



Third year

GIT..

Anatomy

Lecture (7)

Anatomy of Pancreas & Duodenum

Dr. Amany Swilam

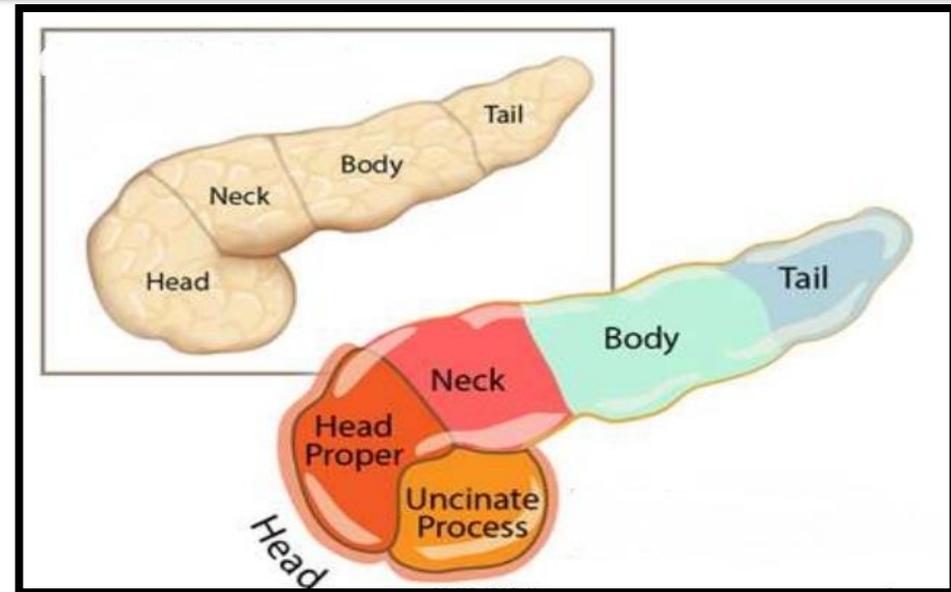
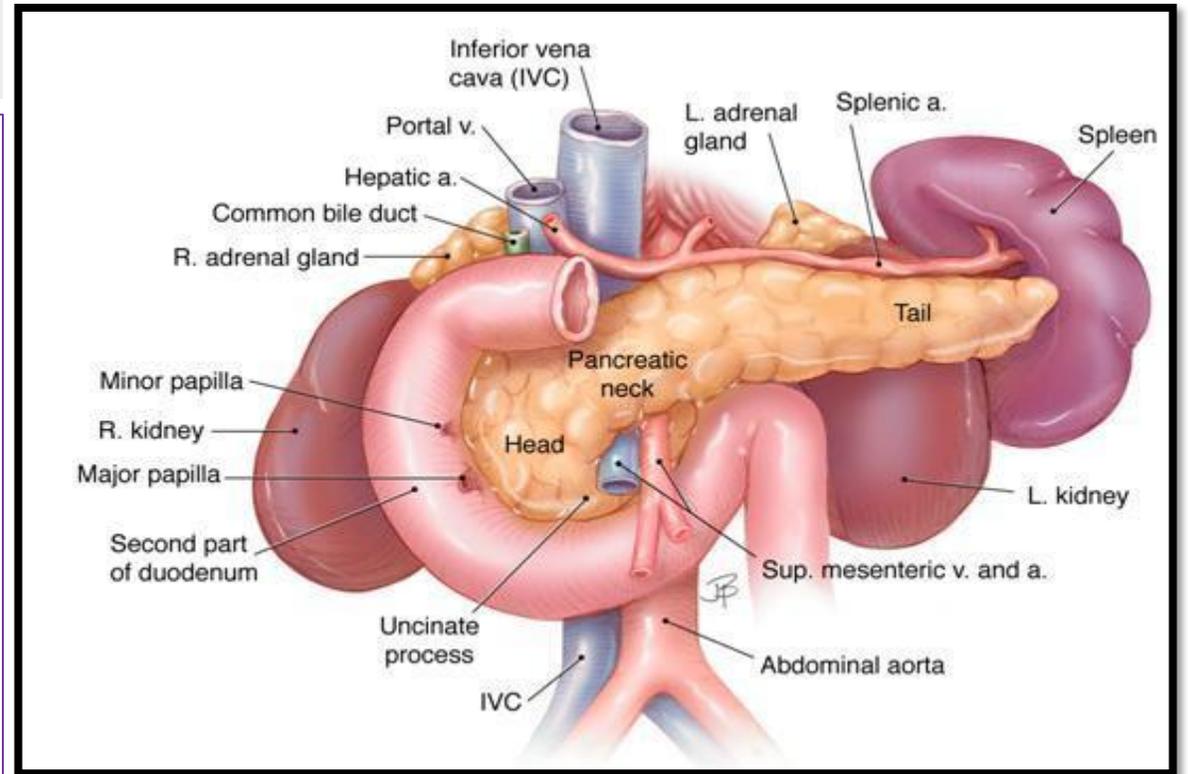
Assistant professor of Anatomy & Embryology

ILOs

- Describe the location, parts and relations, blood & nerve supply, and lymph drainage of pancreas.
- Describe the histology of pancreas.
- Describe the parts of small intestine.
- Understand the relation of the four parts of duodenum, blood & nerve supply, and lymph drainage of duodenum.

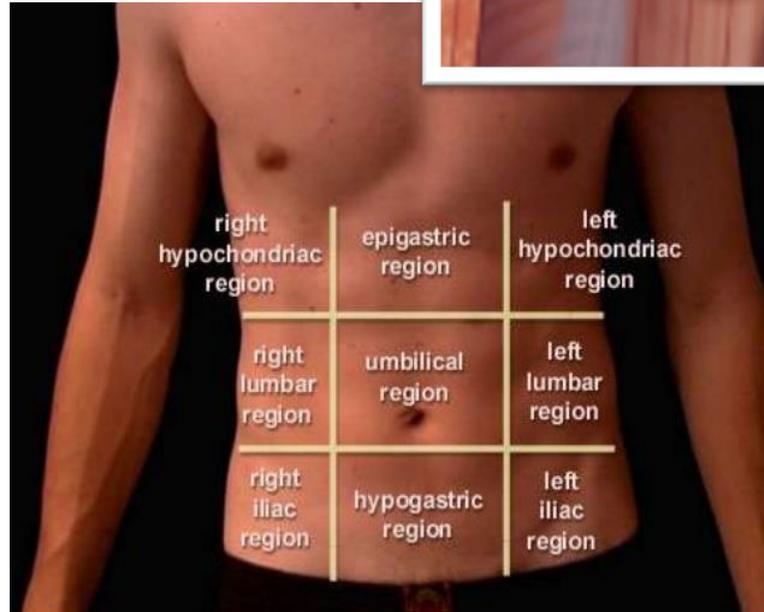
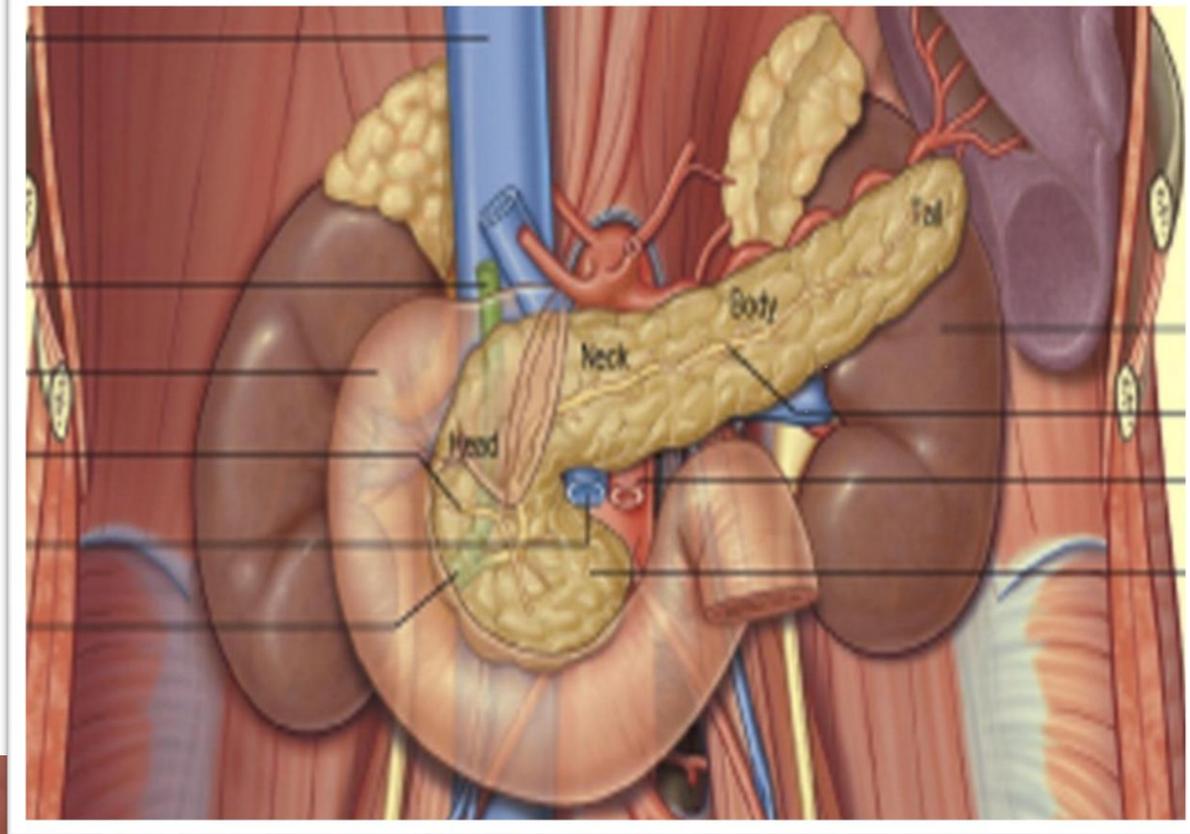
Pancreas

- **The pancreas** is one of the digestive glands and performs both endocrine and exocrine functions.
- It has a firm, lobulated smooth surface.
- **It has four parts; Head, Neck, Body and Tail.**
- **It has one accessory lobe (Uncinate process).**
- In adults the pancreas **measures** between 12 and 15 cm long.
- It is **shaped** as a flattened 'tongue' of tissue, thicker at its head and thinner towards its tail.



Site of Pancreas

- The pancreas **lies within** the curve of the duodenum.
- It **across the posterior abdominal wall** transversely to the left and slightly upwards.
- It **lies in** the lower part of epigastric region.



Head of the pancreas

Site: It lies to the right of the midline, within the curve of the duodenum.

Relations:

Superiorly:

- First part of the duodenum.

Laterally (to the right):

- Second part of the duodenum.
- Superior & Inferior pancreaticoduodenal arteries.

Inferiorly:

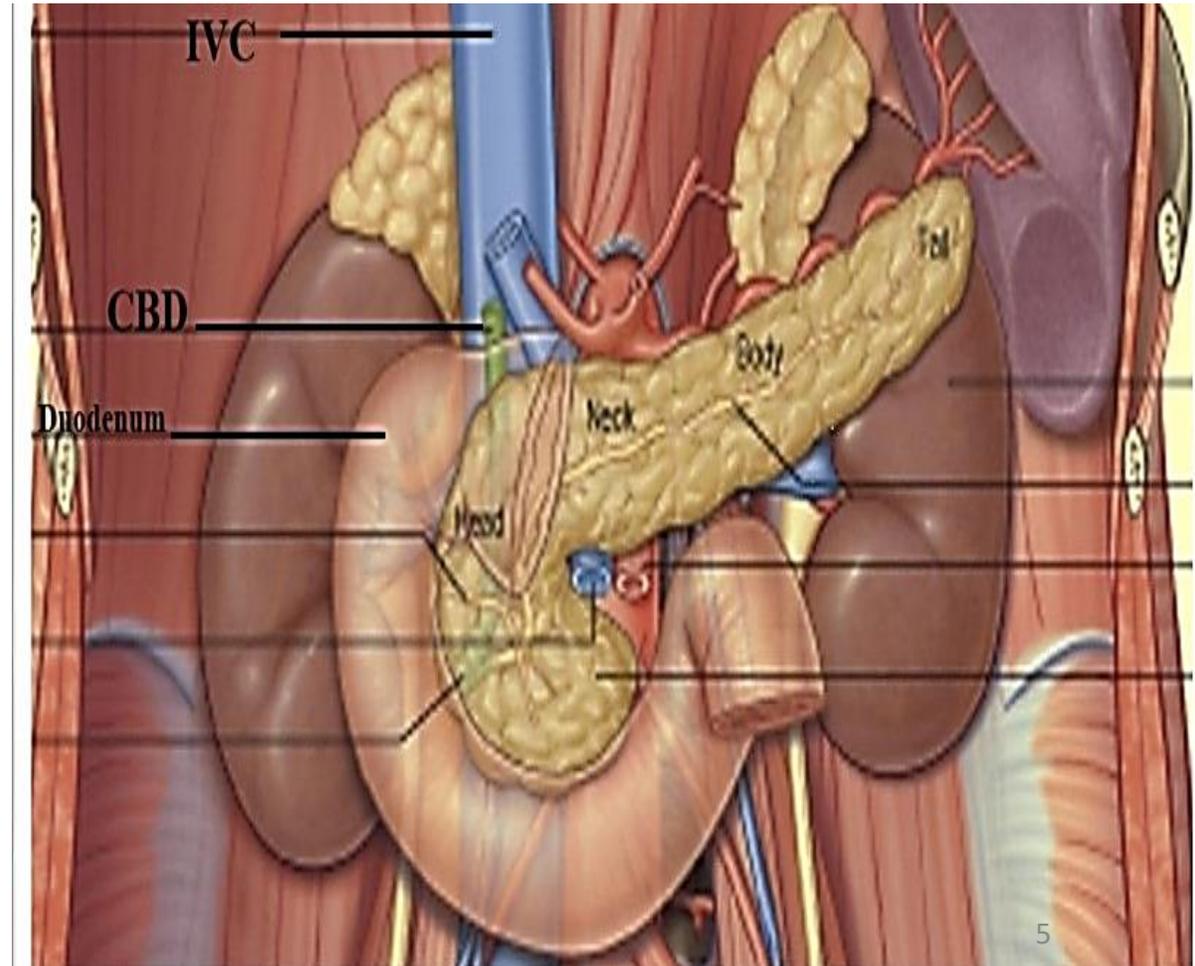
- Third part of the duodenum.

