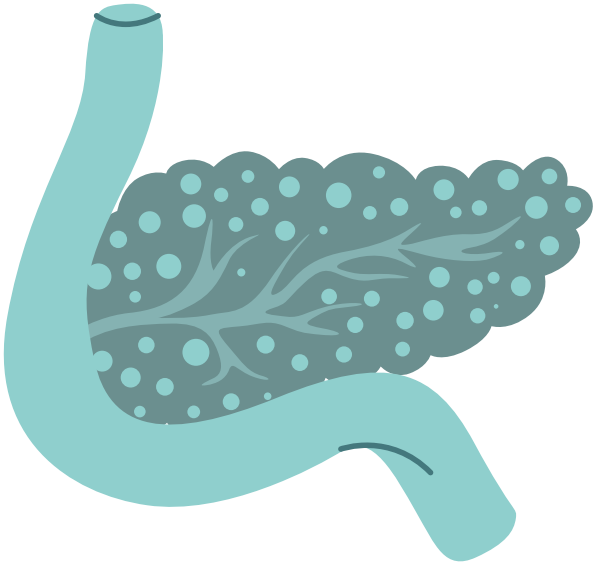
رمضان كريم



Anatomy of pancreas

Endocrine block

Color Index

Main Text

Male's Slides

Female's Slides

Important

Doctor's Notes

Extra Info

The Editing File

Objectives

- Describe the anatomical view of the pancreas regarding; location, parts relations.
- Course of pancreatic duct.
- Arterial supply & Venous drainage.
- Describe the nerve supply and lymph drainage.

يهنئكم فريق عمل الأناتومي بحلول شهر رمضان المبارك،
جعلنا الله وإياكم من صوامه وقوامه.
ونذكركم؛ بألّا تلهيكم دراستكم عن الطاعات.

This lecture was presented by :

Prof. Musaad Alfayez **Dr. Samira Shaheen**

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Pancreas

➥ The **Pancreas** is an elongated soft pinkish structure, it's lobulated because it is surrounded by a fibrous tissue capsule from which septa pass into the gland and divide it into lobes and the lobes are divided into lobules.

➥ It is located in the **epigastrium** and **left upper quadrant** of abdomen (from concavity of the duodenum to the hilum of spleen opposite the level of **T12– L3** vertebrae).

➥ It is **retroperitoneal** structure. (The majority of it is. Some parts anteriorly are intraperitoneal)

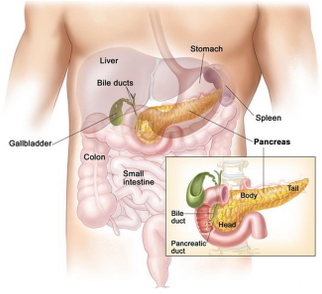
➥ It extends in a transverse oblique direction at the **transpyloric plane** **(1st lumbar vertebral)** from the concavity of the duodenum on the right to the spleen on the left.

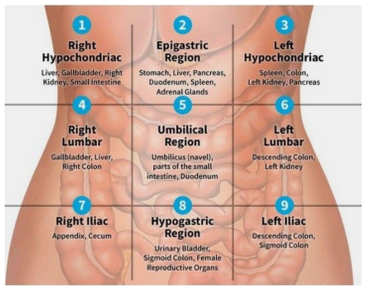
➥ It lies transversely across the posterior abdominal wall.

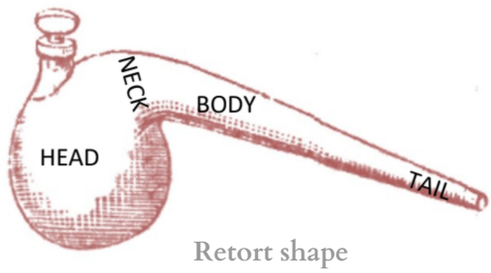
➥ Length: 6-10 inch (12–15 cm).

➥ Weight: 60–100 g.

➥ The pancreas is "J"-shaped or RETORT shaped being set obliquely.







Retort shape

Functions of Pancreas

Exocrine (Digestive)

- Small ducts arise from the lobules and enter the main pancreatic duct (it begins in the tail) and passes through the body and head where it meets the bile duct.
- Makes and secretes digestive enzymes into the intestine (Exocrine pancreas).
- Comprise more than 95% of the pancreatic mass.

