

## Gallbladder & Pancreas

✓ Concepts :

- Duct system for bile .
- Anatomy & Histology of the gallbladder .
- Anatomy of the pancreas .
- Histology of the pancreas .

### • Duct system for bile (Bile ducts of the liver)

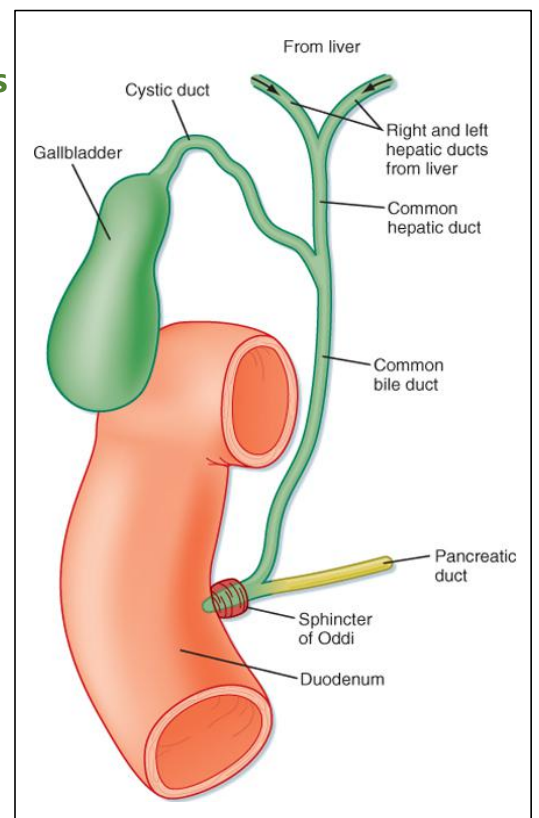
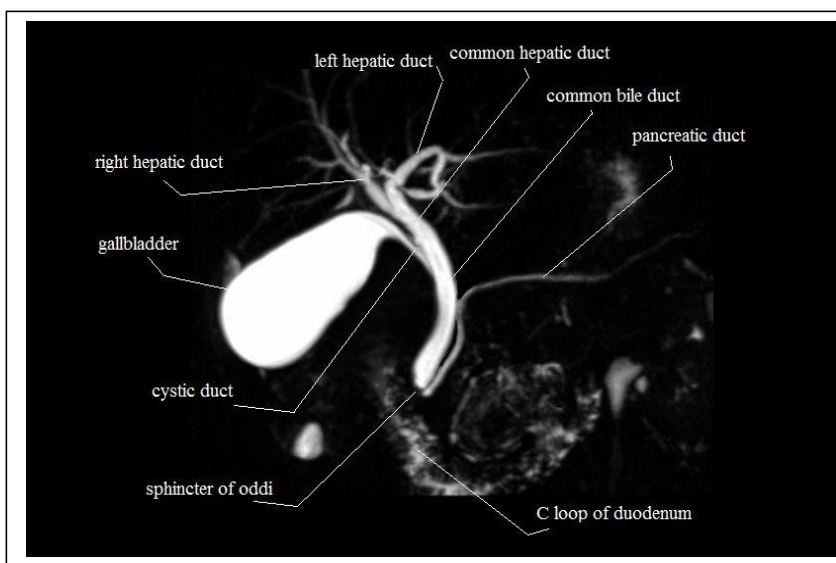
° The duct system for the passage of bile extends from the liver , connects with the gallbladder and empties into the descending part of duodenum .

° The coalescence of ducts begins in the liver parenchyma and continues until the Rt&Lt hepatic ducts are formed , draining the respective lobes of the liver .

