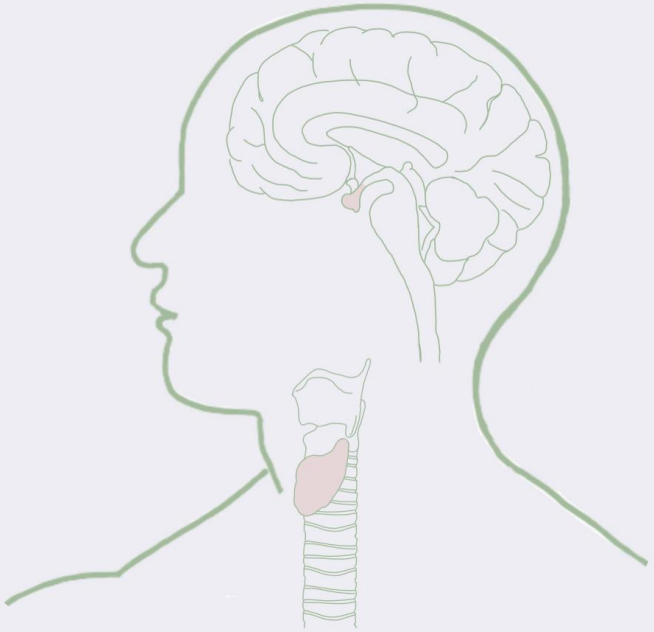

Anatomy of the pancreas

Editing File

Color index:

Girls' slides	Boys' slides
Main content	Extra
Important	Drs' notes

MED439
KING SAUD UNIVERSITY

Anatomy Team
MED 439

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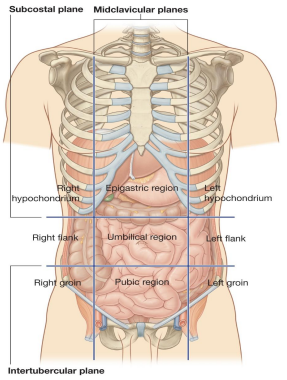
Objectives:

- Describe the anatomical view of the pancreas regarding ; location, parts, relations, ducts.
- Arterial supply & venous drainage
- Describe the nerve supply and lymph drainage

Pancreas

Click here to check out lecture's related videos playlist

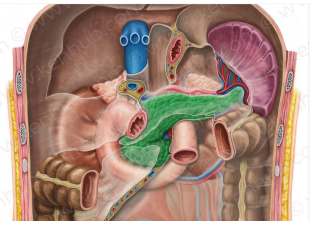
Location



- Lies in the upper abdomen behind the stomach
- It is a Retroperitoneal structure covered by peritoneum from the anterior only behind the lesser sac.
- it lies on the posterior abdominal wall in the epigastrium & left upper quadrant (left hypochondriac region) of the abdomen. (it sticks to the posterior abdominal wall by the peritoneum except the tail which is in the lienorenal ligament)
- 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 hilum of the spleen on the left the level of T12-L3 vertebrae.
- Because of its oblique direction the tail is higher than the head (at T12).
- All parts of the pancreas lies at L1 except the tail lies at T12

Shape

- Soft pinkish structure
- The pancreas is "J"-shaped or RETORT (a tool used in the chemistry lab) shaped being set obliquely.
- It is Lobulated Because it is surrounded by a fibrous tissue capsule from which septa pass into the gland and divide it into lobes. The lobes are divided into lobules.
- It is divided into:
  -Head (with one process— uncinate process).
  -Neck
  -Body (with one process—tuber omentale).
  -Tail.