Endocrine (hormonal)

- **(Islets of langerhans)** produce insulin and glucagon.
- Control energy metabolism and storage throughout the body (Endocrine pancreas Islets of Langerhans).
- Comprise 1-2% of pancreatic mass.

Parts of Pancreas

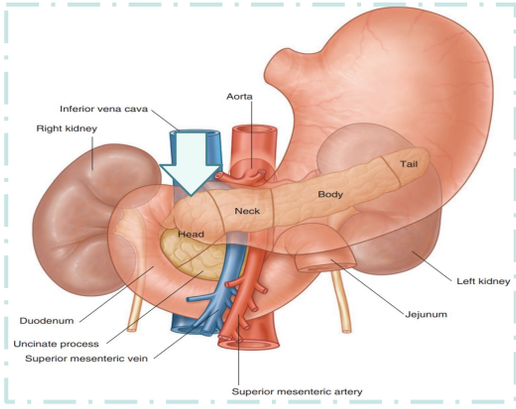
Head of pancreas at level L2

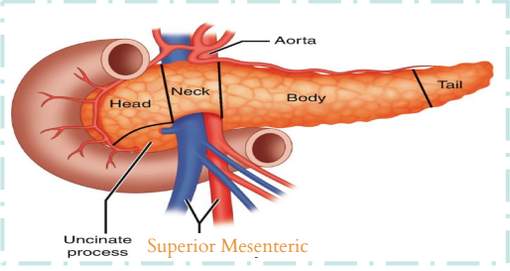
It is disc shaped and on the right, it emerges into the neck.

Lies within the concavity of the duodenum at level of L2. It is related to the 2nd and 3rd portions of the duodenum.

The lower and left part forms a projection called **Uncinate Process** (an extension of the lower & left part of the head **behind the superior mesenteric vessels**).

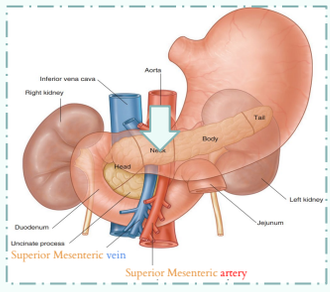
Anterior surface From Superior to Inferior	**Posterior surface**
Gastroduodenal artery	IVC runs upwards, the head lies on IVC & termination of two renal veins.
Transverse colon	Left renal vein
Root of transverse mesocolon	Bile duct runs downwards and may be embedded in the substance of head.
Jejunum	Right crus of diaphragm
Uncinate process relations	
Superior mesenteric vessels Anterior to the Uncinate	Abdominal aorta Posterior to the Uncinate





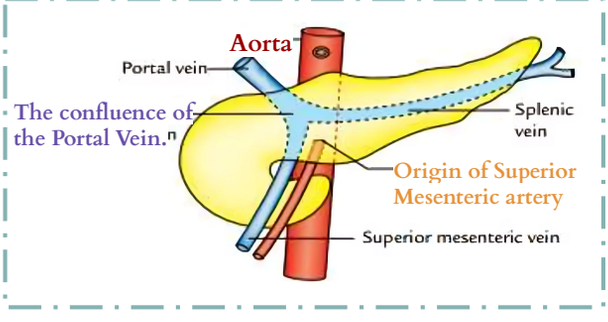
Neck

- It is the constricted portion connecting the head & body of pancreas
- Narrow band of pancreatic tissue that Lies in front of Superior Mesenteric and the Portal Vein
- Its **antero-superior** surface supports the **pylorus of the stomach.**
- The **superior mesenteric vessels** emerge from its inferior border.



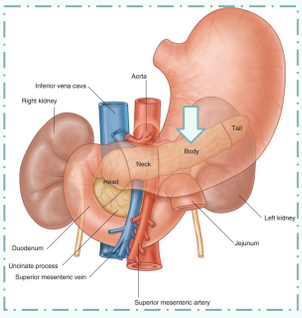
Posterior relations
It lies in front of:

- Aorta
- Origin of Superior Mesenteric artery
- The confluence of the Portal Vein



Parts of Pancreas

Body at level L1



- It runs upward and to the left, It is triangular in cross section.
- lies in front of the vertebral column at or just below the transpyloric plane.
- The Splenic **Vein** is embedded in its **posterior Surface.**
- The Splenic **Artery** runs to the left along the **upper border** of the pancreas.
- One process: **Tuber omentale** (a part of the body projects above the lesser curvature of the stomach and comes in contact with the lesser omentum across the lesser sac).

