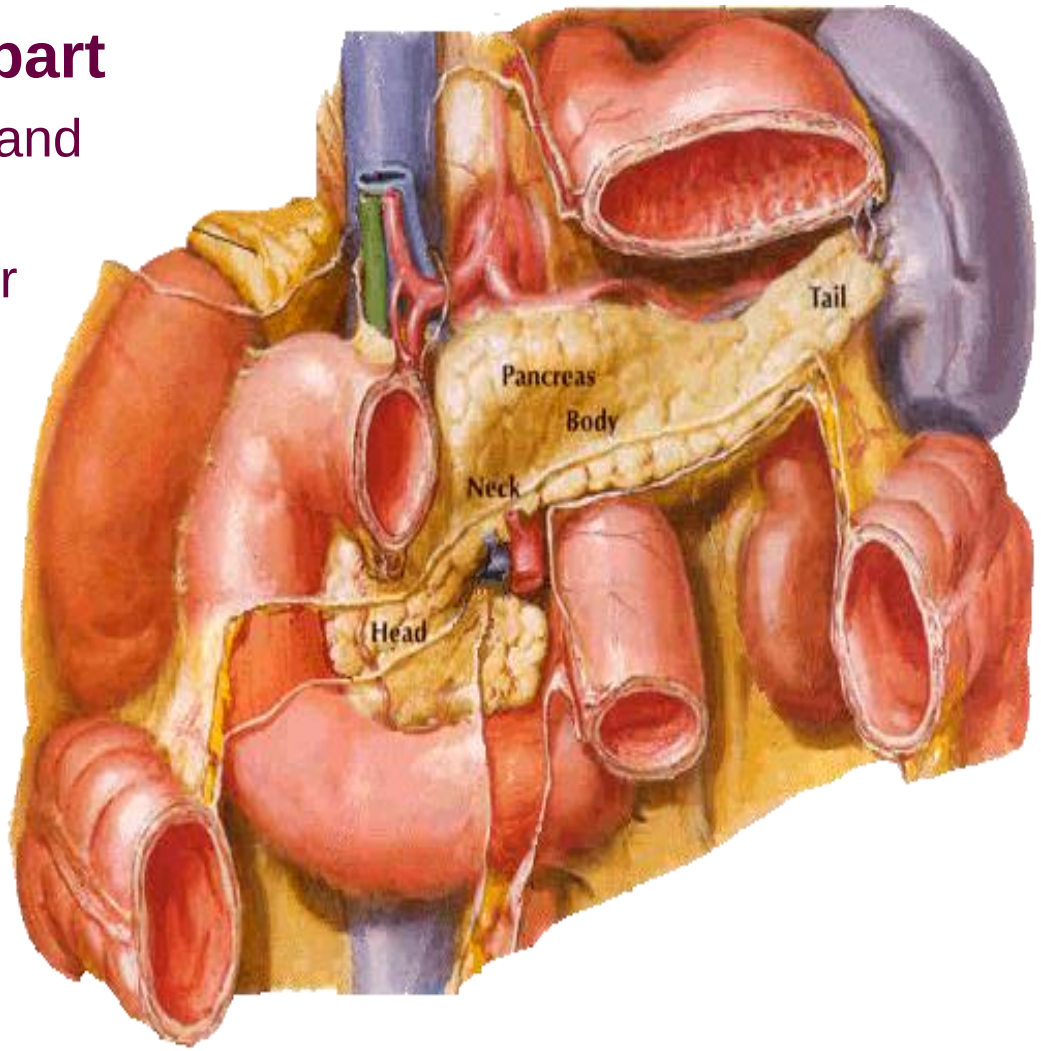
- **Both vessels:**
  - Cross the horizontal segment anteriorly.
  - These vessels may compress the duodenum, leading to distention of the proximal duodenum and stomach



The Duodenum

Relations of ascending part

- **Right** — Head of pancreas and abdominal aorta
- **Left** — left kidney and ureter



The Duodenum

- **Suspensory muscle of the duodenum:**
  - Secures the duodenum to the posterior abdominal wall and has two parts:
    - One derived from the diaphragm, which contains striated muscle.
    - The other part derived from the duodenal wall, which contains smooth muscle.

Superior (first) part:

Relations

2. The second inch of the duodenum:

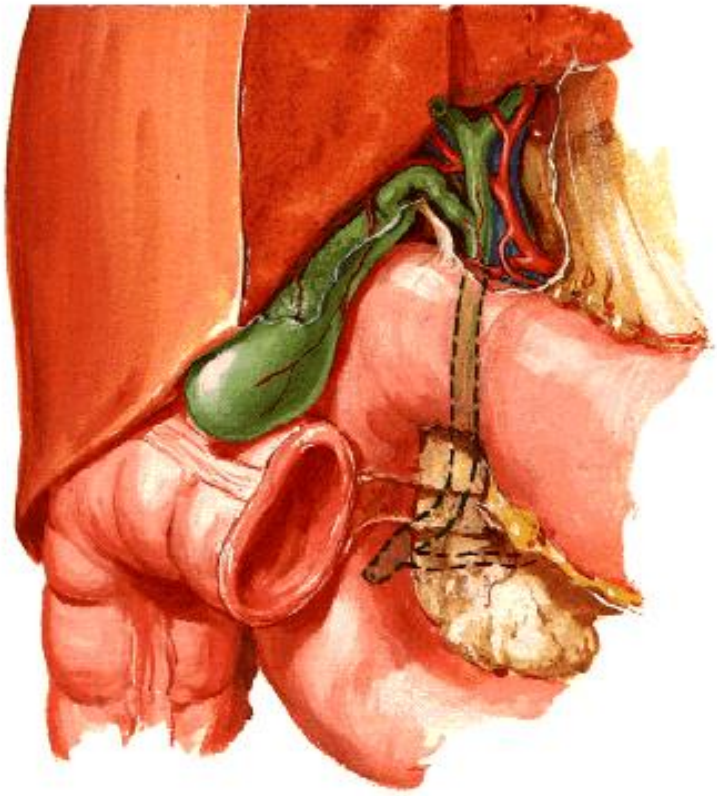
- **Anteriorly:**

a. The quadrate lobe of the liver,
b. The neck of the gall bladder

- **Posteriorly:**

a. The bile duct.
b. The gastroduodenal artery.
c. The portal vein.
d. The inferior vena cava.

- **Superiorly:** the opening into the lesser sac.
- **Inferiorly:** pancreas.



Second part:

Relations of the second part:

- **Anteriorly:**

1. **Upper part: right lobe of the liver.**
2. **The middle part: transverse colon.**
3. **Lower part: loops of the jejunum.**

- **Laterally:**

The right colic flexure.
The fat in front of the right kidney.

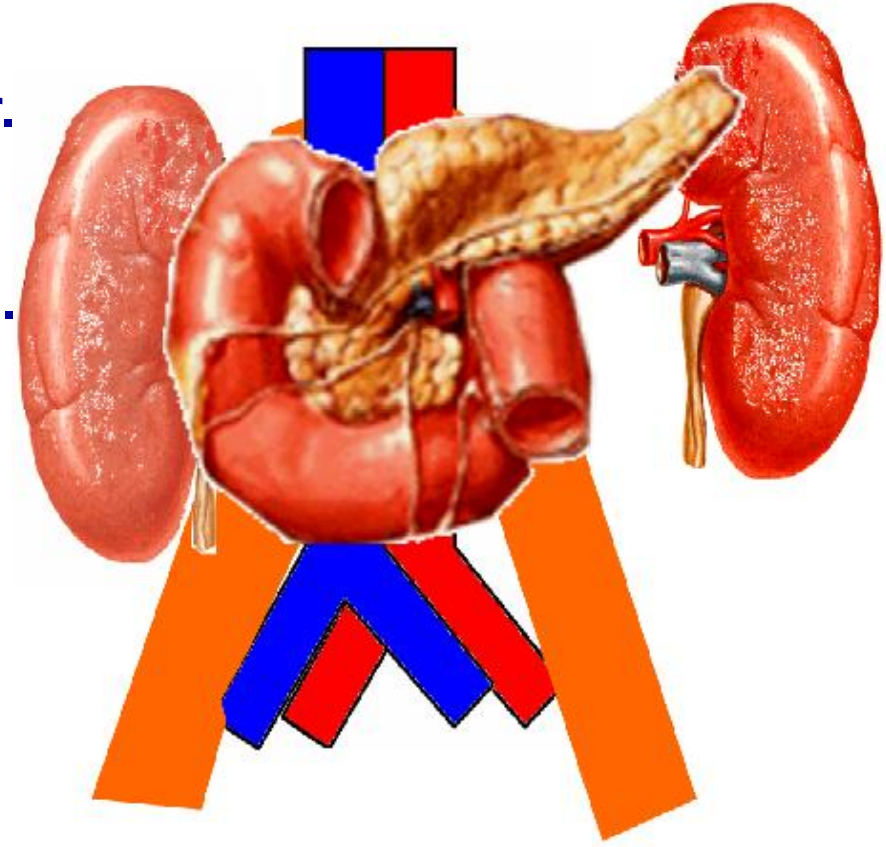
- **Medially:**

The head of pancreas
The bile duct

- **Posteriorly:**

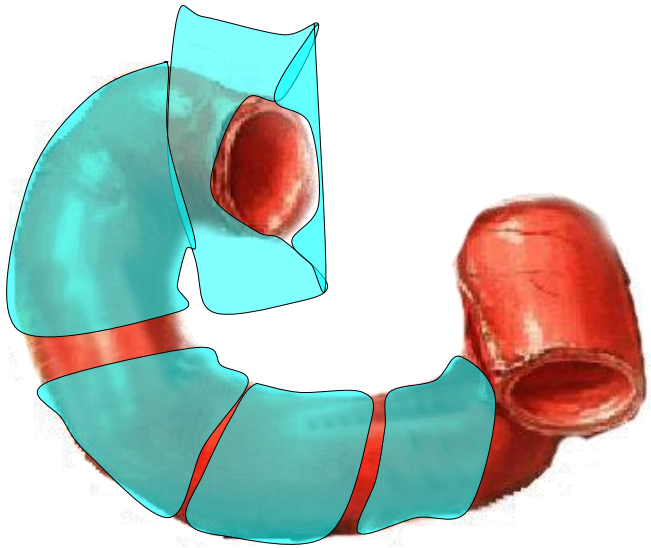
The hilum of right kidney.
The right renal vessels.
The right psoas major muscle.

.



Third part:

Length: four inches
Extent: at the level of the 3rd lumbar vertebra.
Direction: lies in a horizontal plane,
Peritoneal covering: is only covered by peritoneum anteriorly and inferiorly except the site of attachment of mesentry.



Third part:

Relations of the 3rd part:

- **Anteriorly:**

1. The root of the mesentery.
2. The coils of jejunum.

- **Posteriorly:**

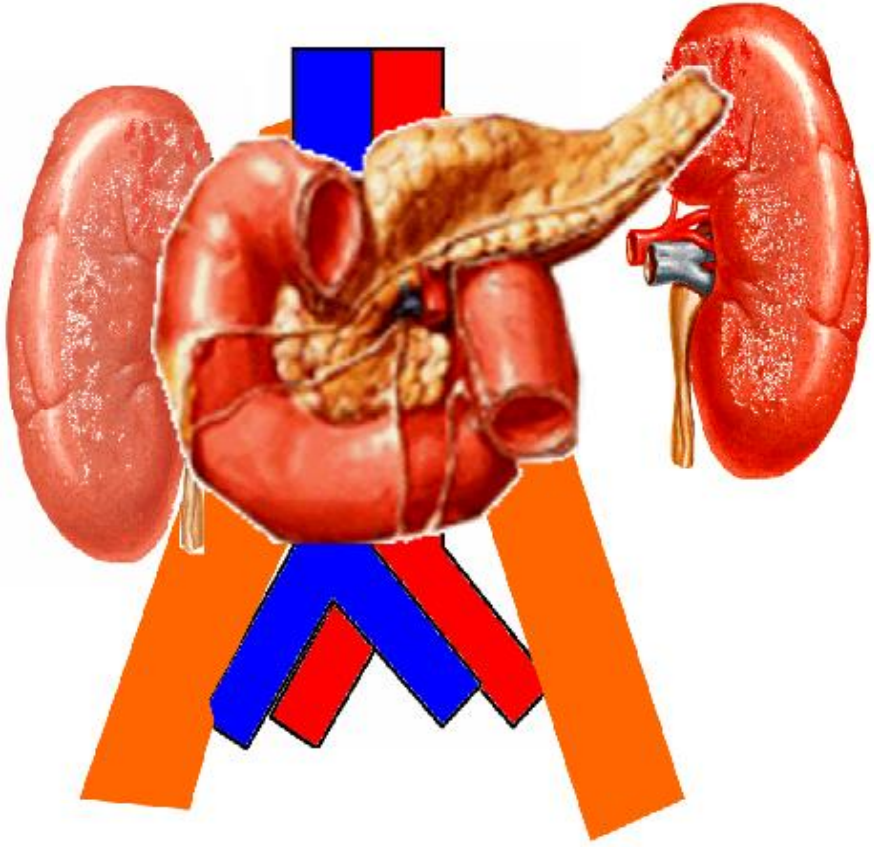
1. The right ureter.
2. The right psoas major muscle.
3. The right testicular (or ovarian) vessels.
4. Inferior vena cava.
5. Abdominal aorta & origin of the inferior mesenteric artery.

- **Superiorly:**

The pancrcas.

- **Inferiorly:**

Coils of the jejunum.



Fourth part:

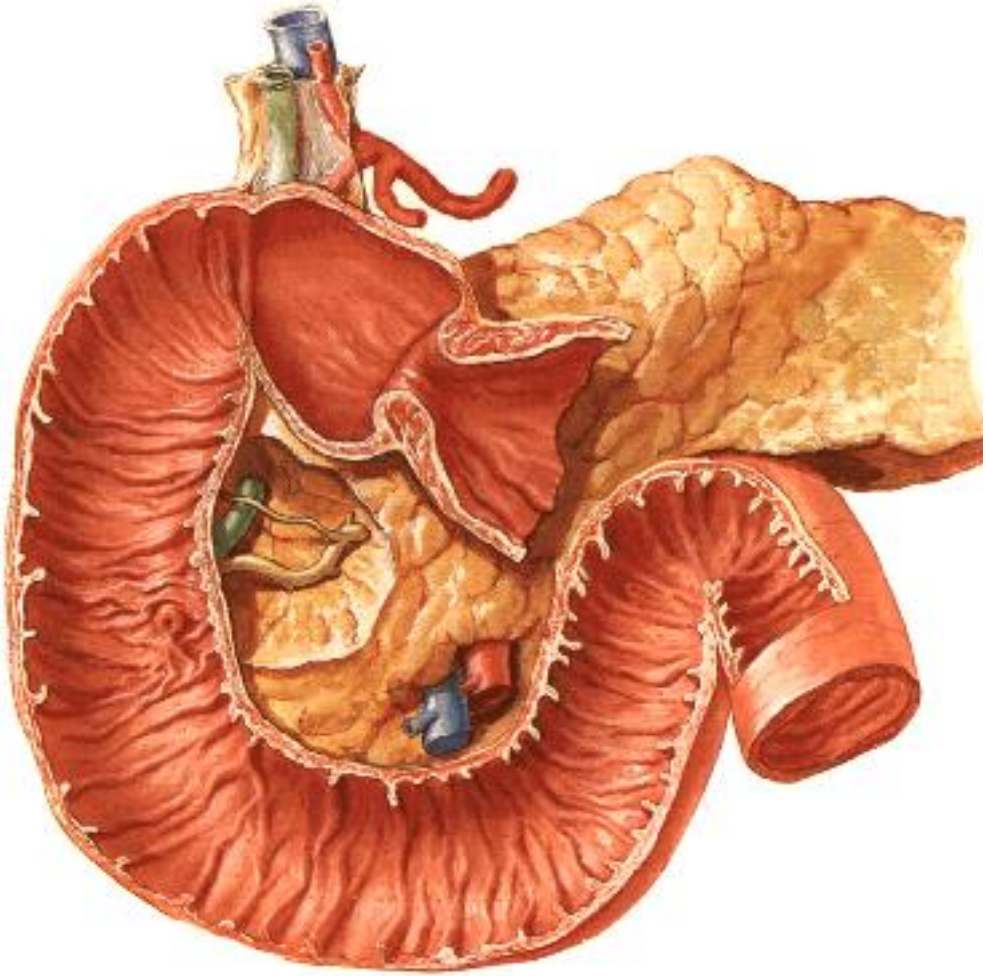
Length: one inch long.

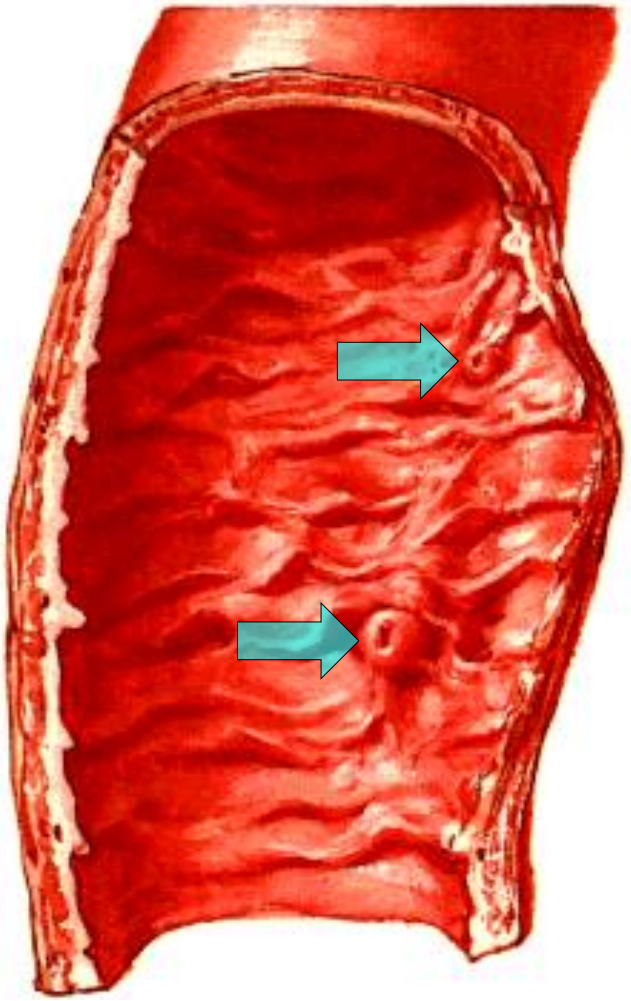
Extent: from the level of the 3rd to the level of the 2nd lumbar vertebrae.

Direction: ascends to end by forming the duodenojejunal flexure.

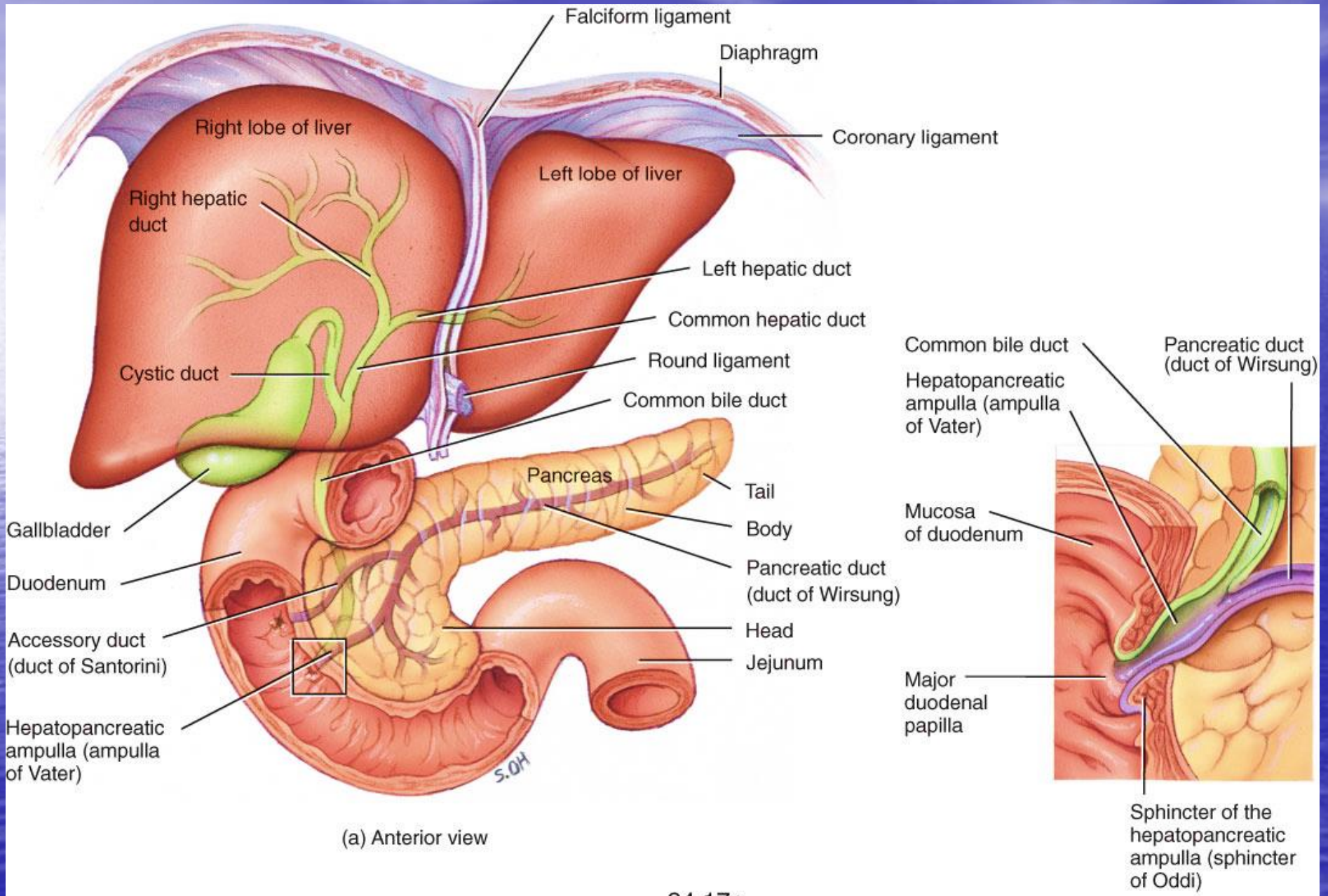
Peritoneal covering: is covered by the peritoneum anteriorly and to the left.

Structures opening in the 2nd part of the duodenum





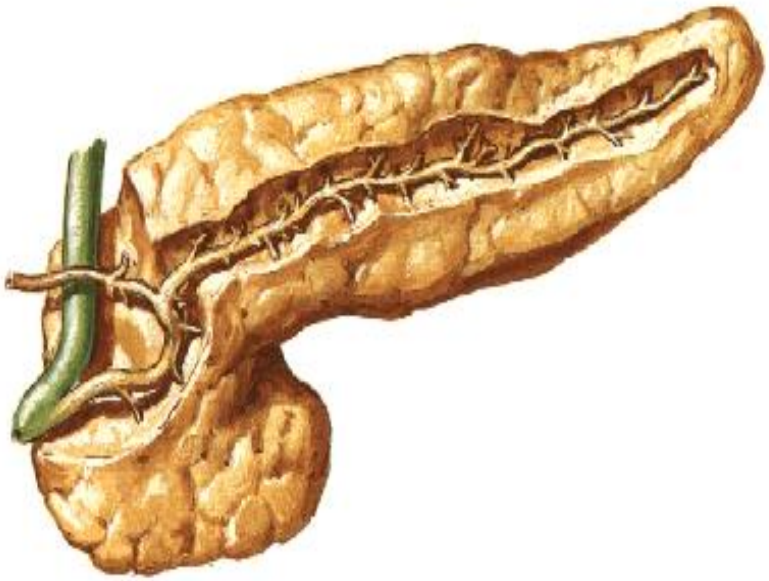
Structures opening in the 2nd part of the duodenum



24.17a

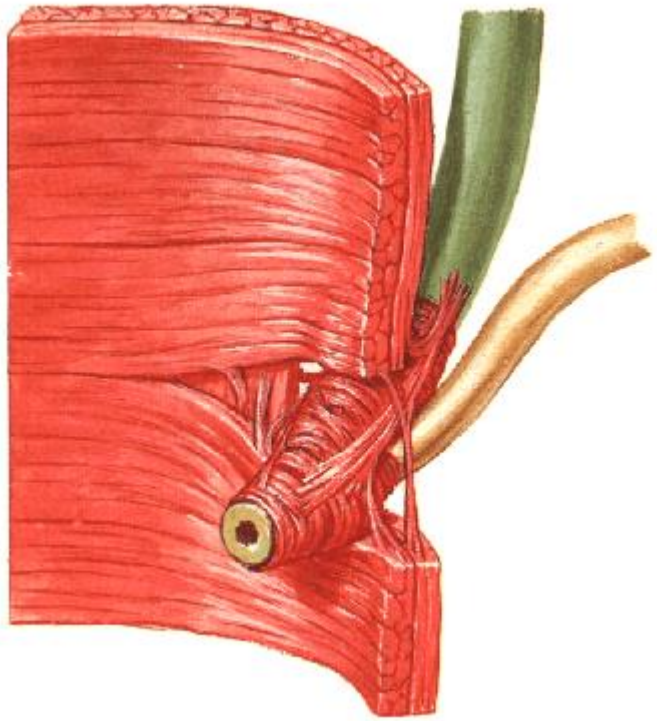
Structures opening in the 2nd part of the duodenum

- The bile duct unites with the pancreatic duct forming a dilatation called the **hepatopancreatic ampulla** (ampulla of Vater).
- The ampulla opens on an elevation called the **major duodenal papilla.**
- The accessory pancreatic duct opens one-inch above the major duodenal papilla, forming a smaller elevation called the **minor duodenal papilla.**



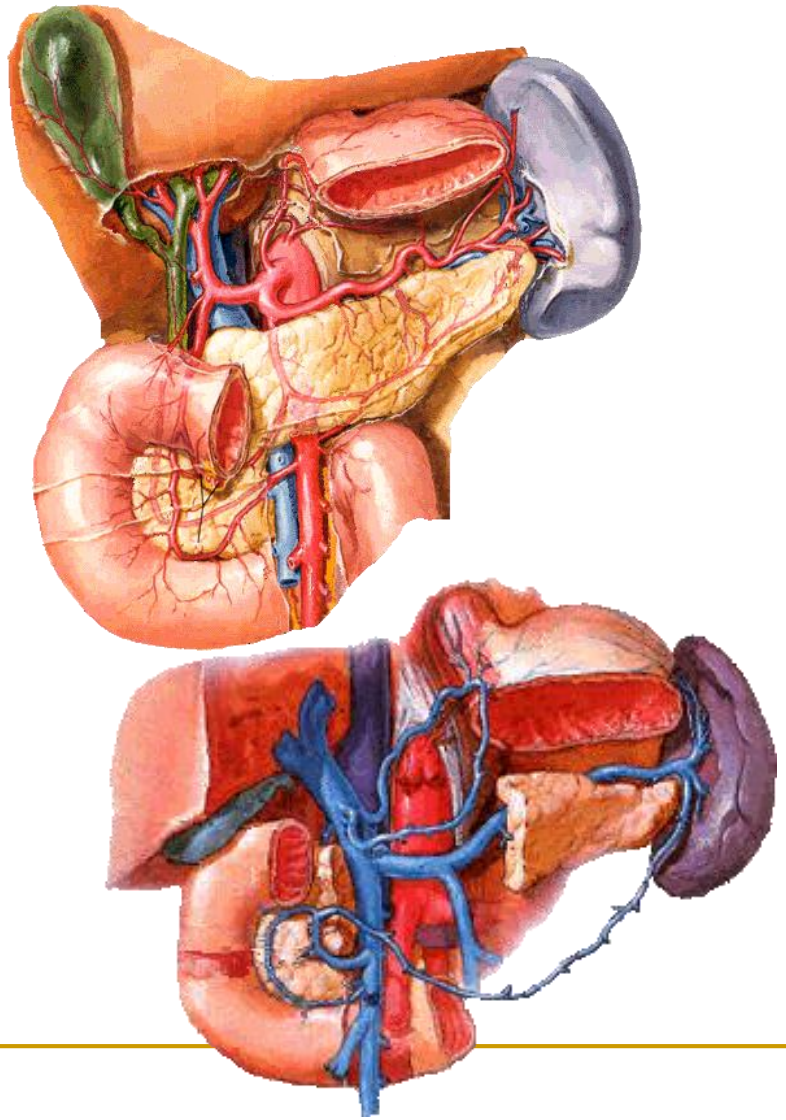
Structures opening in the 2nd part of the duodenum

- The bile duct unites with the pancreatic duct forming a dilatation called the hepatopancreatic ampulla (ampulla of Vater).
- The ampulla opens on an elevation called the major duodenal papilla.
- The accessory pancreatic duct opens one-inch above the major duodenal papilla, forming a smaller elevation called the minor duodenal papilla.