Anterior relations:

- Transverse colon.

Posterior relations:

- Common bile duct.
- Inferior vena cava.
- Right renal vein.



Uncinate process of the pancreas

- It extends from the head of the pancreas.

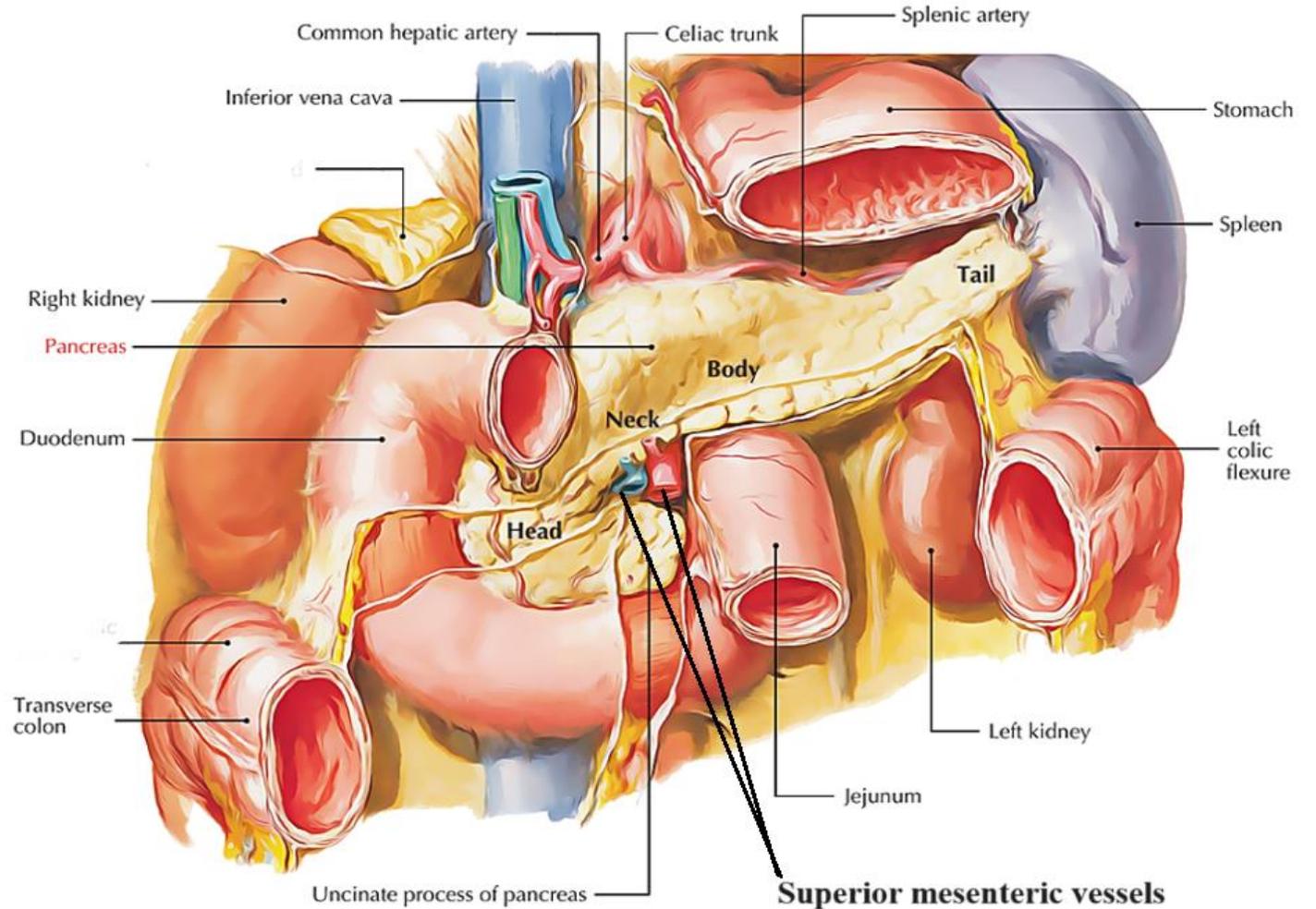
Relations:

Anterior relations:

- Superior Mesenteric Vessels.

Posterior relations:

- Abdominal Aorta.



Neck of the pancreas

- The neck of the pancreas is a part between the head and body of pancreas.

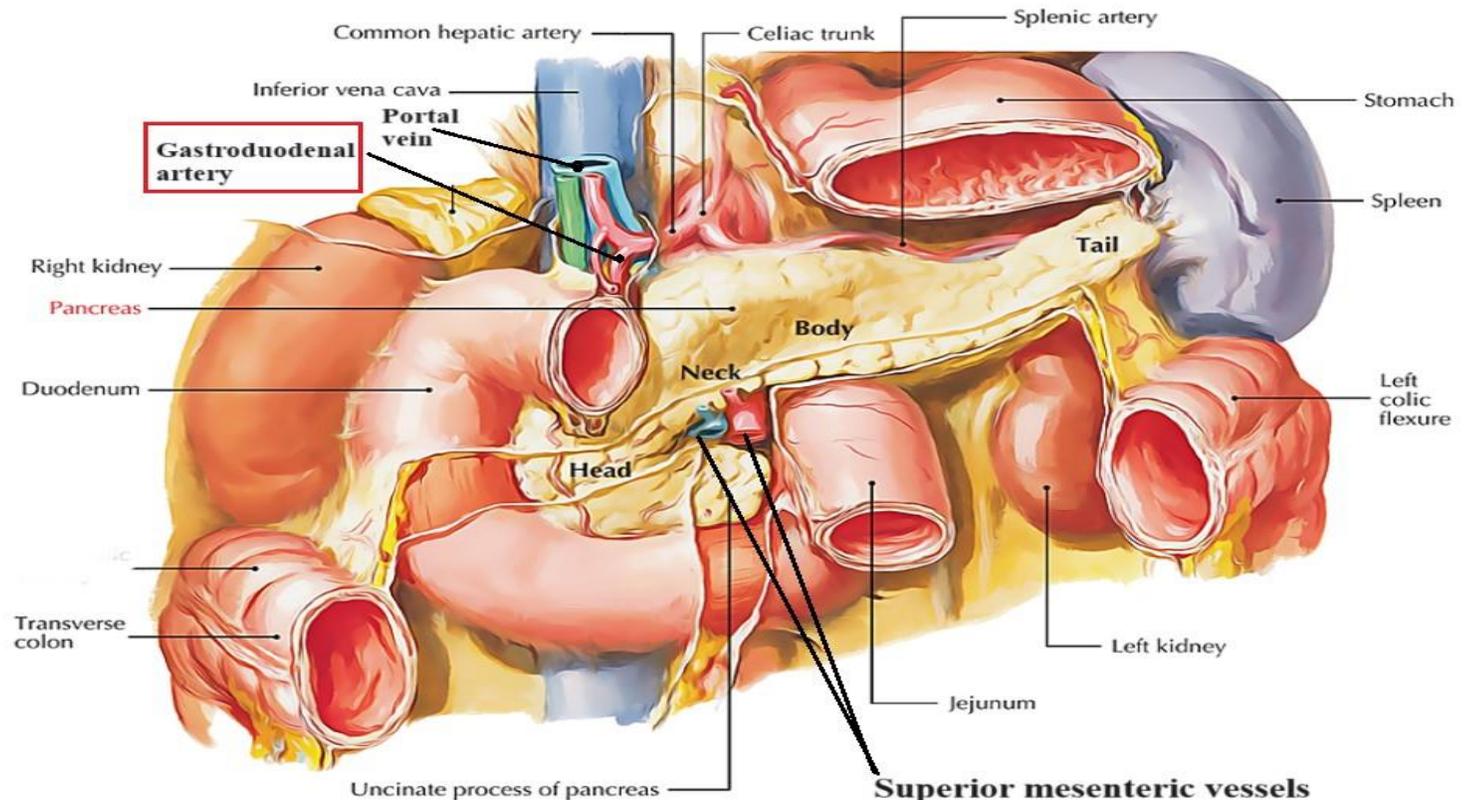
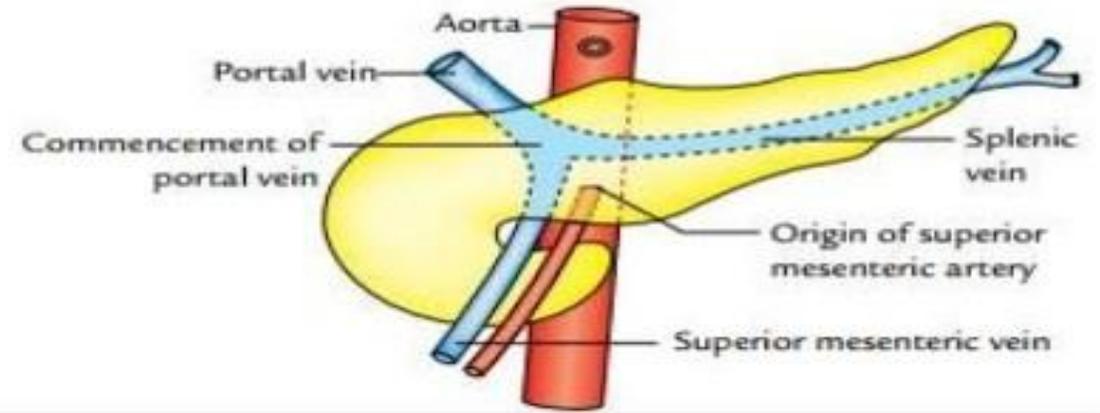
Relations:

Anterior relations:

- Pyloroduodenal junction.

Posterior relations:

- Beginning of Portal vein.



Body of the pancreas

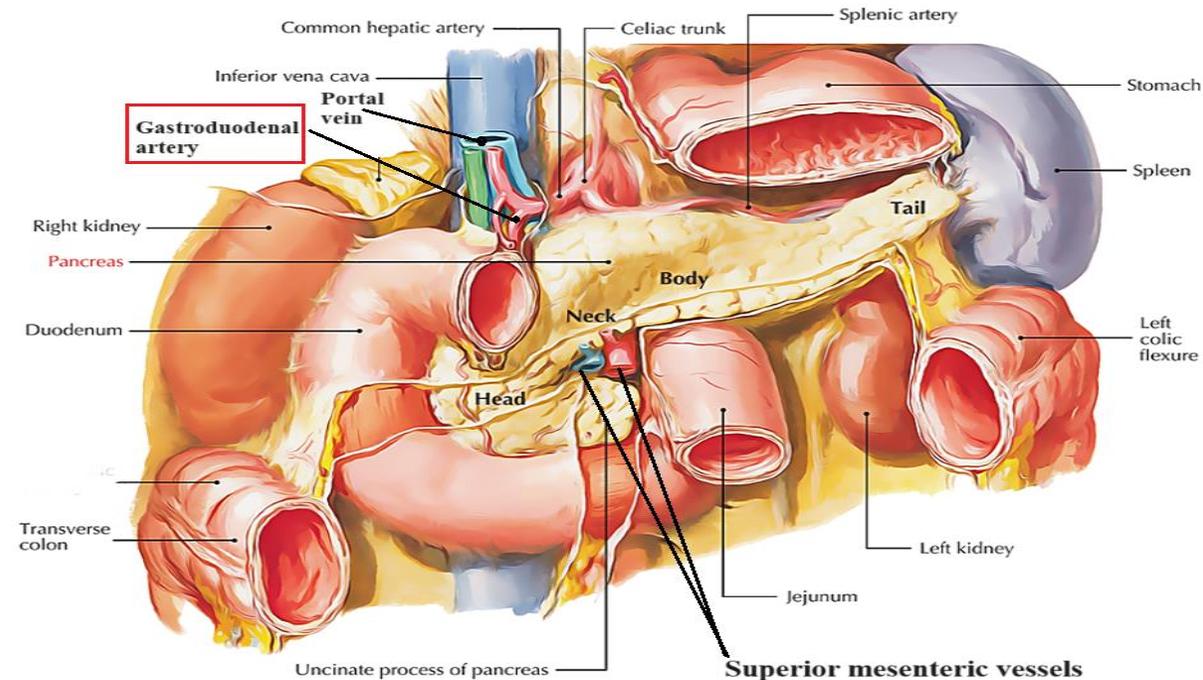
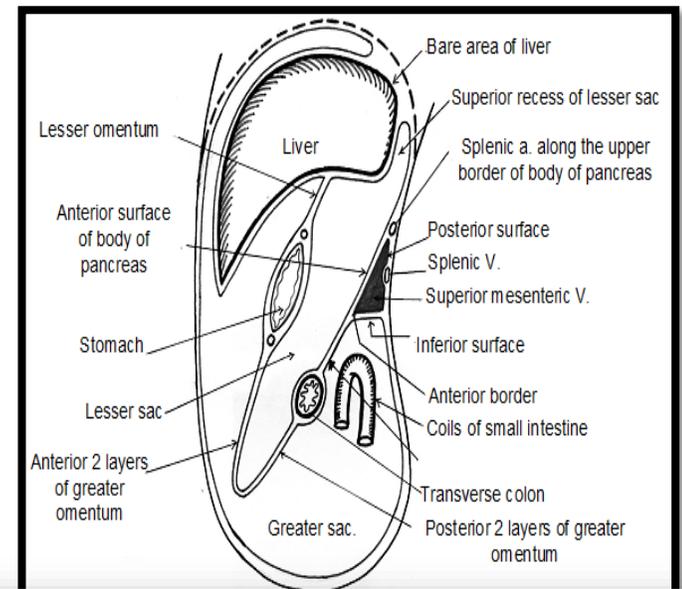
- The body of the pancreas is the longest portion of the gland.
- It is **triangular in shape in cross-section, having three surfaces & three borders.**