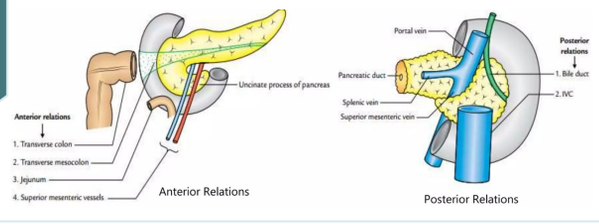
Tail

- Narrow, short segment, ending at the splenic hilum.
- Lies at the level of **T12 vertebra.**
- It is mobile unlike the other major retroperitoneal parts of the gland.
- Contains the largest number of islets of Langerhans

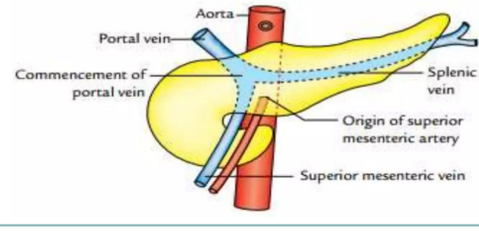
- Because of its oblique direction the **tail is higher than the head.**
- Lies in the splenicorenal (lienorenal) ligament
- It **may get injured during splenectomy** along with splenic vessels.
- **Anteriorly**, related to splenic flexure of colon.

(EXTRA) Summary of Pancreas Relations

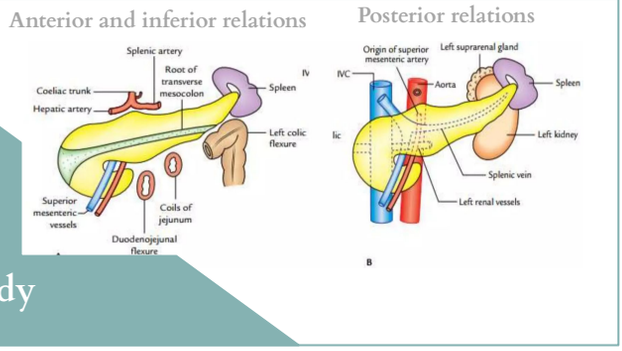
1 Head



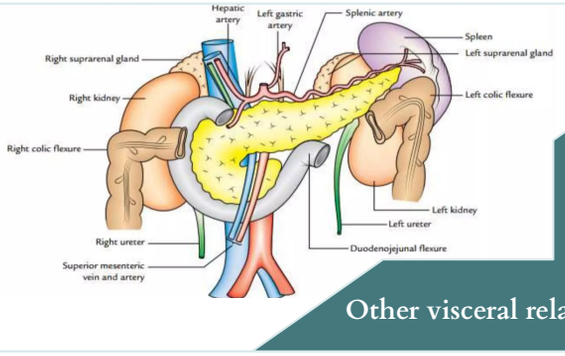
2 Neck



3 Body



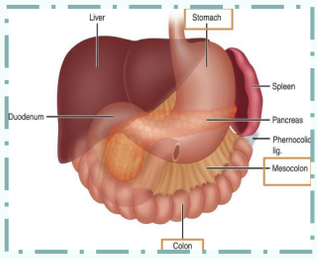
4 Other visceral relations



Relations and Ducts

Anterior relations (to body & tail):

- Stomach separated from by lesser sac.
- Transverse colon.
- Transverse mesocolon.



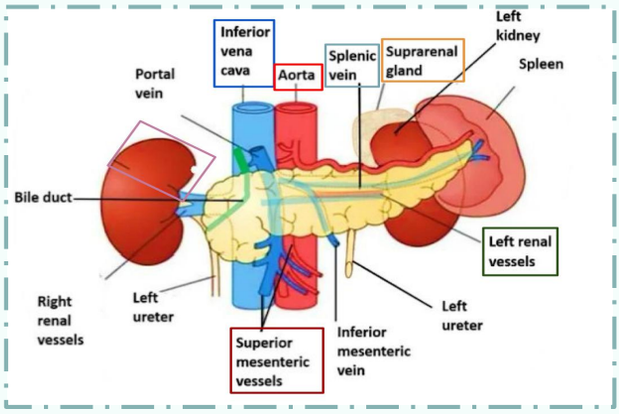
Posterior relations

(pink from R to L)

- Bile duct, portal & splenic veins
- inferior vena cava
- Aorta & origin of SMA

Posterior to (body & tail):

- Left psoas muscle
- Left adrenal gland
- Left renal vessels
- upper 1/3rd of left kidney
- Hilum of the spleen.