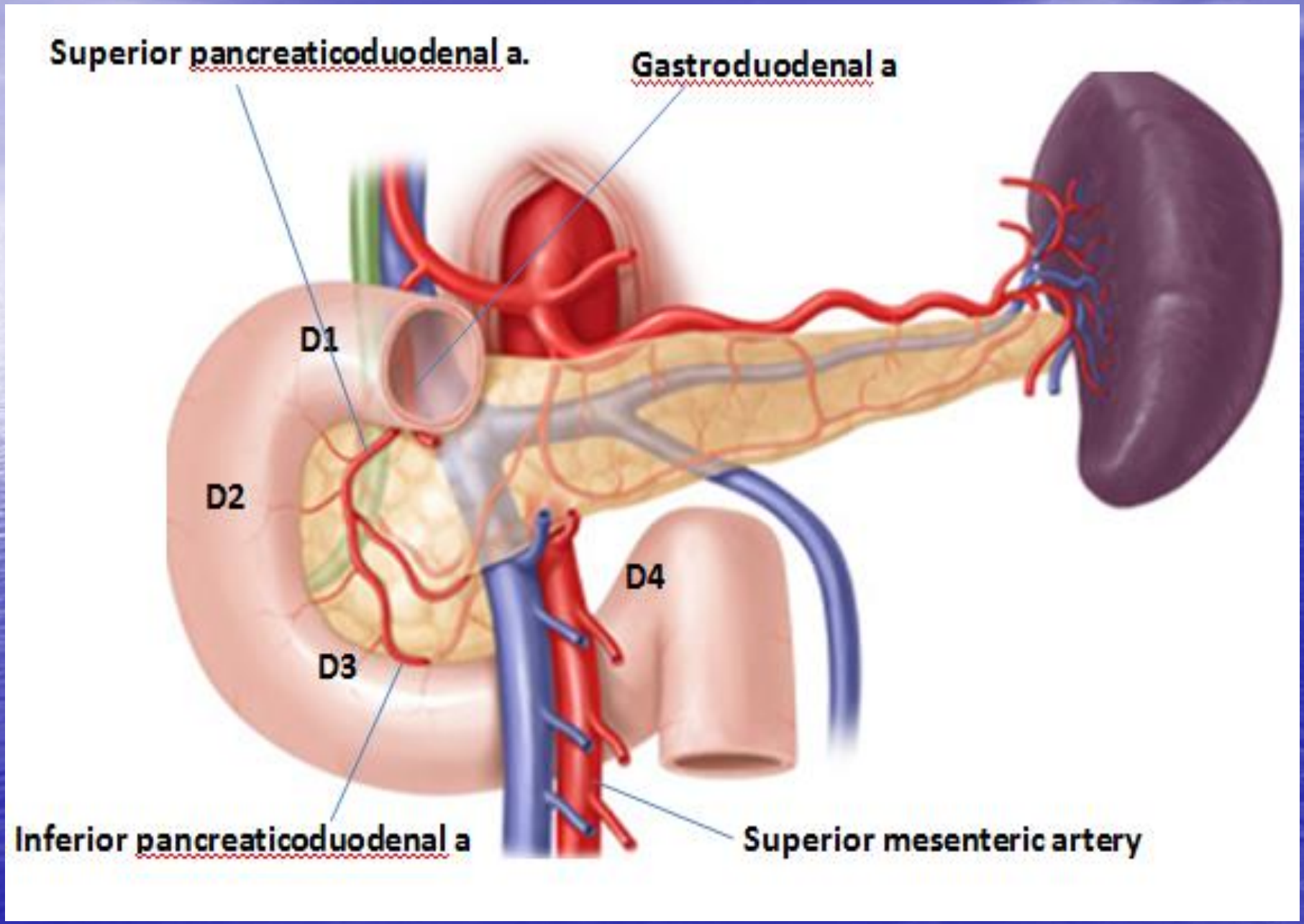


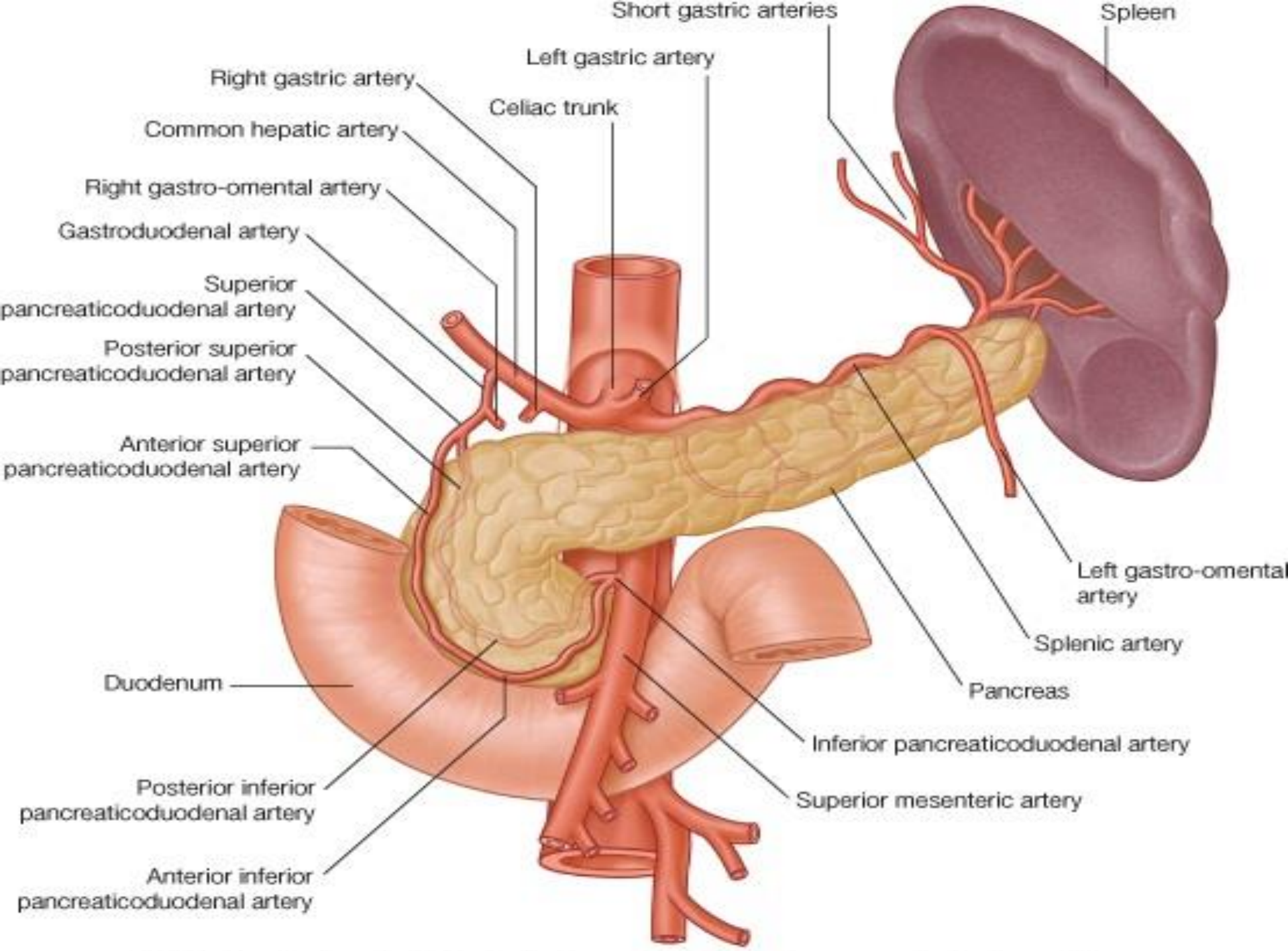
Blood supply of duodenum

- **Arteries**
  - Superior pancreaticoduodenal a.
  - Inferior pancreaticoduodenal a.
- **Veins**—follow arteries, draining directly into superior mesenteric and hepatic portal veins



Blood supply of duodenum




Short gastric arteries
Spleen
Left gastric artery
Right gastric artery
Celiac trunk
Common hepatic artery
Right gastro-omental artery
Gastroduodenal artery
Superior pancreaticoduodenal artery
Posterior superior pancreaticoduodenal artery
Anterior superior pancreaticoduodenal artery
Left gastro-omental artery
Splenic artery
Pancreas
Duodenum
Inferior pancreaticoduodenal artery
Superior mesenteric artery
Posterior inferior pancreaticoduodenal artery
Anterior inferior pancreaticoduodenal artery

Lymphatic drainage

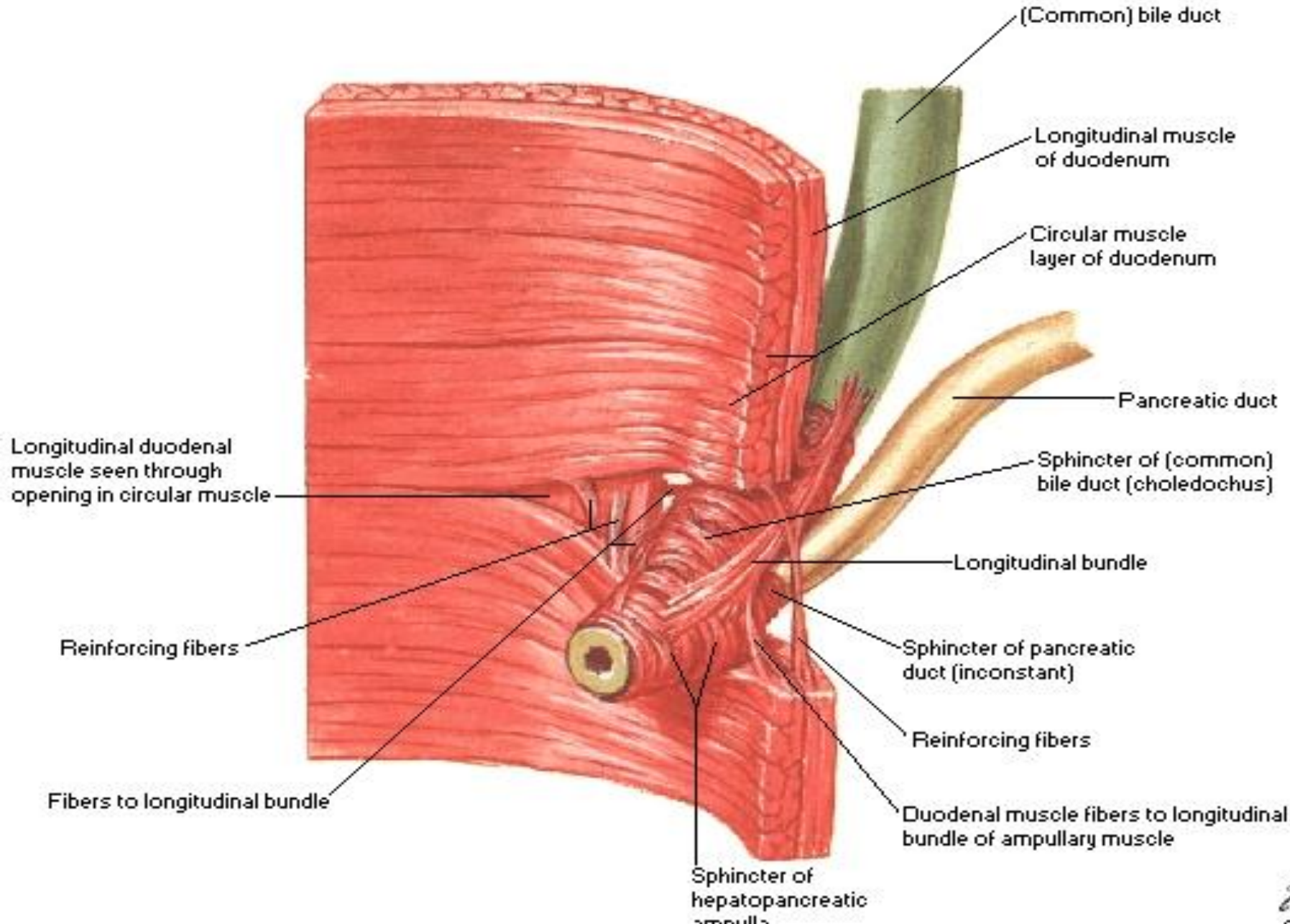
- The lymph vessels follow the arteries
- **drain upward**→ via pancreaticoduodenal nodes → the gastroduodenal nodes → the celiac nodes
- **drain downward** →via pancreaticoduodenal nodes→ the superior mesenteric nodes around the origin of the superior mesenteric artery.

Nerve supply

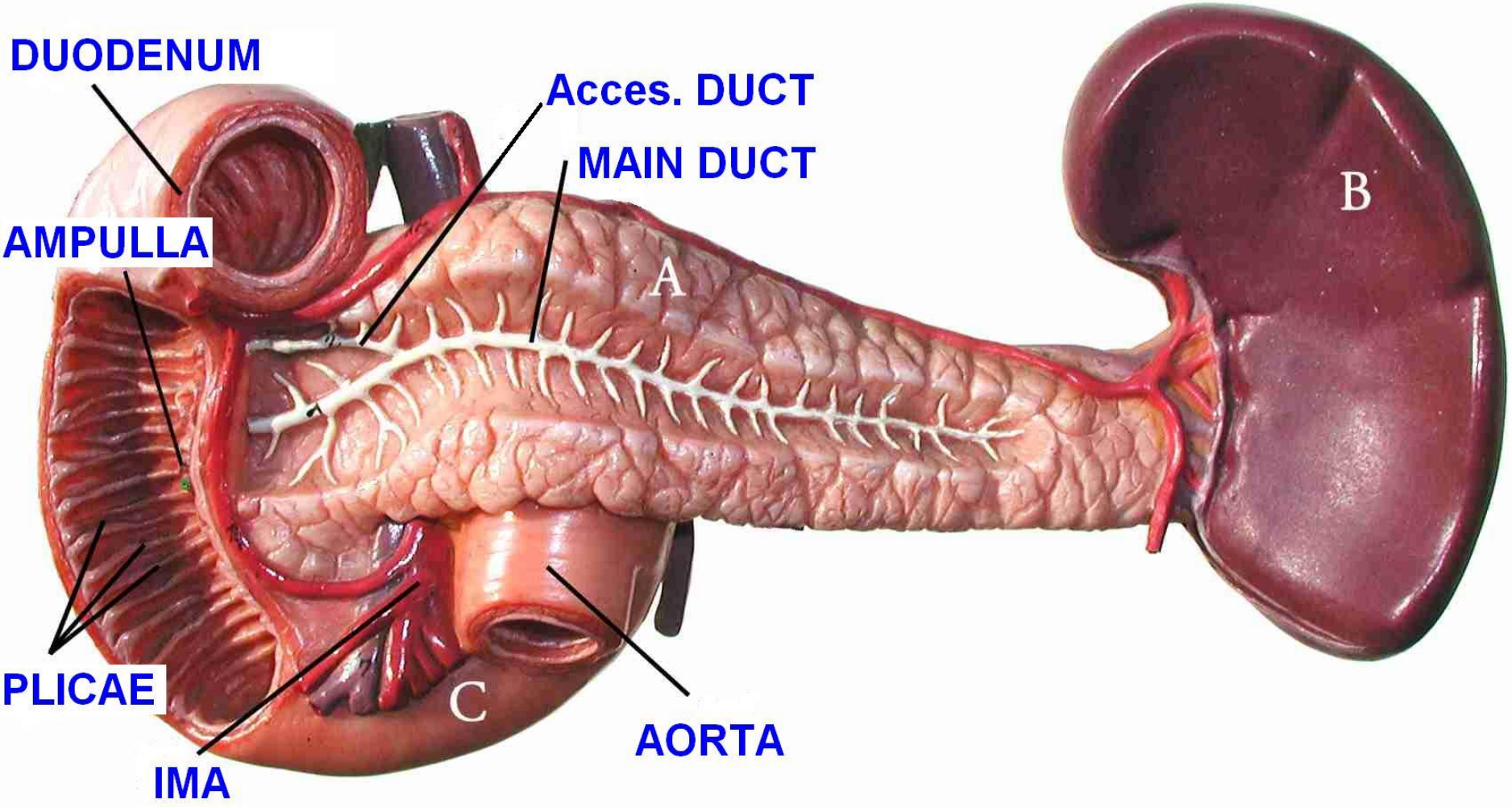
- Sympathetic nerve
- parasympathetic nerves from:
  1- The celiac plexus
  2- Superior mesenteric plexus.

Junction of Bile Duct and Duodenum

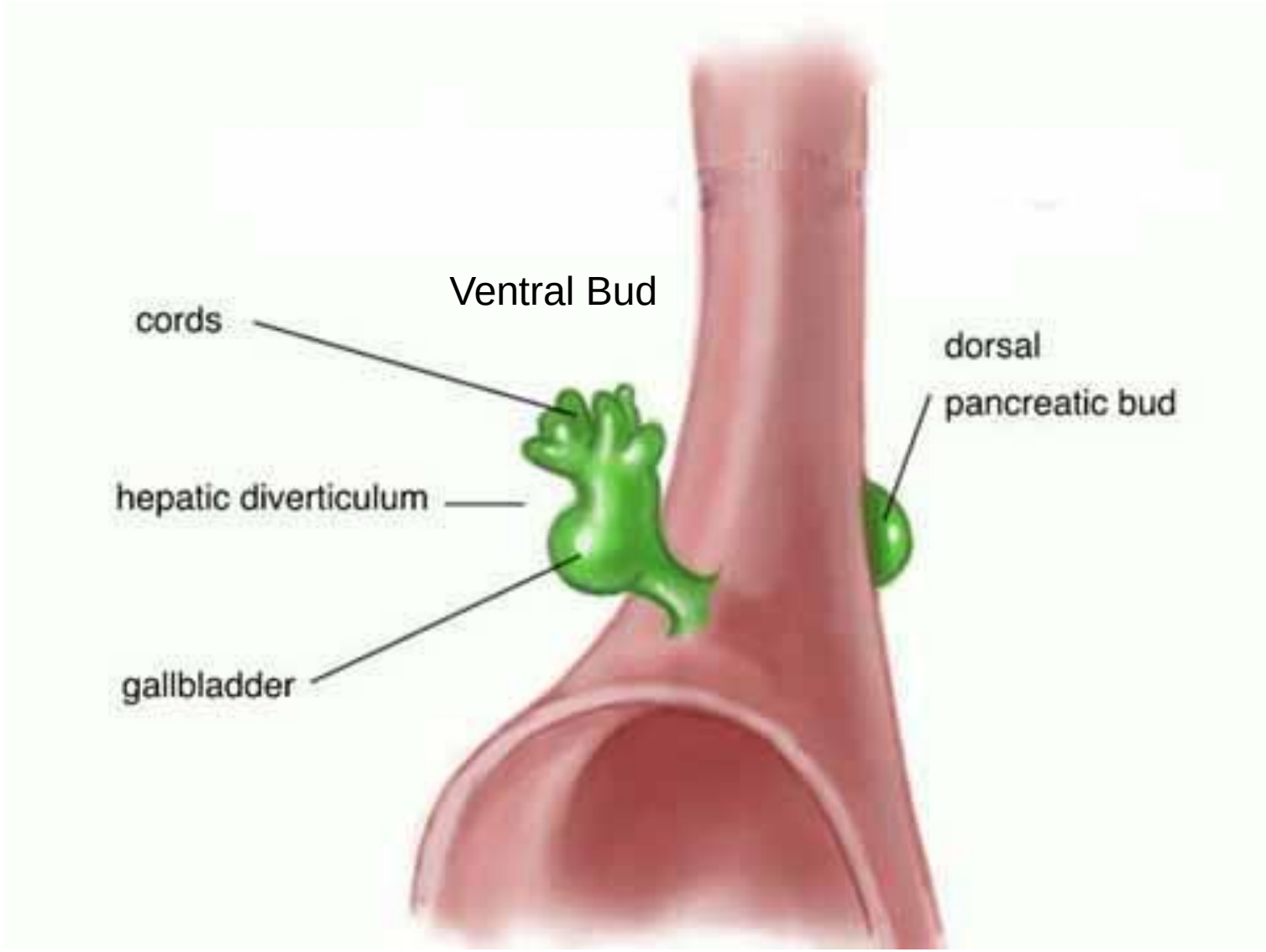
Dissection

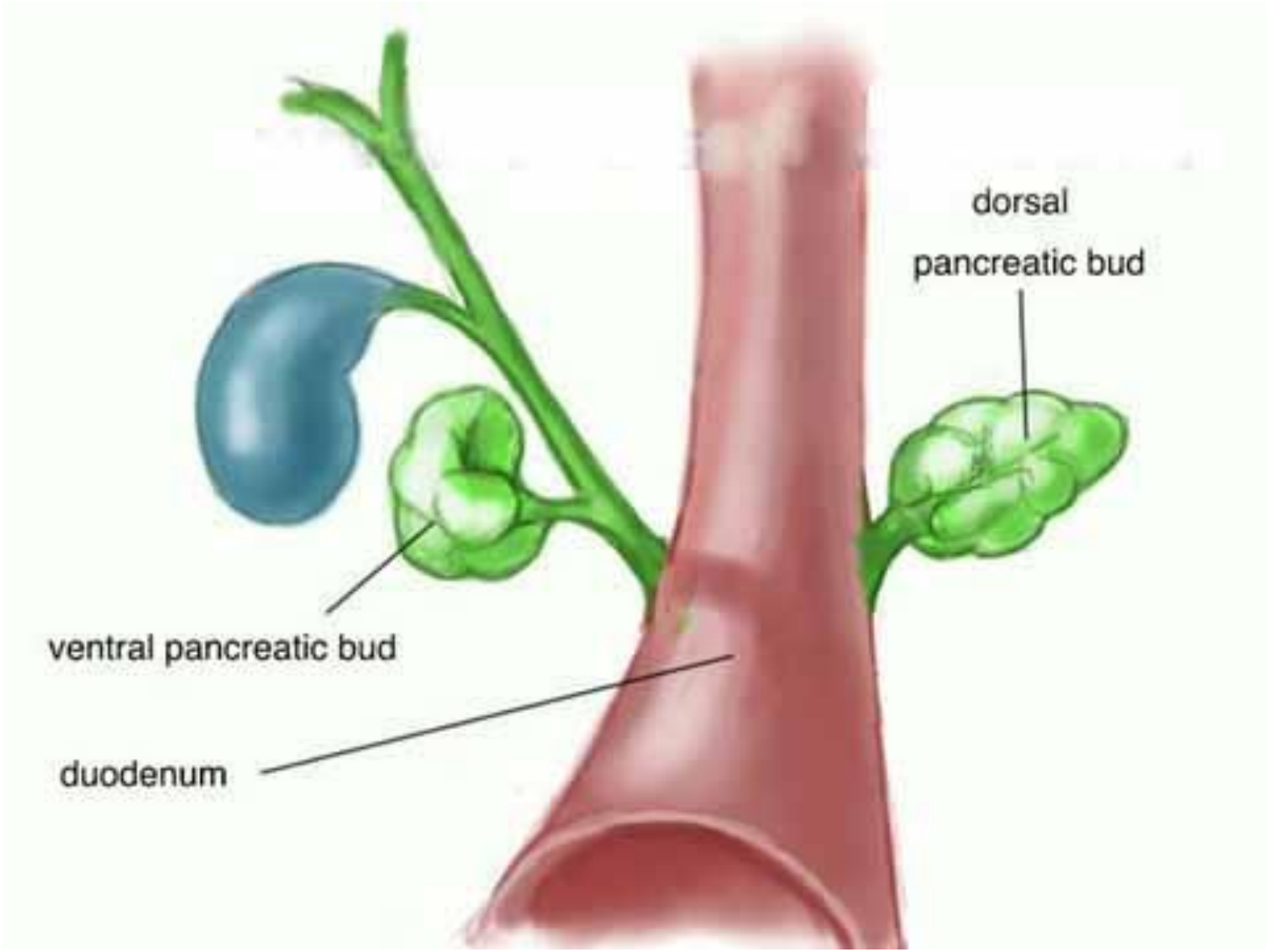


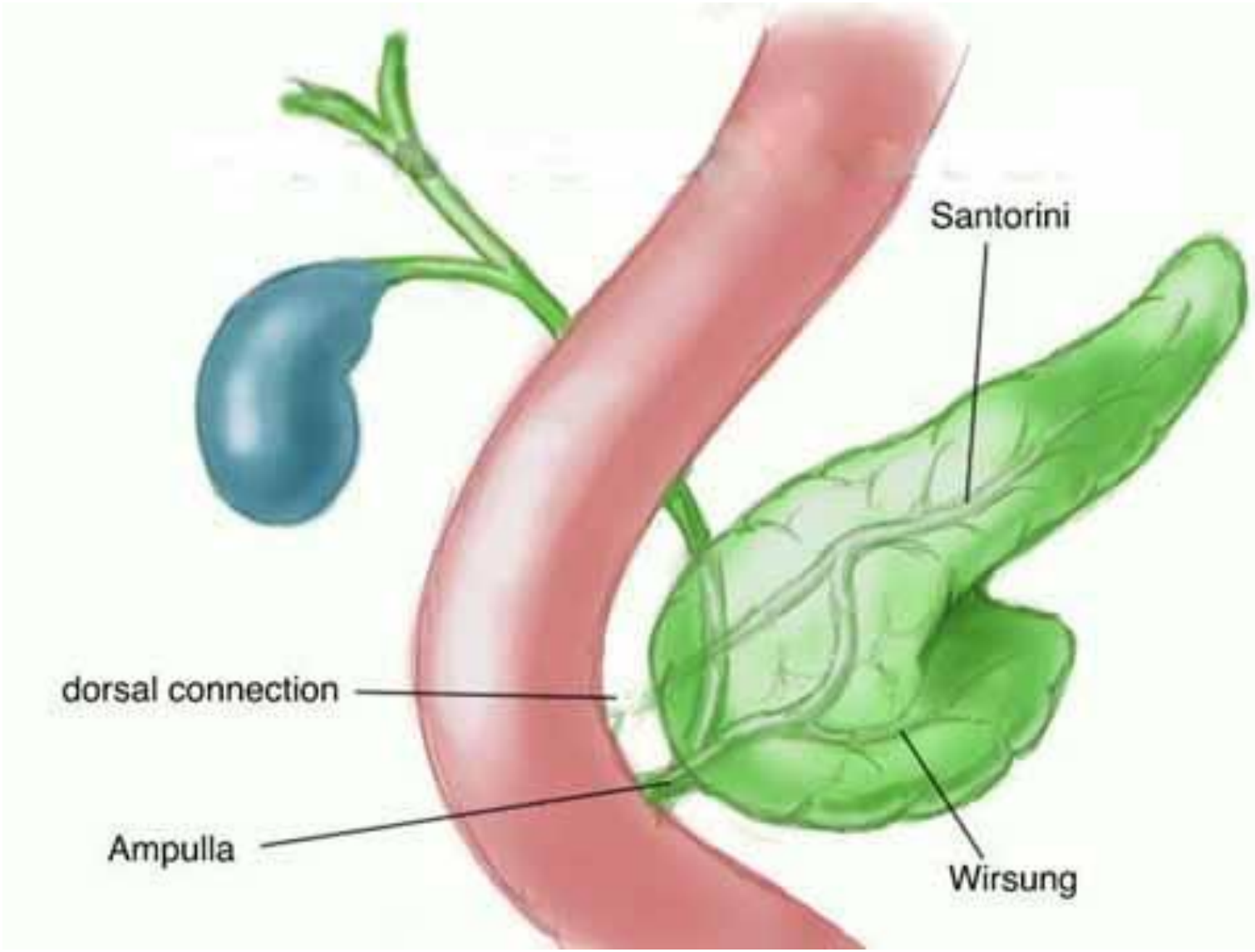
Hepaticopancreatic ampulla (Ampulla of Vater)