1-Anterior surface:

- It is **covered by peritoneum.**
- It is related to;
 - **Stomach** separated from it by **the lesser sac.**

2- Inferior surface:

- It is **covered by peritoneum.**
- It is related to;
 - **Duodenojejunal flexure & coils of jejunum.**
 - **Transverse colon.**



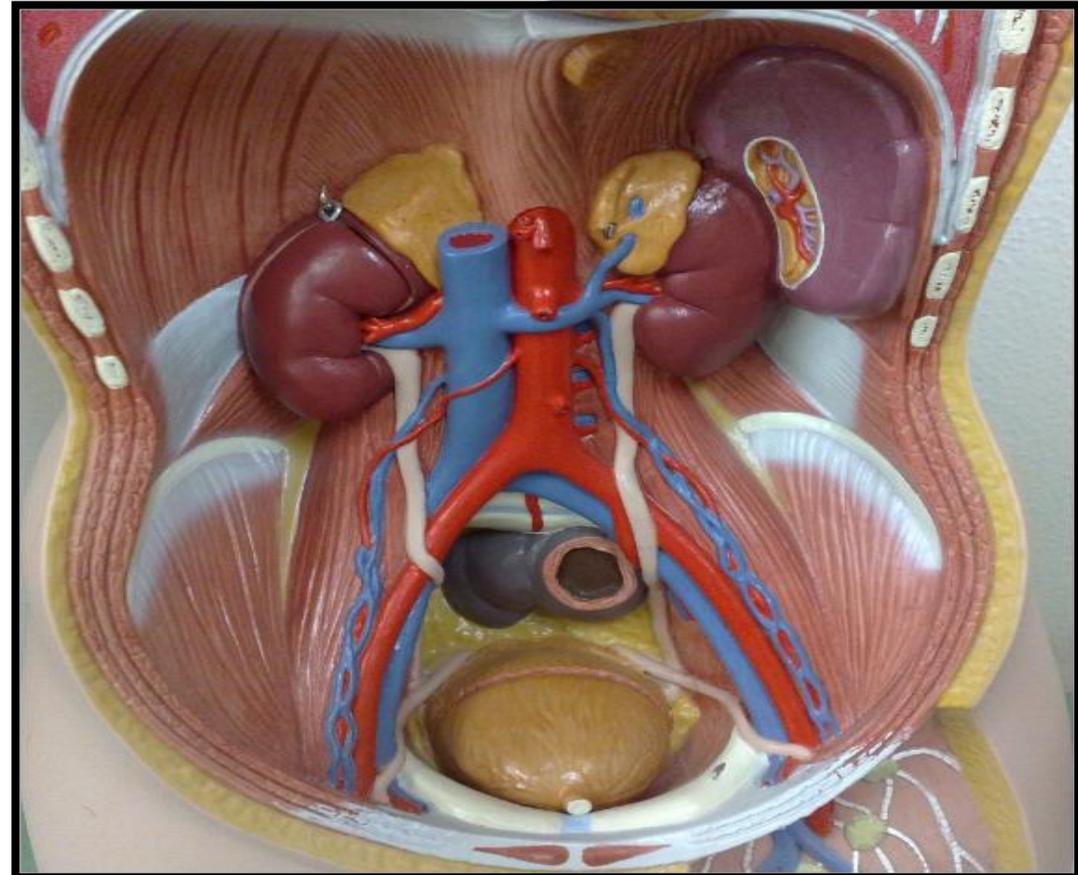
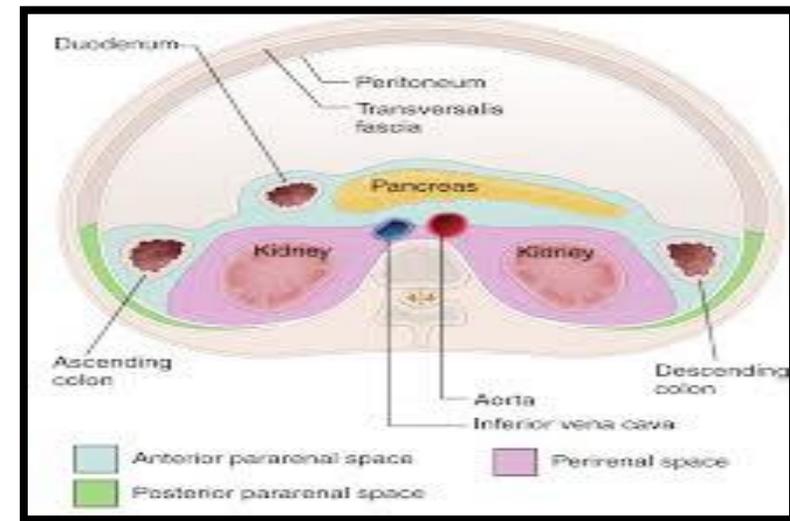
Body of the pancreas

3- Posterior surface:

- The posterior surface of the pancreas is **devoid of peritoneum**.

Its posterior relations:

- Abdominal aorta & origin of the superior mesenteric artery.
- Left suprarenal gland, left kidney & left renal vein.
- Splenic vein (closely related).



Borders of body of the pancreas

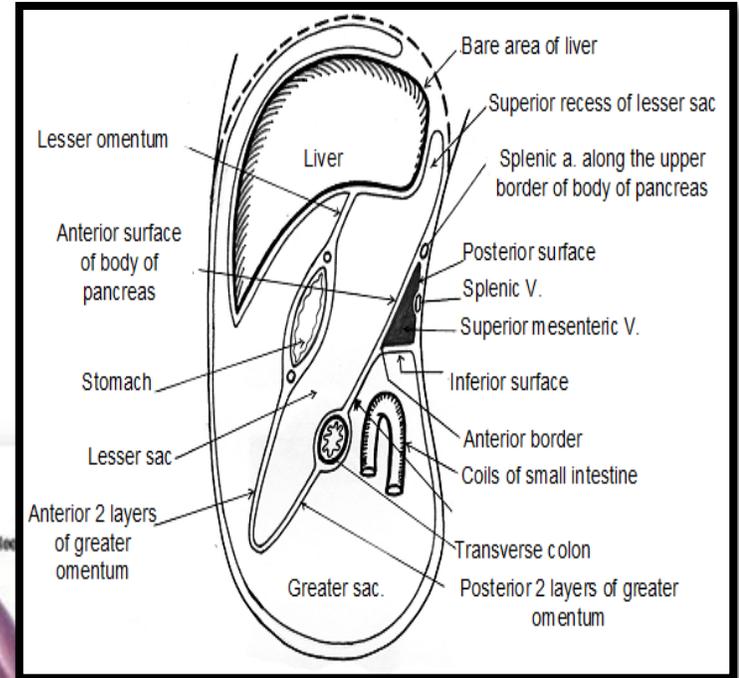
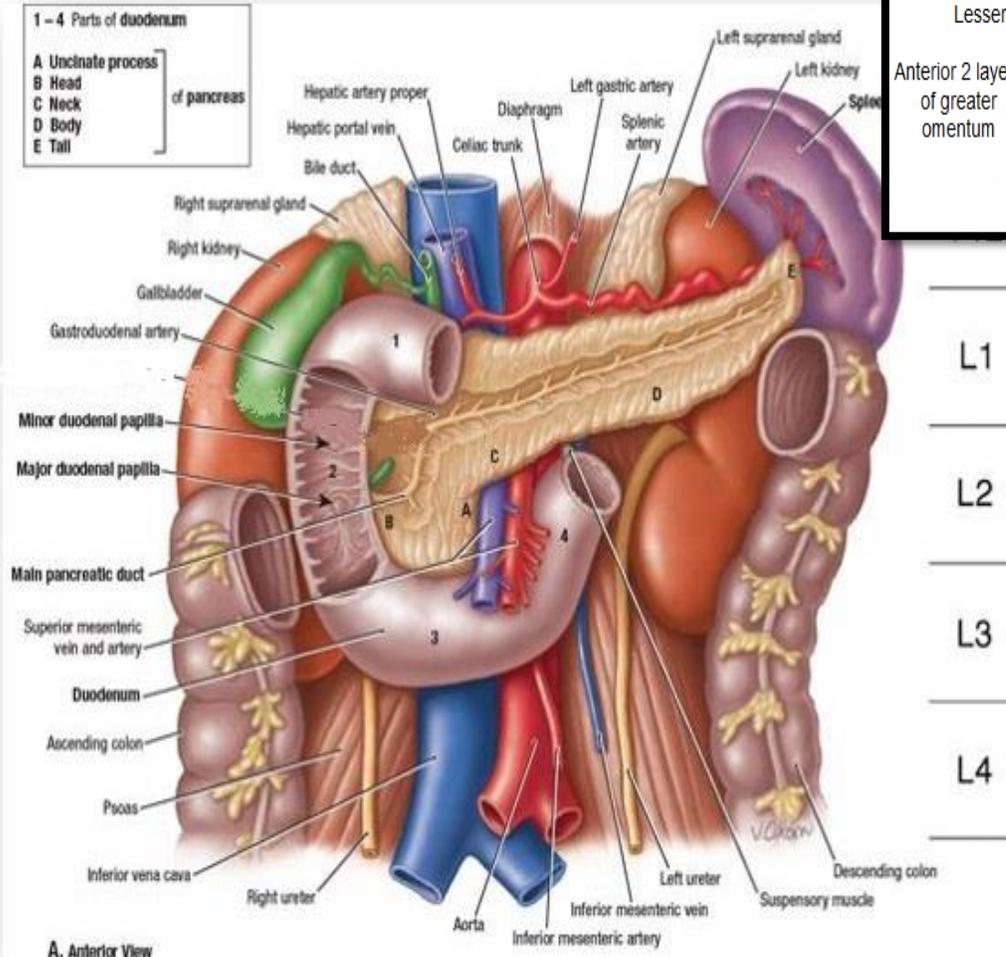
1-Superior border:

- It is related to the **splenic artery**.

2-Anterior border:

- The two layers of the **transverse mesocolon** attached along this border.

3- Inferior border.