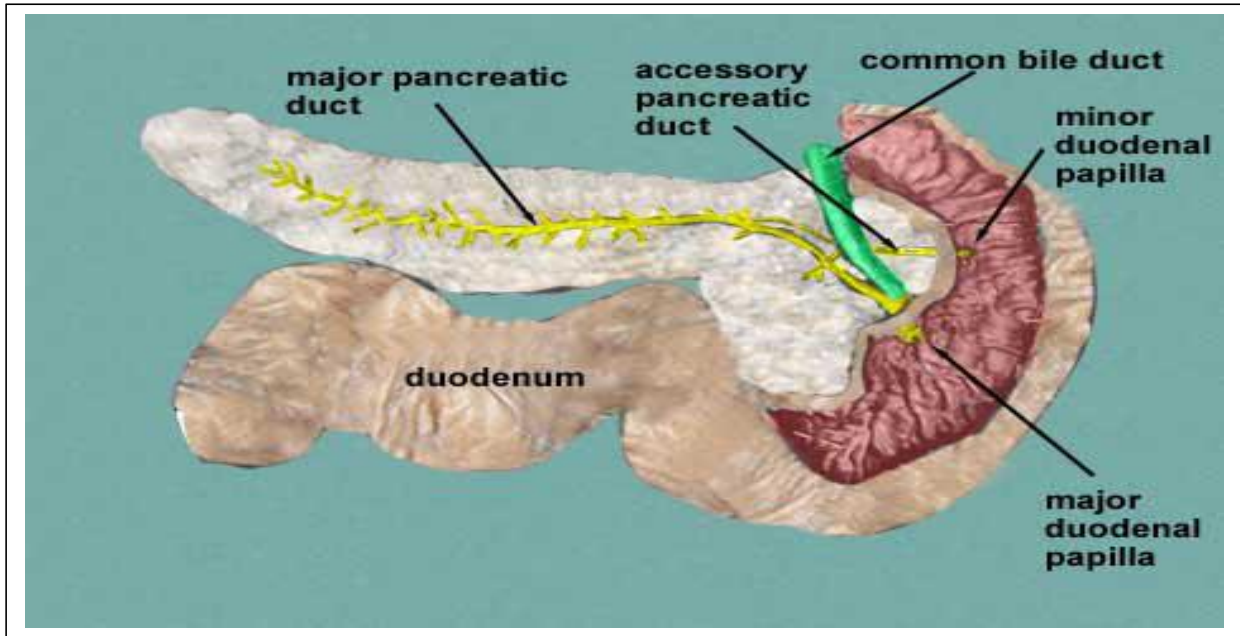
The 2 hepatic ducts (Rt&Lt) combine (in the porta hepatis ) to form the common hepatic duct , this runs near the liver with the hepatic a. proper & portal vein in the free margin of the lesser omentum .

° The common hepatic duct , continues to descend until joined by the cystic duct from the gallbladder, this completes the formation of the bile duct .

### Common Bile Duct



°The common bile duct continues to descend , passing posteriorly to the sup part of the duodenum before joining the pancreatic duct to enter the descending part of the duodenum at : The major duodenal papilla .



## •Anatomy&Histology of the gallbladder

°Pear-shaped sac lying on the visceral surface of the Rt lobe of the liver in a fossa b/w the Rt&quadrate lobes .

°The gallbladder is divided into :

### (1) Fundus

Rounded end ,projects below the lower margin of the liver .

<Completely covered with peritoneum >

### (2) Body

Major part in fossa of the gallbladder ,in contact with the visceral surface of the liver and directed upward ,backward & to the Lt .