Ducts

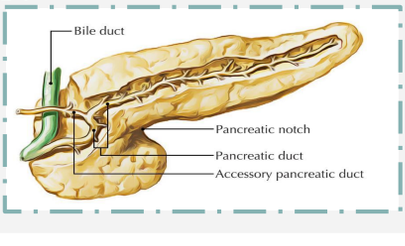
Pancreatic Ducts

Main duct(of Wirsung) :

- Runs the entire length of pancreas beginning from the tail.
- It drain whole pancreas except upper portion of the head i.e.(tail, body, neck, inferior portion of head & uncinate process.
- Joins **common bile duct** & together they open into a small **hepatopancreatic ampulla (Ampulla of Vater)** in the 2nd part of the duodenum/ duodenal wall.
- The ampulla opens **into the lumen of duodenum** by a narrow mouth on the summit of **major duodenal papilla** 8–10 cm distal to the pylorus.

Accessory duct (of Santorini):

- Drains superior portion of the head
- It empties separately into **2nd part of duodenum** at **(minor duodenal papilla)** about 2–3 cm above the opening of main pancreatic duct (6–8 cm distal to pylorus).



Supply of the Pancreas

Arterial Supply

Celiac trunk → Common hepatic artery → Gastroduodenal artery → Superior pancreatico-duodenal

Common hepatic artery → Right gastric artery
Common hepatic artery → Hepatic artery

Different parts of the pancreas have different arterial supply;

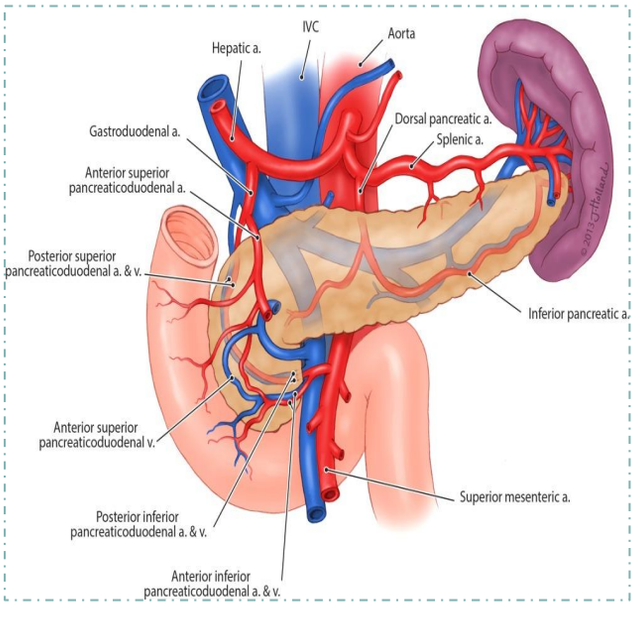
- **Head & Neck:**
  - ➥ **Superior pancreatico-duodenal artery** branch of gastroduodenal artery (GDA), branch of hepatic artery, branch of Celiac trunk.
  - ➥ **Inferior pancreatico-duodenal artery**, branch of Superior mesenteric artery.