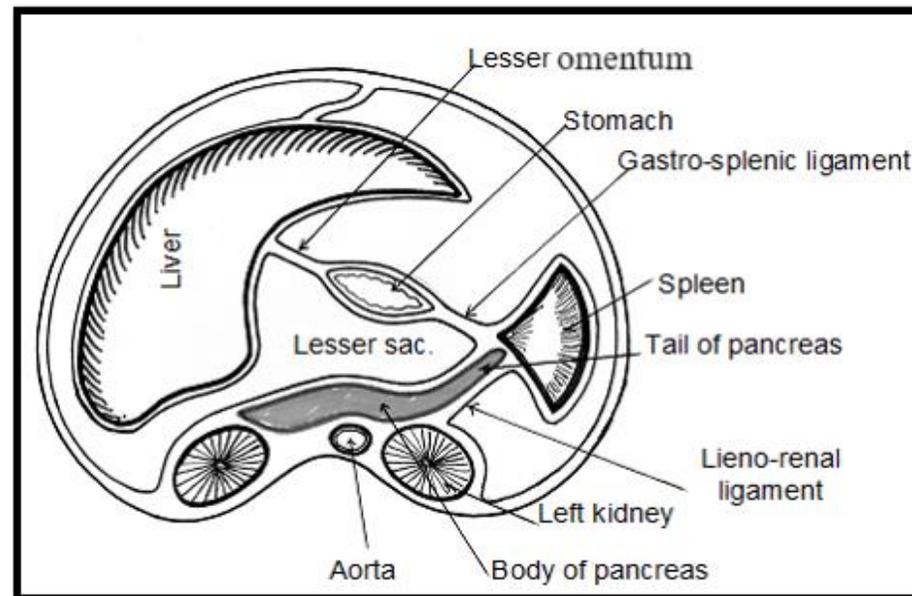
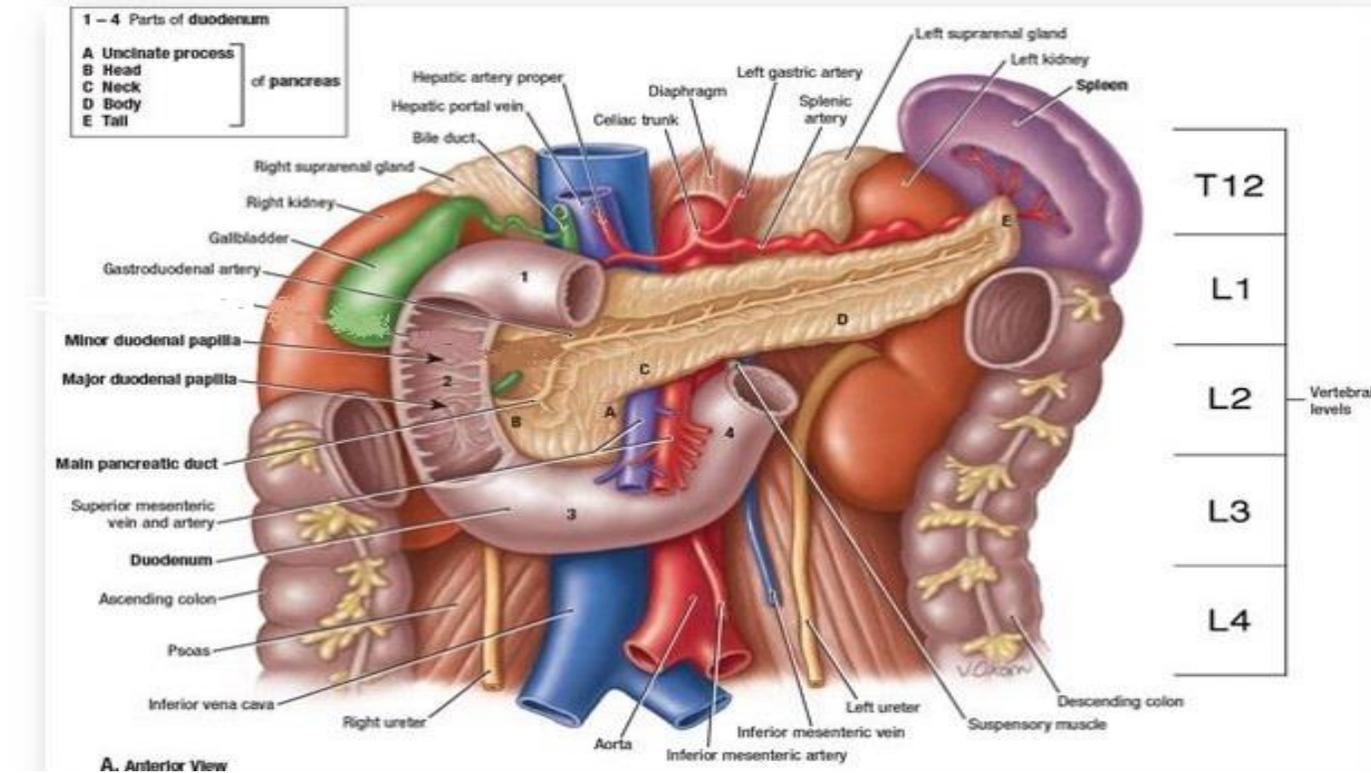


Tail of the pancreas

- The tail of the pancreas is most lateral portion of the gland.

Relations:

- Its tip lies in contact with** the visceral surface of **spleen**.
- Posteriorly it is related to** splenic branches of the splenic artery and tributaries of the **splenic vein**.
- It lies between the layers of **the lienorenal ligament**.



Pancreatic Ducts

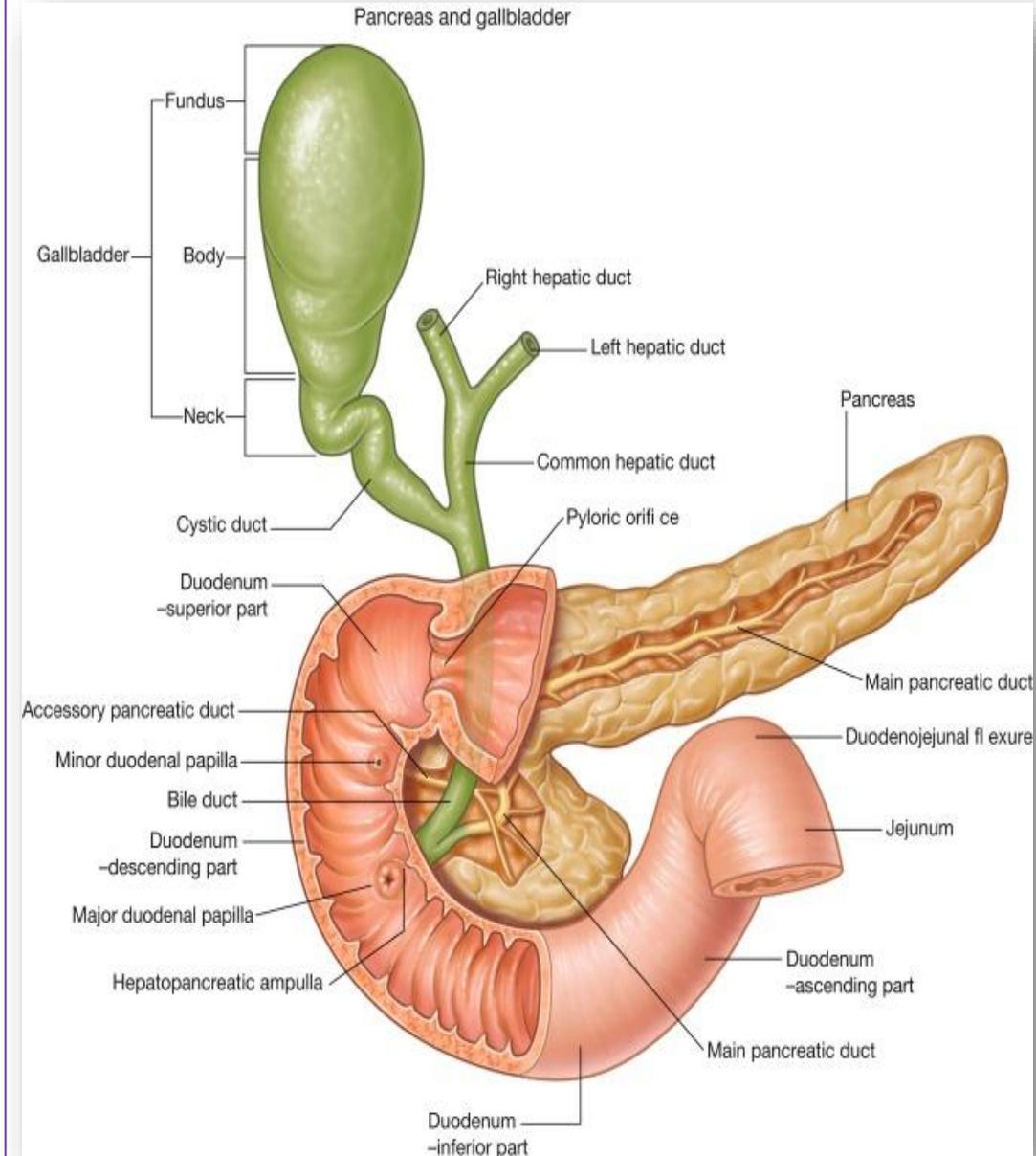
The exocrine pancreatic secretion is discharged into the duodenum through **two pancreatic ducts**:

1- Main pancreatic duct: (of Wirsung)

- It is formed by the junction of several lobular ducts in the tail.
- In its course toward the duodenum, it receives numerous lobular ducts.
- The duct terminates by joining the common bile duct to form the **Hepatopancreatic ampulla** which opens into the second part of the duodenum on summit of **Major duodenal papilla**.

2- Accessory pancreatic duct: (of Santorini)

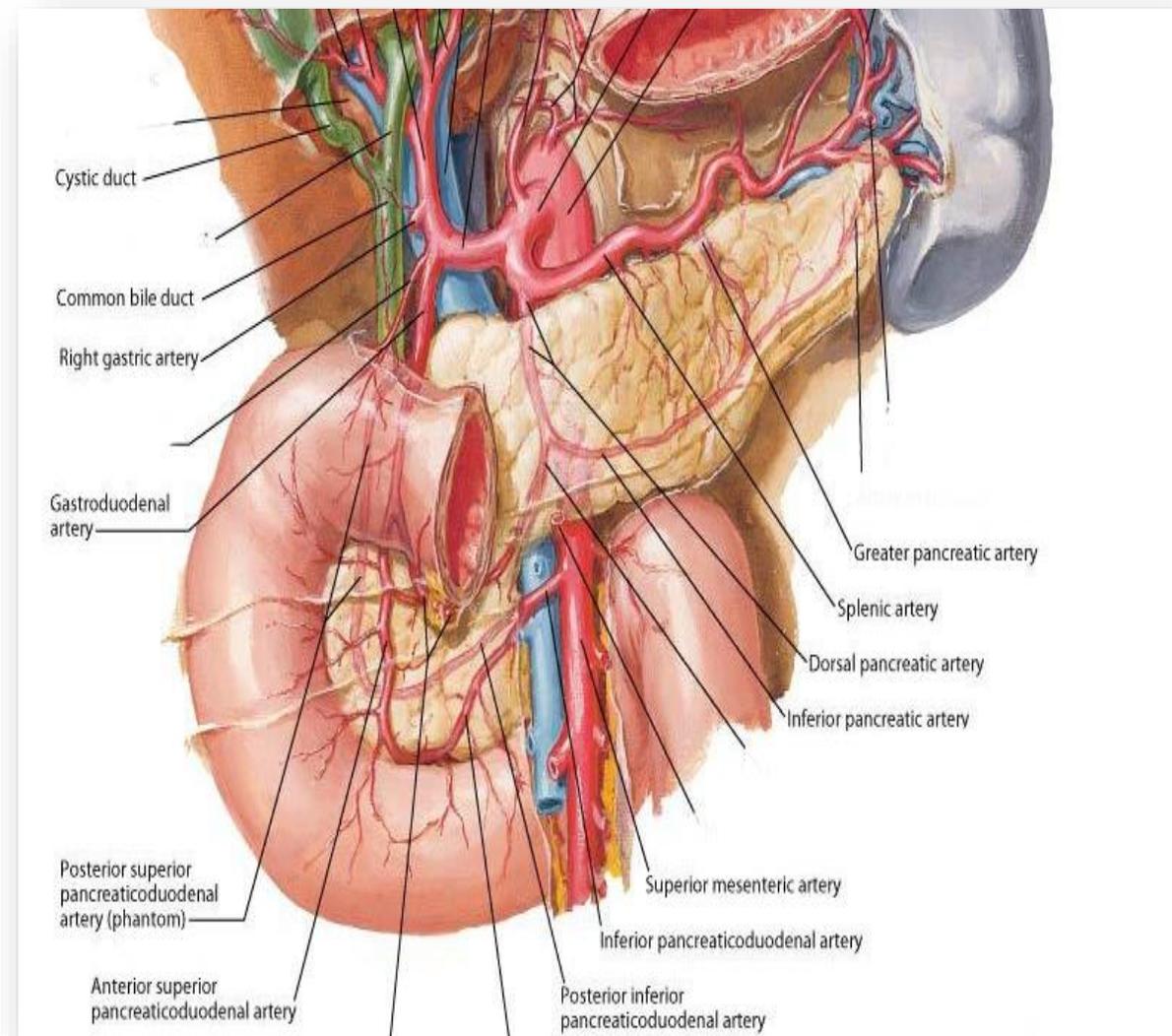
- It drains the anterior portion of the head of the pancreas.
- It ascends anterior to the main duct.
- It opens into the second part of the duodenum on summit of **Minor duodenal papilla**, which lies superior to the major papilla.