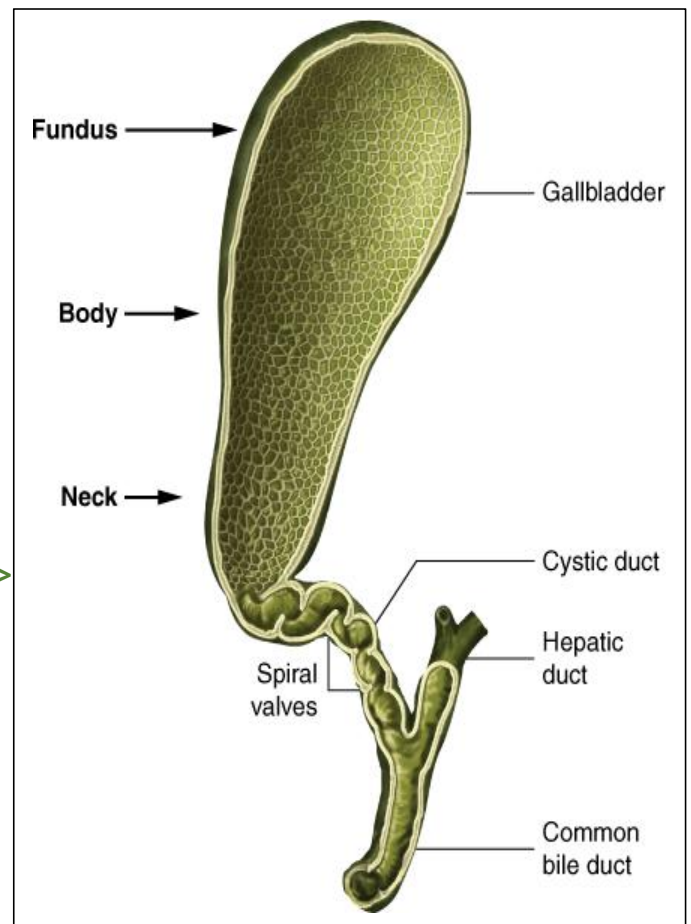
<Covered with peritoneum inferiorly >

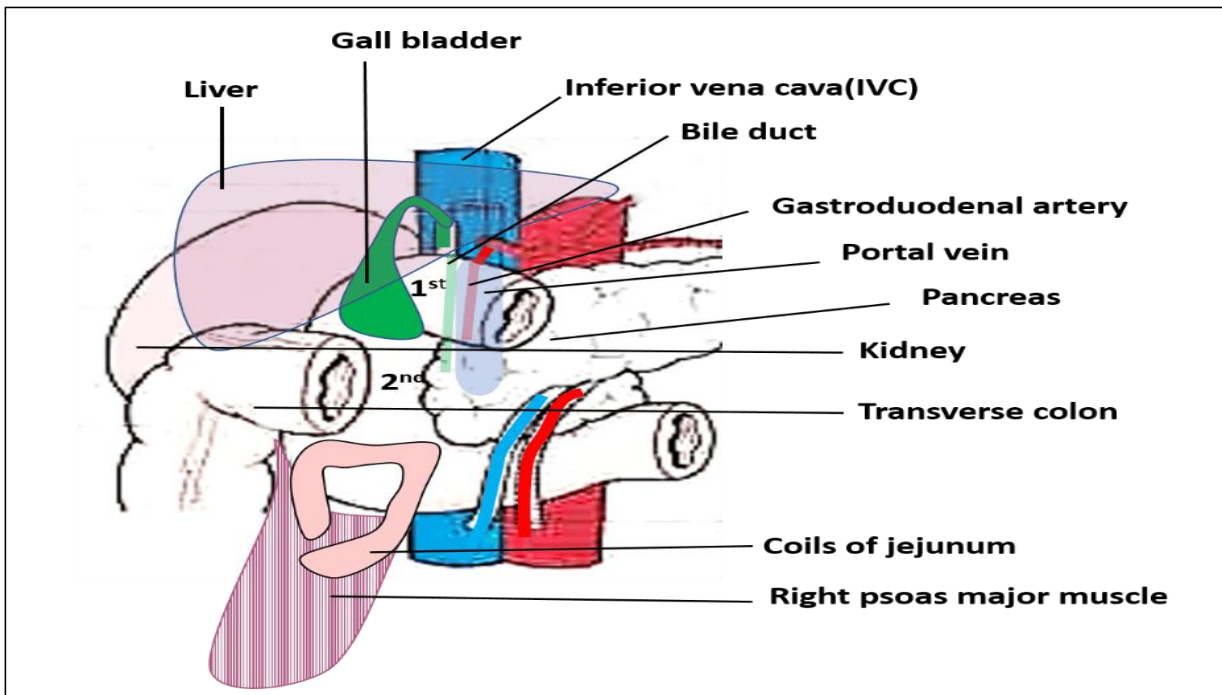
<In contact with the 2<sup>nd</sup> pt of the duodenum>

### (3) Neck

Narrow part with mucosal folds forming the spiral folds(aka spiral valves of Heister), ,continuous with a similar fold in the cystic duct ,function to keep the lumen open (prevent kinking ) .

<In contact with the 1<sup>st</sup> pt of the duodenum>





### Relations :

Anterior	Posterior
Ant abd wall	Transverse colon
Inferior surface of the liver	1 <sup>st</sup> part of duodenum
	2 <sup>nd</sup> (descending) part of duodenum

### •Common bile duct

°Length : 3in .