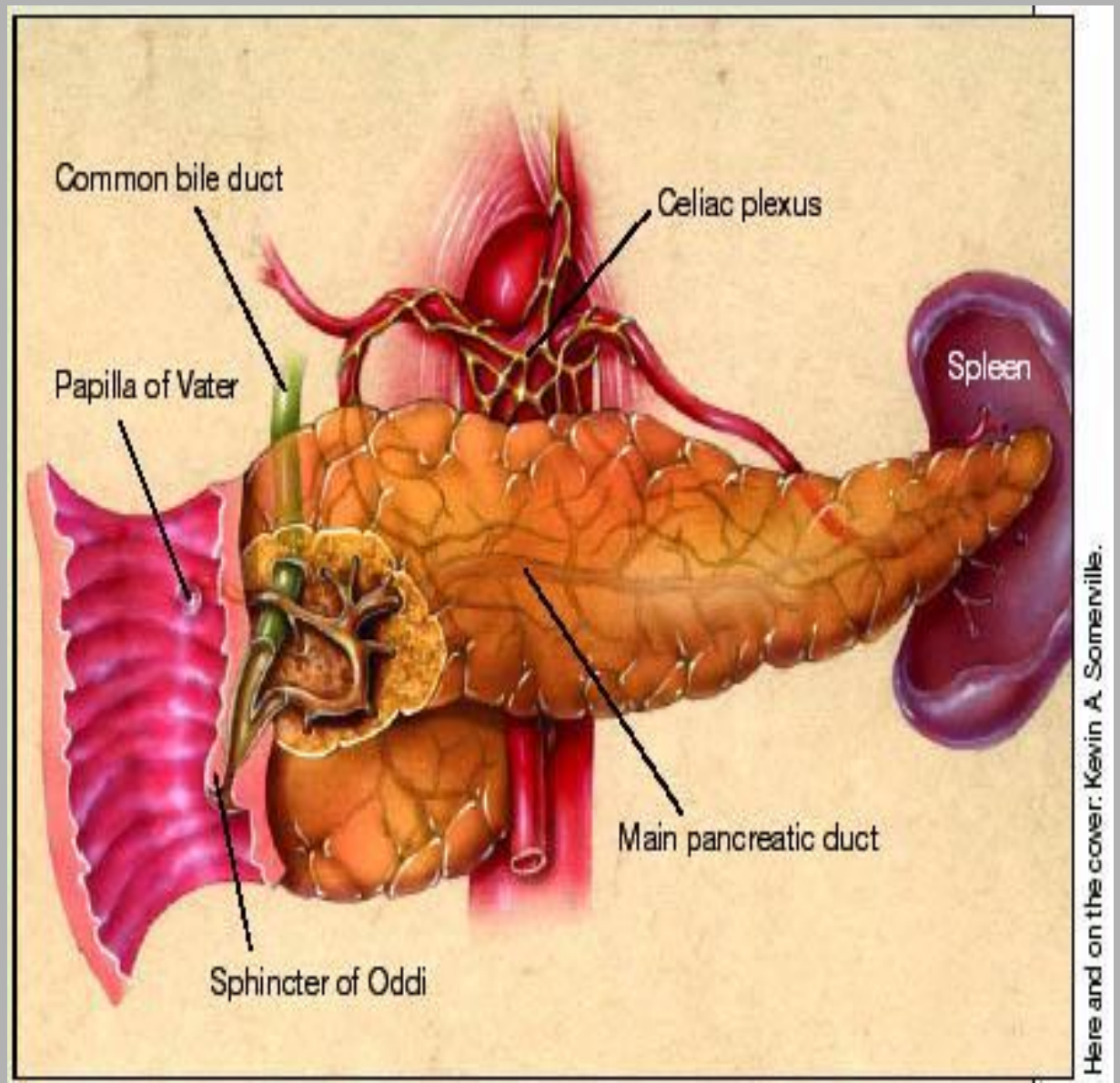
PANCREAS


Ventral Bud
cords
dorsal
pancreatic bud
hepatic diverticulum
gallbladder


dorsal
pancreatic bud
ventral pancreatic bud
duodenum


Santorini
dorsal connection
Ampulla
Wirsung

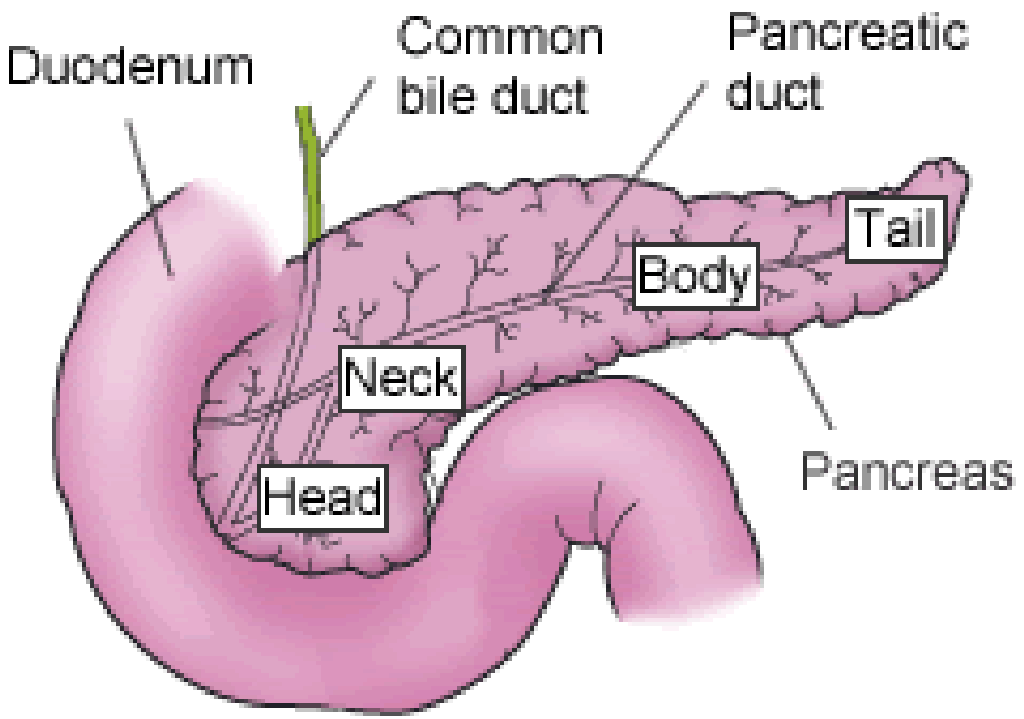
Normal Anatomy of the Pancreas



The pancreas is a retroperitoneal organ and is positioned in the anterior pararenal space. It is posterior to the stomach and lesser sac and anterior to the abdominal aorta and upper lumbar vertebrae.

Parts of pancreas :

- Head
- Neck
- Body
- Tail



Four parts

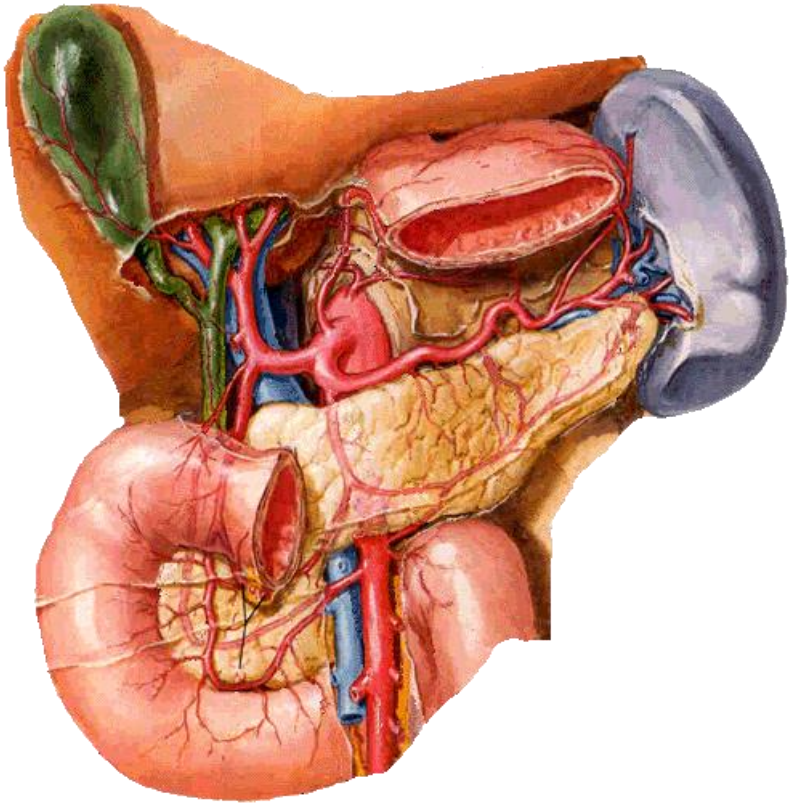
- **Head**
  - Lies within the concavity of the C-shaped curvatune of duodenum
  - **Uncinate process**— a projection to the left from the lower part of the head behind the superior mesenteric vessels.
- **Neck**—narrow part, overlies the superior mesenteric vessels and beginning of the portal vein

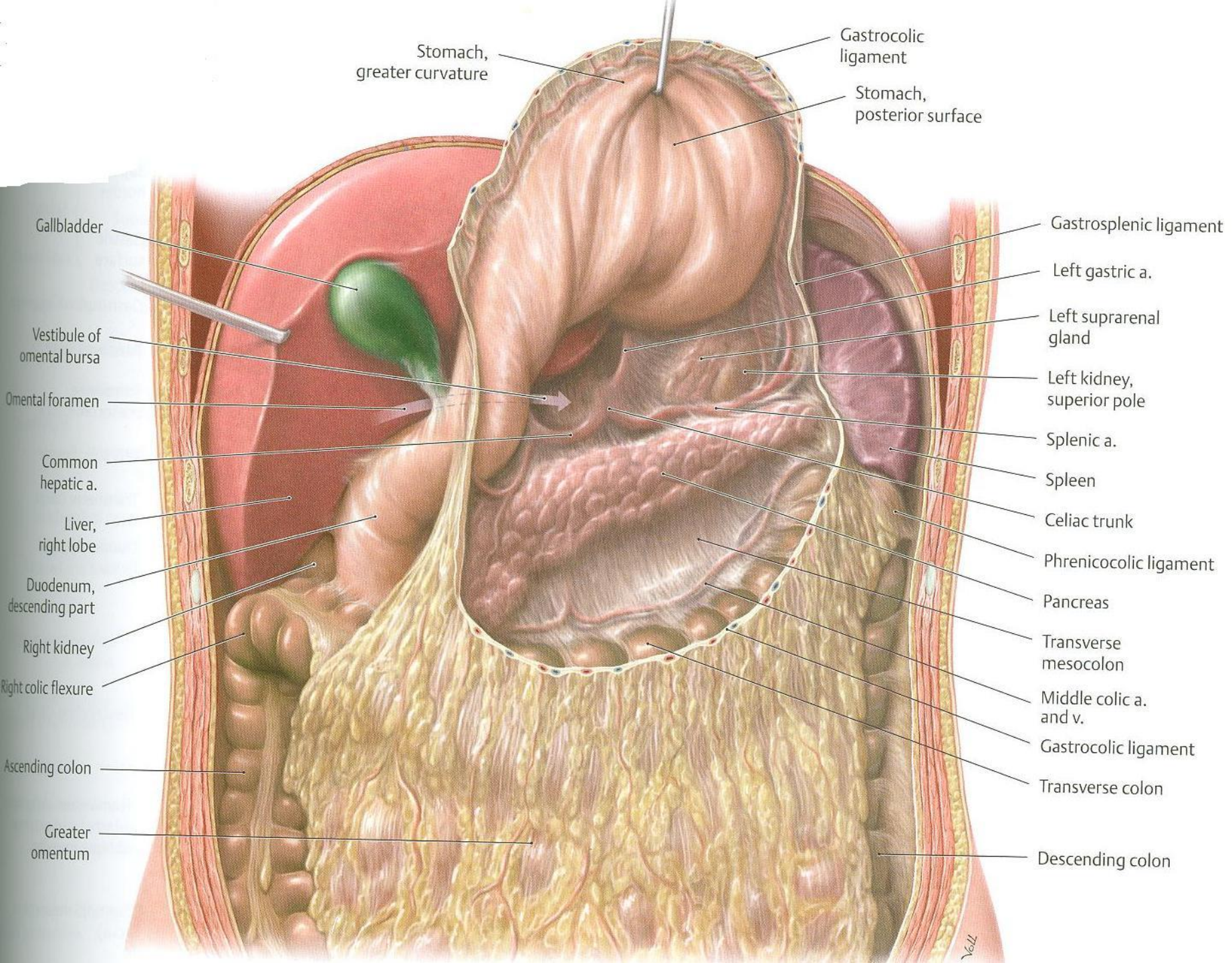
Body—

• Continues from the neck and lies to the left of the superior mesenteric vessels, passing over the aorta and L2 vertebra

• The posterior surface of the body is devoid of peritoneum and is in contact with the aorta, SMA, left suprarenal gland and left kidney and renal vessels

- **Tail**— Lies anterior to the left kidney extends to the hilum of spleen in the splenorenal ligament

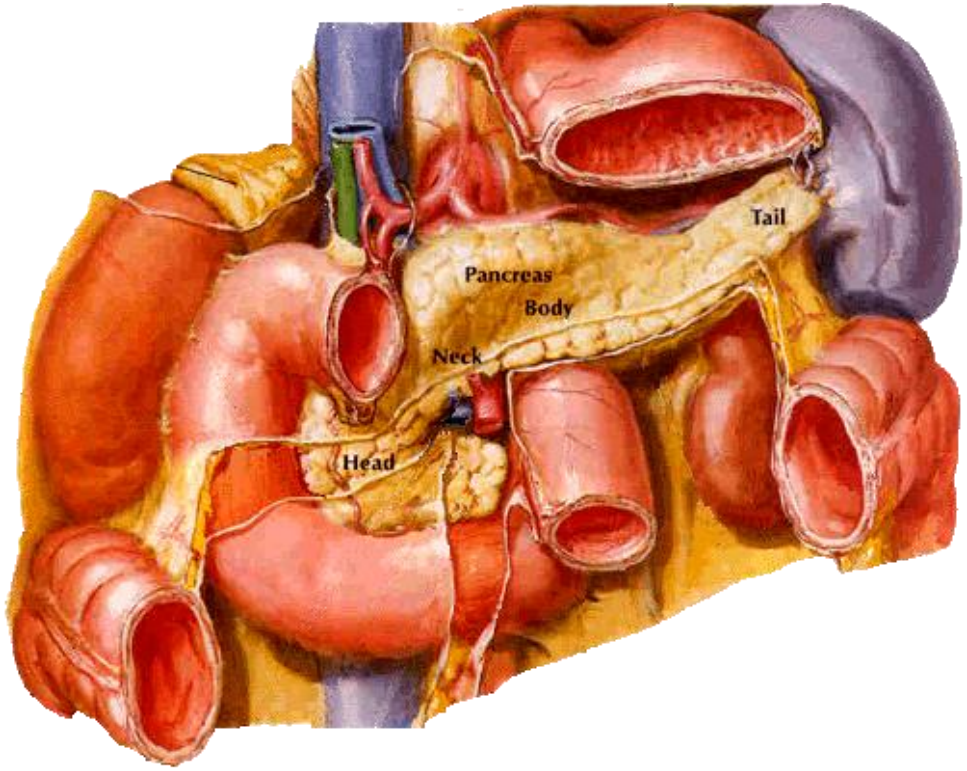



Stomach, greater curvature
Gastrocolic ligament
Stomach, posterior surface
Gallbladder
Gastrosplenic ligament
Left gastric a.
Vestibule of omental bursa
Left suprarenal gland
Omental foramen
Left kidney, superior pole
Splenic a.
Common hepatic a.
Spleen
Liver, right lobe
Celiac trunk
Duodenum, descending part
Phrenicocolic ligament
Pancreas
Right kidney
Transverse mesocolon
Right colic flexure
Middle colic a. and v.
Gastrocolic ligament
Ascending colon
Transverse colon
Greater omentum
Descending colon

Relations of pancreas

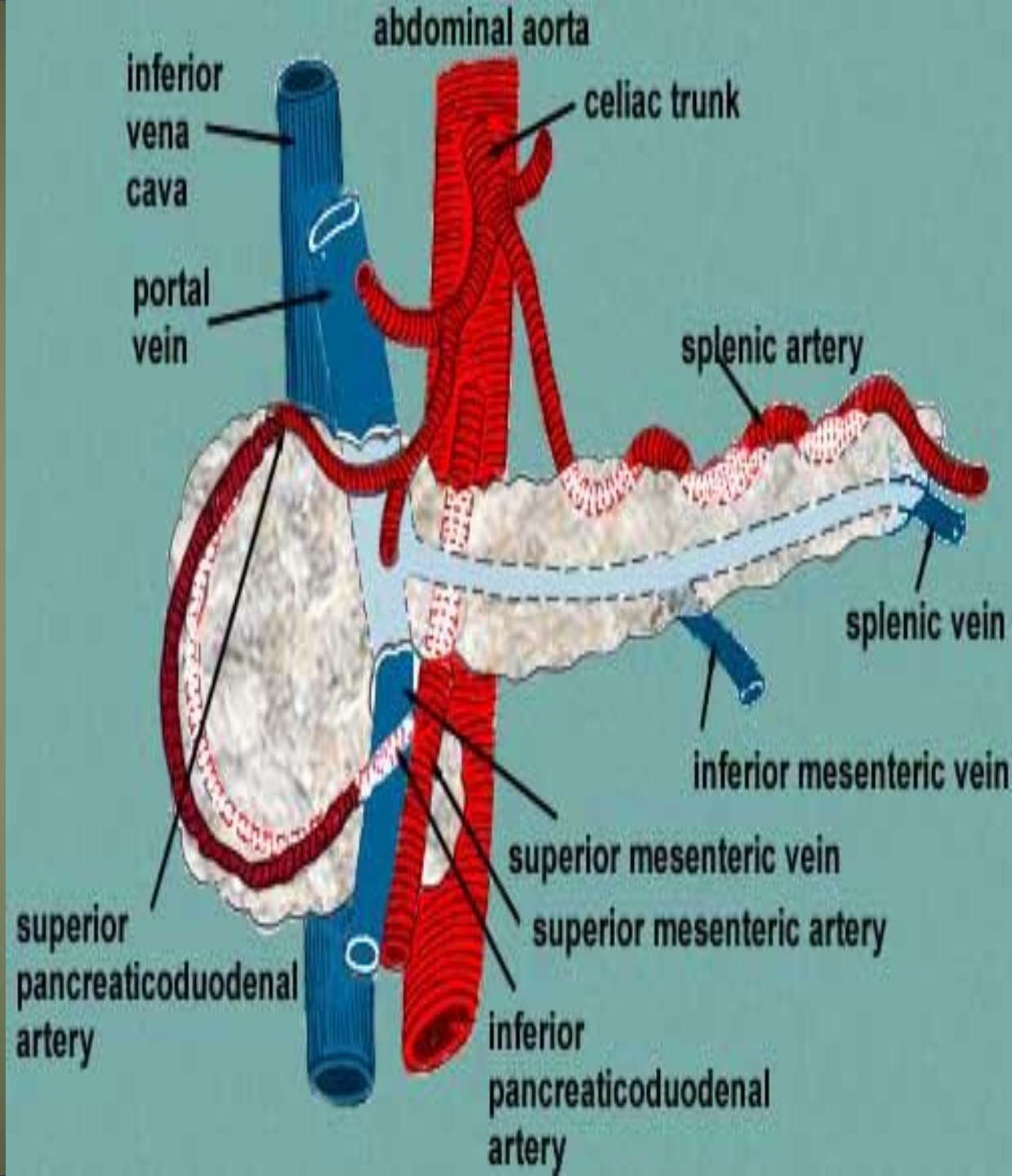
Head of pancreas

- Located in C-shapes curvature of doudenum
- **Anteriorly**
  - Transverse mesocolon
- **Posteriorly**
  - Inferior vena cava
  - Right renal vessels
  - Common bile duct



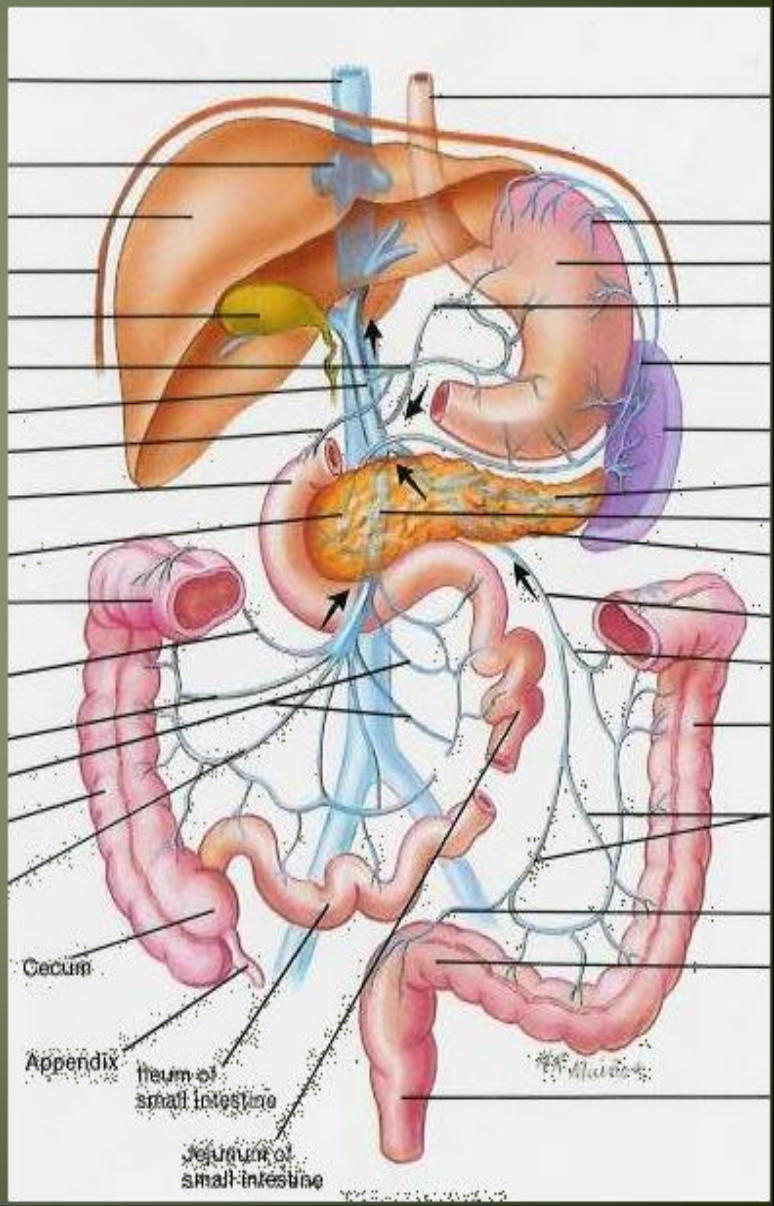
The neck

- It is the constricted portion of the pancreas
- connects the head to the body.
- It lies in front of the beginning of the portal vein the origin of the



Body of pancreas...cont

- Three surfaces: **anterior, posterior,** and **inferior.**
- **Three borders: ant ,post & inf**



The **anterior surface**

1- Covered by peritoneum of post. Wall of lesser sac

2- Tuber omental *:*

where the ant. surface of pancreas join the neck

Body of pancreas…cont

The **posterior surface**

- devoid of peritoneum
- in contact with

1- the aorta

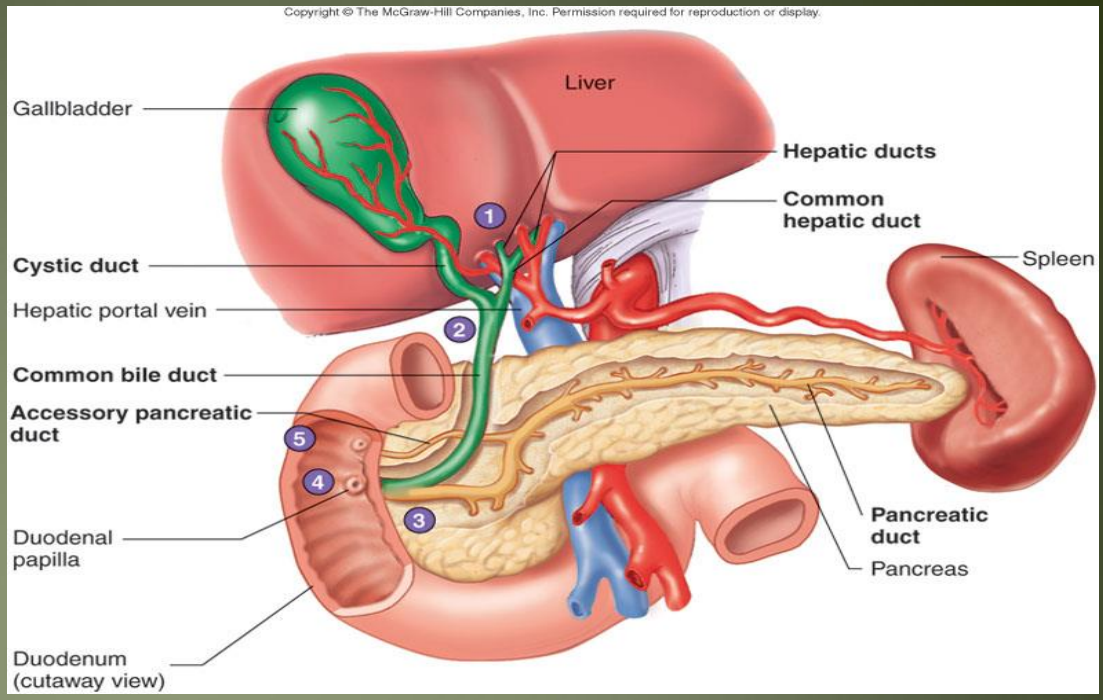
2- the splenic vein

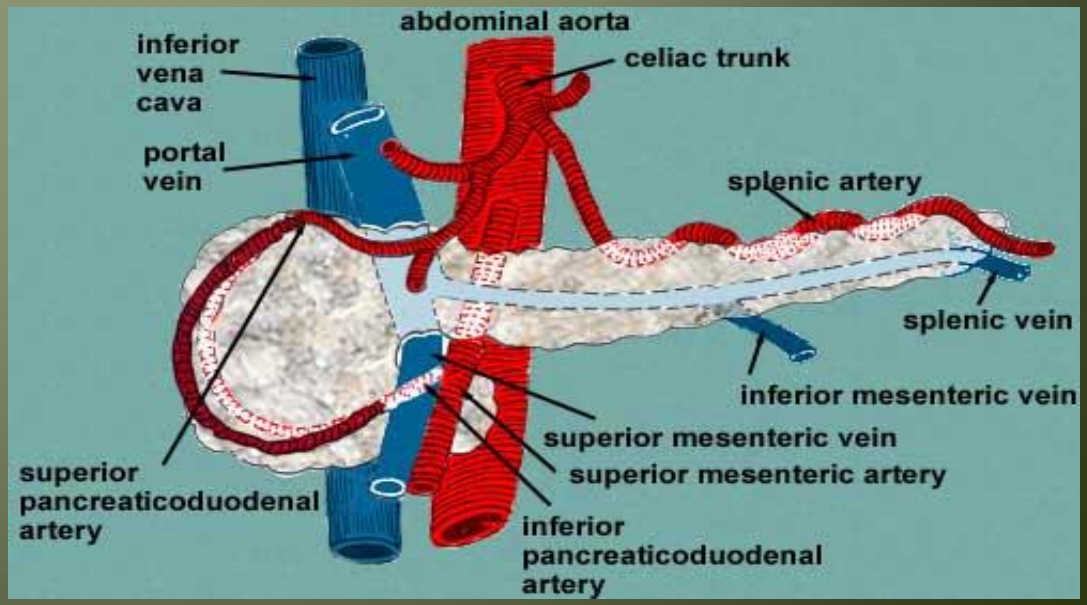
3- the left kidney and its vessels

4- the left suprarenal gland

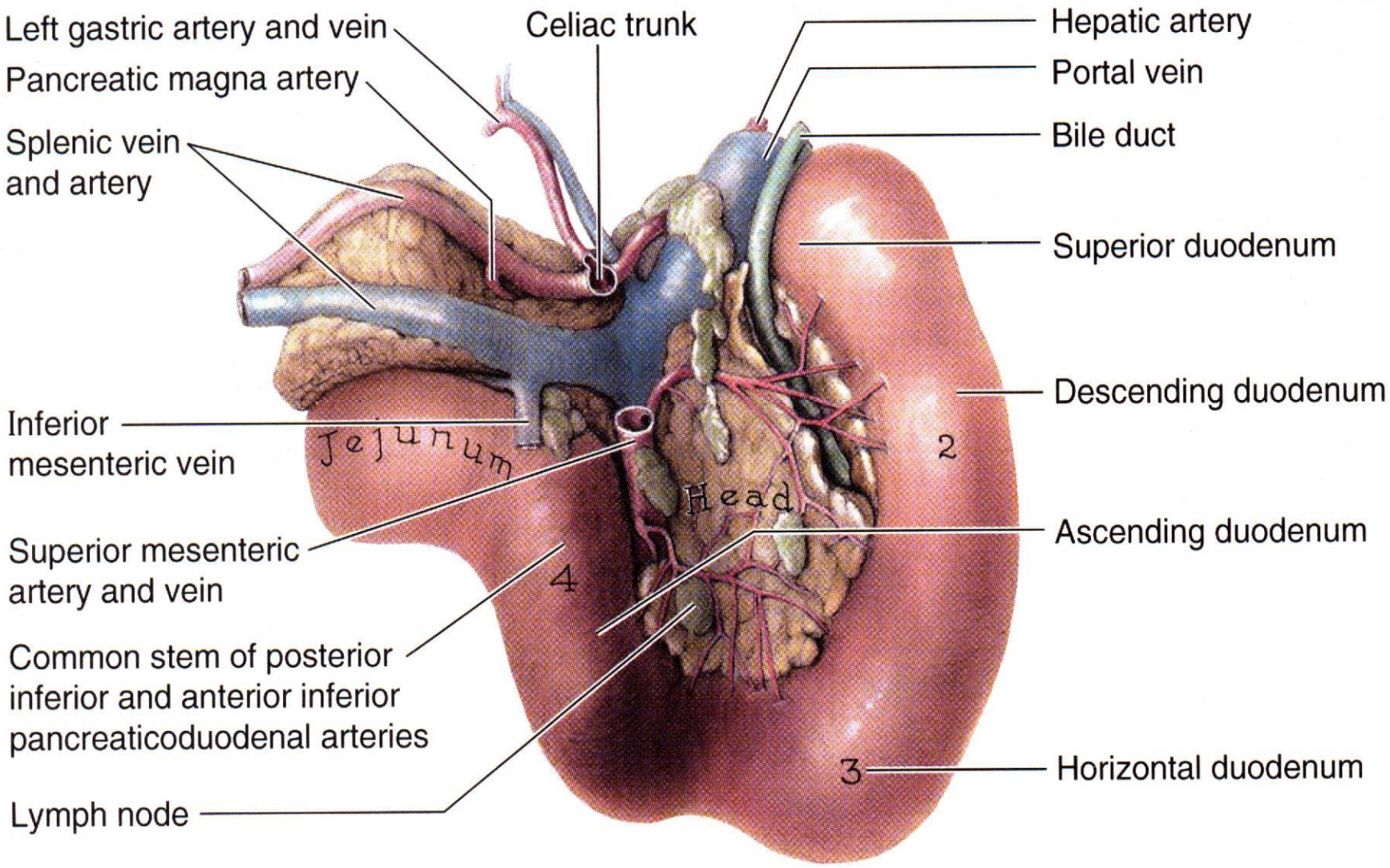
5- the origin of the superior mesenteric artery

6- and the crura of the diaphragm.