Vascular supply of the pancreas

Arterial supply:

- **1- Pancreatic branches:** They arise from the splenic artery and **supply the body and tail.**
- **2- Superior pancreaticoduodenal artery:** It arises from the gastroduodenal artery. **It supplies the upper part of the head of the pancreas.**
- **3- Inferior pancreaticoduodenal artery:** It arises from the superior mesenteric artery. **It supplies the lower part of the pancreatic head and its uncinate process.**



Venous drainage:

- The head and neck drain into **superior mesenteric vein**, via superior & inferior pancreaticoduodenal veins.
- The body and tail drain into **splenic vein.**

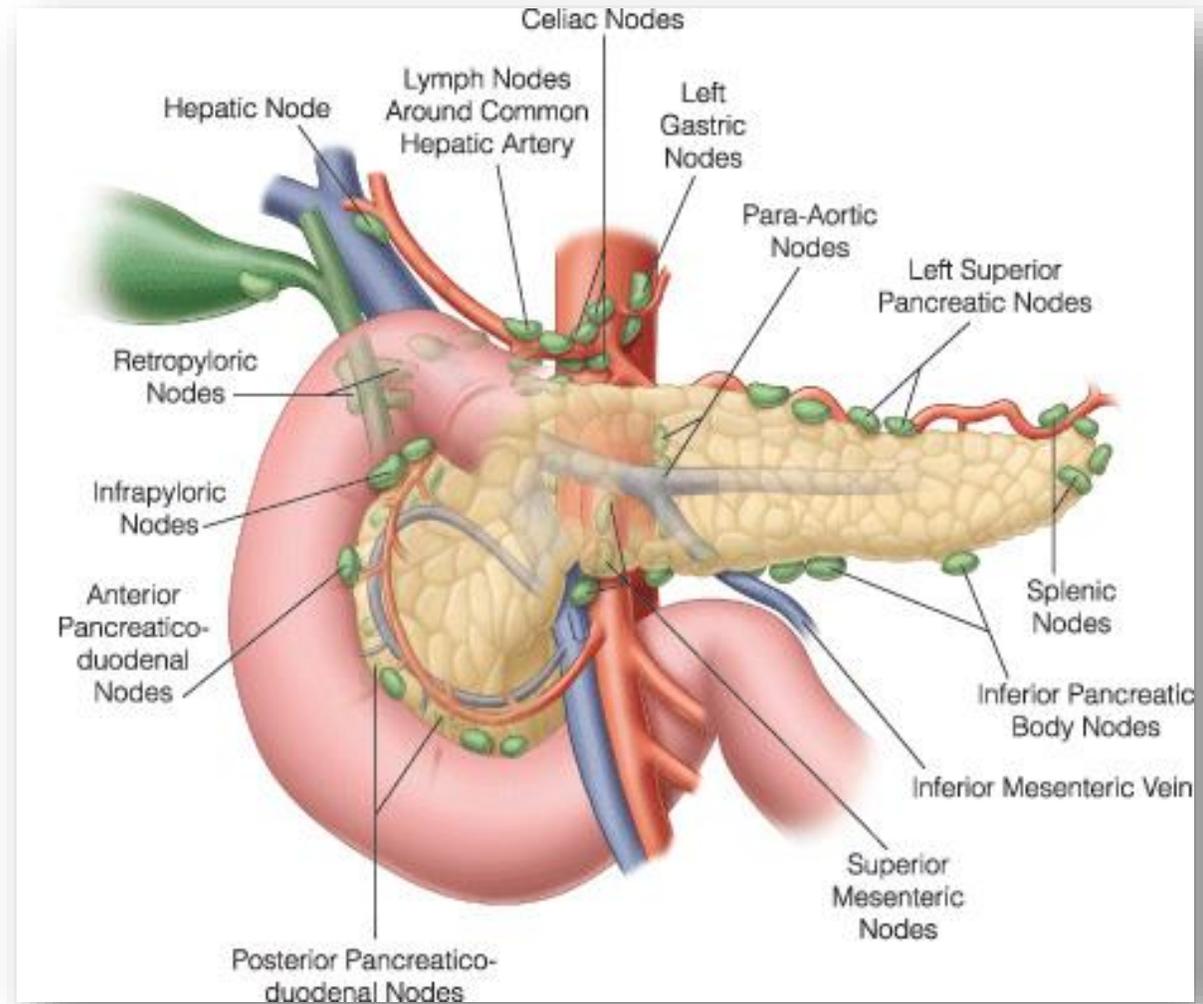
Lymphatic drainage of Pancreas

Lymphatic drainage:

- **Lymphatics from the tail and body drain into the pancreaticosplenic nodes to coeliac lymph nodes.**
- **Lymphatics from the upper part of head drain into hepatic nodes to coeliac lymph nodes.**
- **From the lower part of head drain into superior mesenteric nodes.**

Innervation of the exocrine part of pancreas:

- Innervated by sympathetic and parasympathetic (vagal) nerve fibers.



Clinical point of pancreas

Cancer of the Head of the Pancreas:

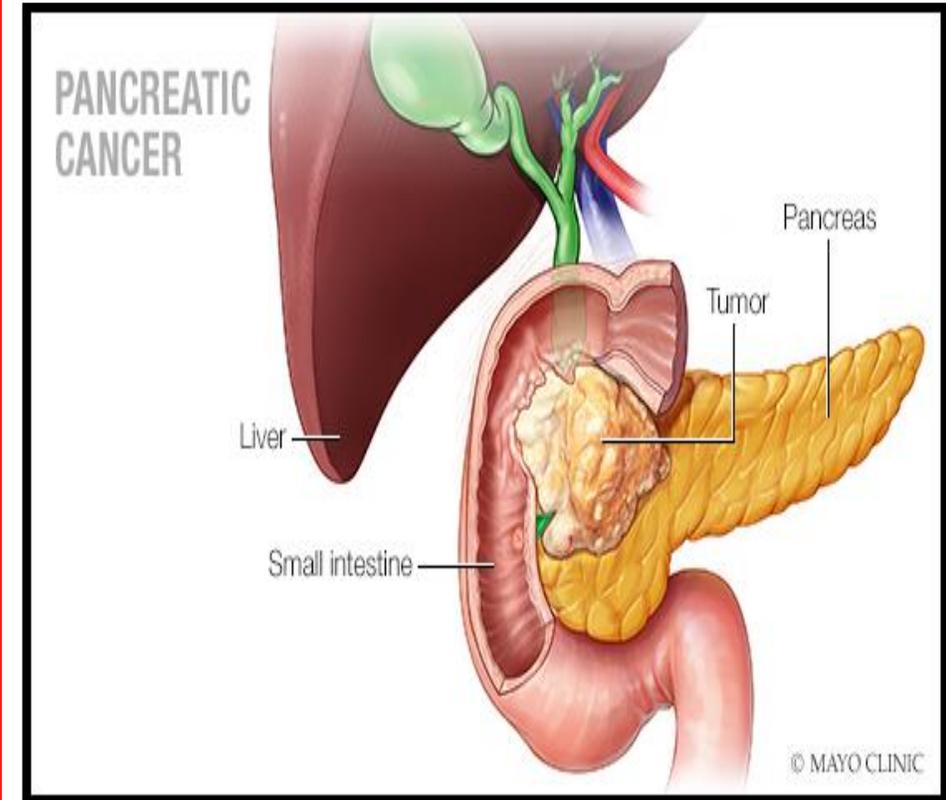
- Because of the close relation of the head of the pancreas to the **Common bile duct**, cancer of the head of the pancreas often causes **obstructive jaundice**.

Diagnosis of Pancreatic Disease:

- Because the pancreas lies behind the **stomach and transverse colon**, disease of the pancreas can be confused with that of the stomach or transverse colon.

The Pancreatic tail & Splenectomy:

- The presence of the tail of the pancreas in the lienorenal ligament sometimes results in its damage during splenectomy. The damaged pancreas releases enzymes that start to digest surrounding tissues, with serious consequences.



Histology of exocrine part of Pancreas

1- Stroma:

- **CT Capsule.**
- **CT septa:** That separating the pancreatic lobules.
- **Reticular fibers:** support the parenchyma.

2- The exocrine Parenchyma:

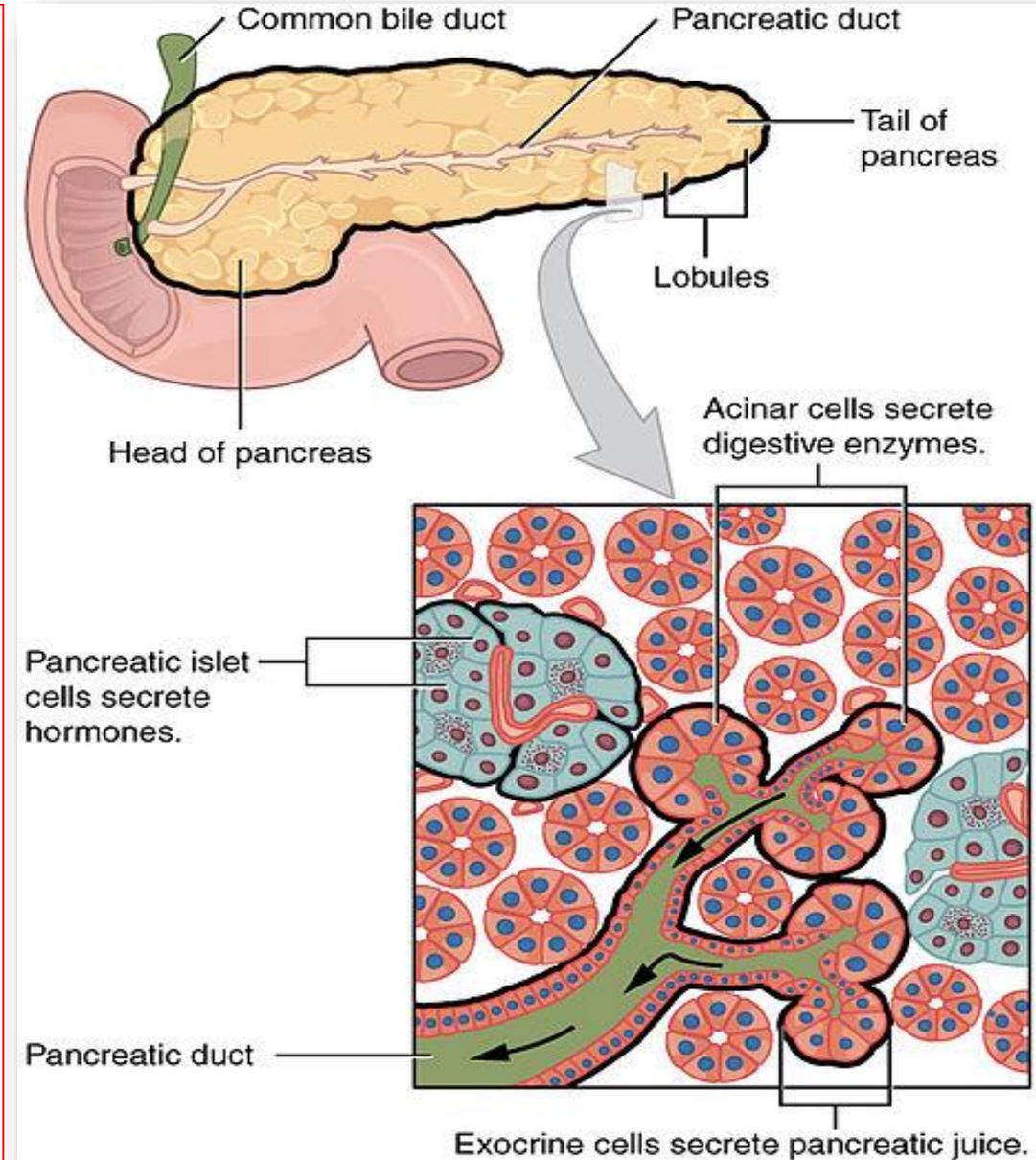
It is a compound tubuloalveolar gland., Consists of:

A-Pancreatic acini.

B- A highly branched duct system.

A- Pancreatic acinus; (Serous acini):

- Closely packed. It is composed of **serous cells** surrounding a lumen.
- Pyramidal cells, rounded nucleus, abundant basal RER & zymogen granules in apical part.
- **Acinus secretion** contains water, ions, and several pancreatic enzymes.



Histology of exocrine part of Pancreas

B- Ductal system:

1- Intercalated duct:

The initial portions of intercalated ducts penetrate lumens of acini (centroacinar cells). then the duct **lined by cuboidal epithelium**.

2- Intralobular duct:

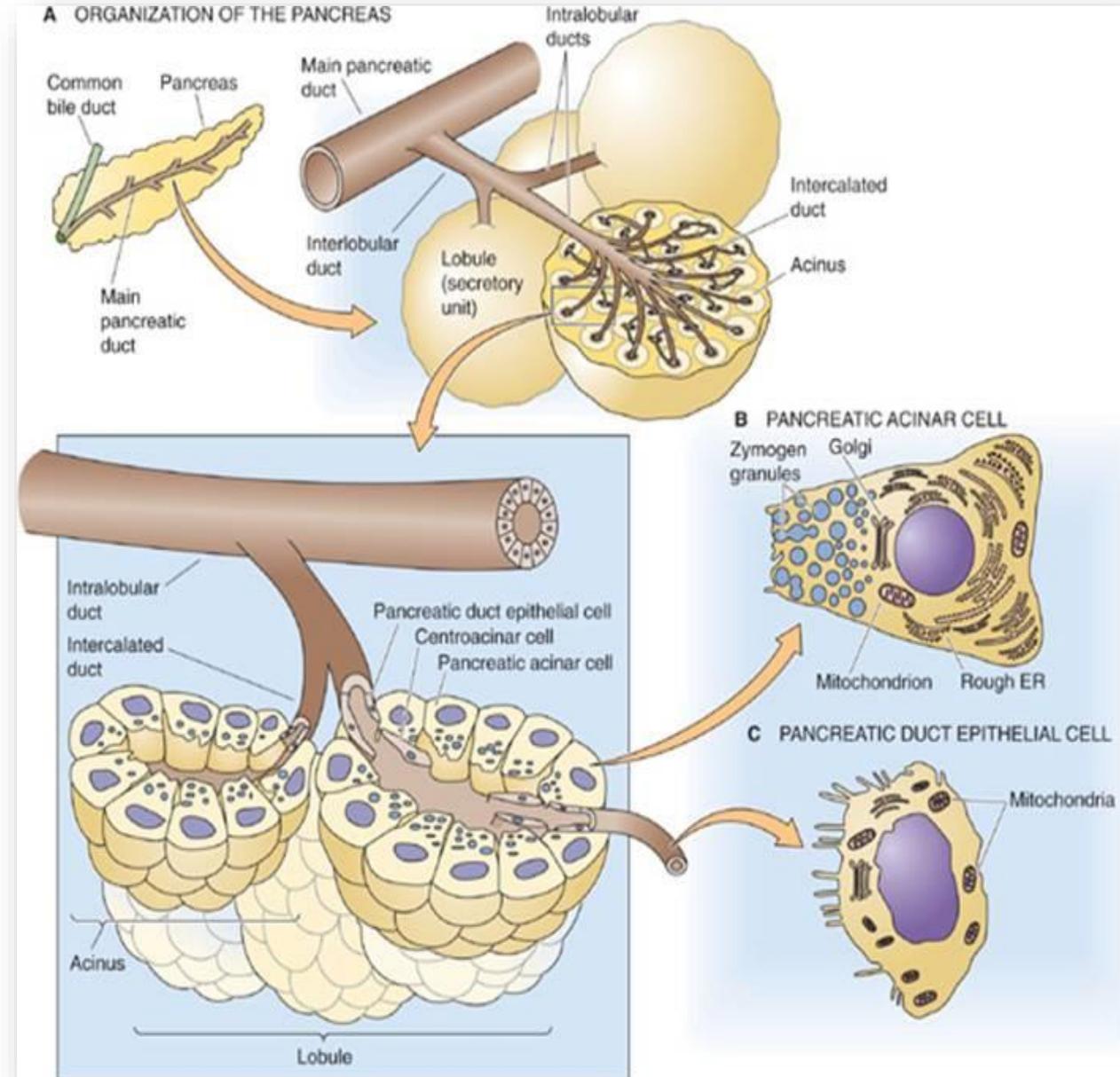
Lined by cuboidal epithelium.