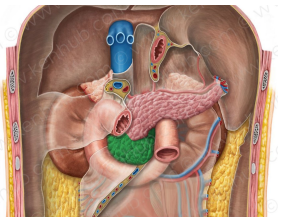
Size

- Elongated
- Length: (6-10) inch 12–15 cm
- Weight :(60-100) gram

Parts Of Pancreas

Head Of pancreas

- Enlarged, disc-shaped right end of the pancreas.
- Lies within the concavity of the C-shaped duodenal loop in front of L2
- Related to the 2nd (vertical part)and 3rd(horizontal part) portions of the duodenum.
- On the left, it emerges into the neck.
- On the right, it Includes Uncinate Process (an extension of the lower part of the head behind the superior mesenteric vessels artery and vein)

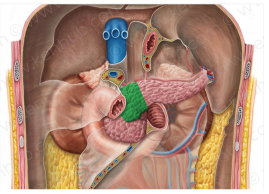


Relations

Anterior surface (related from above downward to)	Posterior surface	Unicate process
1. The gastroduodenal artery, 2. Transverse colon 3. Root of the transverse mesocolon 4. Jejunum.	1. IVC (runs upwards.) 2. Bile duct (runs downwards and may be embedded in it. Patients with late stages cancer located in the head of the pancreas present with jaundice , because of the compression on the common bile duct. 3. Left renal vein 4. Right crus of diaphragm	1. Anterior: superior mesenteric vessels 2. Posterior: abdominal aorta.

Neck Of pancreas

- Best defined as “narrow band of pancreatic tissue that Lies in front of superior mesenteric and the portal vein”
- It is the constricted portion connecting the head & body of pancreas



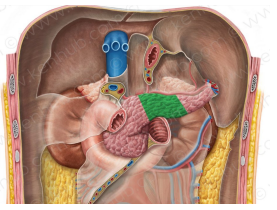
Relations

Posterior (It lies in front of)	Antero-superior	inferior border
1. Aorta 2. Origin of Superior Mesenteric artery level of L1 3. The confluence beginning of the Portal Vein (superior mesenteric vein and splenic)	Supports the pylorus of the stomach	The superior mesenteric vessels emerge to descend down on the uncinate process

Parts Of Pancreas

Body of pancreas

- It is triangular in cross sections and it runs upward and to the left
- Lies in front of the vertebral column at or just below the transpyloric plane.

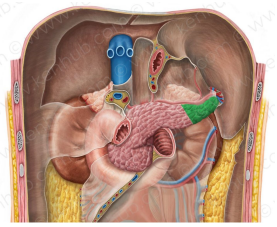


Relations

Upper border	Posterior Surface
Splenic Artery runs to the left along the borders (higher level)	Splenic Vein is embedded in it (lower level)

Tail of pancreas

- A narrow, short segment ends within the splenic hilum It is mobile unlike the other major retroperitoneal parts of the gland.
- Contains the largest number of islets of Langerhans
- Lies in the Splenicorenal (lienorenal) ligament (the peritoneum fold between the kidney and the spleen) may get injured during splenectomy along with splenic vessels, at the level of the T12 vertebra



Relations

Anteriorly

Splenic flexure of colon (left colic flexure)

Body and Tail of pancreas

Relations

Anterior	Posterior
○ Stomach separated by lesser sac ○ Transverse colon ○ Transverse mesocolon	○ Left Psoas muscle ○ Left Adrenal gland ○ Left Renal vessels ○ Upper 1/3rd of left kidney ○ Hilum of the spleen. ○ Bile duct ○ Portal vein ○ Splenic veins, ○ Inferior vena cava ○ Aorta & origin of superior mesenteric artery.

Pancreatic ducts

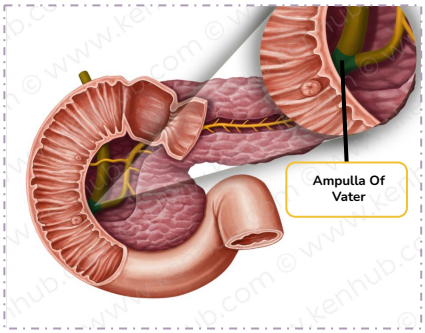
(the pancreas has two ducts because it developed from two buds one dorsal and one ventral which is then moves around and going back to join the dorsal bud)