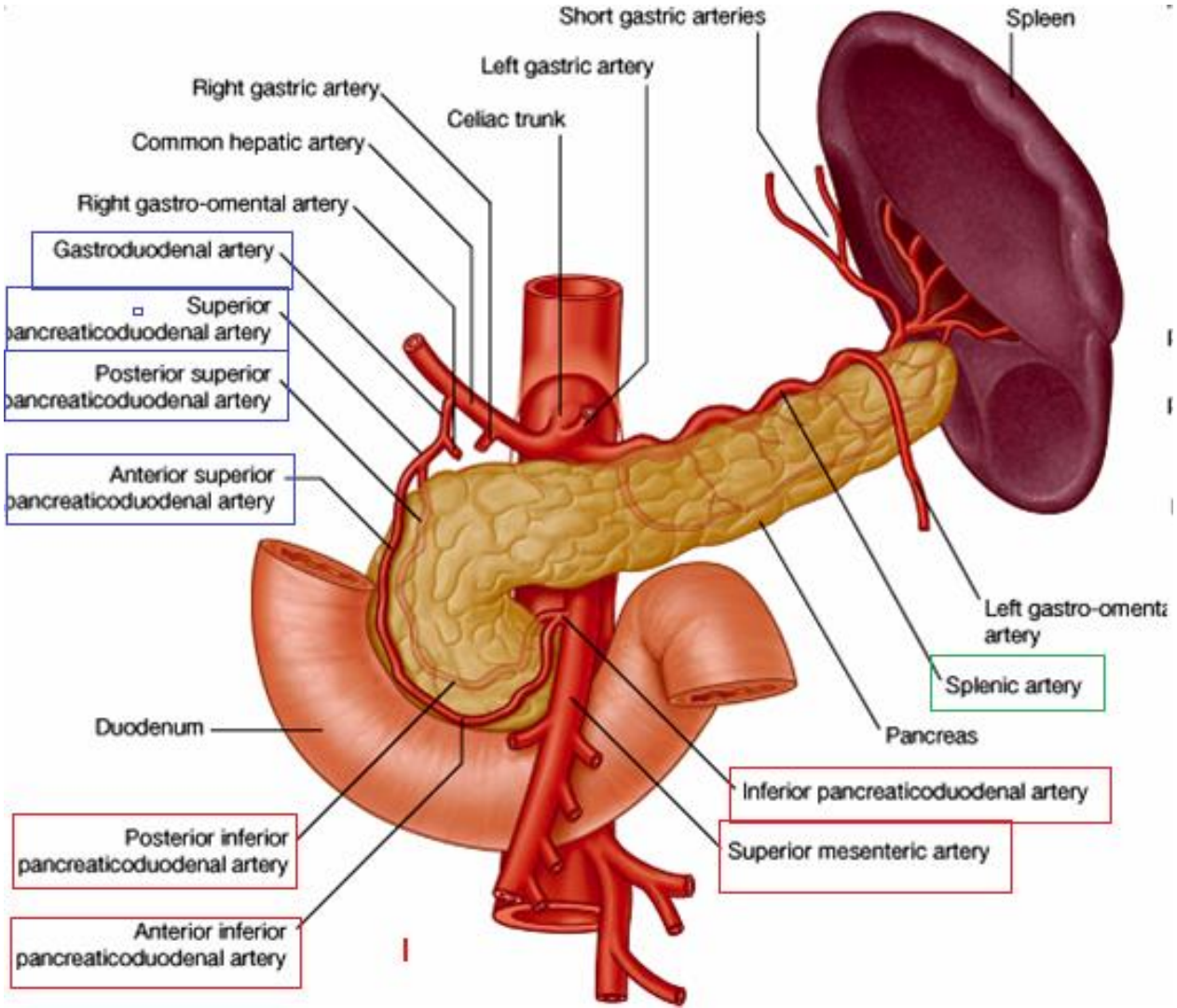
Posterior view of duodenum/pancreas



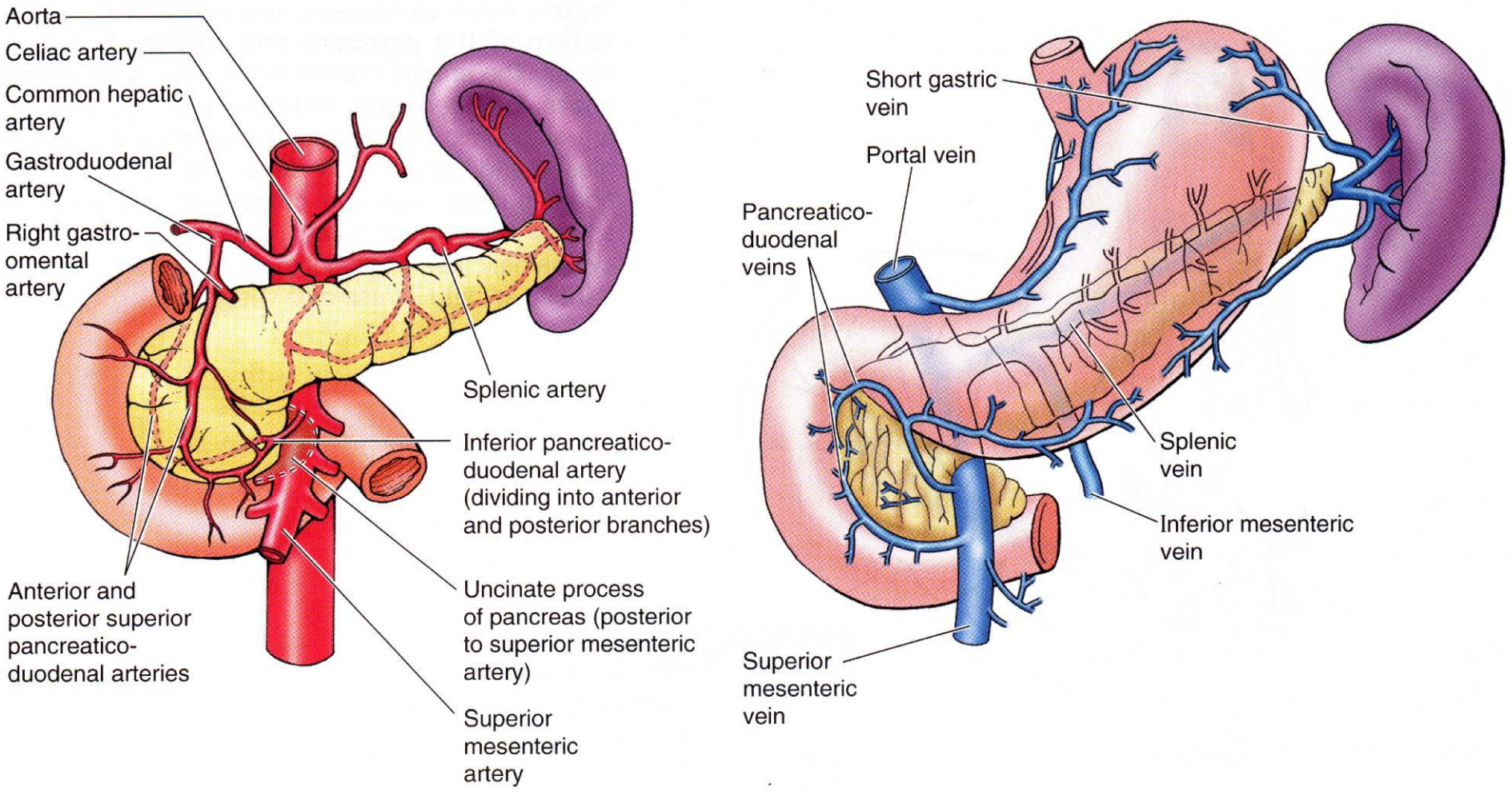
-The **pancreatic arteries** derive mainly from the branches of the splenic artery

-**The anterior and posterior superior pancreaticoduodenal arteries**, branches of the gastroduodenal artery

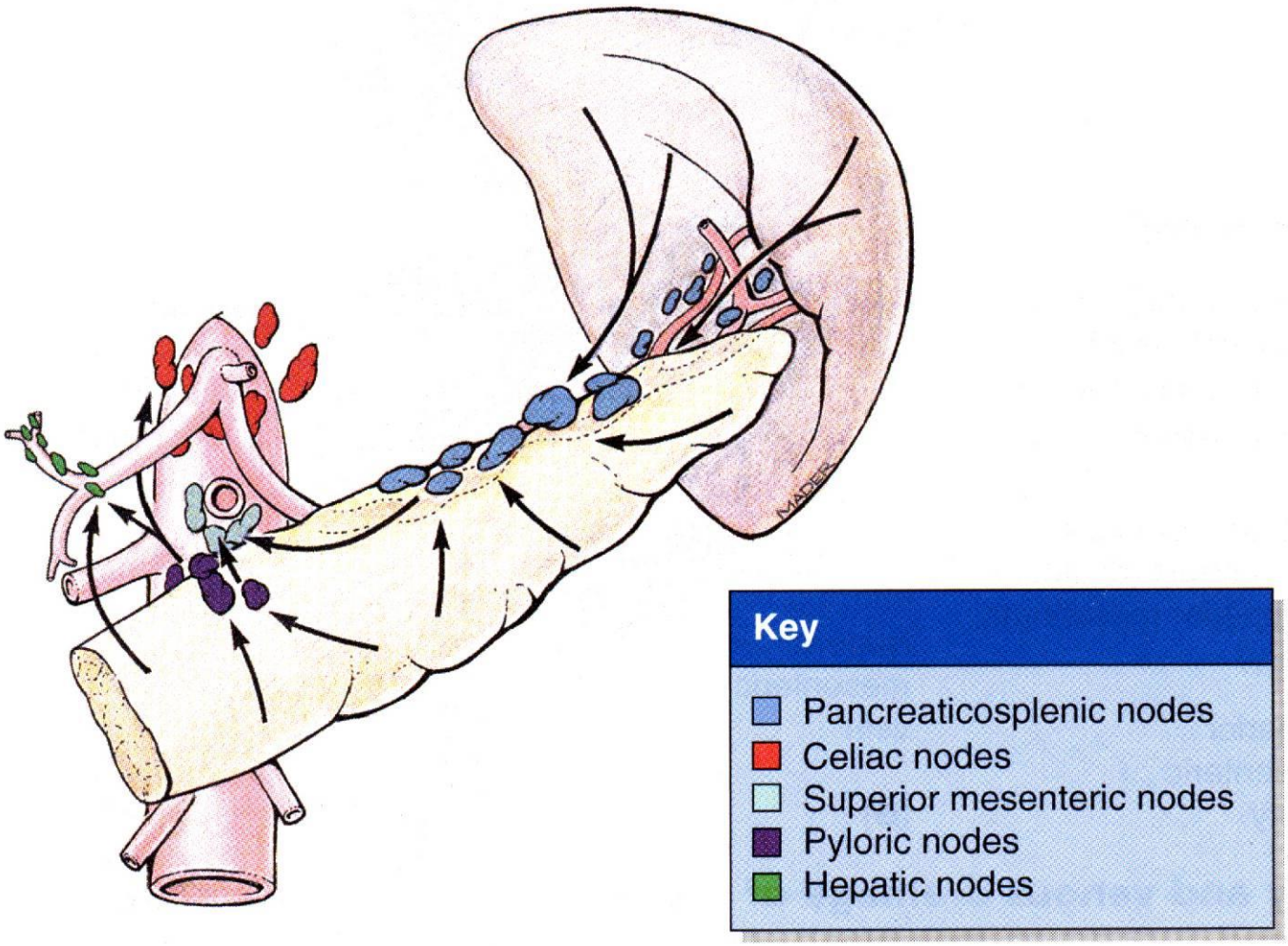
-**The anterior and posterior inferior pancreaticoduodenal arteries**, branches of the SMA



Arterial supply and venous drainage of the pancreas and spleen



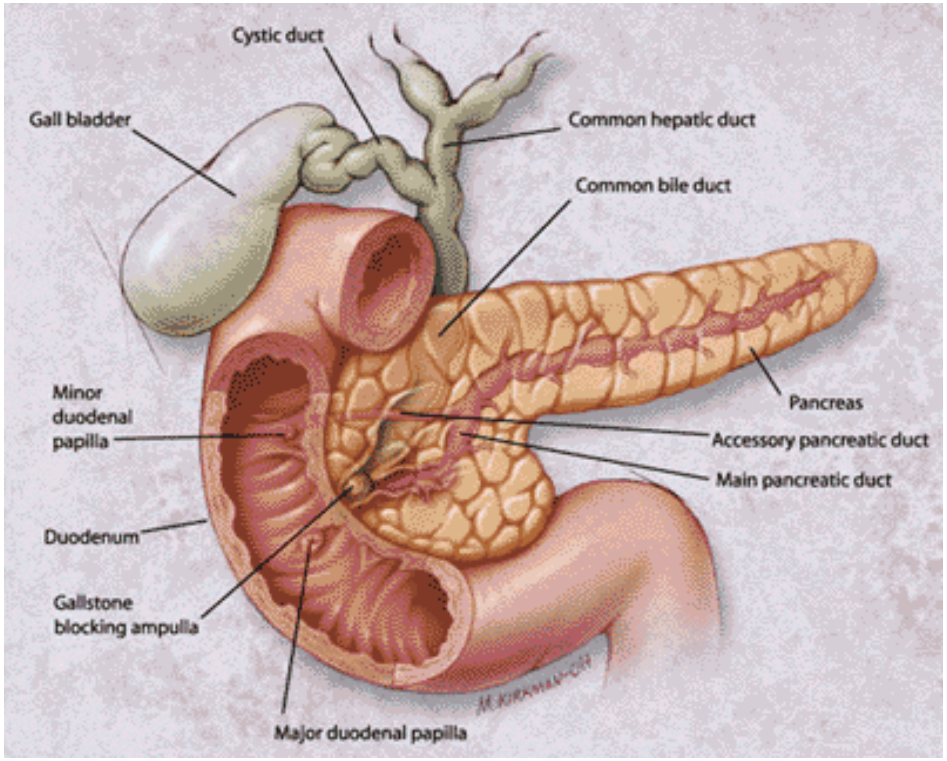
Lymphatic drainage of the distal pancreas and spleen

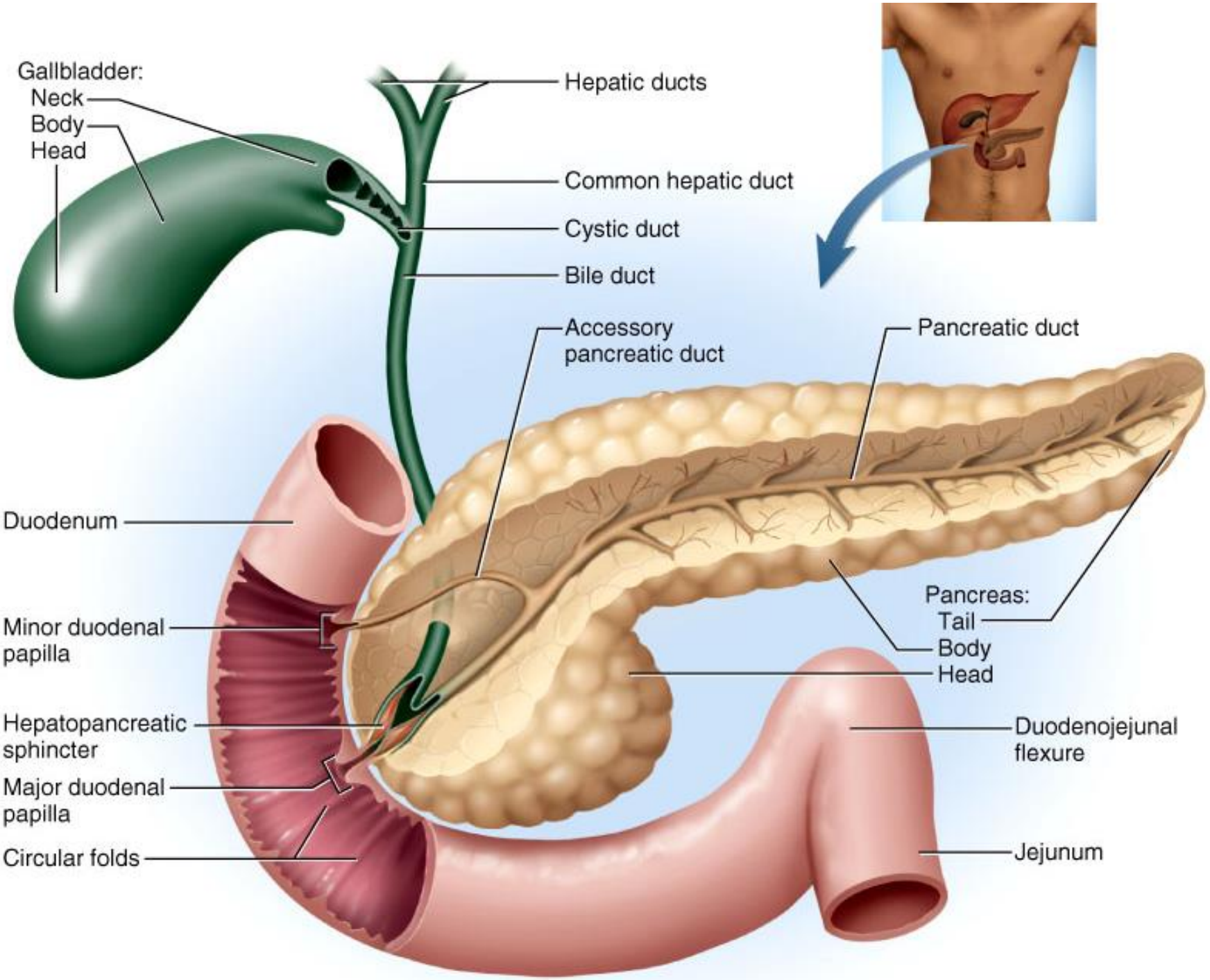


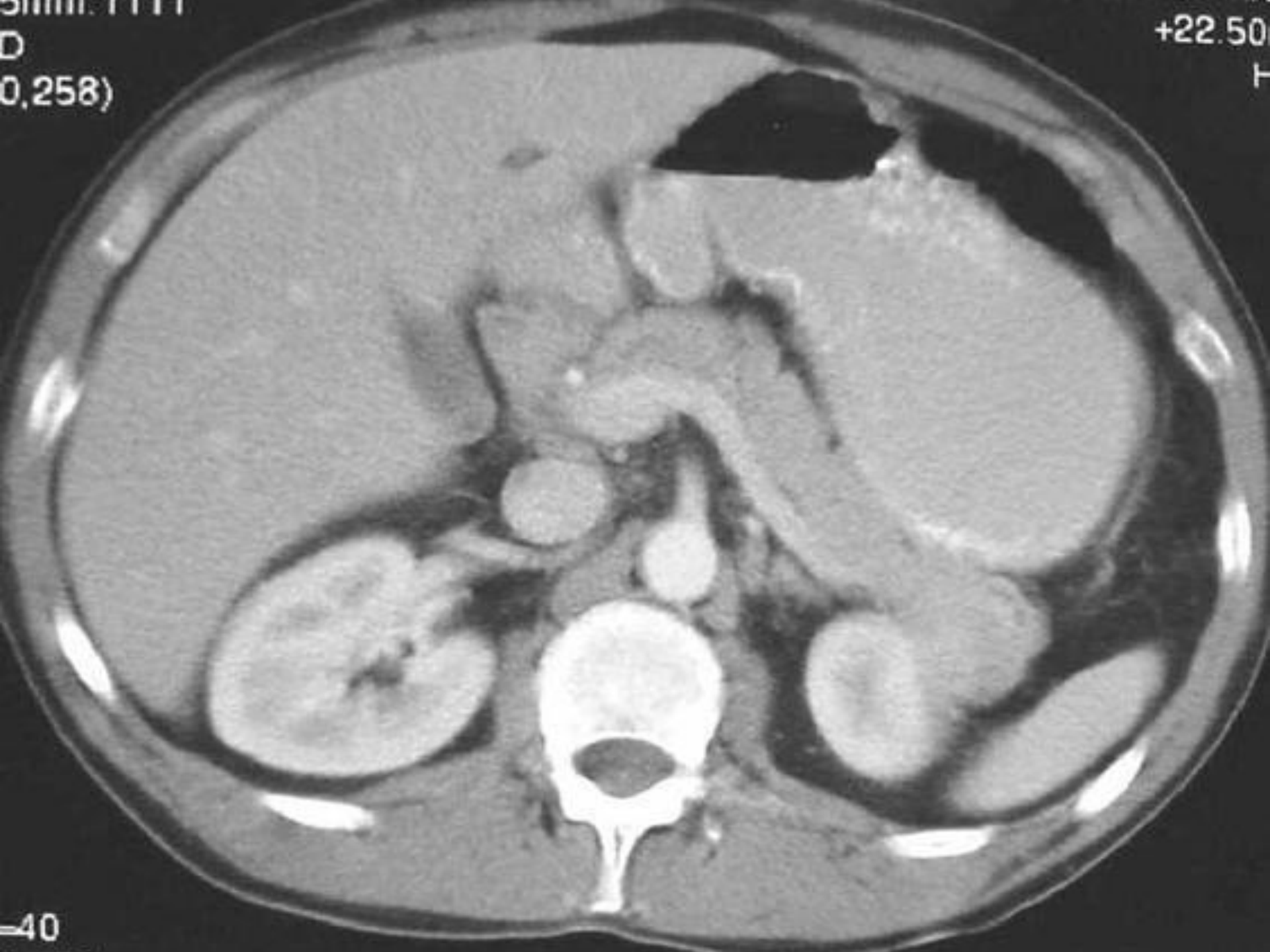
The main pancreatic duct

- Begins in the tail of the pancreas and runs through the parenchyma of the gland to the pancreatic head, here it turns inferiorly and is closely related to the bile duct.

- Most of the time, the main pancreatic duct and the bile duct unite to form the short, dilated hepatopancreatic ampulla (of vater), which opens into the descending part of the duodenum at the summit of the major duodenal papilla



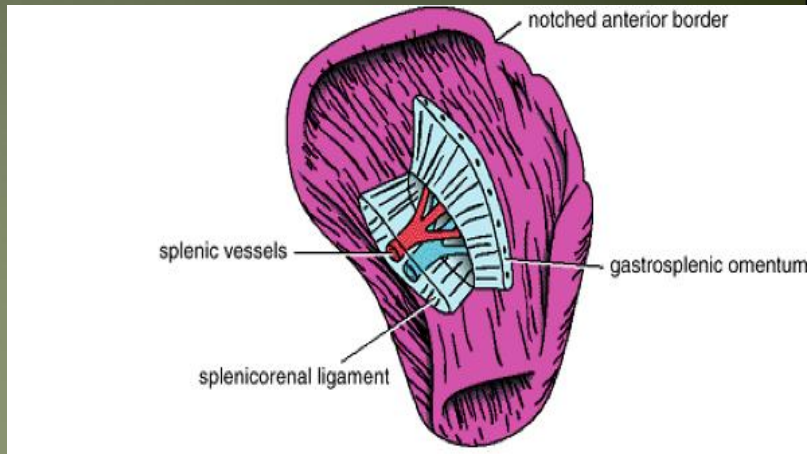

Gallbladder:
Neck
Body
Head
Hepatic ducts
Common hepatic duct
Cystic duct
Bile duct
Accessory pancreatic duct
Pancreatic duct
Duodenum
Minor duodenal papilla
Hepatopancreatic sphincter
Major duodenal papilla
Circular folds
Pancreas:
Tail
Body
Head
Duodenojejunal flexure
Jejunum

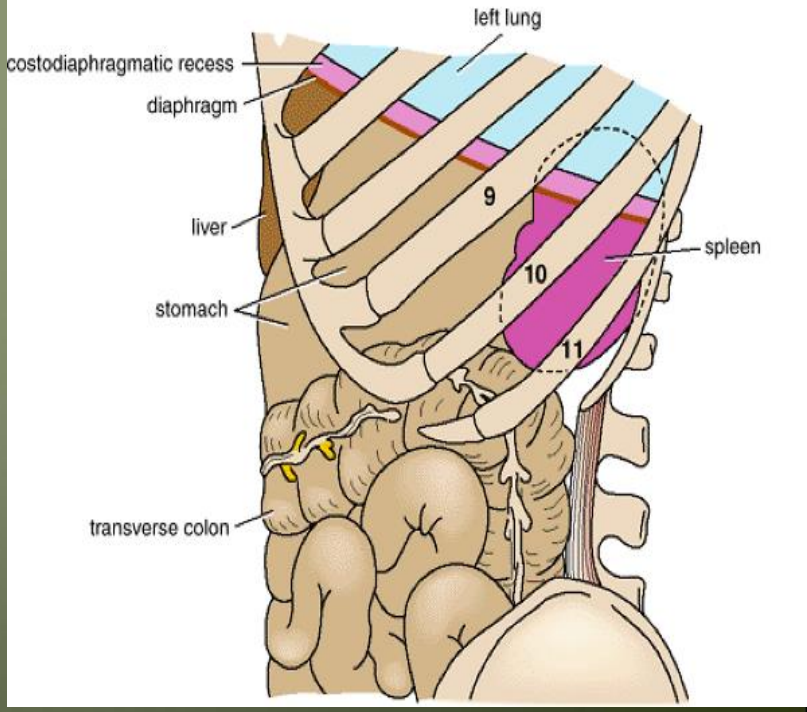

5mm. 1111
D
0.258)
+22.50
H
-40

Spleen

Location and Description

- it is reddish & oval shaped
- the largest single mass of lymphoid tissue in the body.
- and
- has a notched anterior border.
- location:
- Lt hypochondrium
- It lies just beneath the left half of the diaphragm
- under the 9th, 10th, and 11th ribs.
- Its long axis parallel to the 10th rib
- Medial end is 4 cm away from mid line post
- Lat.end is in left mid axillary line





Spleen

- Peritoneum
- The spleen is completely covered with peritoneum → intraperitoneal organ
- Two ligaments

1- the gastrosplenic omentum (ligament)→ between the spleen & the greater curvature of the stomach (carrying the short gastric and left gastroepiploic vessels)

2- splenicorenal ligament→ between spleen & kidney (carrying the splenic vessels and the tail of the pancreas).

Spleen.....