3- Interlobular ducts:

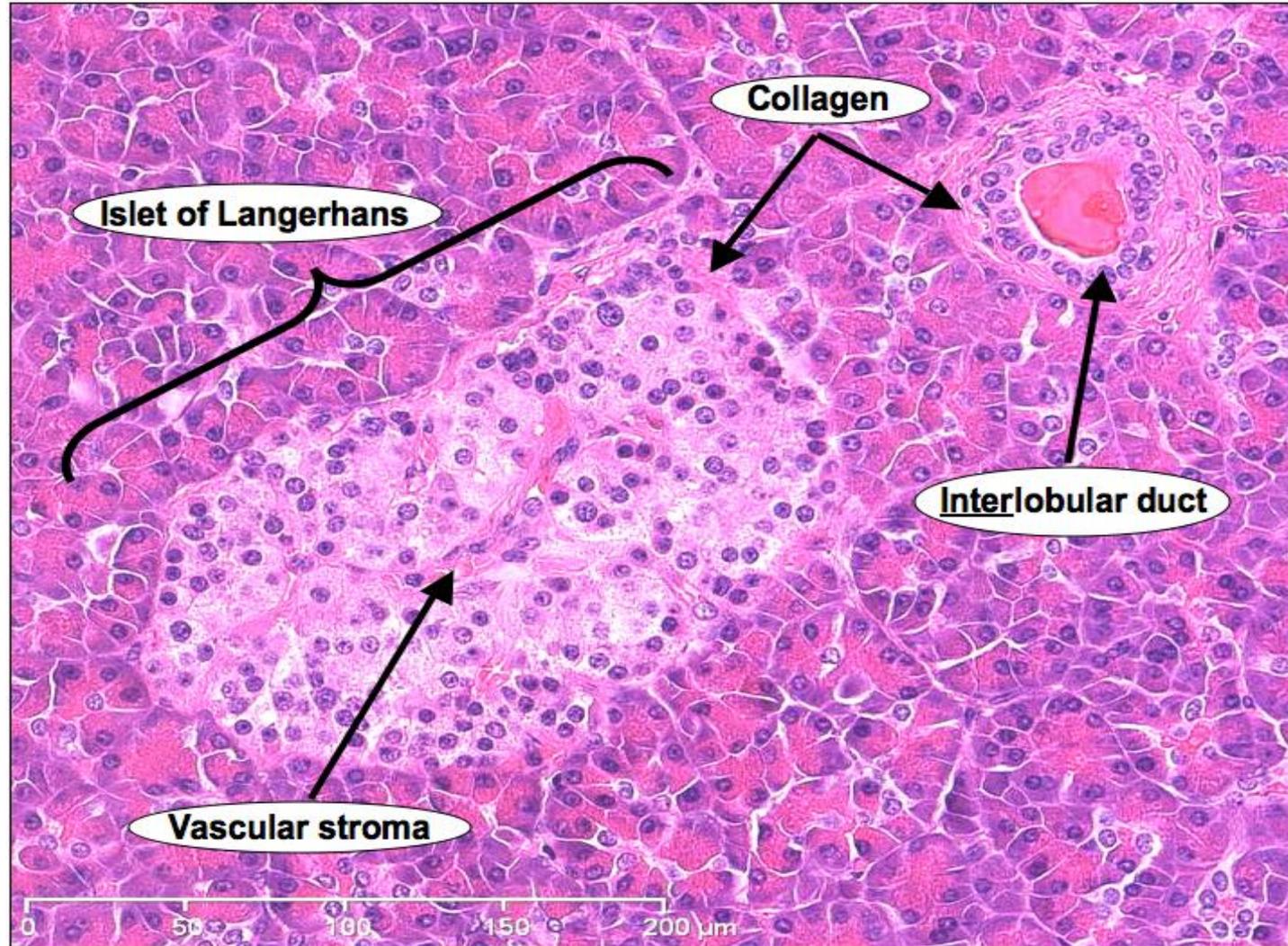
Lined by columnar epithelium.

4- Main pancreatic duct:

Lined by columnar epithelium with goblet cells.



Histology of pancreas



Duodenum

Def.: It is shortest, widest & most fixed part of the small intestine.

Shape: C- shape concave to Lt.

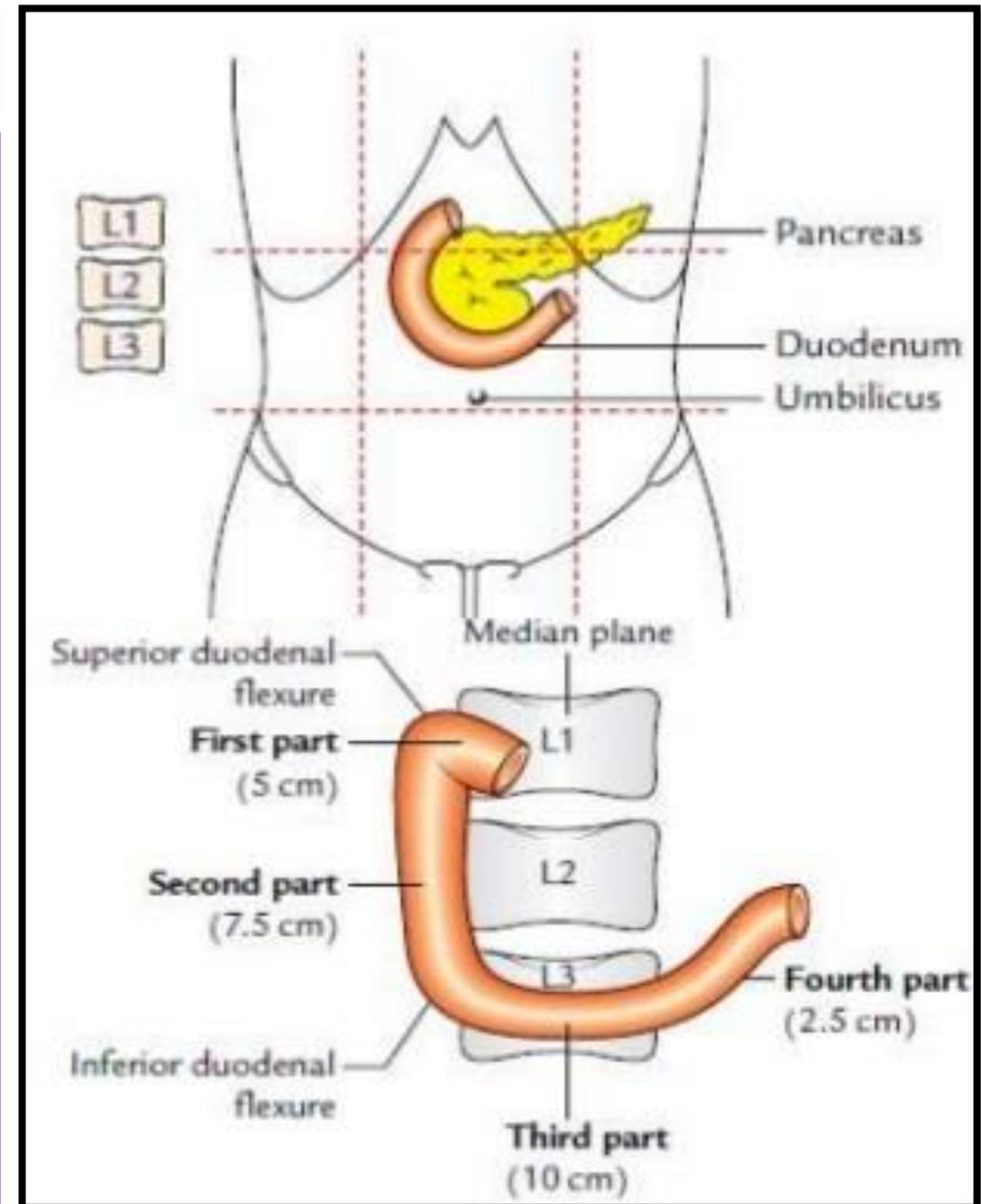
Length: (10 inch) in adult.

Position:

- Epigastric & umbilical regions.
- On the posterior abdominal wall **opposite upper 3 lumbar vertebrae.**

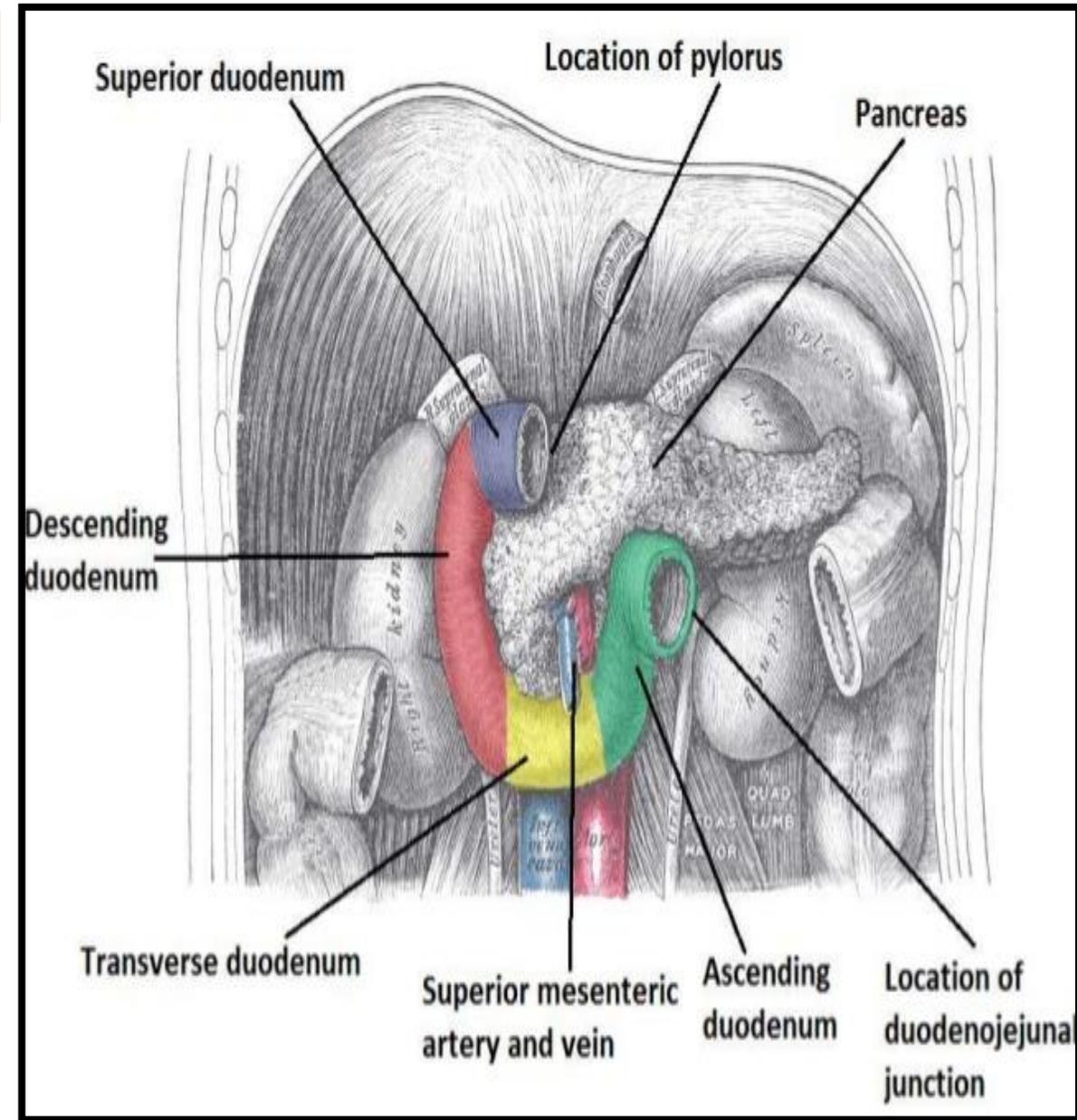
Extent:

- **Begins at pyloro-duodenal junction** (0.5 inch to right of median plane, level of L 1).
- **Ends at duodeno- jejunal flexure** (1 inch to left of median plane level of L 2).