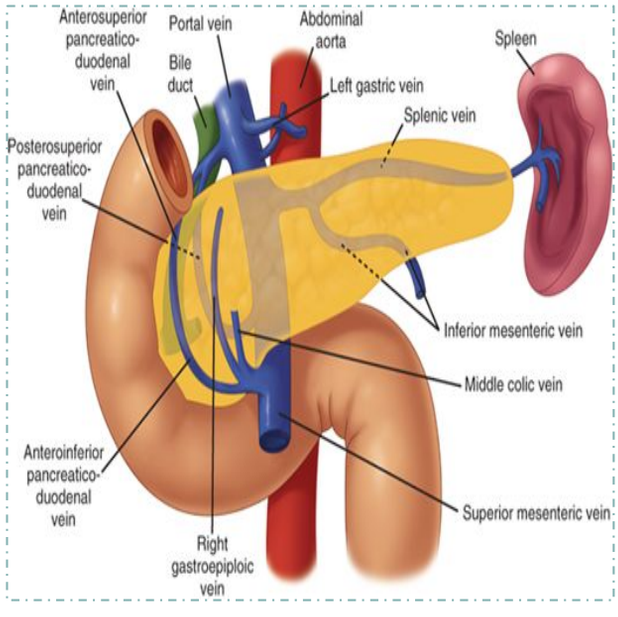
- **Body & Tail:**
  - ➥ Supplied by **Splenic artery** (main artery), largest branch of the Celiac trunk, through 8-10 branches.
  - ➥ Major branches of splenic artery include the dorsal & greater pancreatic arteries.

Venous Drainage

- **Head & Neck:**
  - ➥ Drained by anterior and posterior venous arcades that form the superior & inferior pancreaticoduodenal veins which follow the corresponding arteries.

- **Body & Tail:**
  - ➥ Drained by the **splenic vein**, which is a tributary of /ultimately end into the **portal vein.**





Supply of the Pancreas

Lymphatic Drainage

The pancreas is drained by lymphatic vessels that follow the arterial supply.

They have a rich network that drain/empty into nodes along the upper border of the pancreas; the hepatic, pyloric nodes & splenic nodes/The pancreaticosplenal nodes.

Ultimately the efferent vessels drain into:

- **Celiac lymph nodes**
- **Superior mesenteric lymph nodes**

Lymph vessels from the region of the head pass to superior mesenteric nodes.

Nerve Supply

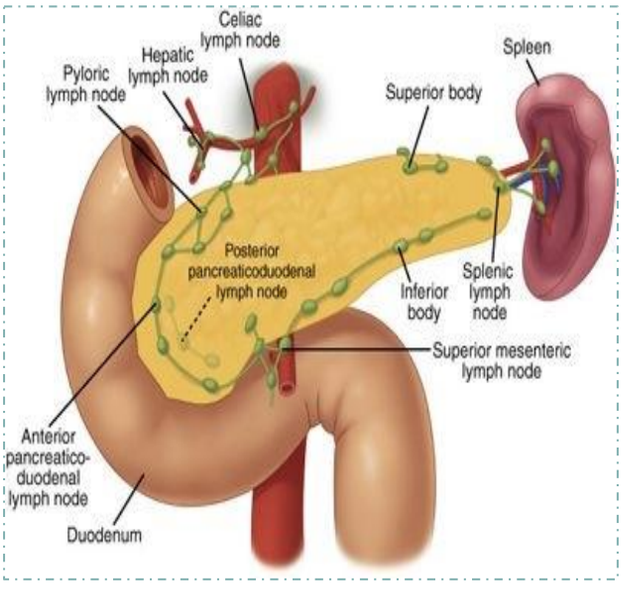
The autonomic innervation to the pancreas is carried along the plexuses around the supplying arteries, which include:

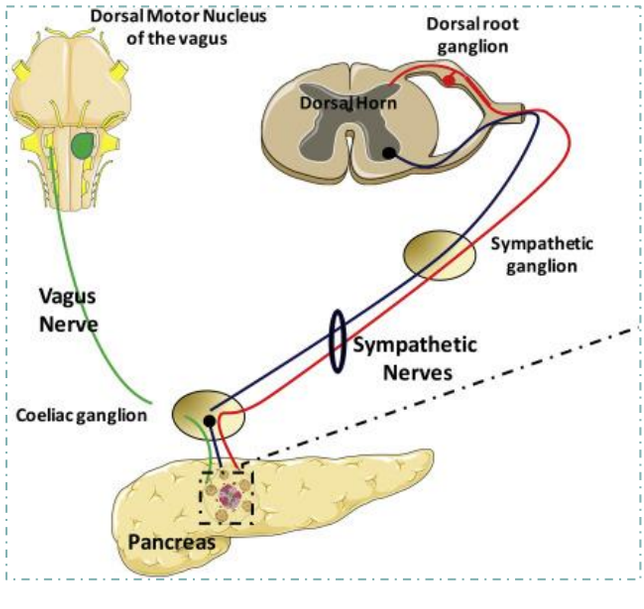
Sympathetic Fibers:

- From the thoracic splanchnic nerves.
- Have a predominantly inhibitory effect.
- The innervation is vasomotor.