Size

1 inch thick

3 inch broad

5 inch long

Weight

7 ounce

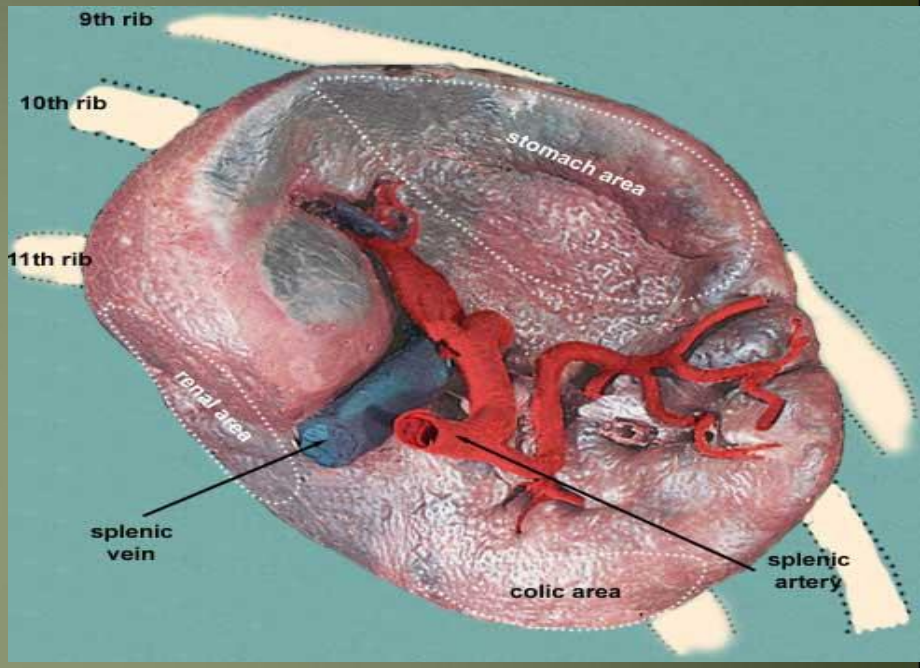
Shape → variable

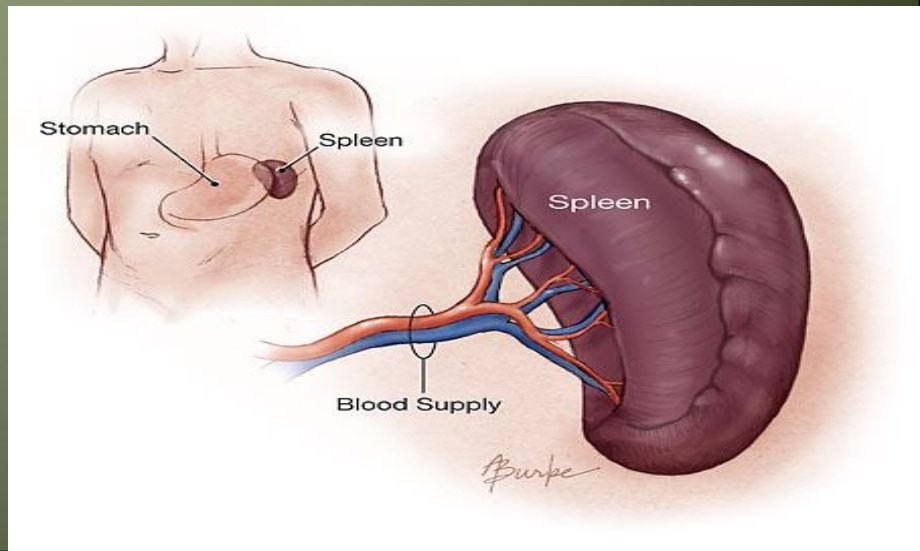
2 ends

2 borders

2 surfaces

Notched





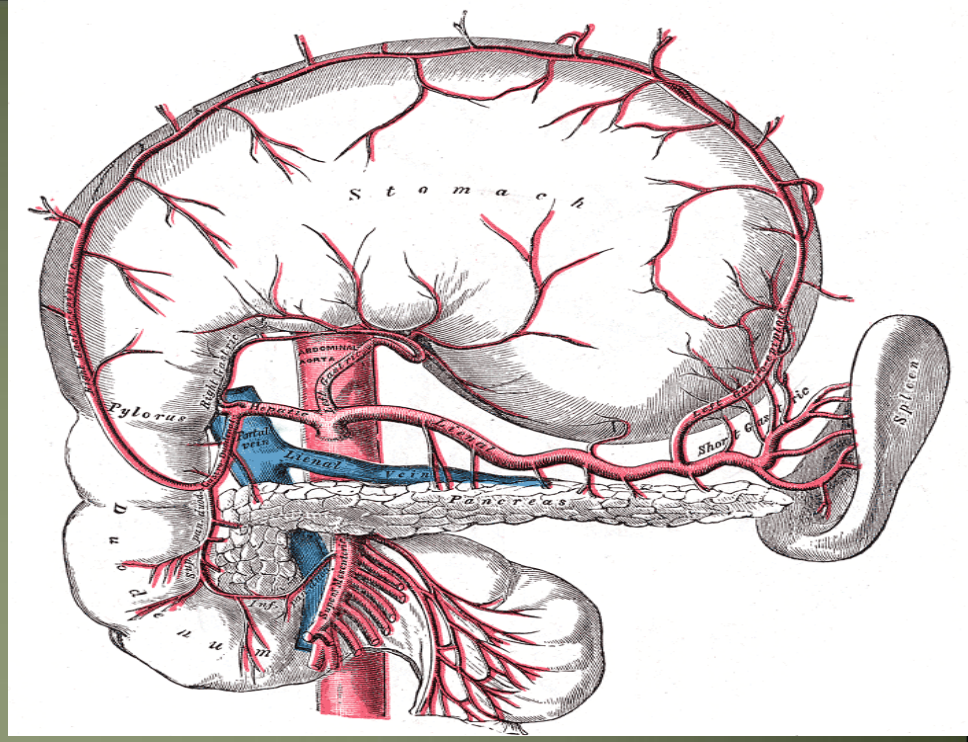
Surfaces of spleen

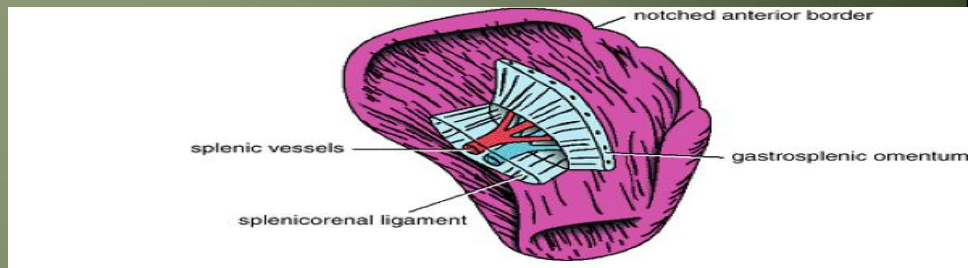
2 surfaces

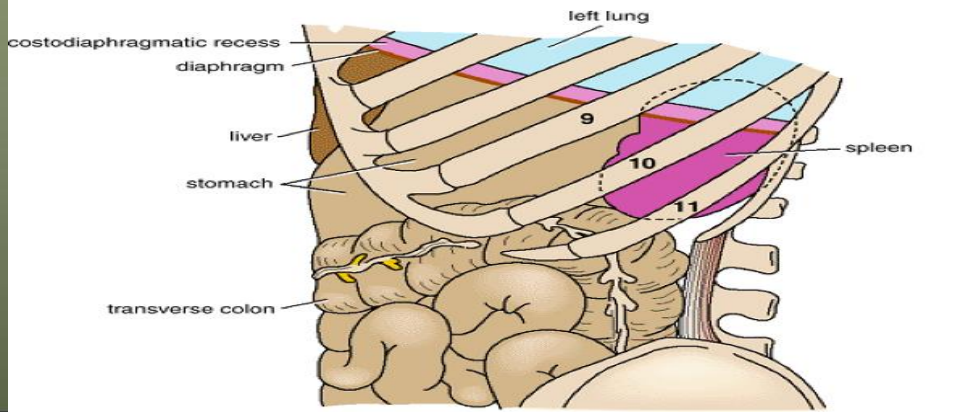
- Diaphragmatic surface
- Visceral surface

1- Diaphragmatic surface

- Has Post- lat.relation
- Convex
- Smooth
- Diaphragm separates it from
  - Pleura & lung
  - Ribs 9,10 ,11







Spleen…..cont

2- Visceral surface

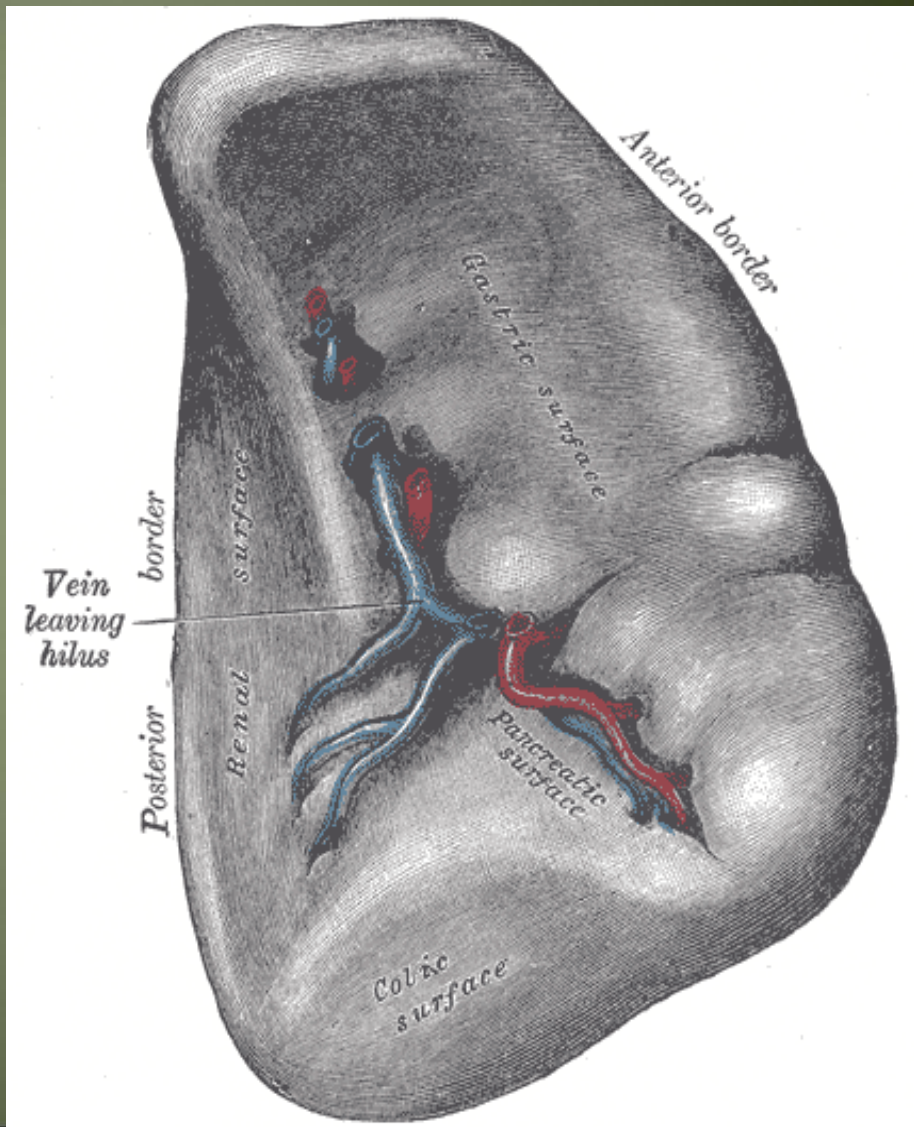
- Has Ant- med. Relations
- **It** is divided by a ridge into

1- An anterior or gastric

2- A posterior or renal portion.

Lower extremity has

- Colic surface
- Pancreatic surface

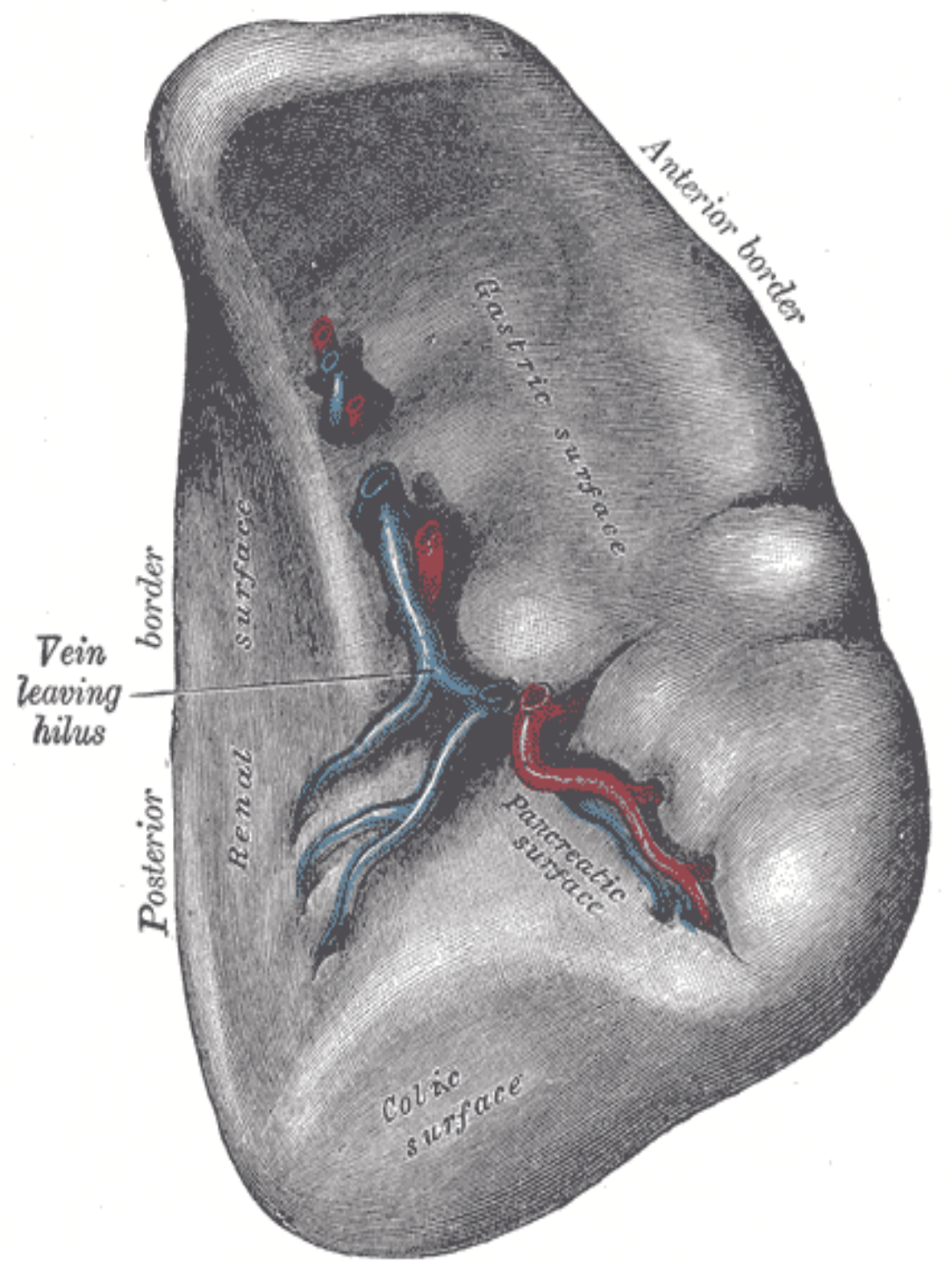


Gastric surface

- Extends forward, upward, and medialward
- Broad and concave
- Related to stomach

Renal surface

- Directed medialward and downward.
-It is somewhat flattened
- Related to Lt.kidney

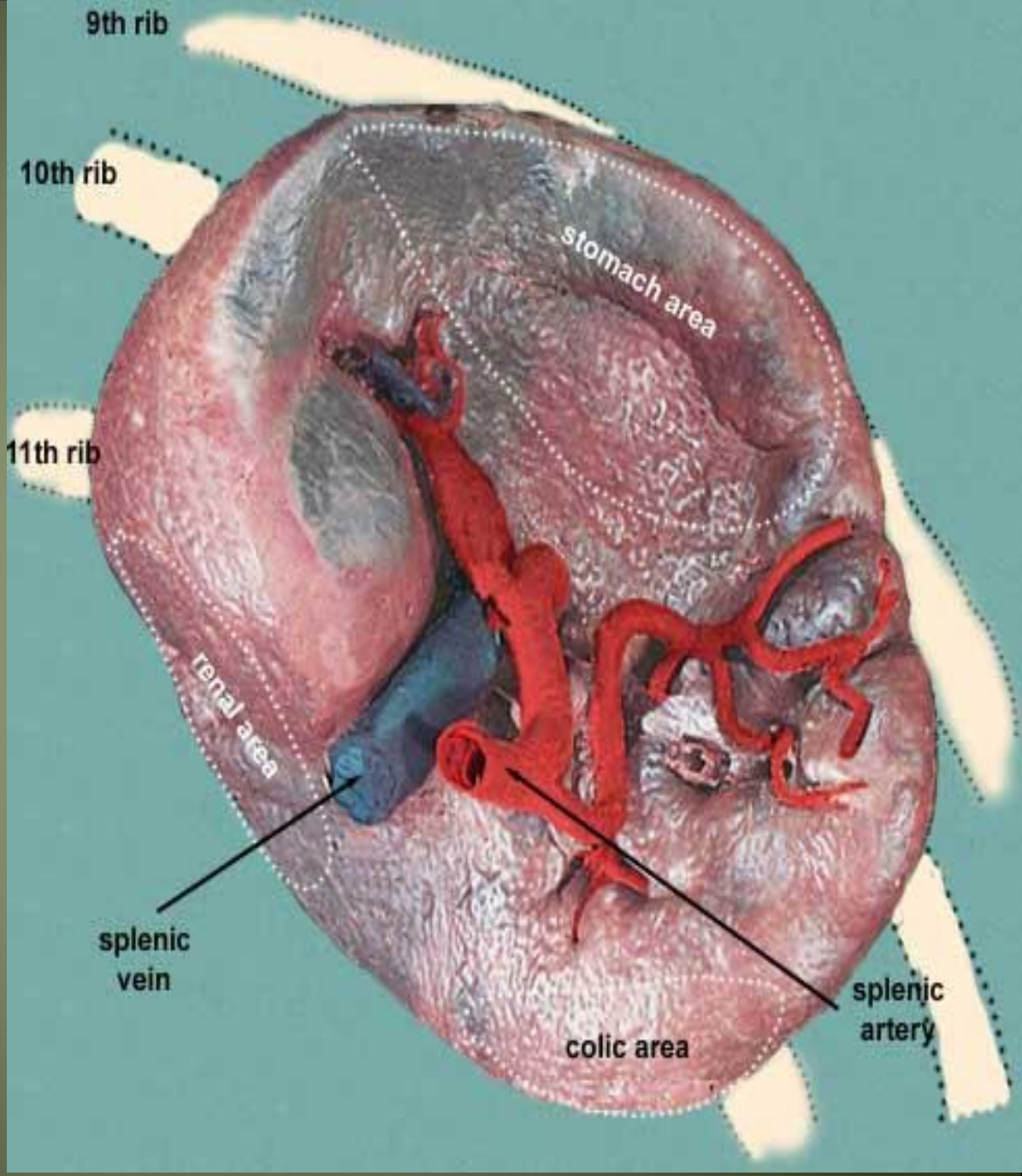


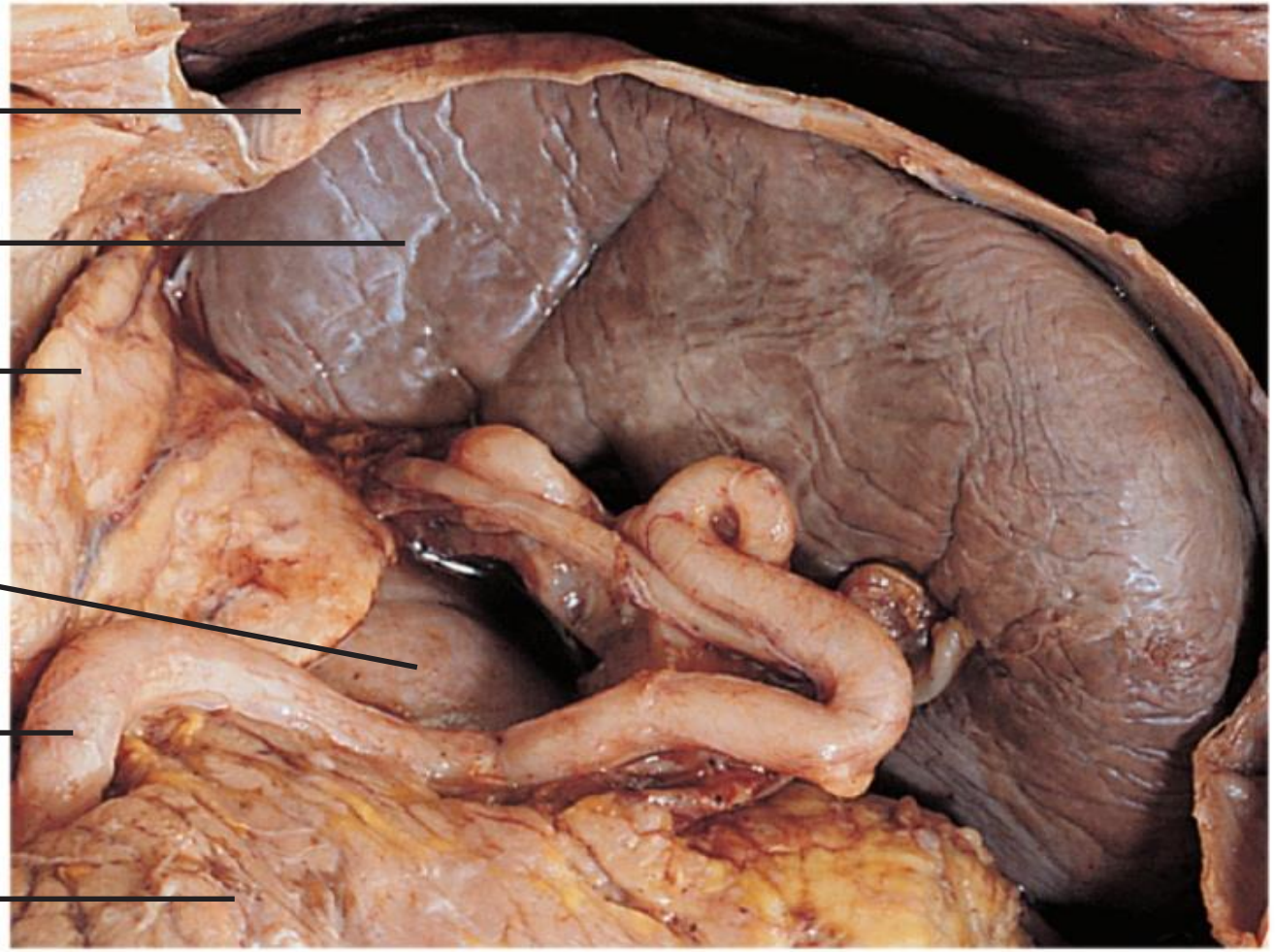
- Hilum of spleen

- Splenic . A→ ant

- Splenic . v → post

- Tail of pancreas





(c) Photograph of the spleen in its normal position in the abdominal cavity, anterior view

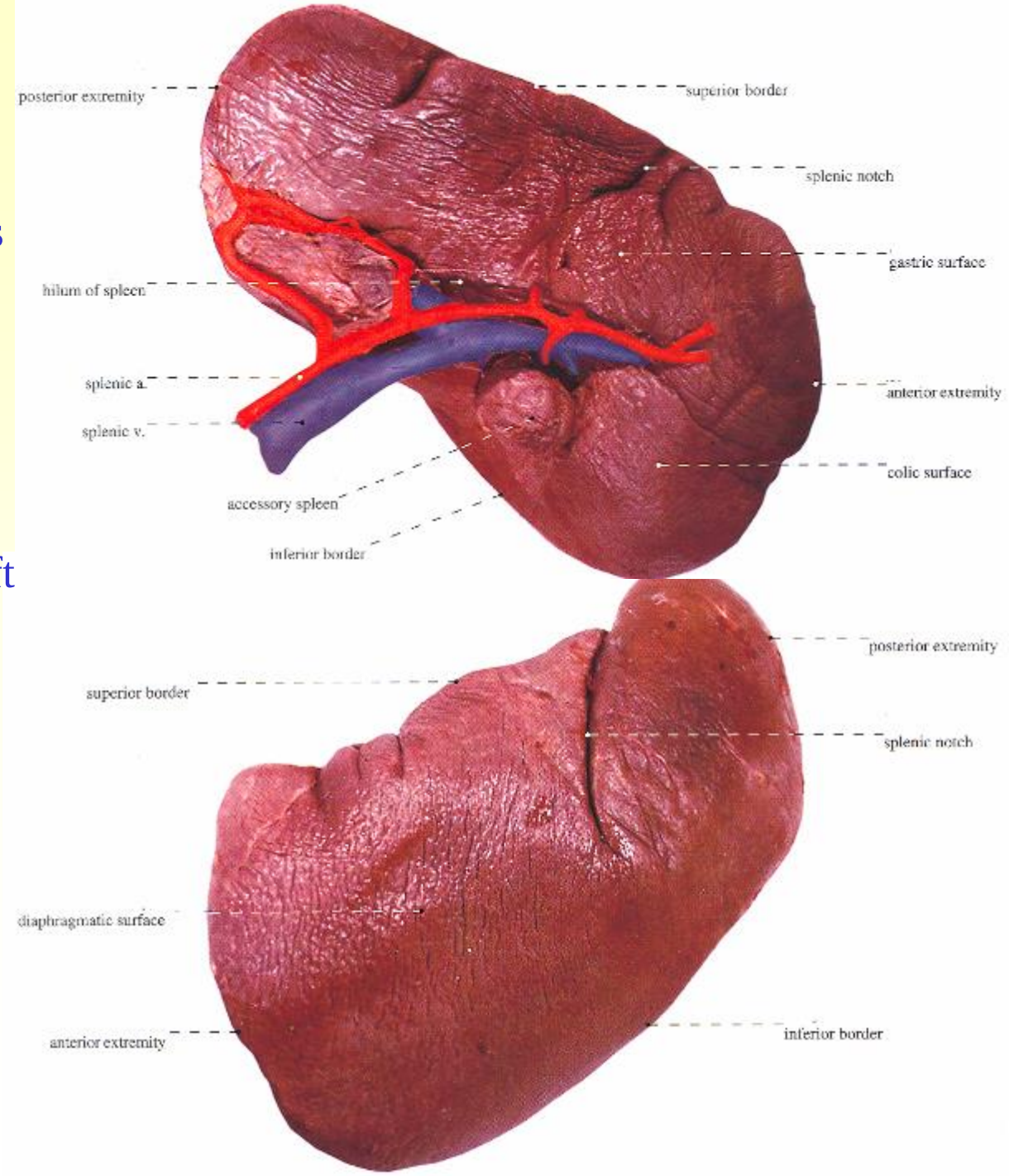
the spleen

The spleen is the largest lymphatic organ. It functions in storing blood, haematogenesis, disposing effete red cells and immunologic response.

the spleen lies deep to the left ninth, tenth and eleventh ribs

hilum of spleen
splenic artery
splenic vein

splenic notches



Blood supply

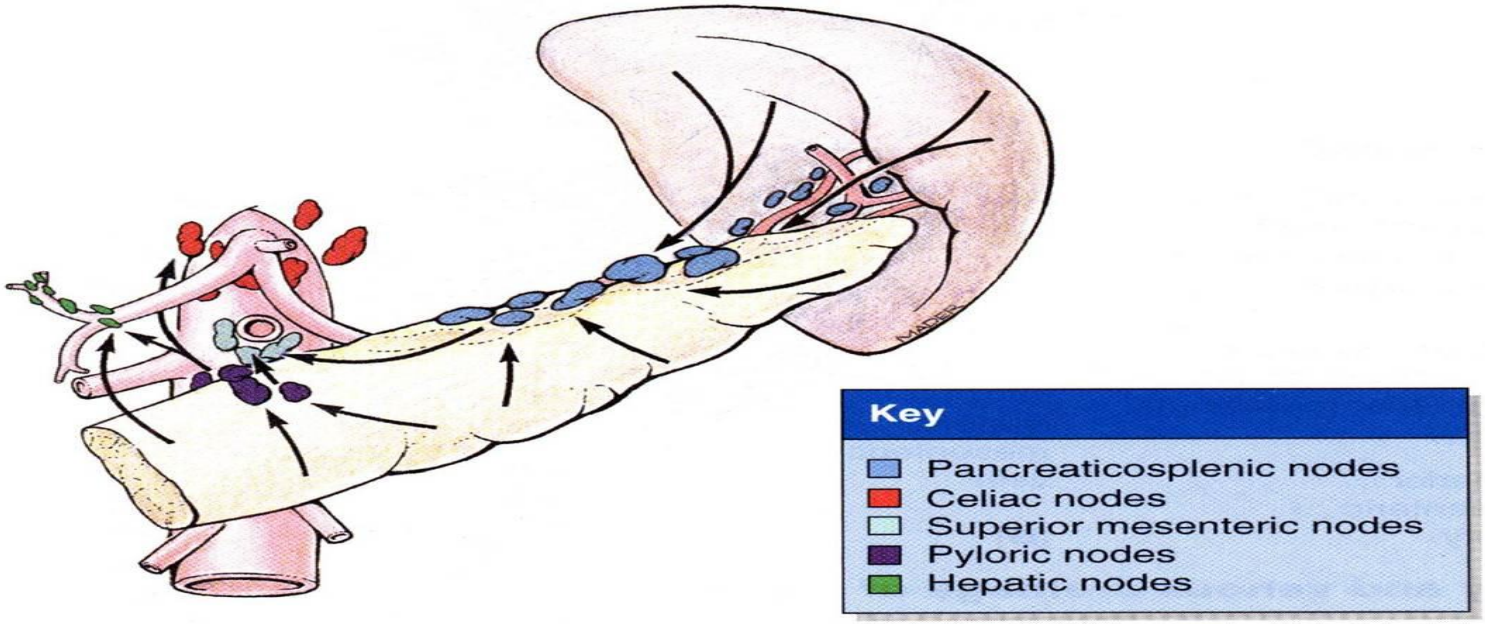
- The large splenic artery is the largest branch of the celiac artery.
- It has a tortuous course
- It runs along the upper border of the pancreas
- The splenic artery then divides into about six branches, which enter the spleen at the hilum

Veins

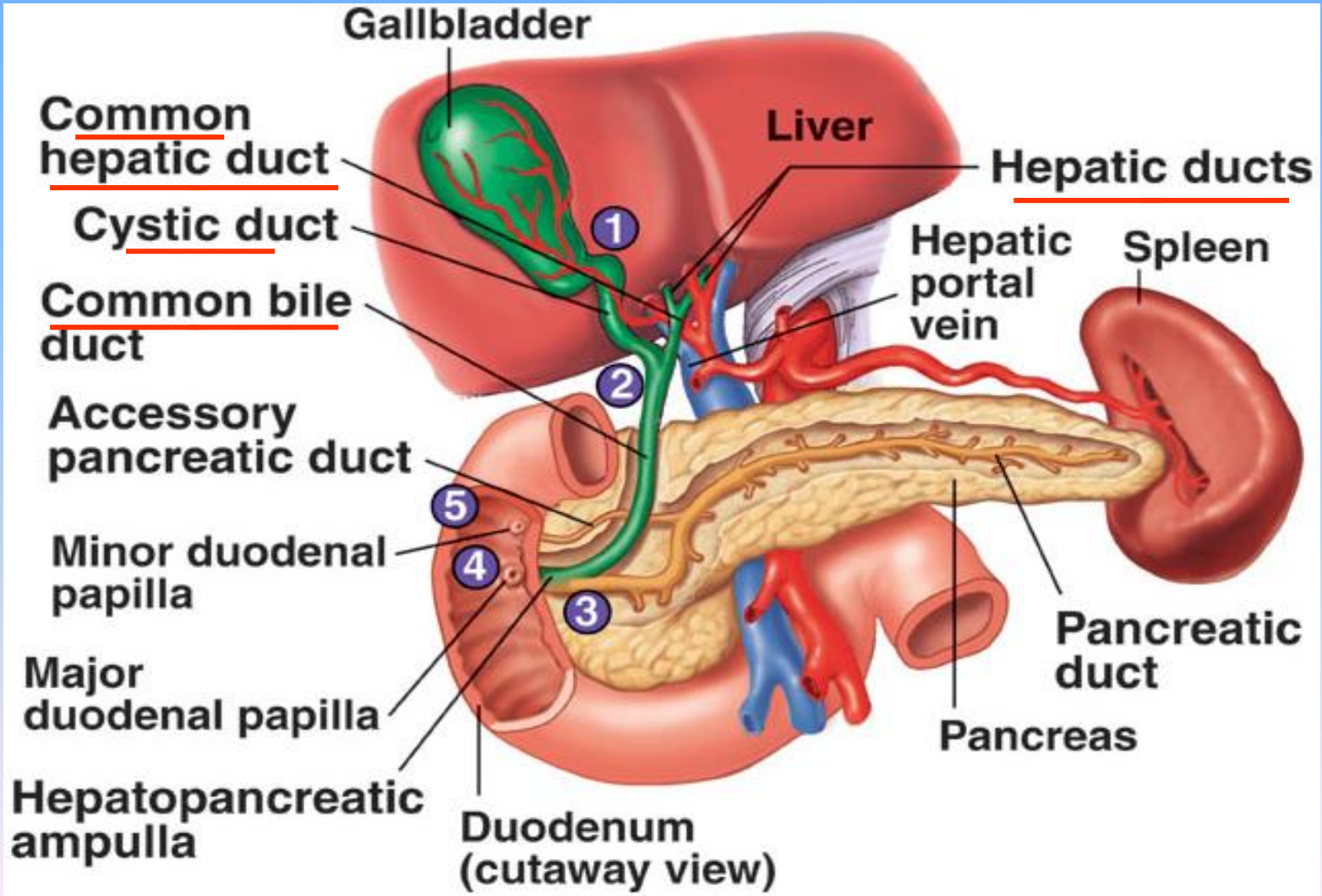
- The splenic vein leaves the hilum and runs behind the tail and the body of the pancreas.
- Behind the neck of the pancreas, the splenic vein joins the superior mesenteric vein to form the portal vein.