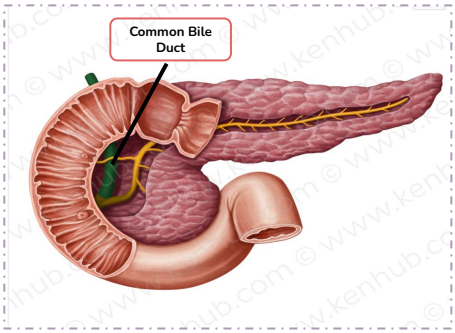
• Main pancreatic duct (of Wirsung)

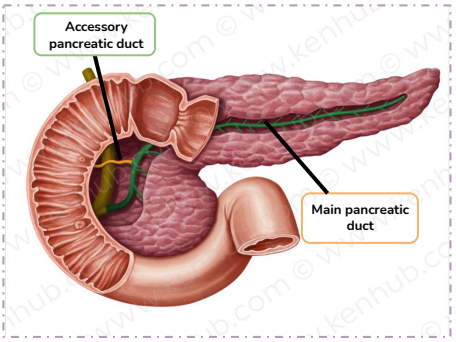
- Runs the entire length of pancreas beginning from the tail.
- It drain whole pancreas <u>except</u> upper portion of the head i.e. tail,body, neck, inferior portion of head & uncinate process.
- Joins • common bile duct & they open into a small hepatopancreatic ampulla in the duodenal wall (opens in the 2nd part of the duodenum posteromedial wall) hepatopancreatic ampulla (• Ampulla of Vater). (through sphincter of oddi)
- The ampulla opens by a narrow mouth into the lumen of the duodenum through • (Major Duodenal Papilla) 8-10 cm distal to the pylorus

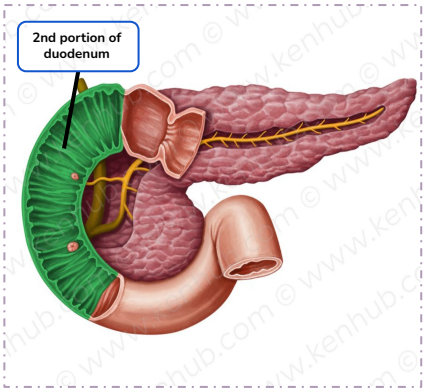
• Accessory Pancreatic duct (of Santorini)

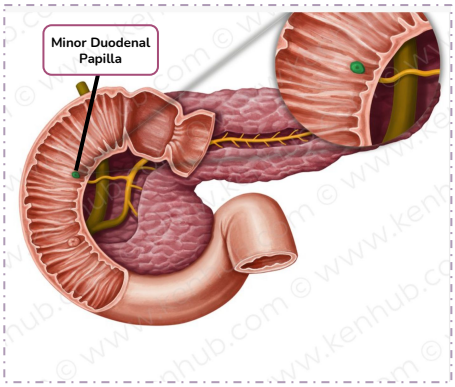
- It drains superior portion of the head
- It empties separately into • 2nd portion of duodenum at (• minor duodenal papilla) about 2–3 cm above the opening of main pancreatic duct (6–8 cm distal to pylorus)

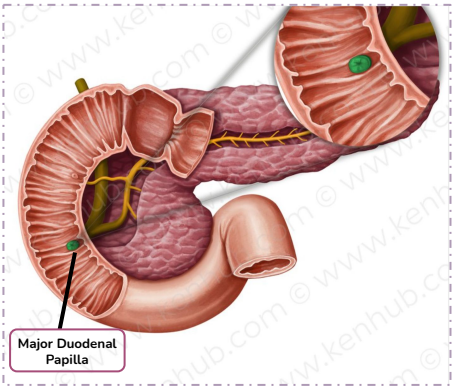












Pancreas function

Function

Both exocrine and endocrine functions

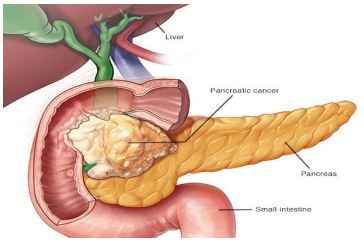
Endocrine component Islet's of Langerhans	Exocrine component
- Makes and secretes hormones (insulin, glucagon, somatostatin) - Control energy metabolism and storage throughout the body - Comprise 1-2% of pancreatic mass.	- Small ducts arise from the lobules and enter the main pancreatic duct (which begins in the tail), and passes through the body and head where it meets the bile duct. (Pancreatic secretion to digest carbohydrates and fats) - Makes and secretes digestive enzymes into the intestine (Exocrine pancreas) - Comprise more than 95% of the pancreatic mass