Parasympathetic Fibers:

- From the Vagus nerve.
- Stimulate exocrine and endocrine secretions.
- The innervation is secretomotor.



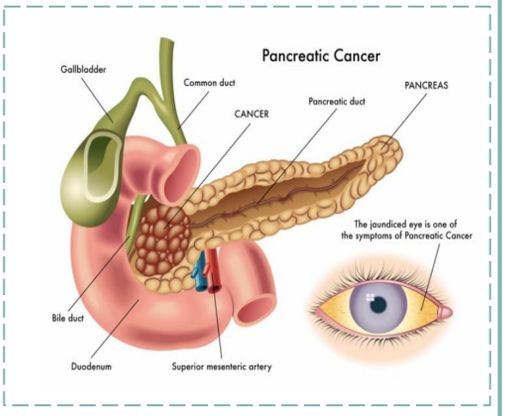


Female Slides

Clinical Anatomy

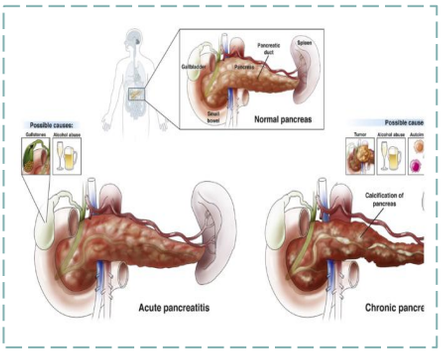
Carcinoma of the head of pancreas:

- It's common.
- Compresses the bile duct leading to persistent obstructive jaundice.
- May press the portal vein or may involve the stomach due to close vicinity of these structures to the **head of pancreas.**



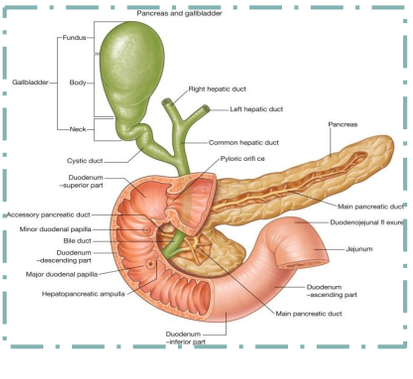
Acute Pancreatitis:

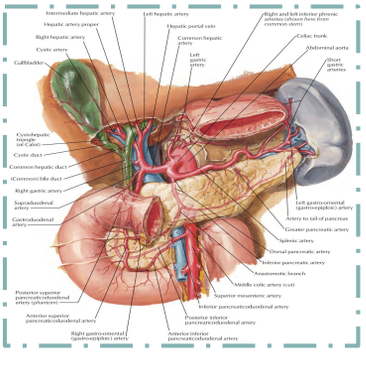
- Is the acute inflammation of the pancreas.
- Occurs due to **obstruction of pancreatic duct**, ingestion of alcohol, viral infections (mumps), or trauma.
- It is serious condition because activated pancreatic enzymes leak into the substance of pancreas and initiates the autodigestion of the gland.
  Clinically, it presents as very severe pain in the epigastric region radiating to the back, fever, nausea, and vomiting.