Lymphatic Drainage of spleen

- The lymph vessels emerge from the hilum and pass through a few lymph nodes along the course of the splenic artery and then drain into the celiac nodes.



GALLBLADDER



Gallbladder - a bile reservoir, lies in the cystic fossa

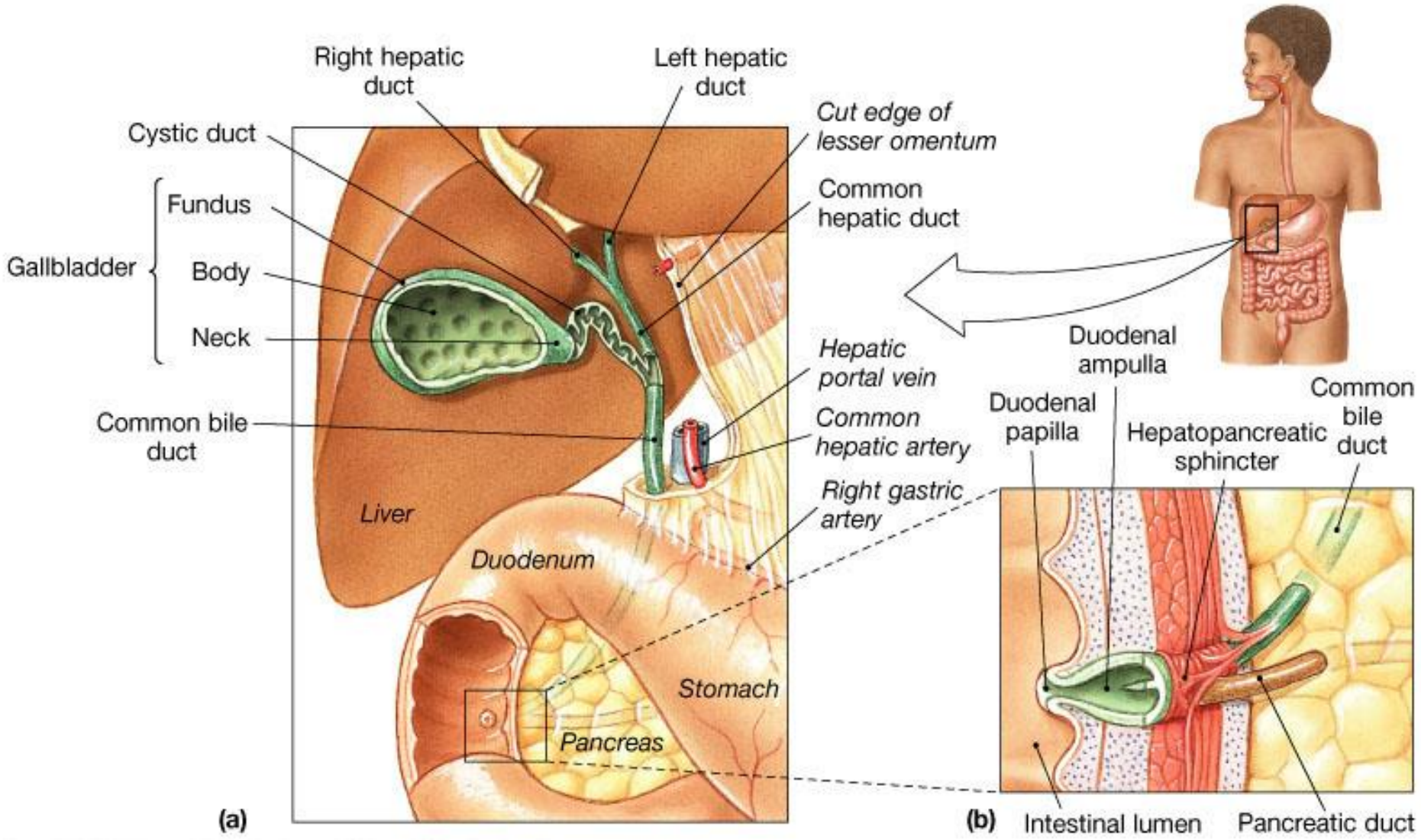


Figure 24.21a, b

Structure of GB

Gallbladder: abile reservoir,lies in th cystic fossa

Fundus

-Ant:ant.abdominal wall

- Post.inf: transverscolon

Body

sup: liver

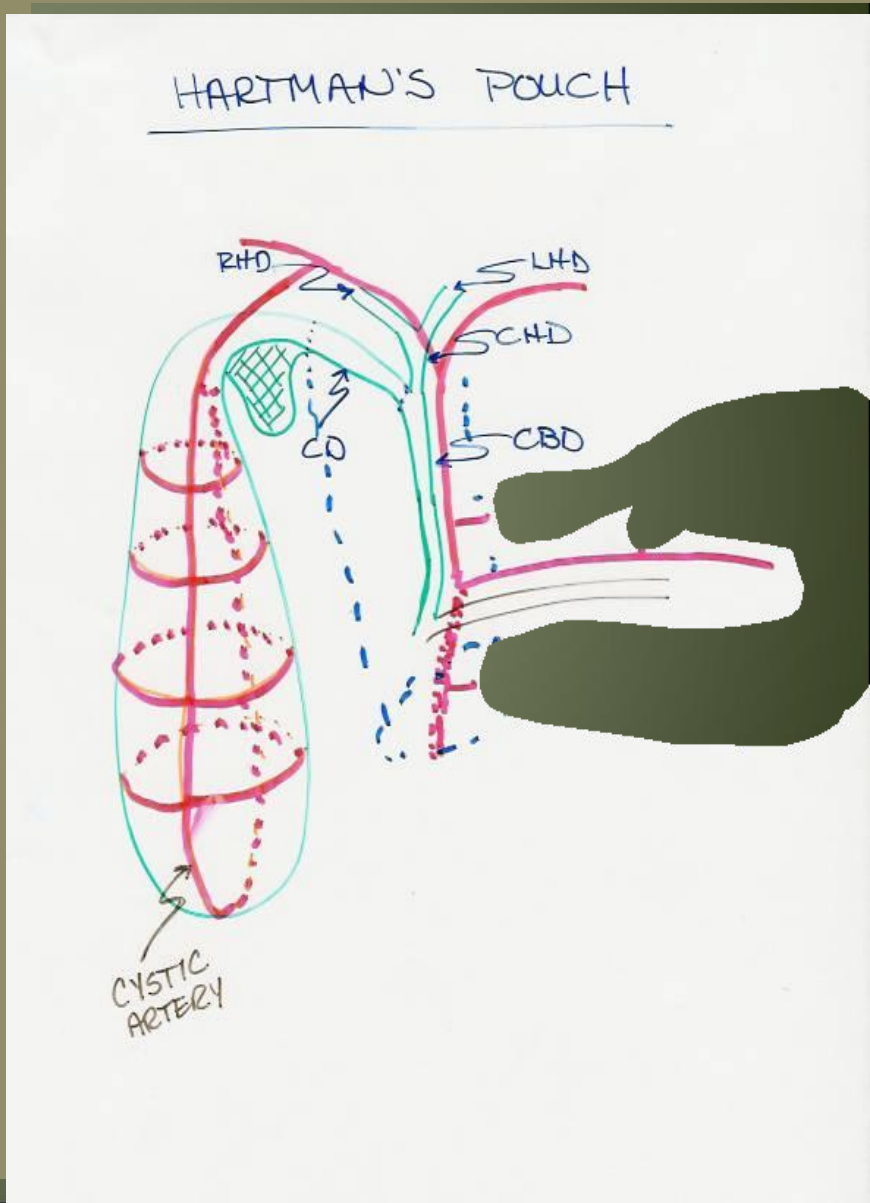
post.inf: Tr.colon. End of 1st part of doudenum , begins of 2nd part of doudenum

Neck

- Form the cystic duct, 4cm

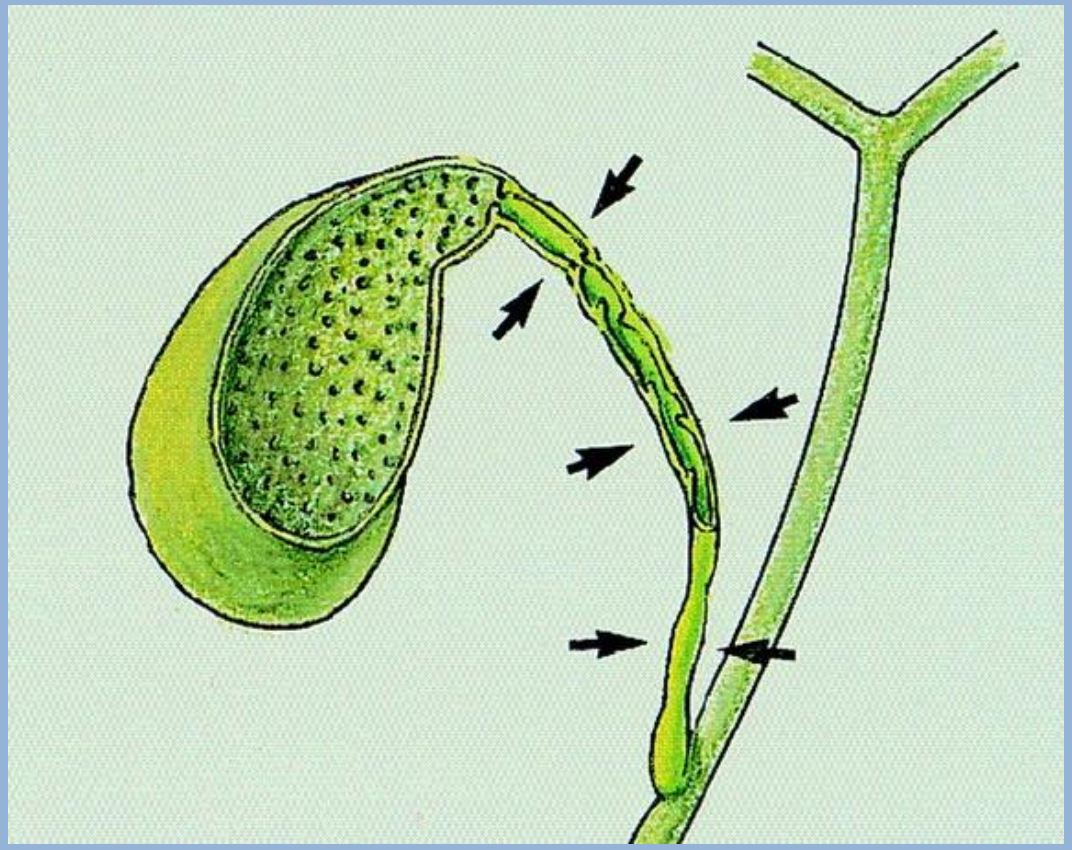
Hartmann's Pouch

1. Lies between body and neck of gallbladder
3. May obscure cystic duct
4. If very large, may see cystic duct arising from pouch



Anatomy

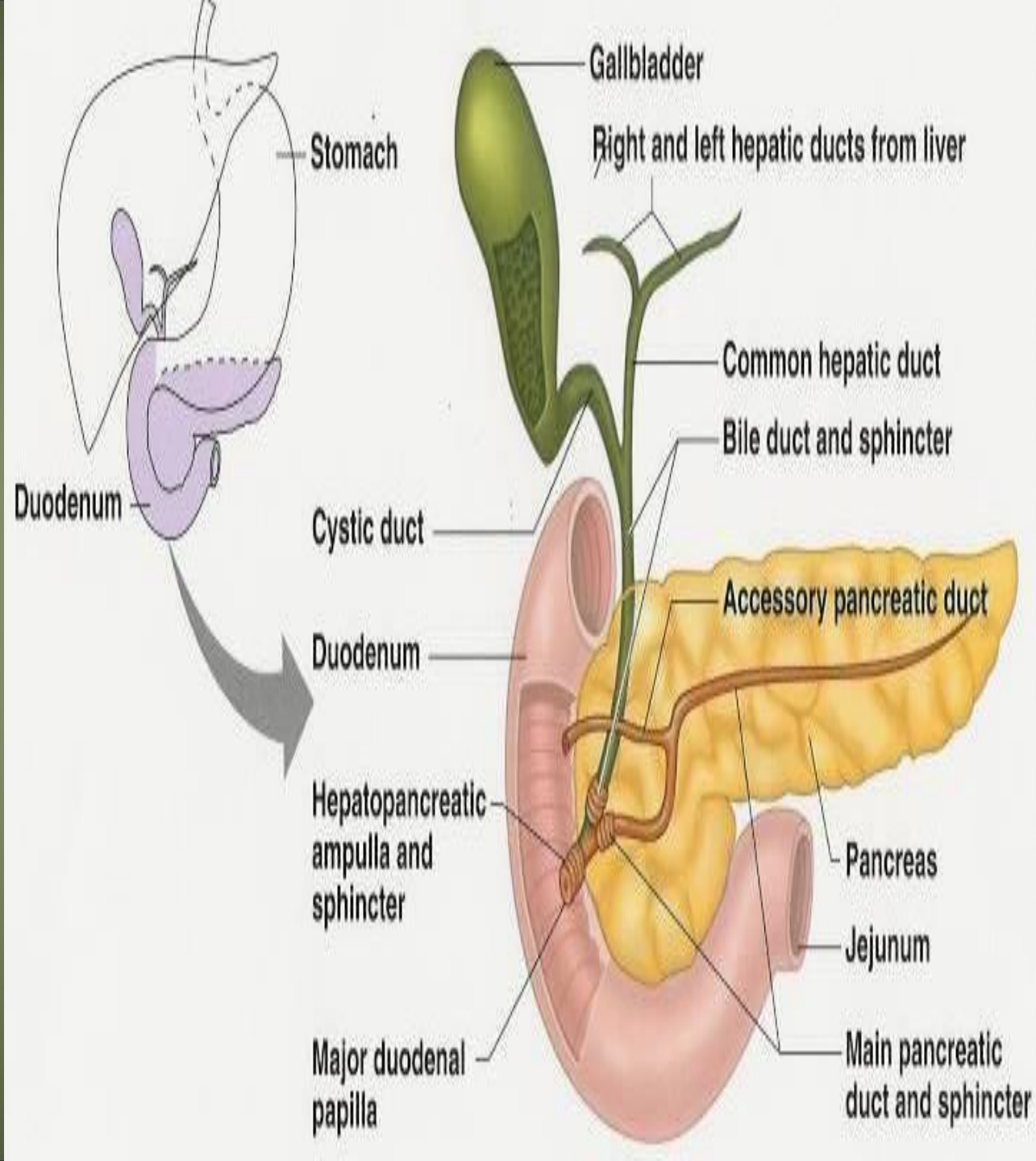
- The Spiral Valves of Heister, and no they do not have any valvular function.



Cystic duct

The cystic duct - lenght 2-4cm, diameter 1-5mm,

joins the common hepatic duct

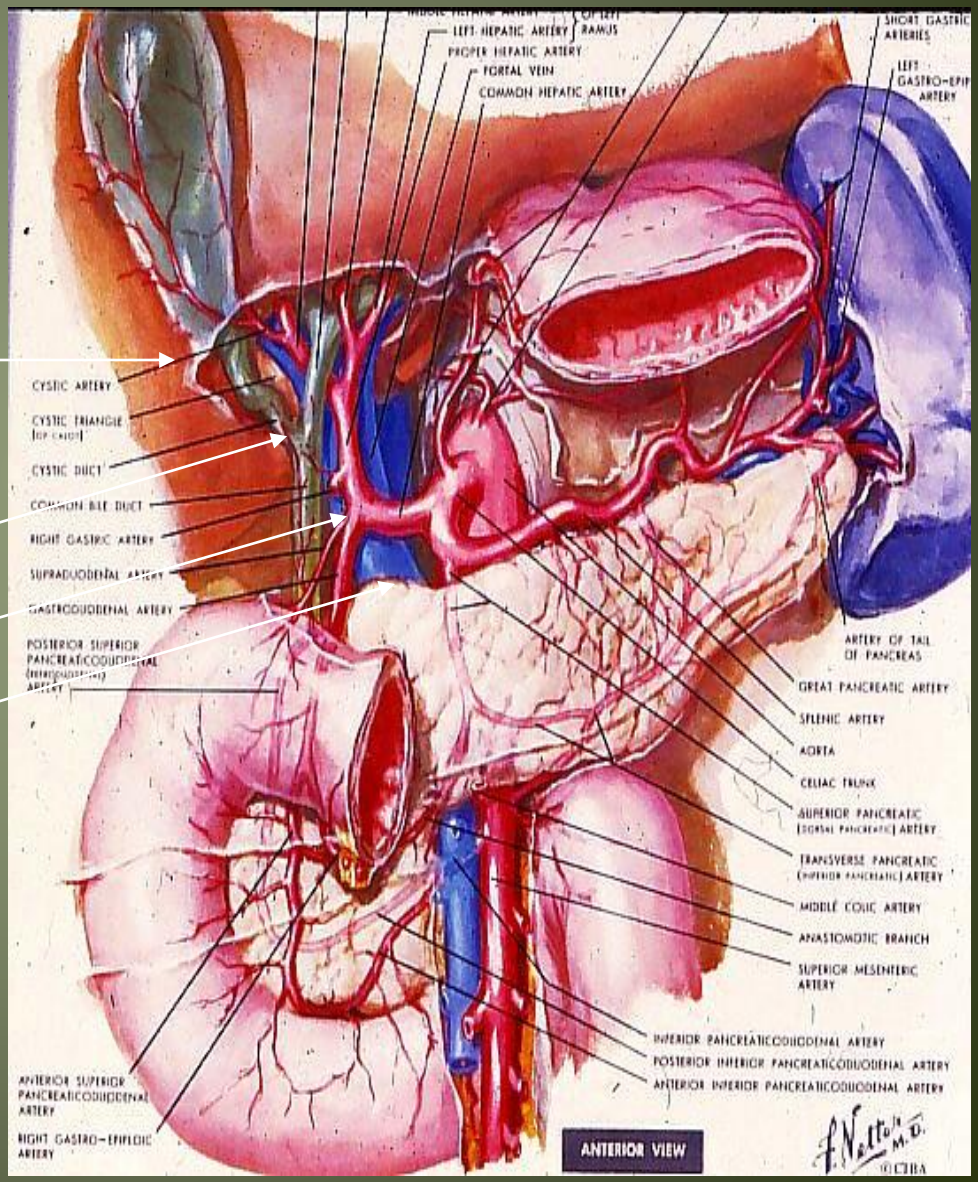


Anatomy

- Name the small ducts which drain directly from the liver into the body of the gallbladder, and are a potential source of biloma post cholecystectomy
  - Ducts of Luschka

Arterial Supply to the Gallbladder

- Cystic artery
- Right hepatic artery
- Proper hepatic artery
- Common hepatic artery

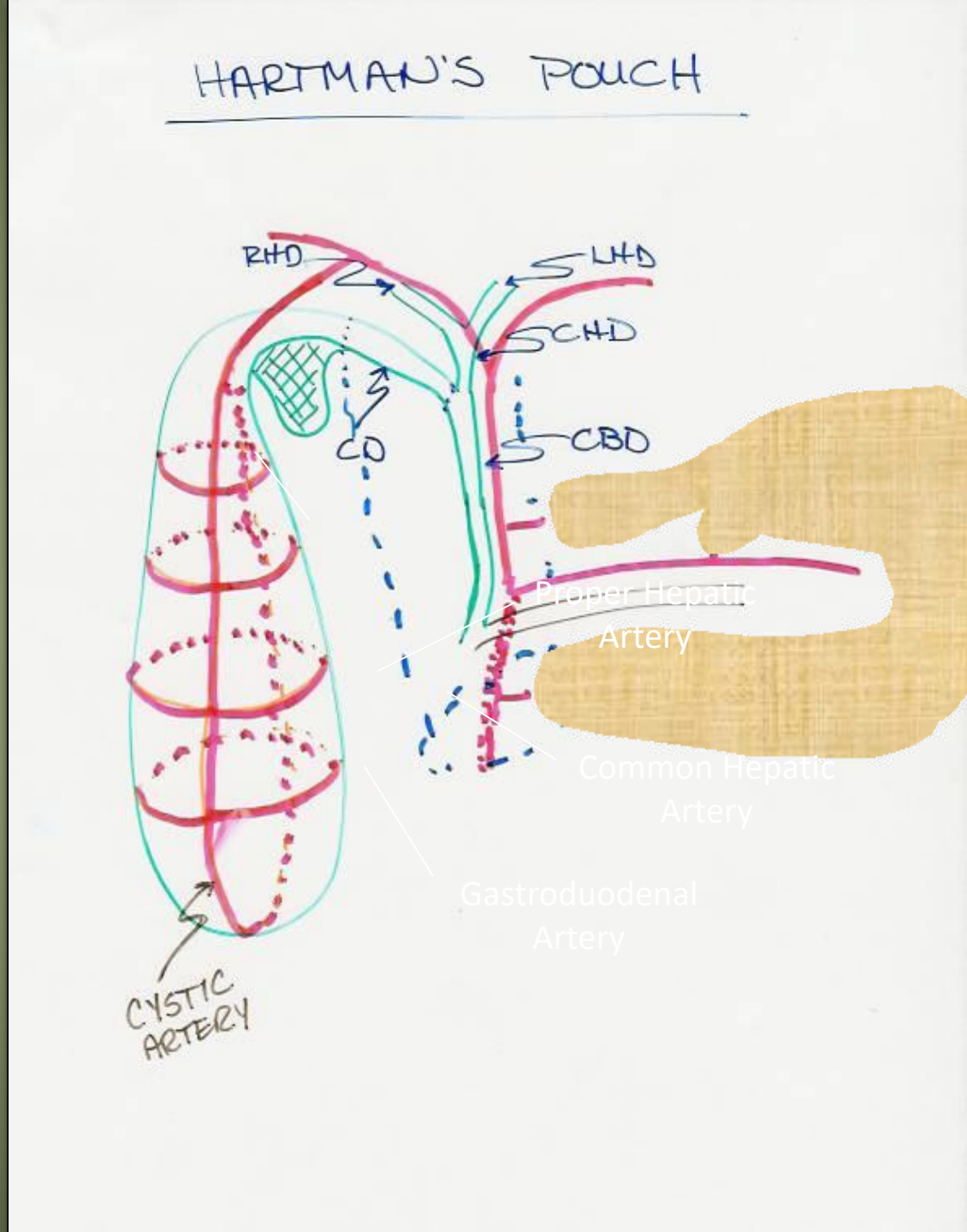


Blood supply of GB:

- Cystic artery→ branch of Rt. Hepatic artery

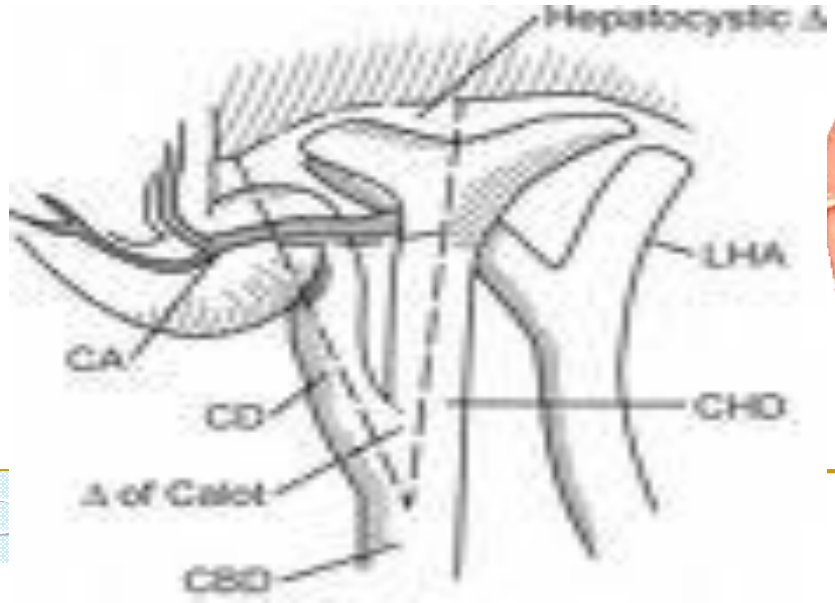
- Cystic vein → end in portal vein

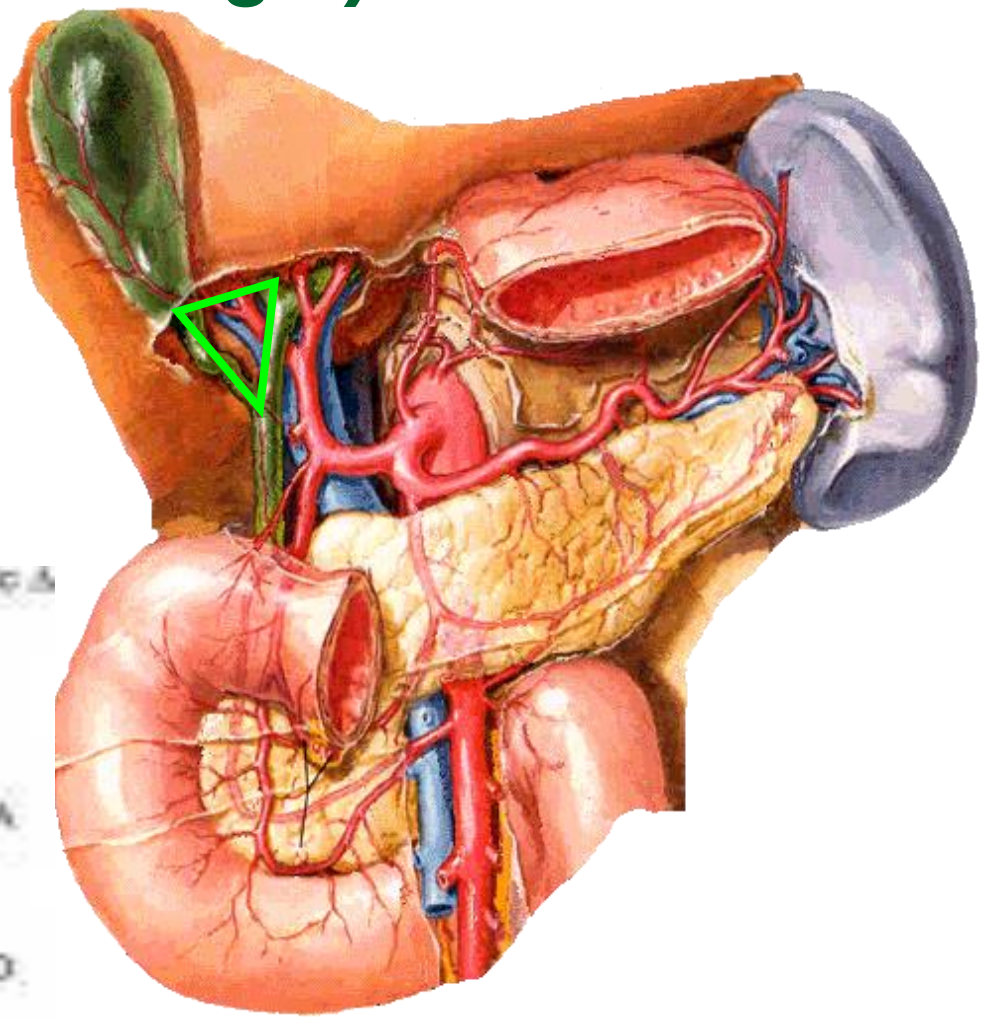
- Small branches (arteries and veins run between liver and gall bladder