Clinical Anatomy

Carcinoma of the head of pancreas

Boys' slides only

- Is 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

Boys' slides only

- 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

Supply of the Pancreas

Arterial supply

Head and Neck:

Supplied by branches from:

1.Celiac trunk → common hepatic → gastroduodenal → **superior pancreaticoduodenal artery** along head of the pancreas

(common hepatic artery gives off three branches:
1.Right gastric 2.hepatic 3.gastroduodenal)

2.Superior mesenteric to **Inferior Pancreaticoduodenal**

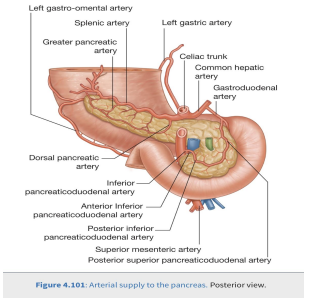
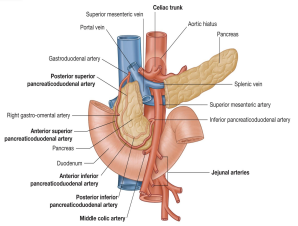


Figure 4.101: Arterial supply to the pancreas. Posterior view.



Body and Tail:

Splenic artery (main artery) (because it supplies the biggest part of the pancreas) through about 8-10 branches

Venous drainage

Head and neck (body):

- Anterior and posterior arcades drain that form superior and inferior pancreaticoduodenal veins which follow the corresponding arteries Direct to portal vein or superior mesenteric then to the portal vein

Body and Tail:

- Splenic vein drains which is a tributary of the portal vein final drainage

Lymphatic

- Rich network drains into nodes along the upper border of the pancreas called pyloric, hepatic, splenic nodes
- Ultimately the efferent vessels drain into the celiac and 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 postganglionic in the celiac plexus not in the trunk (supply abdominal viscera) and they have a predominantly inhibitory effect.
- Parasympathetic fiber: from the Vagus. they stimulate both exocrine and endocrine secretions

Anatomy's 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
Levels	L1			T12
Relations	**Posterior surface:** -Bile Duct(embedded in it) -IVC(runs upwards)	**In front of:** Aorta, Origin of Sup.Mes.artery, the confluence of the Portal Vein.	**Posterior:** Splenic Vein **Upper border:** Splenic Artery	**Anterior:** splenic flexure of colon
	Uncinate process: behind the superior mesenteric vessels	**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	
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 Direct to portal vein or superior mesenteric then to the portal vein		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 of the following structures runs posterior to the neck of the pancreas?

A- Superior mesenteric vessels
B- Renal arteries
C- Aorta
D- Inferior phrenic

Q2: Joins common bile duct & they open into a hepatopancreatic ampulla.

A- Main pancreatic
B- Accessory pancreatic duct
C- Ampulla of vater
D- Splenic artery

Q3: 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

Q4: which one of these arteries supply the pancreas ?

A- Splenic artery
B- Inferior mesenteric artery
C- Left gastric artery
D- Right gastric artery

Q5: Which part of the pancreas may be injured in a splenectomy procedure?

A. .Body
B. Tail
C. Head
D. Neck

Q6: Pancreas in relation to stomach and duodenum.

A- Anterior
B- Posterior
C- Medial
D- Lateral

Answers: [Q1:C] [Q2:A] [Q3:B] [Q4:A] [Q5:B] [Q6:B]

SAQs

Q1: Enumerate the anterior relations of the body and tail of the pancreas

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

Q2: The ampulla of vater opens into the duodenal lumen through:

Major duodenal papilla.

Q3: Mention the lymphatic drainage of the pancreas?

Pyloric node, Hepatic node, Splenic nodes then all drain into celiac nodes and superior mesenteric nodes.

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