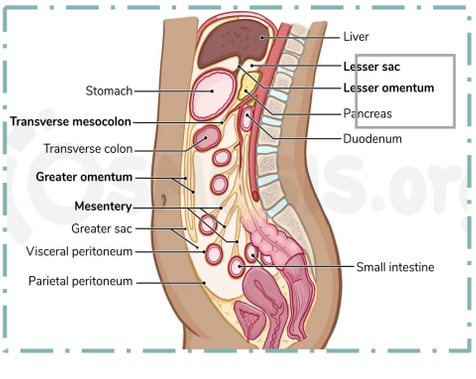


EXTRA Pictures

EXTRA







Summary

Pancreas

Note	Retroperitoneal structure, in posterior abdominal wall(Epigastrium & Left upper quadrant of the abdomen). from the concavity of the duodenum on the right to the spleen on the left. extends in a transverse oblique direction at the transpyloric plane (L1)			
Parts	**Head**	**Neck**	**Body**	**Tail**
	Disc shaped lies on On the 2nd & 3rd parts of duodenum	Narrow	runs upward and to the left	Lies in the Splenorenal ligament
Level	L2	L1		T12 (t with t)
Relations	**Posterior surface:** -Bile Duct(embedded in it) -IVC(runs upwards)	**In front of:** Aorta, Origin of SMA, the confluence of the Portal Vein.	**Posterior:** Splenic Vein **Upper border:** Splenic Artery	**Anterior:** splenic flexure of colon
	Uncinate process: **Behind the superior mesenteric artery**	**Inferior border:** superior mesenteric Vessels **Antero-superior:** supports the pylorus of the stomach.	**Anterior:** Stomach separated by the lesser sac Transverse colon & transverse mesocolon **Posterior:** Left Psoas muscle ,Left Adrenal gland, Left Renal vessels ,Upper 1/3rd of Left kidney, Hilum of the spleen, Bile duct, portal & splenic veins, IVC, Aorta & origin of SMA	
Arterial	1. Celiac trunk → common hepatic → gastroduodenal → superior pancreaticoduodenal artery along head of the pancreas 2. Superior mesenteric to Inferior Pancreaticoduodenal		Splenic artery (main artery) through about 8-10 branches	
Venous	Anterior and posterior arcades drain that form superior and inferior pancreaticoduodenal veins which follow the corresponding arteries		Splenic vein drains which is a tributary of the portal vein	
Lymphatic	Rich network drains into nodes along the upper border of the pancreas called 1. Pyloric 2. Hepatic 3. Splenic nodes Ultimately the efferent vessels drain into 1. celiac. 2. superior mesenteric lymph nodes. Lymph vessels from the region of the Head pass to Superior Mesenteric nodes			
Innervation	Sympathetic fibers: from the thoracic splanchnic nerves they have a predominantly inhibitory effect. Parasympathetic fiber: from the Vagus. they stimulate both exocrine and endocrine secretions.			
Ducts	Main duct: Joins common bile duct & they open into a hepatopancreatic ampulla in the duodenal wall (Ampulla of Vater). it opens into the lumen of the duodenum through (Major Duodenal Papilla).		Accessory duct (Santorini) Drains superior portion of the head,It empties separately into 2nd portion of duodenum at (minor duodenal papilla)	

MCQs

Q1- Which part of the pancreas contain the largest number of langerhans islets?			
A-Body	B-Neck	C- Head	D- Tail
Q2-All of these related to the posterior surface of the pancreas, except?			
A- Bile duct	B- Origin of inferior Mesenteric Artery	C- Hilum of the spleen	D- Inferior vena cava
Q3- Patient presenting with persistent obstructive jaundice compressing his portal vein, which location would you suspect the carcinoma of pancreas to originate from?			
A-Body	B-Neck	C- Head	D- Tail
Q4- Which one of the following vessels is related Posteriorly to the neck of the pancreas?			
A- Confluence of portal vein	B- Subclavin artery	C- Splenic vein	D- Inferior Mesenteric Artery
Q5- At which vertebral level dose the body of the pancreas lies?			
A- L1	B- T12	C- L2	D- L3
Q6-The stomach is separated from the tail of pancreas by which one of the following ?			
A- Lesser omentum	B- Lesser sac	C- Greater omentum	D- Splenorenal ligament
Q7- Which one of the following vessels is embedded in the body of pancreas?			
A- Superior mesenteric artery	B- Splenic vein	C- Superior pancreaticoduodenal artery	D- Portal vein

Answers: 1-D 2-B 3-C 4-A 5-A 6-B 7- B

For Anki flashcards click here

Team leaders

- Renad M Alshehri
- Faris Alzahrani
- Aseel Alshehri

Team Members

- Remaz Almahmoud
- Moath Alhudaif
- Aljoharah Alkhalifah
- Mohammed Alarfaj
- Noura Alateeq
- Faisal Alshowier
- Bayan Abdullah
- Khalid Alsobei
- Wajd Almutairi
- Amira Abdulaziz

Anatomy.med443@gmail.com

Special Thanks to M.H for his help behind the scenes.