Cystohepatic triangle (Calot's Triangle)

- **Boundaries**
  - Common hepatic duct on the left
  - Cystic duct on the right
  - Live superiorly
- Content: **cystic artery**





Nerve supply

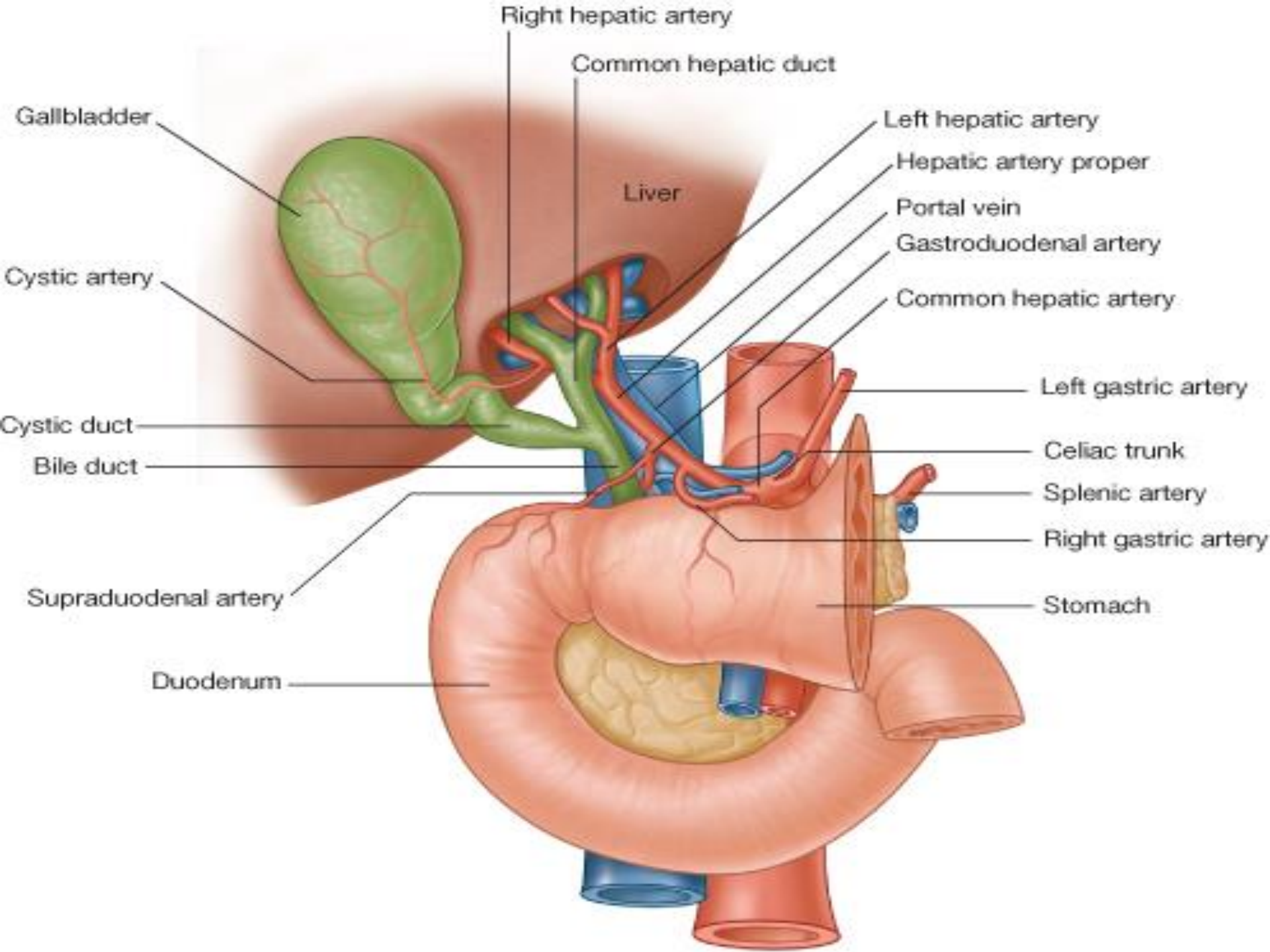
- Sympathetic and parasympathetic from celiac plexus
- Parasympathetic ---- vagous nerve
- Hormone →cholecystokini → duodenum

Biliary tract anatomy

The common bile duct passes inferiorly posterior to the first part of the duodenum and pancreatic head. In the majority it then forms a short common channel with the main pancreatic duct within the wall of the duodenum, termed the ampulla of Vater.

The left hepatic duct drains 3 segmments of the left liver, and the right hepatic duct 4 segments of the right liver.

The caudate lobe (segment 1) has a variable drainage pattern, but in the majority (78%) drainage is into both main ducts.

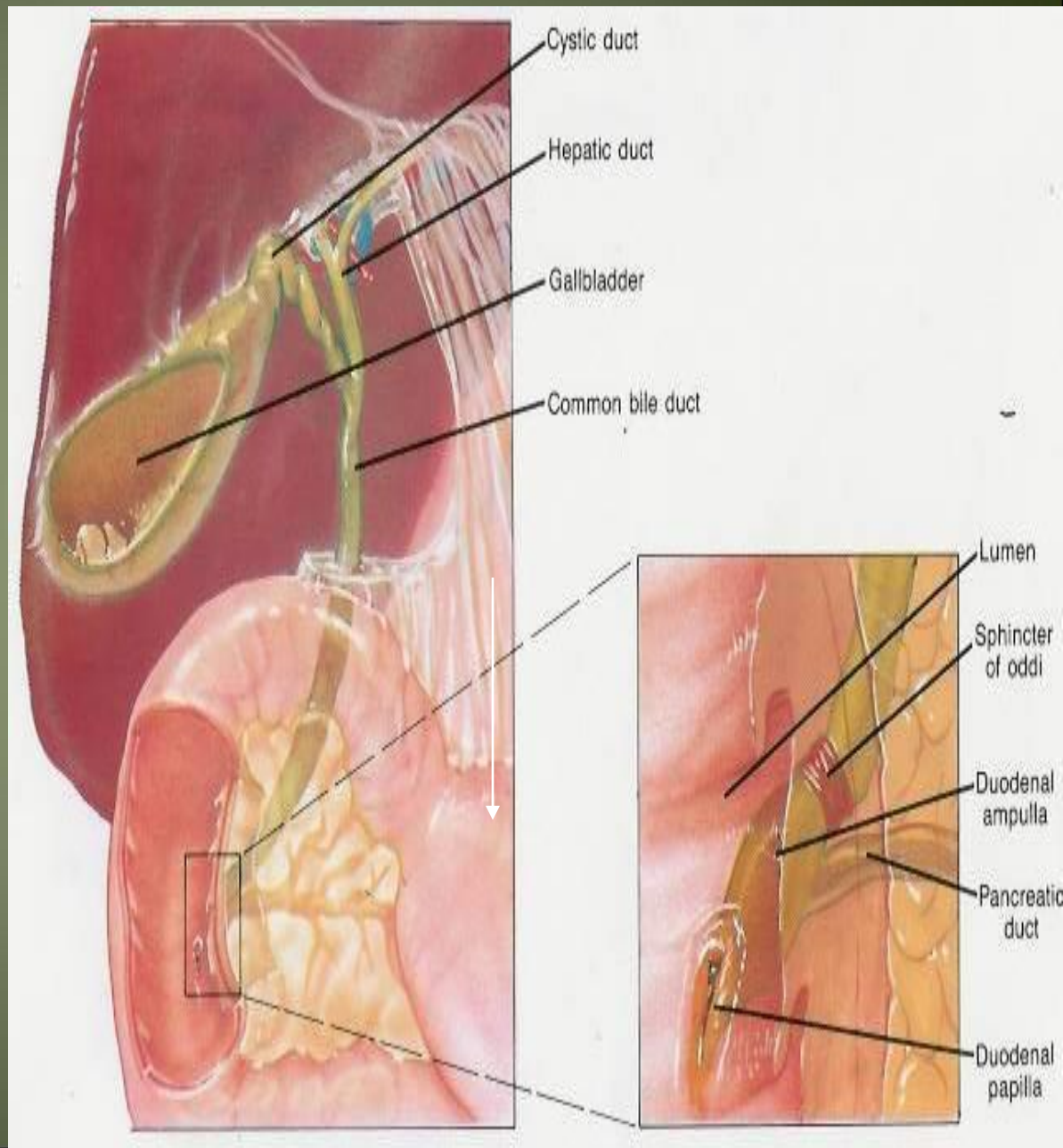

Right hepatic artery
Common hepatic duct
Gallbladder
Left hepatic artery
Hepatic artery proper
Liver
Portal vein
Gastroduodenal artery
Cystic artery
Common hepatic artery
Left gastric artery
Cystic duct
Celiac trunk
Bile duct
Splenic artery
Right gastric artery
Supraduodenal artery
Stomach
Duodenum

Common bile duct

Extra hepatic biliary system

Rt. hepatic duct
+
Lt hepatic duct
↓
Common hepatic duct
+
Cystic duct
↓
Common bile duct

- 4cm
- Descend in free edge of lesser omentum
- Supra duodenal part
  Retro duodenal part
  Retro pancreatic part



Bile duct. parts relations

-3 inc long

-1st part

-Located in right free margin of lesser omentum

- in front of the opening into the lesser sac (Epiploic opening)

-Rt to hepatic artery and portal vein

- 2nd part

-Behind the 1st part of the duodenum

-Rt to the gastroduodenal artery

-3 rd part

-Posterior surface of the head of the pancreas

-Contact with main pancreatic duct

-Related with IVC, gastroduodenal artery, portal vein

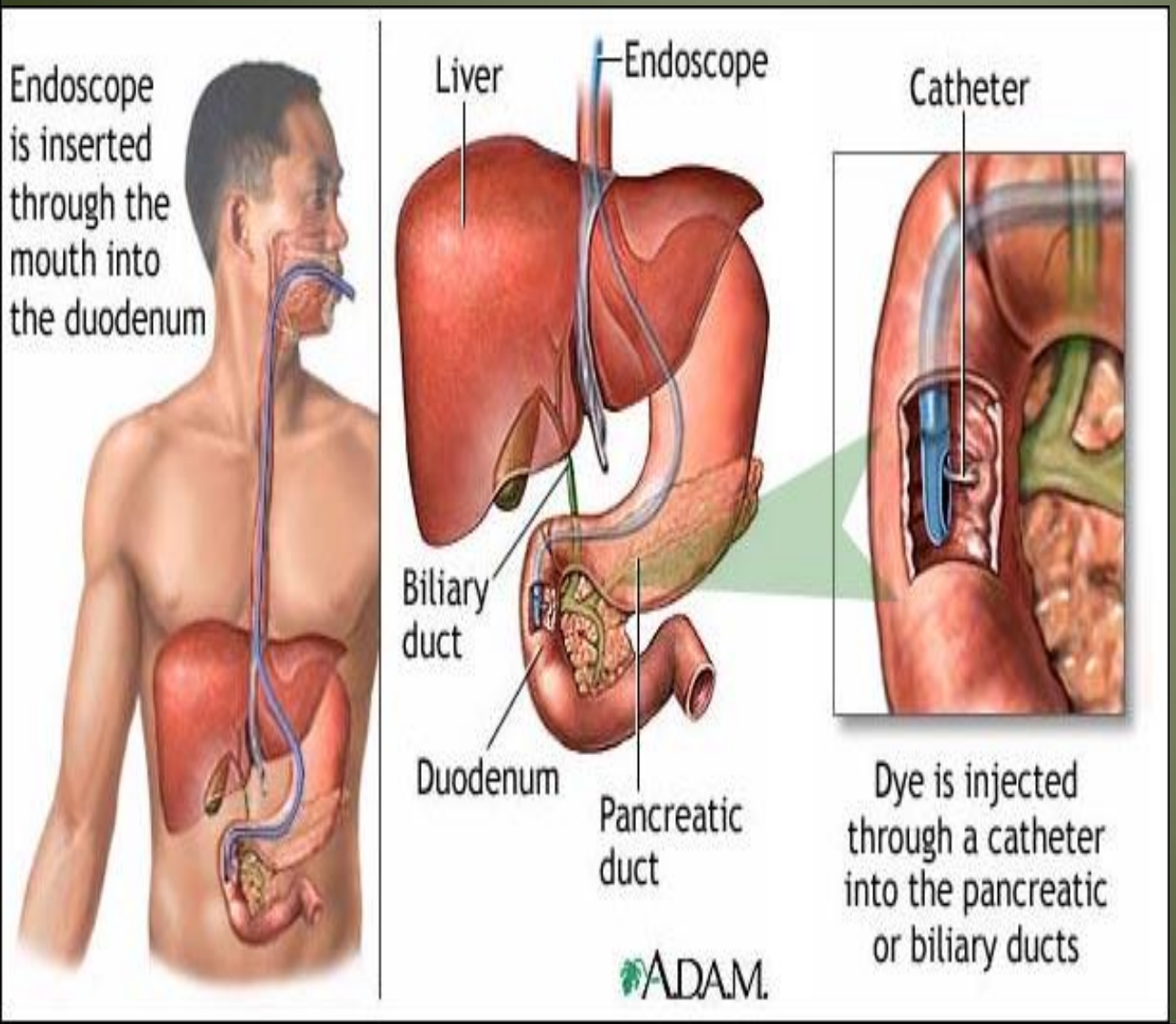
-End in the half second part of duodenum at ampulla of Vater

Blood supply of CBD

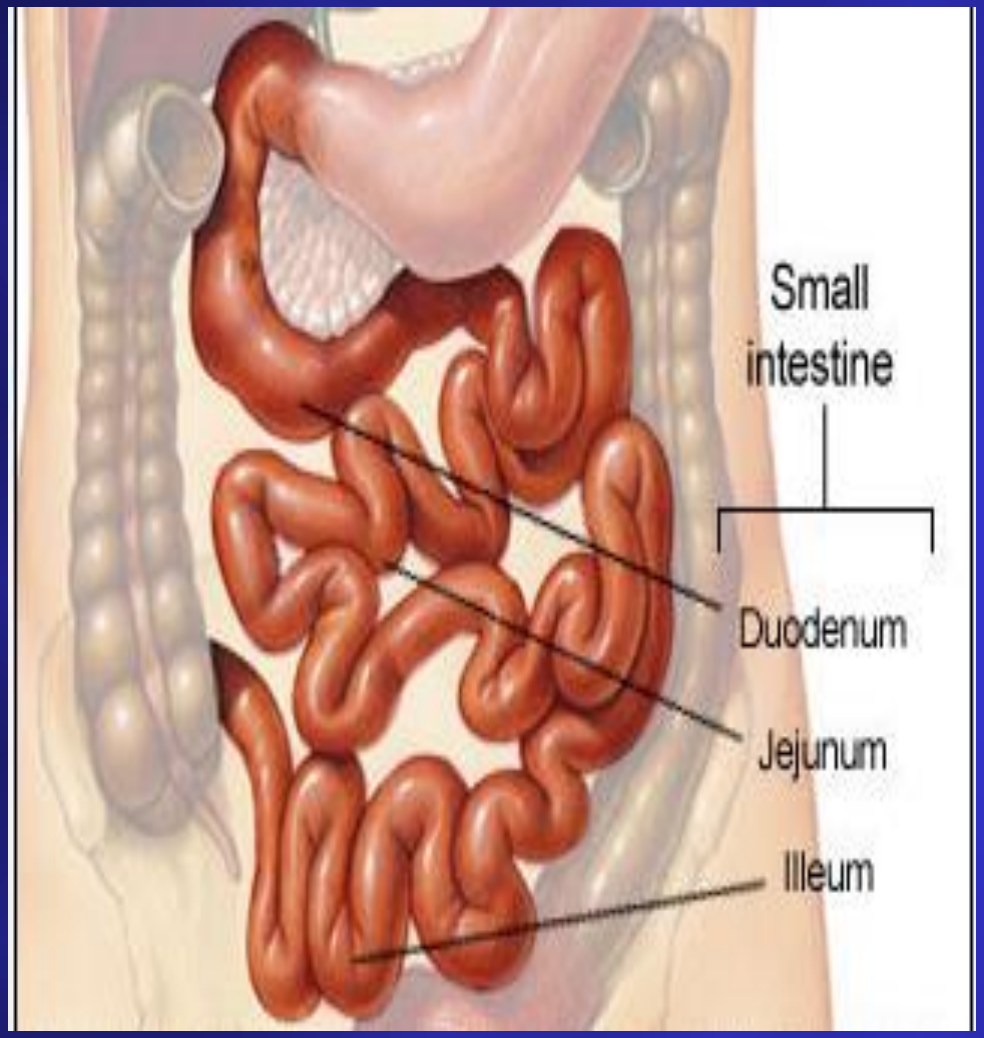
Small arteries supplying CBD

a. Arise from cystic artery
b. Posterior branch of superior pancreaticoduodenal artery

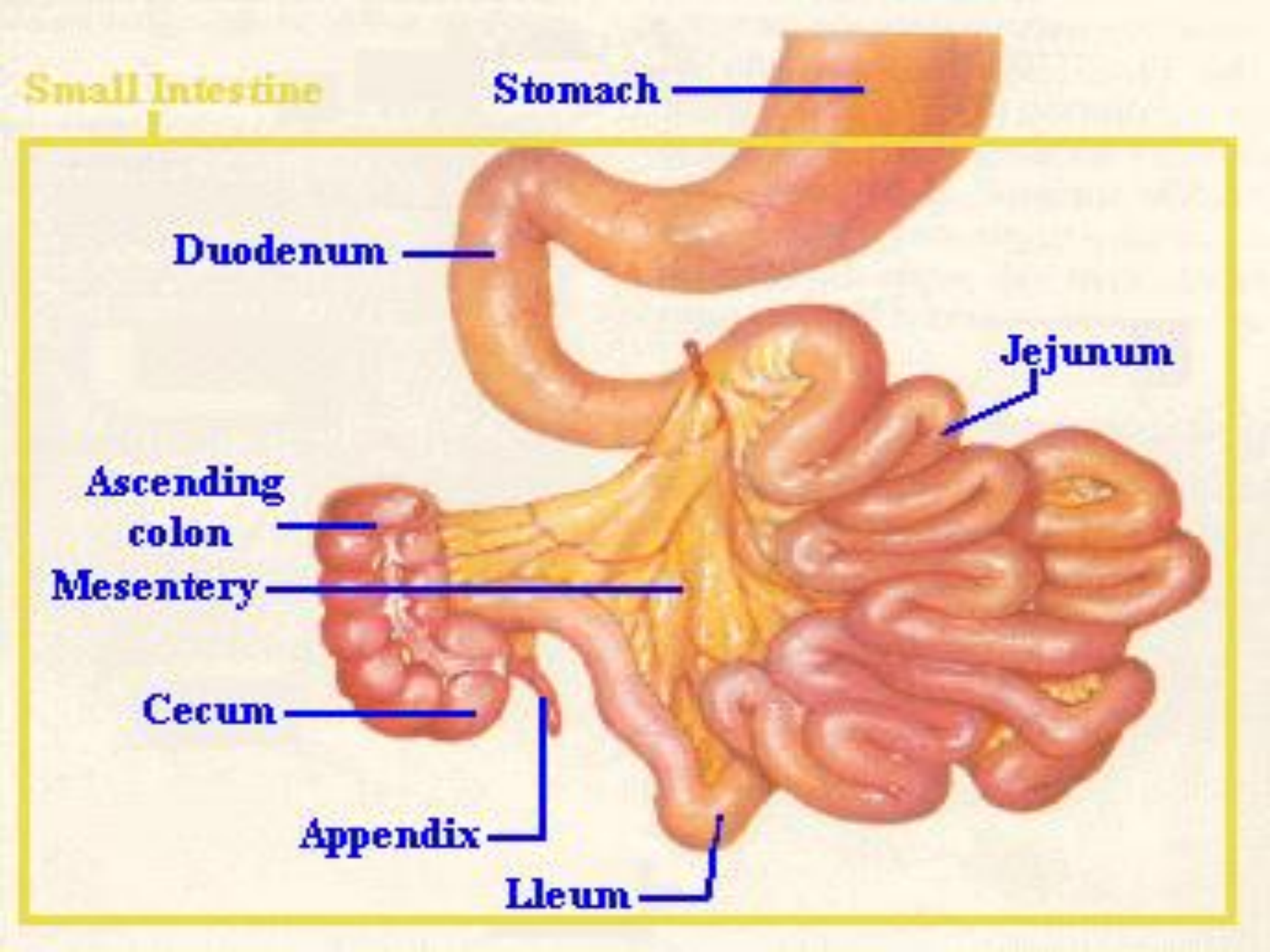
ERCP


Endoscope is inserted through the mouth into the duodenum
Liver
Endoscope
Biliary duct
Duodenum
Pancreatic duct
A.D.A.M.
Catheter
Dye is injected through a catheter into the pancreatic or biliary ducts

SMALL INTESTINE



- The small intestine is divided
- duodenum
- jejunum
- ileum.


Small Intestine
Stomach
Duodenum
Jejunum
Ascending colon
Mesentery
Cecum
Appendix
Lleum

Differences
Large & small intestines

• Teniae coli	• No teniae coli
• Haustra	• No Haustra
• Omental appendices / Appendices epiploica	• No Omental appendices / Appendices epiploica
• Semicircular folds	• Circular folds
• Large diameter	• Small diameter

SMALL INTESTINE

- **DUODENUM: fixed part**
- **JEJUNUM & ILEUM: movable part (with mesentery)**

JEJUNUM & ILEUM

- **Length:** 6 meters (20 feet)
- **Beginning:** duodenojejunal flexure
- **Termination:** ileocecal junction
- **Embryological origin:** midgut
- **Peritoneal fold:** mesentery of small intestine
- **Arterial supply:** jejunal & ileal branches of **superior mesenteric**
- **Lymphatic drainage:** **superior mesenteric** lymph nodes
- **Nerve supply:** **superior mesenteric** plexus: sympathetic & parasympathetic (vagus)

MESENTERY OF SMALL INTESTINE

- **Content of root:** superior mesenteric vessels
- **Contents (structures between its 2 layers):**

1. **Jejunal vessels:** form few arcades
2. **Ileal vessels:** form many arcades
3. **Mesenteric lymph nodes**
4. **Autonomic nerve fibers**
5. **Mesenteric fat**

JEJUNUM

1. **Length:** shorter (proximal 2/5)
2. **Diameter:** wider
3. **Wall:** thicker (more numerous plicae circulares: circular folds of mucosa)
4. **Appearance:** more red in color (more vascular)
5. **Vessels:** less arcades, long terminal branches
6. **Mesenteric fat:** small amount near intestinal border
7. **Aggregations of lymphoid tissue:** few

ILEUM

1. **Length:** longer (distal 3/5)
2. **Diameter:** narrower
3. **Wall:** thinner (less numerous plicae circulares: circular folds of mucosa)
4. **Appearance:** light red in color (less vascular)
5. **Vessels:** more arcades, short terminal branches
6. **Mesenteric fat:** large amount near intestinal border
7. **Aggregations of lymphoid tissue:** numerous (Peyer's patches)

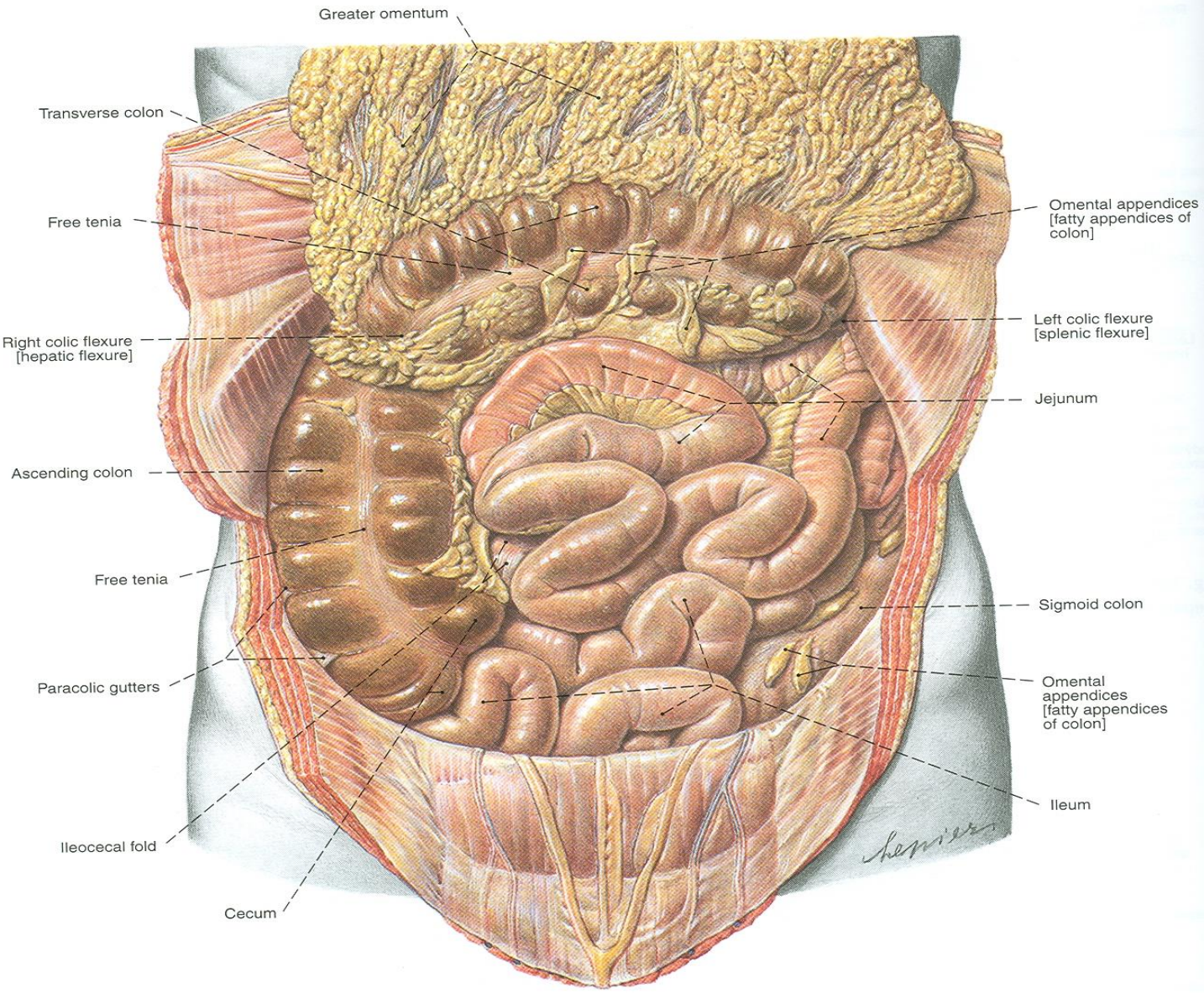
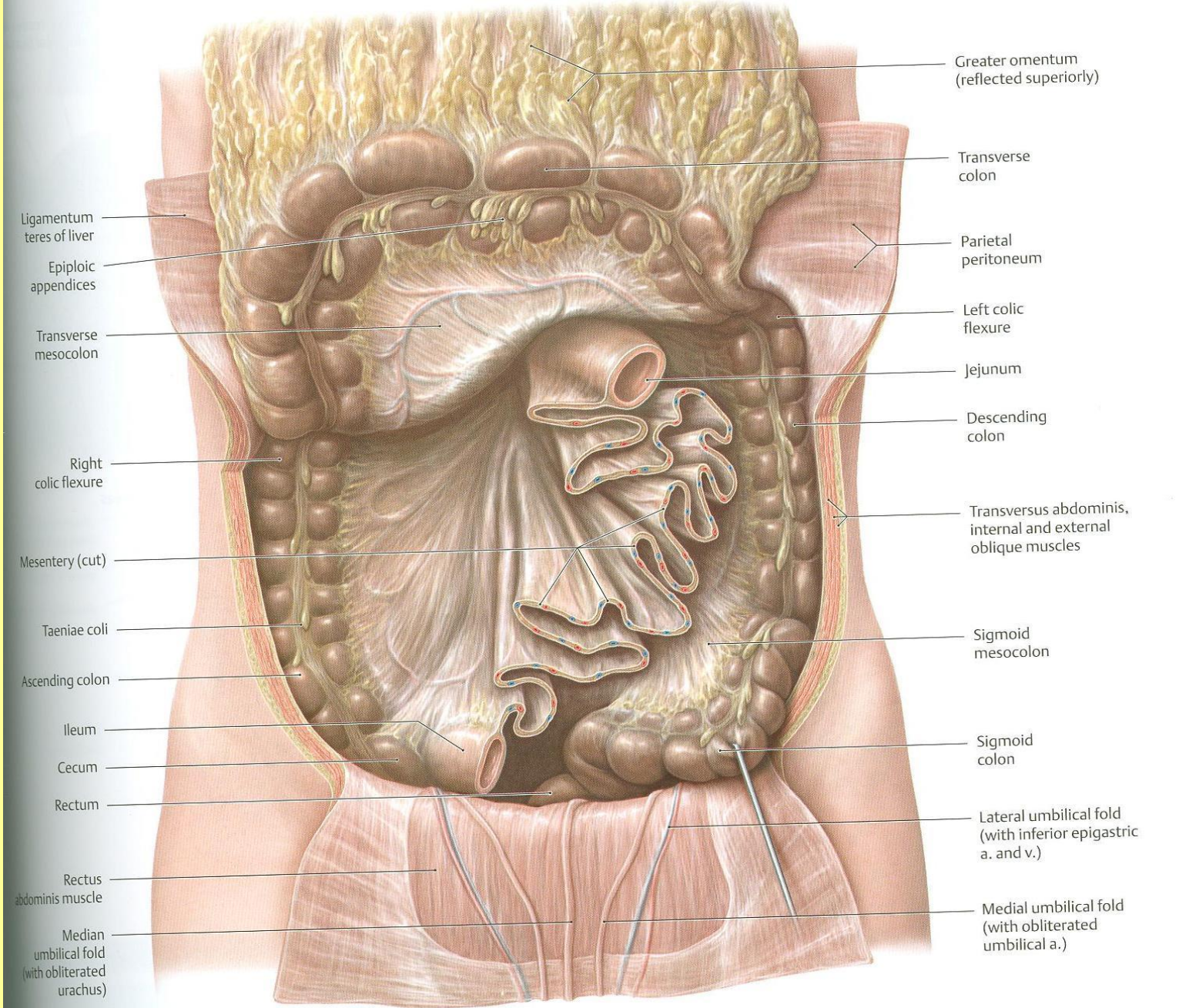


Fig. 1004 Position of abdominal viscera; greater omentum and transverse colon retracted cranially; ventral aspect.