Parts of Duodenum

	1 st . Superior part	2 nd Descending part	3 rd Horizontal part	4 th Ascending part
Length	2 inch	3 inch	4 inch	1 inch
Course	Ascends to Rt.	Descends vertical	Horizontal to Lt.	Ascends to Lt.
Level	L 1	L 1, 2, 3	L3	L2



First part of Duodenum

It begins at the Pyloro-duodenal junction.

■ Relations:

Anterior:

- Quadrate lobe of liver.
- Gall bladder.

Posterior:

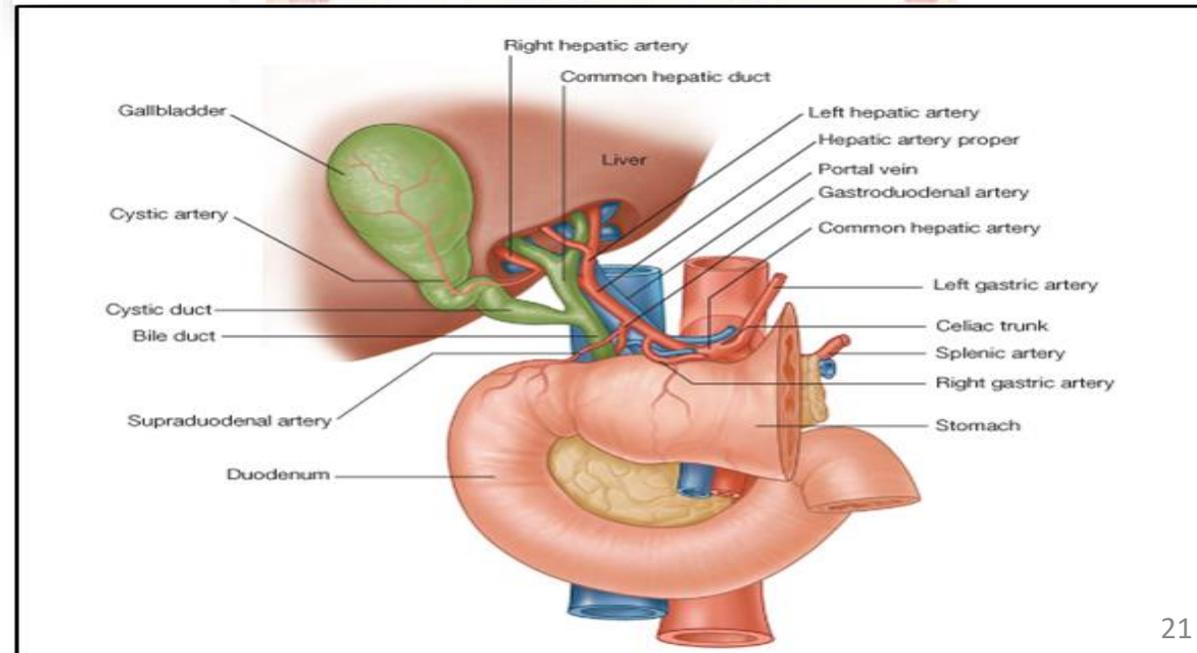
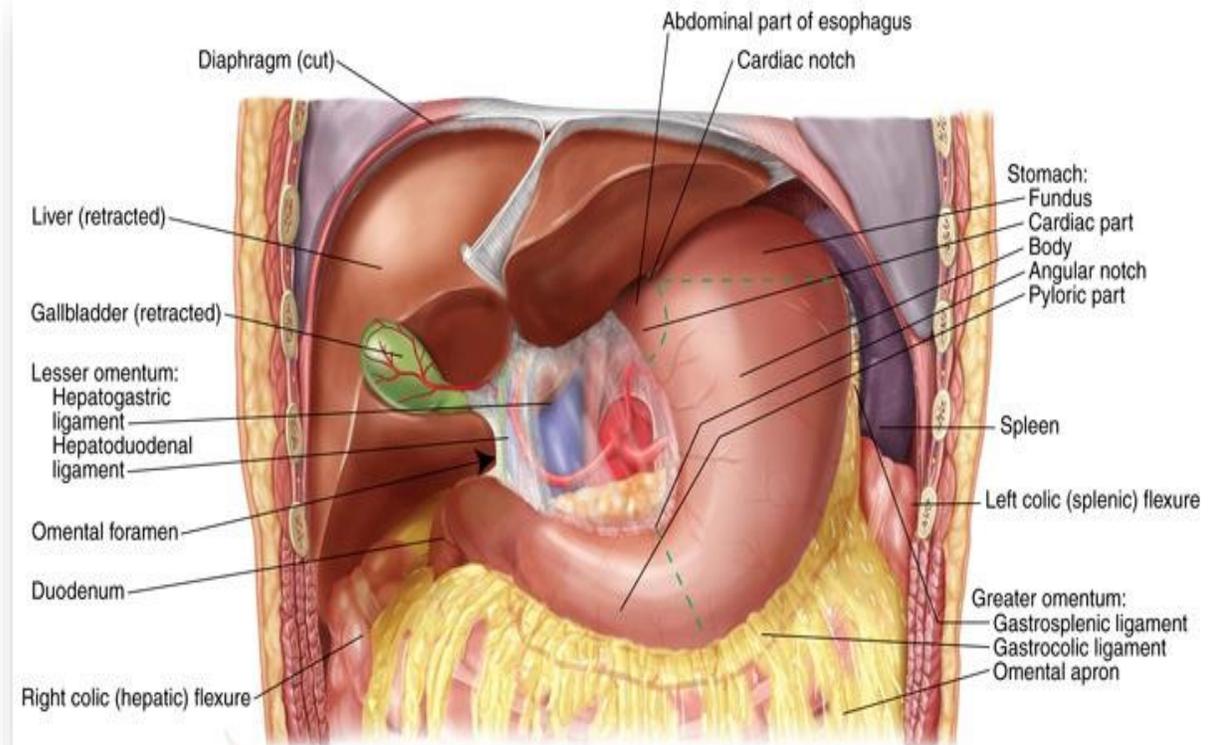
- Neck of pancreas.
- IVC, Portal vein, CBD & Gastro duodenal artery.

Superior: Lesser omentum & Epiploic foramen.

Inferior: Head of pancreas.

■ Peritoneal Relations:

- **1st inch:** it gives attachment to lesser omentum & greater omentum (Intraperitoneal).
- **2nd inch:** Retroperitoneal.



Relations of Second part of Duodenum

Anterior:

- Rt. lobe of liver.
- Transverse colon.

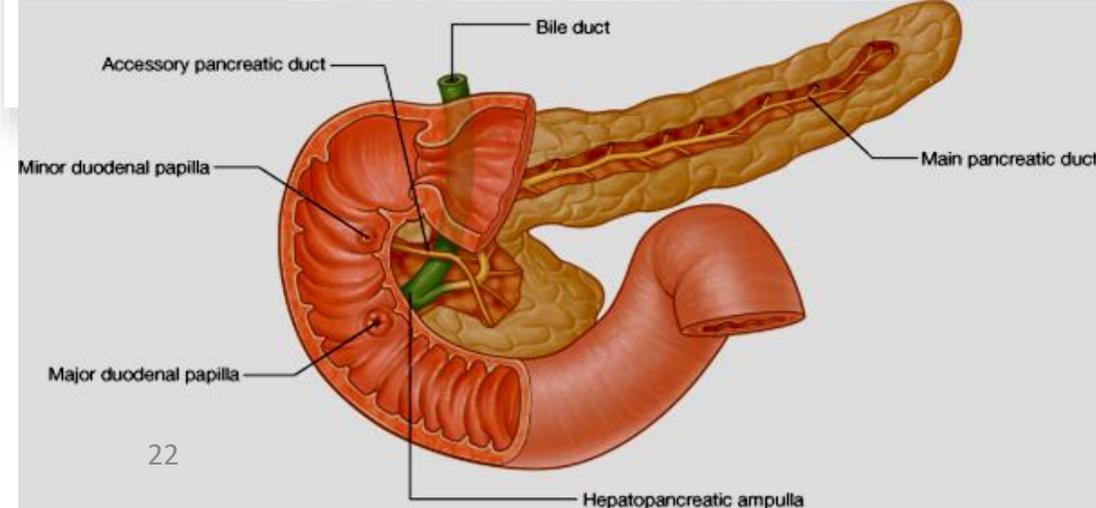
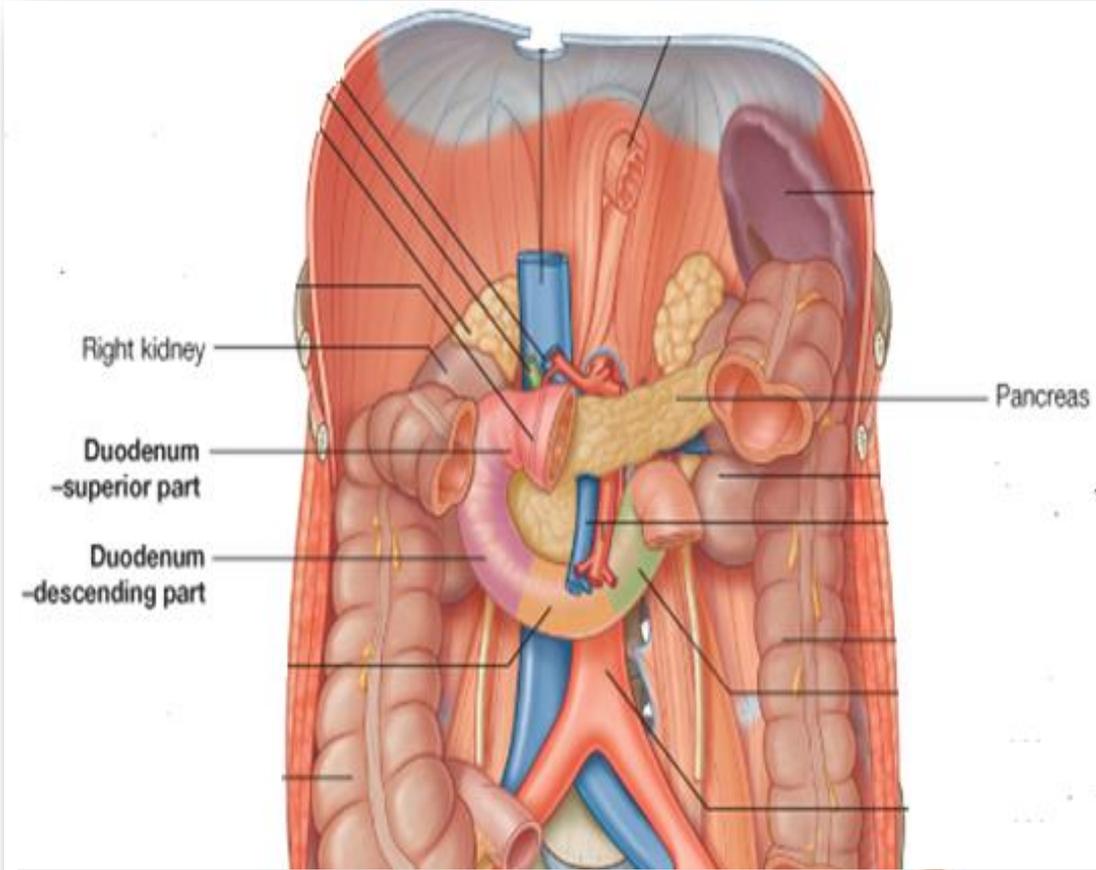
Posterior:

- Rt. Kidney.
- Rt. Renal vessels.

Medial:

- **Head of pancreas.**
- **Hepato-pancreatic ampulla (of Vater)** opens on **Major duodenal papilla** in the medial wall of 2nd part of duodenum. This ampulla is surrounded by **sphincter of Oddi**.
- **Accessory pancreatic duct** open on **Minor duodenal papilla**.

Peritoneal relation: It is retroperitoneal.



Third part of Duodenum

Anterior relations:

- Root of mesentery of small intestine **containing** superior mesenteric vessels.