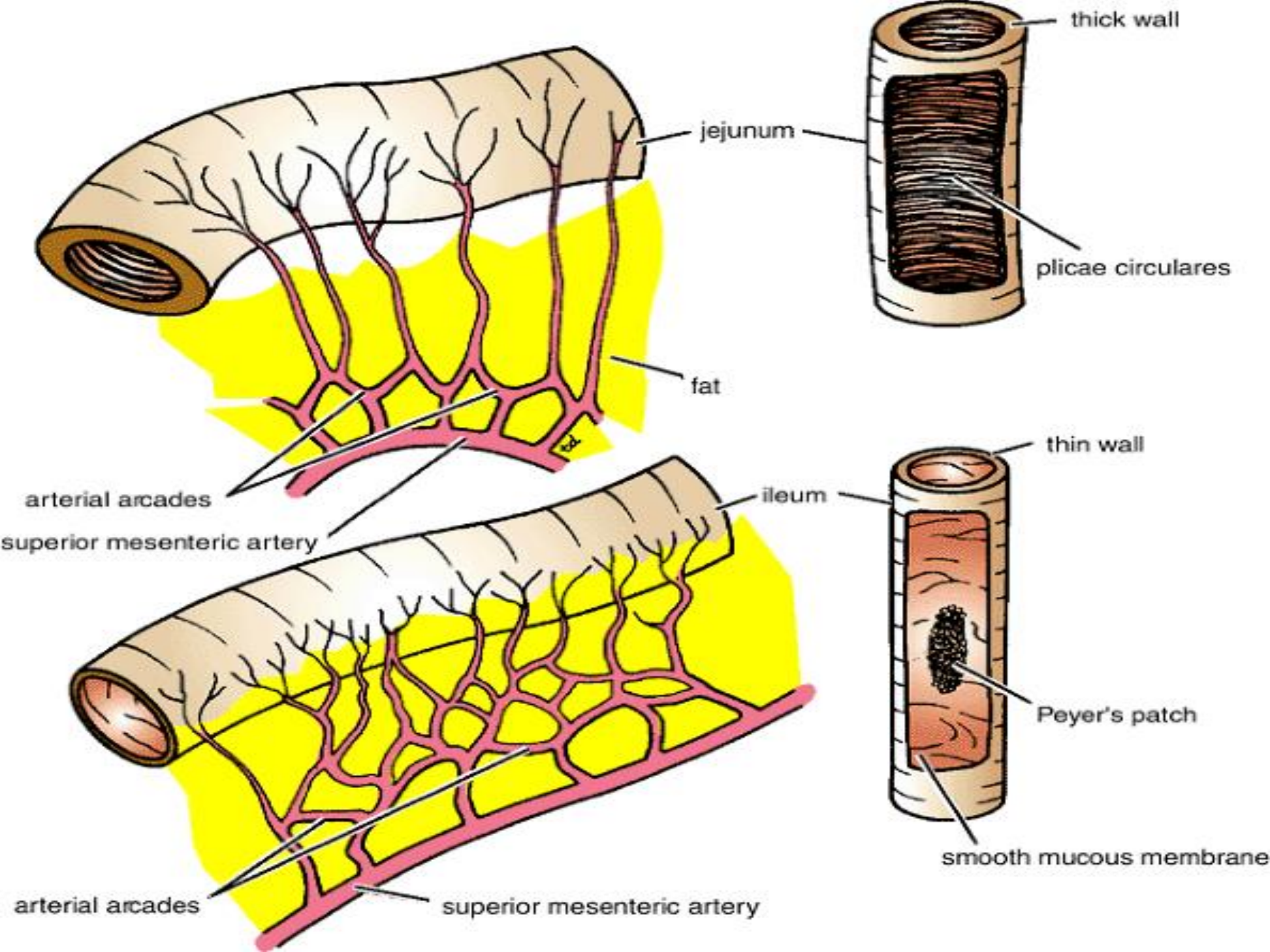
C Mesenteries. *Reflected:* Greater omentum and transverse colon. *Removed:* Intraperitoneal small intestines.

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
plicae circulares
fat
arterial arcades
superior mesenteric artery
thin wall
ileum
Peyer's patch
smooth mucous membrane
arterial arcades
superior mesenteric artery

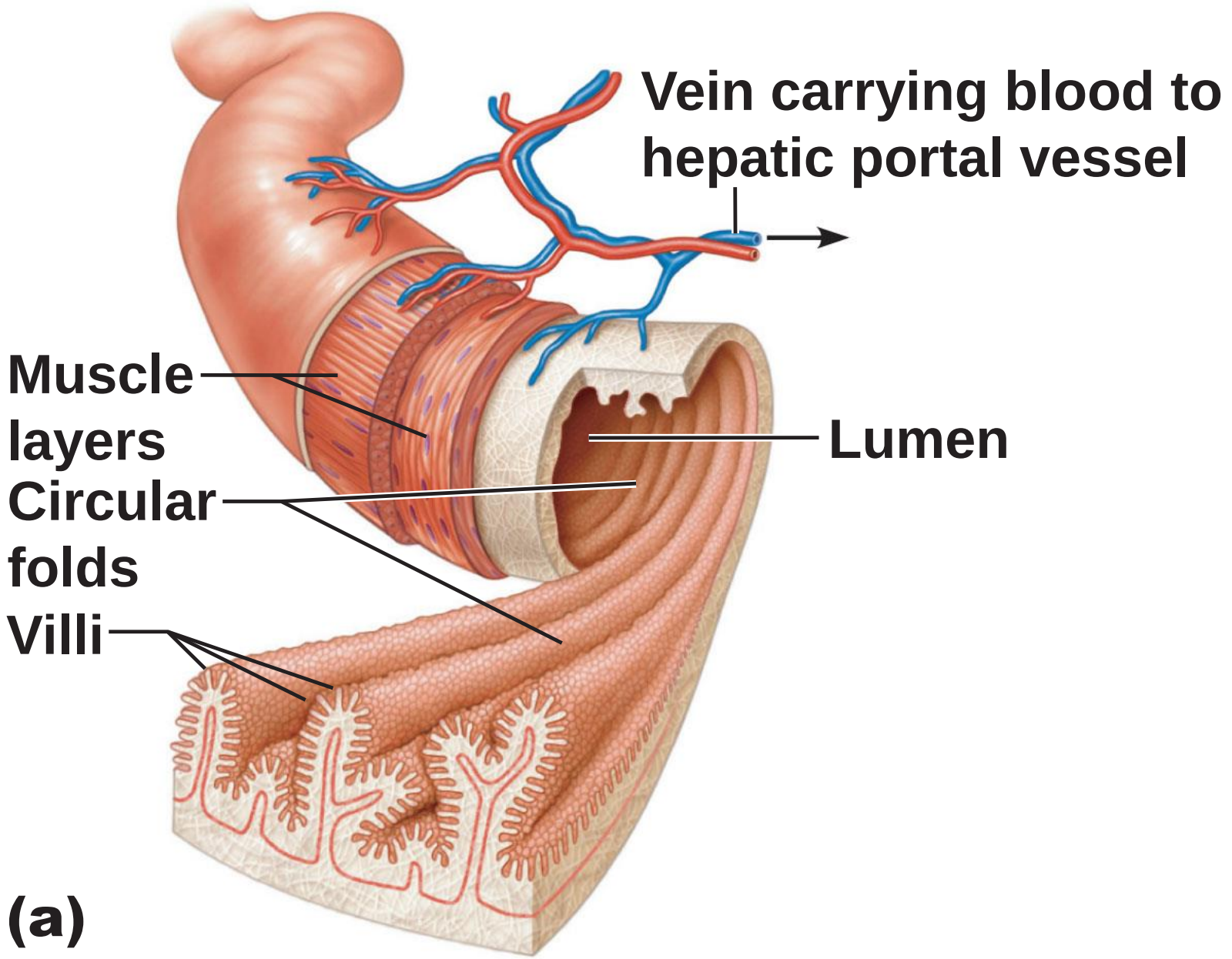
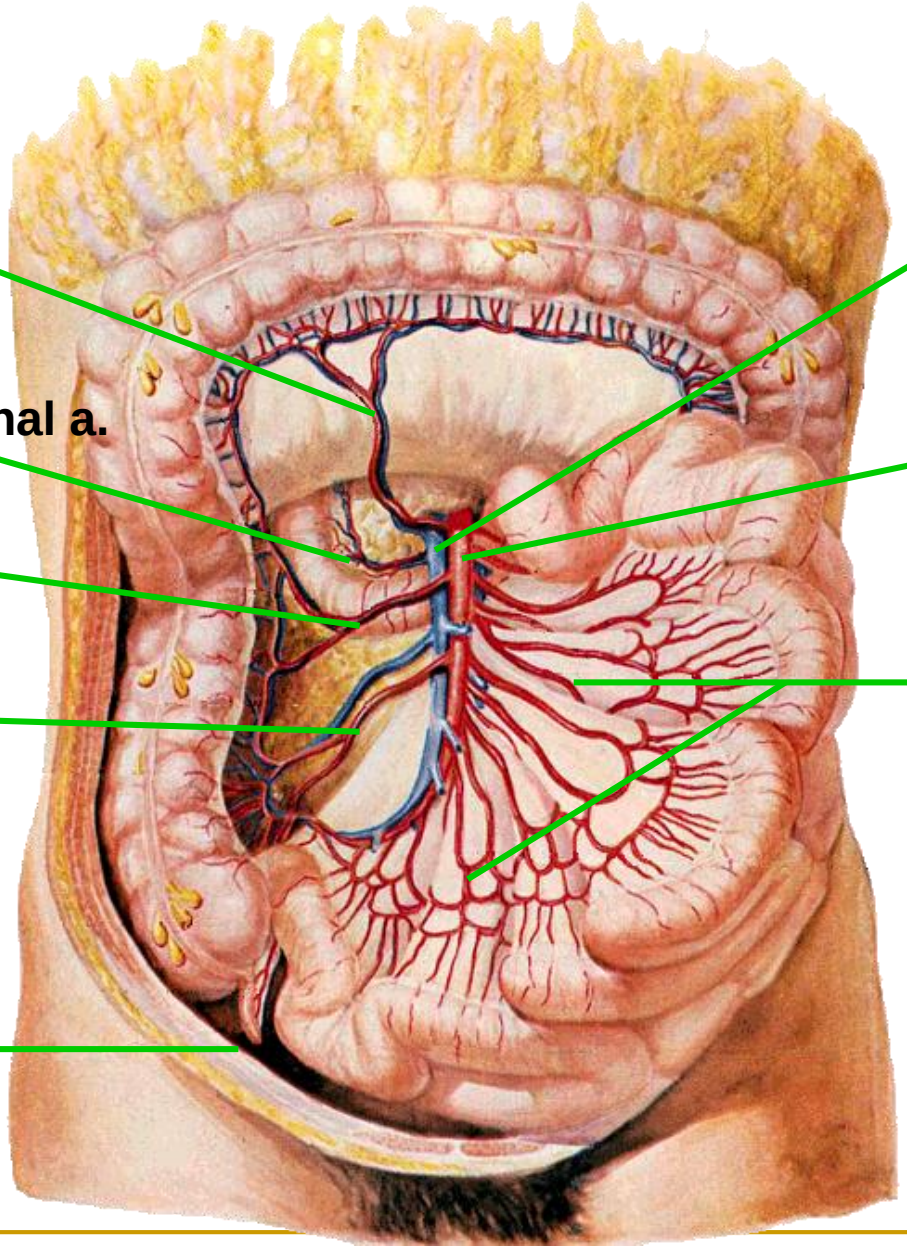
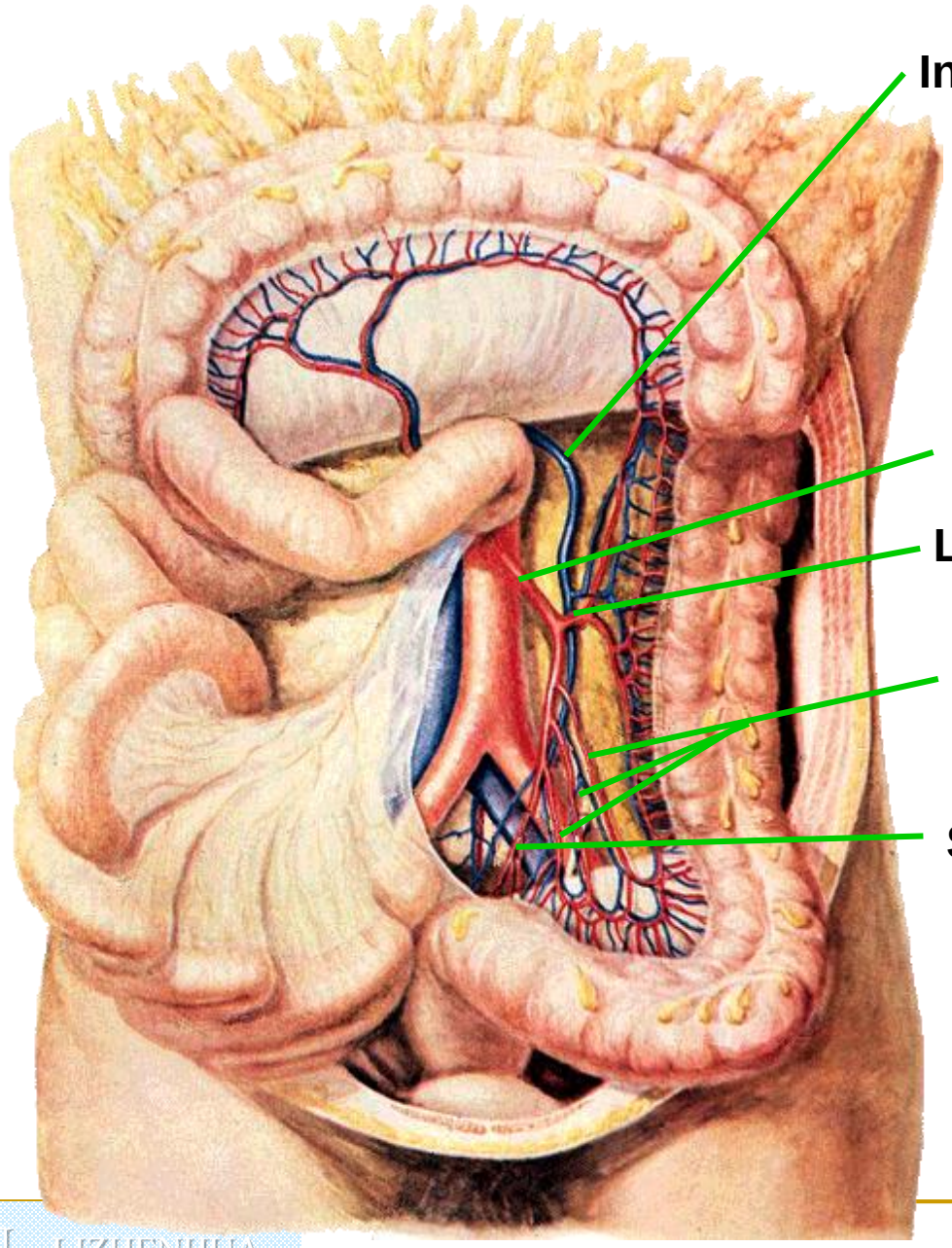
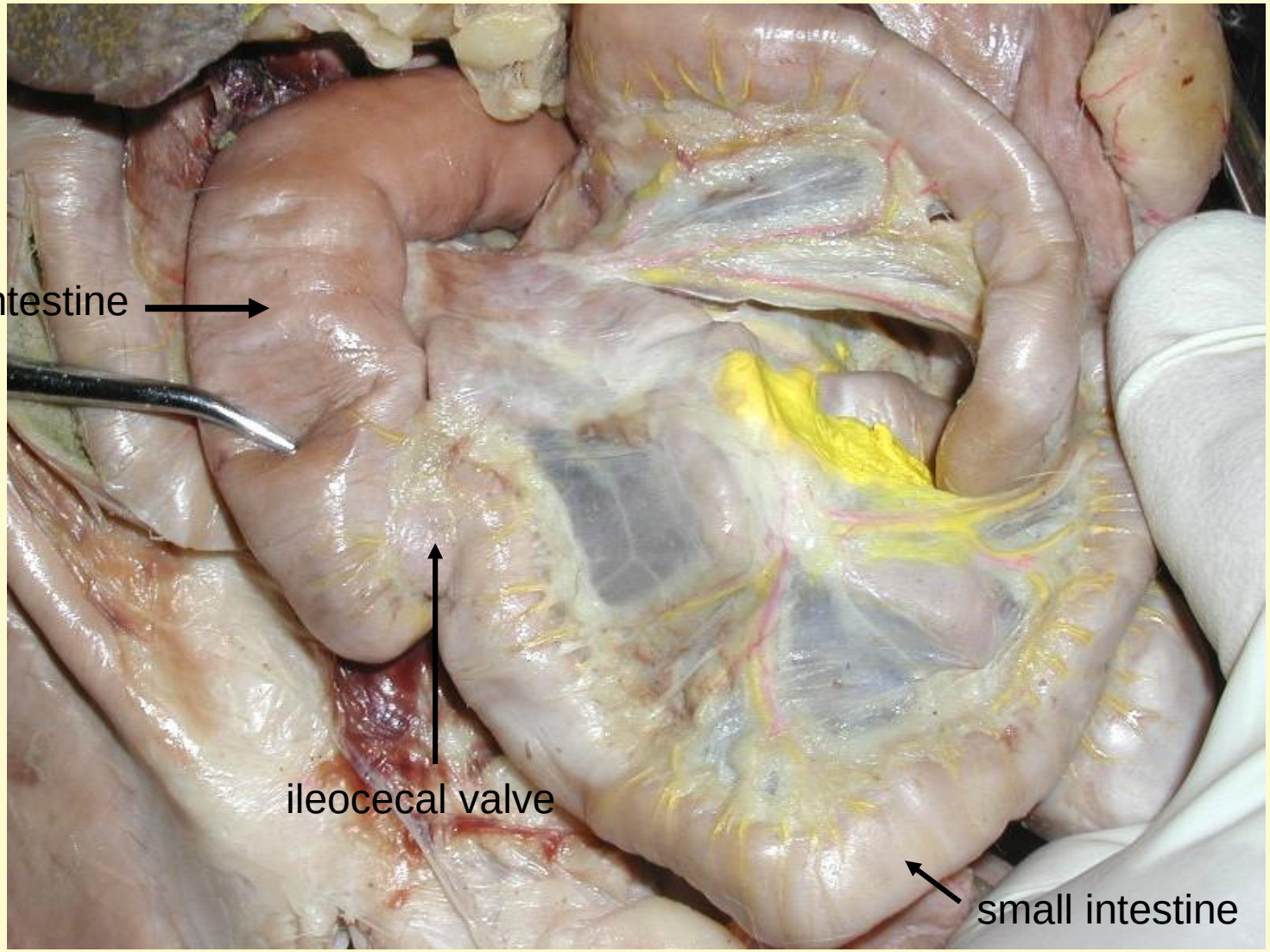


Figure 23.22a


Middle colic a.
Inf. pancreaticodudenal a.
Right colic a.
Ileocolic a.
Appendicular a.
Superior Mesenteric v.
Superior mesenteric a.
Jejunal and ileal a.

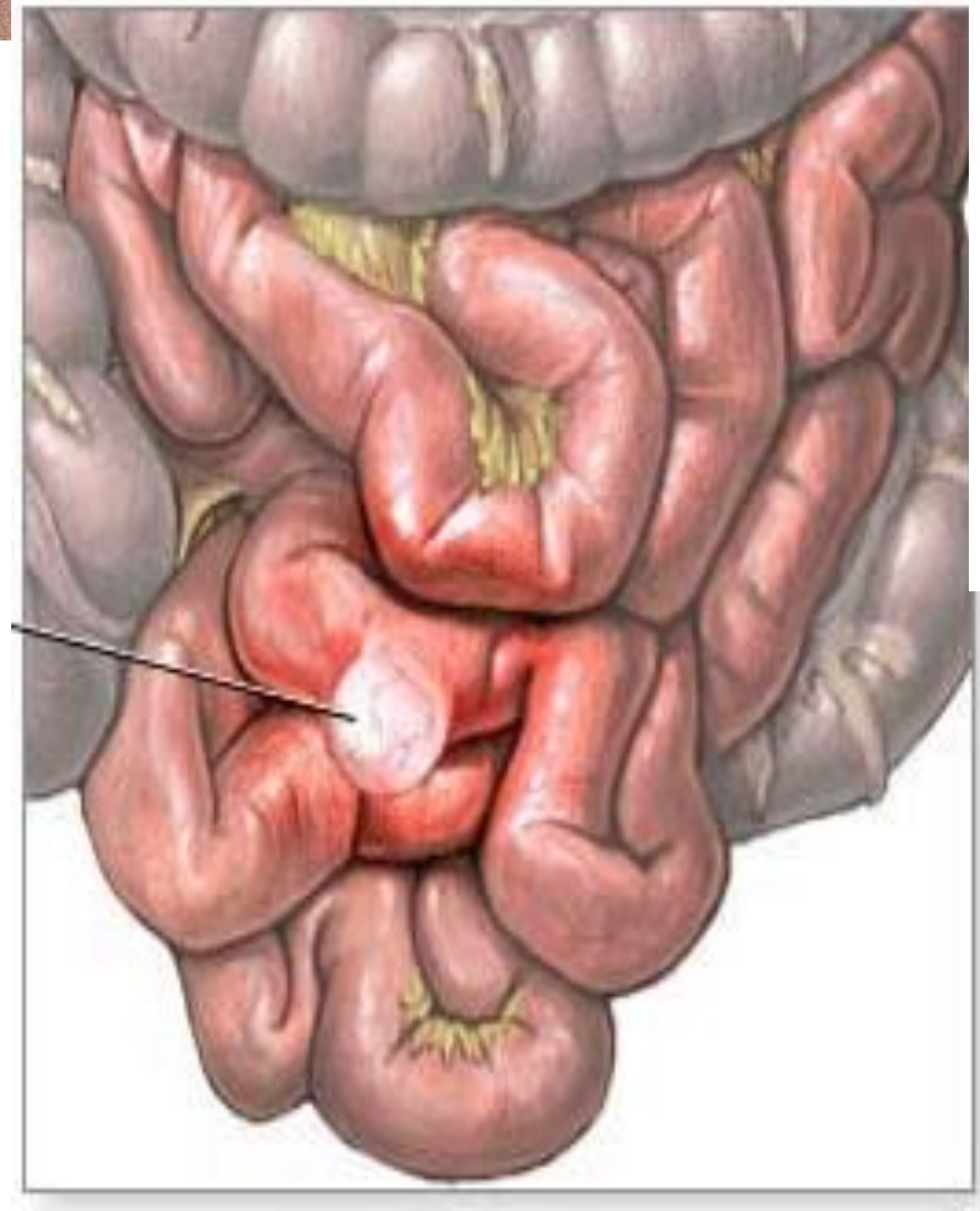

Inferior mesenteric v.
Inferior mesenteric a.
Left colic a.
Sigmoid a.
Superior rectal a.


large intestine
ileocecal valve
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



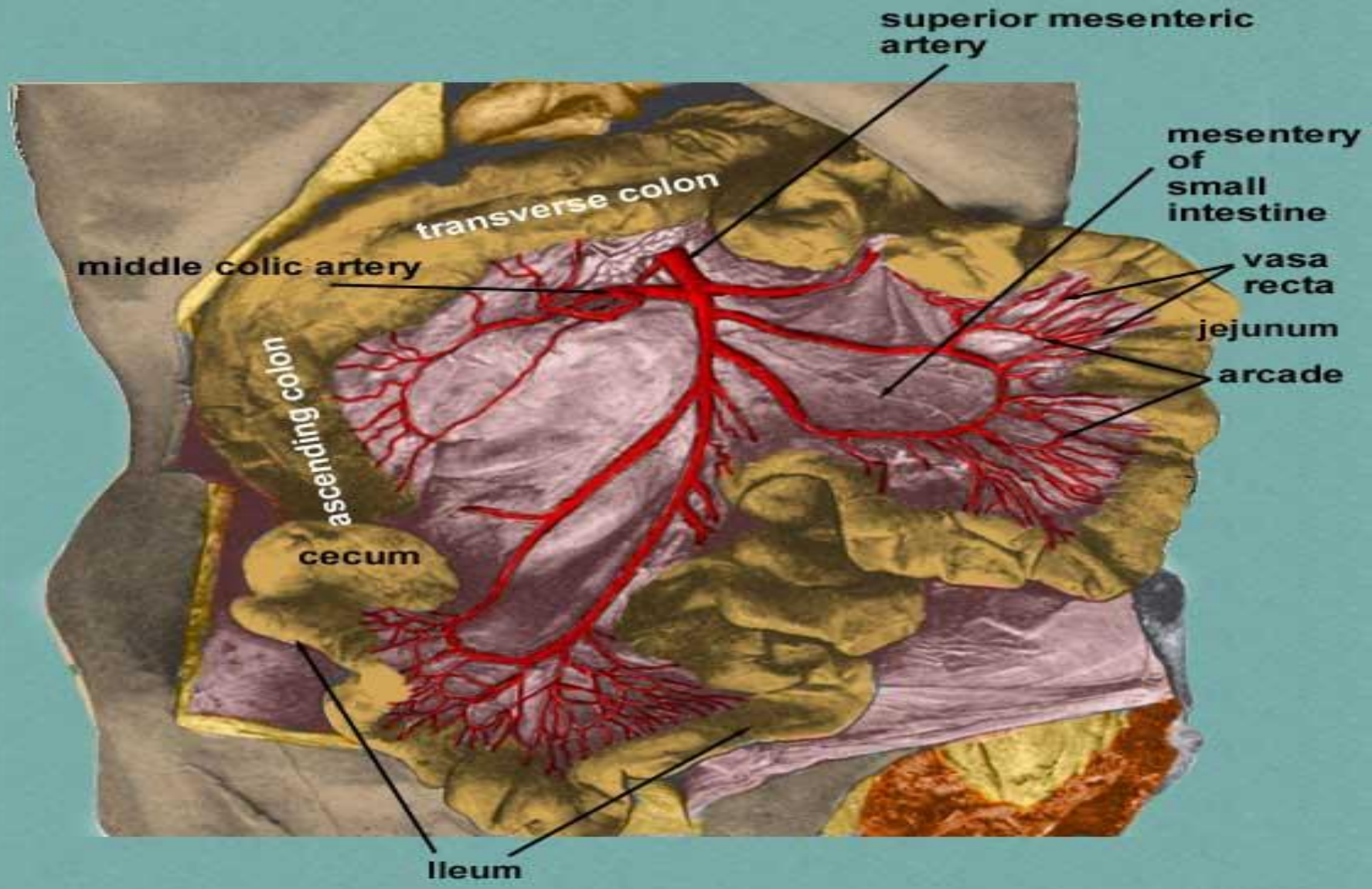

Small intestine
Meckel's diverticulum

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



Nerve supply for small intestine