Posterior relations:

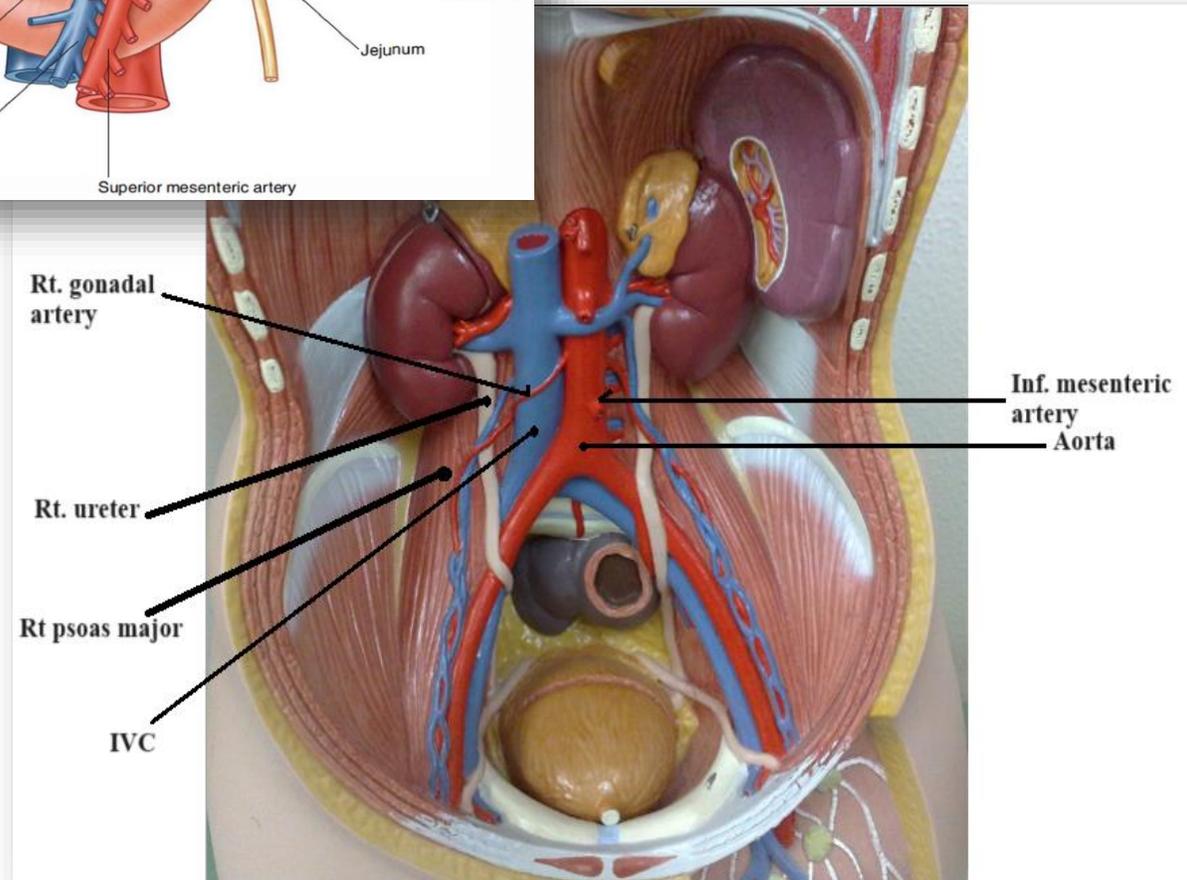
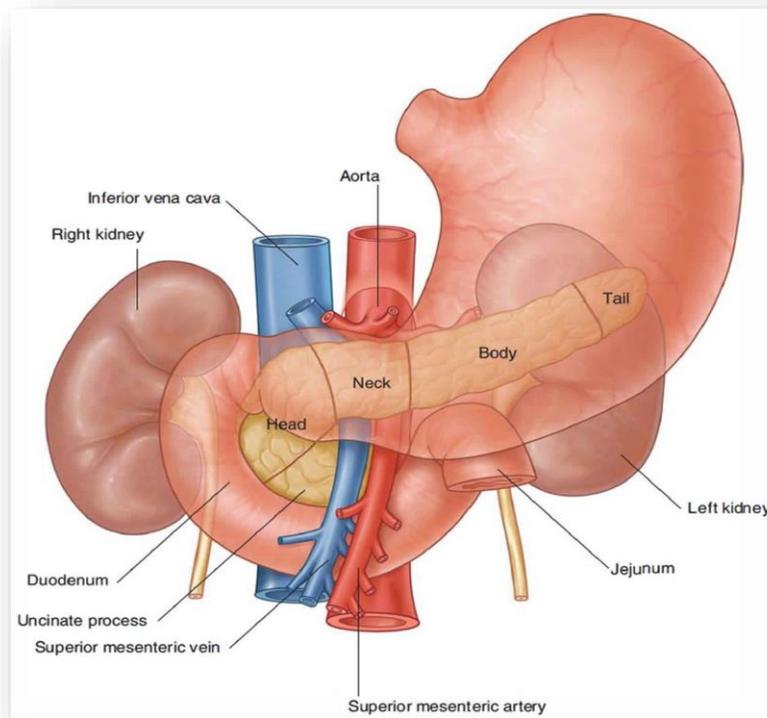
- I. V. C.
- Aorta & inferior mesenteric artery.
- Right ureter & Right psoas major.

Superior relations:

- Head of pancreas.

Peritoneal relation:

- It is retroperitoneal.



4th part of duodenum

Course:

- It **runs** superiorly and laterally (to the left),
- Then it **turns** anteroinferiorly at the **duodeno-jejunal flexure** to become continuous with the jejunum.

Relations:

Anterior:

- Transverse colon.
- Beginning of the root of the mesentery of small intestine.

Posterior:

- Lt psoas major muscle.

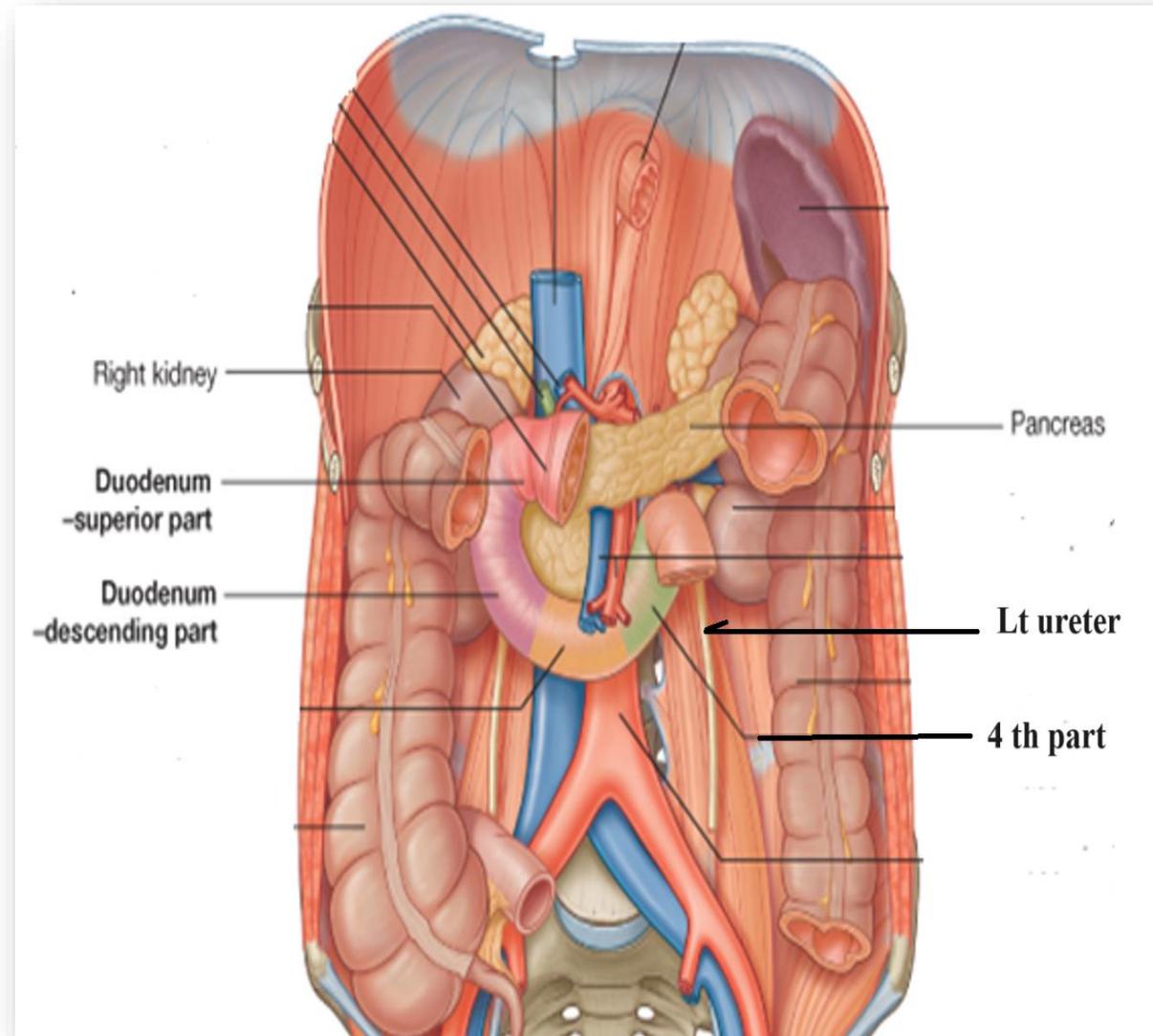
Lateral (left):

- The left kidney and left ureter.

Medial:

- Abdominal aorta.

Peritoneal relation: It is retroperitoneal.



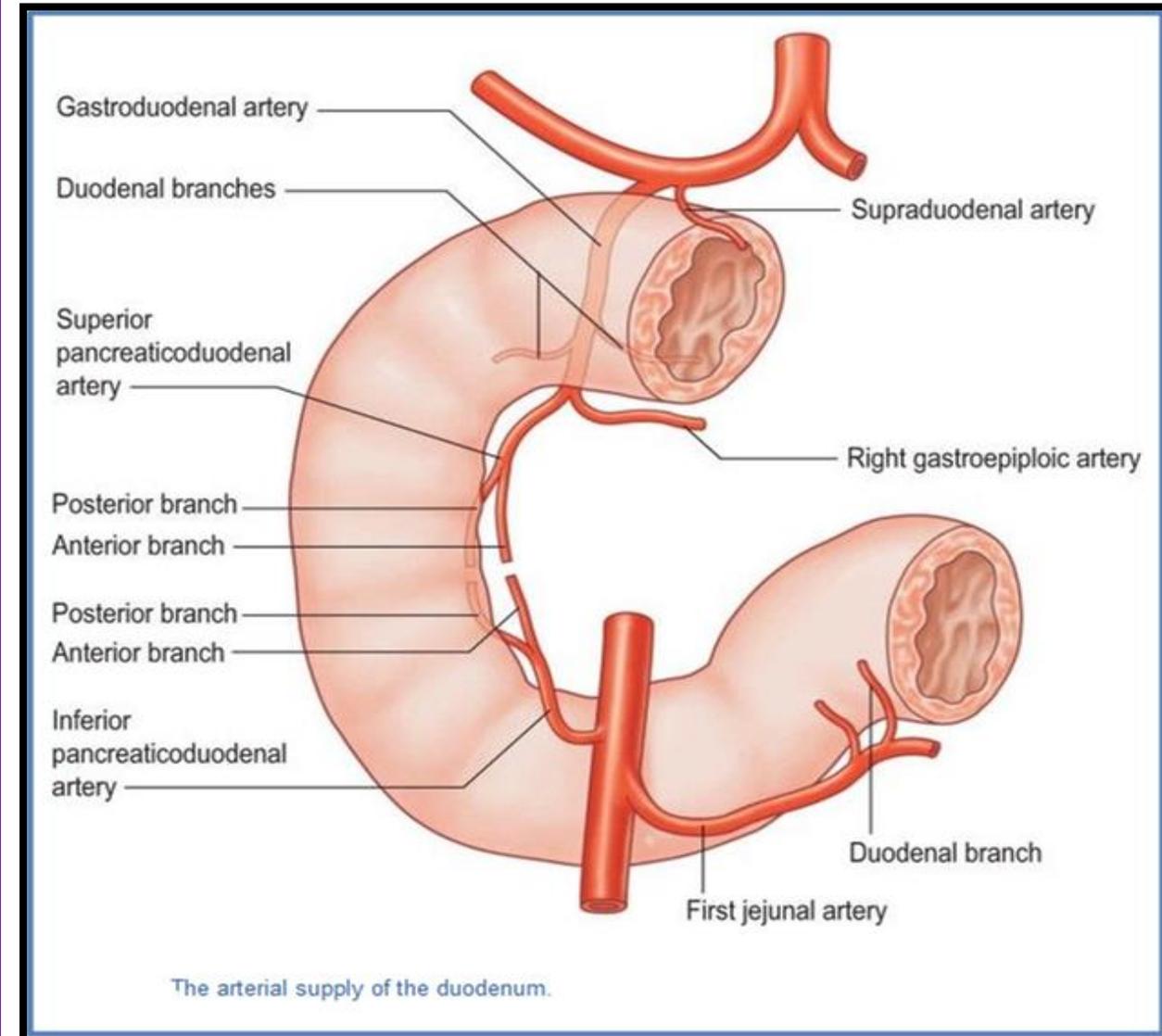
Blood supply of Duodenum

Arterial supply by:

- Rt. Gastric artery.
- Rt. gastroepiploic artery.
- Superior pancreaticoduodenal artery.
- Inferior pancreaticoduodenal artery.
- 1st jejunal branch.

Venous drainage:

- Corresponding to arteries drain into the **portal vein** either directly or through superior mesenteric vein.



Duodenum

Lymphatics

- Gastroduodenal node
→hepatic node →coeliac nodes
- Superior mesenteric nodes.

Innervation

- The duodenum is innervated by both sympathetic & parasympathetic (vagus) supply

Clinical Notes

- An ulcer of the posterior wall of the first part of the duodenum may penetrate the wall and erode the **gastroduodenal artery**, causing a severe hemorrhage.
- In cases of a large gallstone may ulcerated through **the gallbladder** wall into the duodenum.

Thank you for listening

ANY

QUESTIONS?