°These 3 inches divided into :

(1) Upper 1/3<sup>rd</sup>

Running in the free margin of the lesser omentum .

(2) Middle 1/3<sup>rd</sup>

Posterior to the 1<sup>st</sup> part of duodenum .

(3) Lower 1/3<sup>rd</sup>

Behind the head of pancreas ,joins the pancreatic duct which results in formation of **Hepatopancreatic ampulla** (aka ampulla of Vater ) ,that enters the descending part of duodenum at the **major duodenal papilla** .

Surrounding the ampulla is the **sphincter of Oddi** which is a muscular valve that controls the flow of digestive juices (bile&pancreatic) through the ampulla into the duodenum .

°Ampulla of Vater is 4in away from the pyloric region .

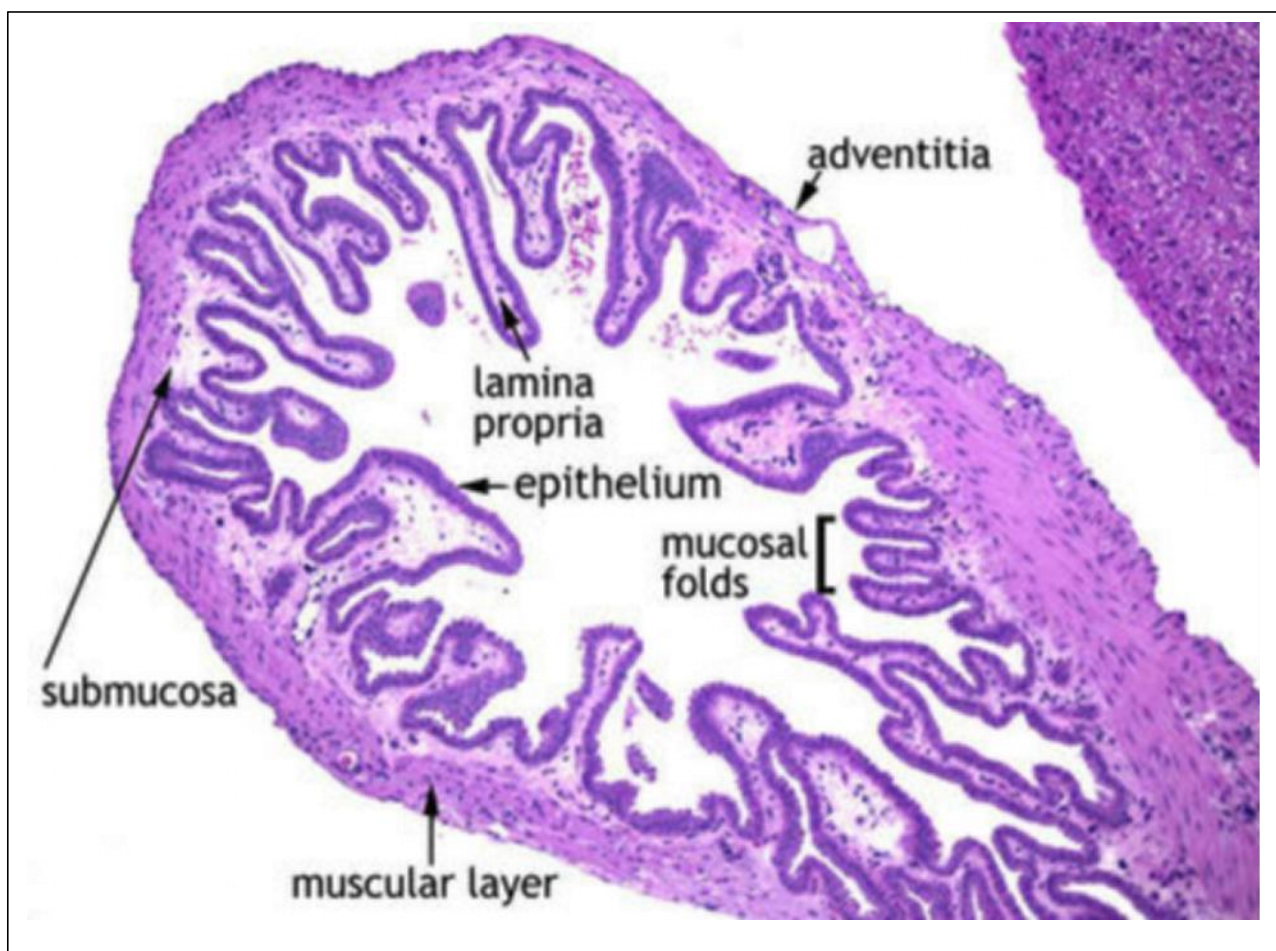
## •Histology of the gallbladder

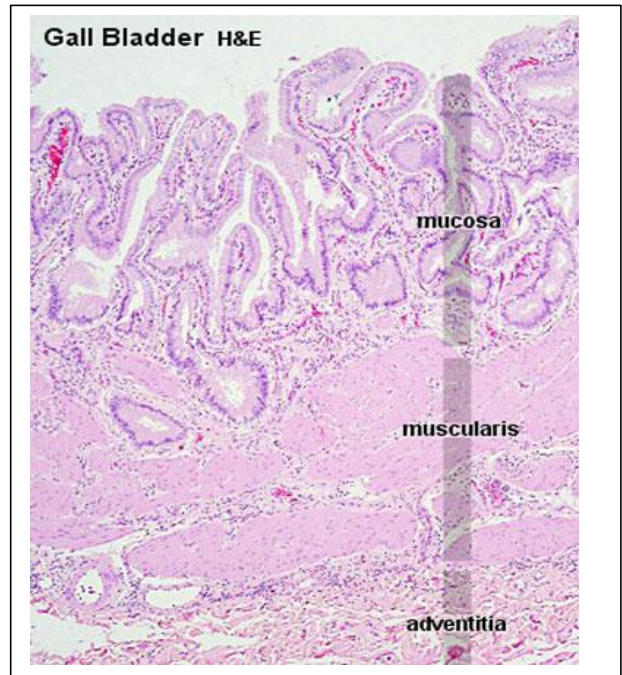
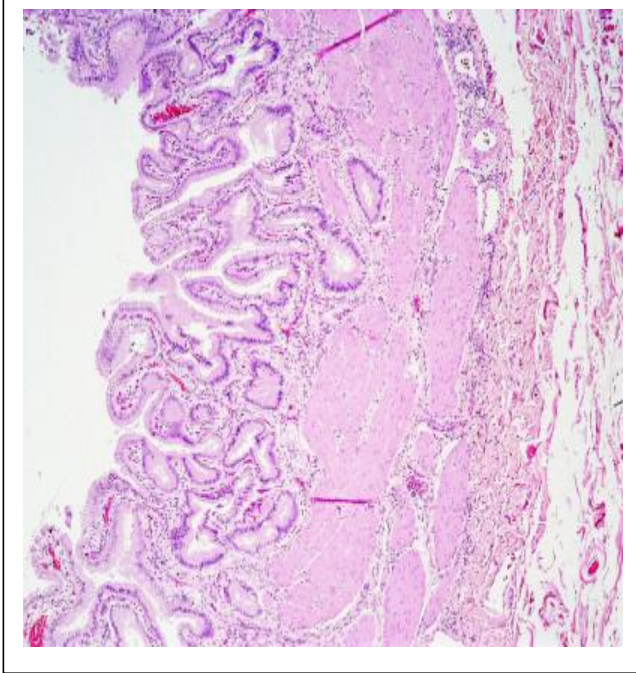
°The gall bladder is a simple muscular sac, lined by a **simple columnar epithelium**. The inner surface of the gall bladder is covered by the mucosa which shows a **honeycombed appearance** and is thrown into numerous folds (rugae). The surface is made up of a **simple columnar epithelium**. The epithelial cells have microvilli, and look like absorptive cells in the intestine. Underneath the epithelium is the lamina propria.

°The wall of the gall bladder **does not have a muscularis mucosae and submucosa**.

°The muscularis externa (muscle layer) contains bundles of smooth muscle cells, collagen and elastic fibres.

°On the outside of the gall bladder is the **adventitia**, it is a thick layer of connective tissue, which contains **large blood vessels, nerves and a lymphatic network**. In the unattached region, there is an outer layer of mesothelium and loose connective tissue (the serosa).





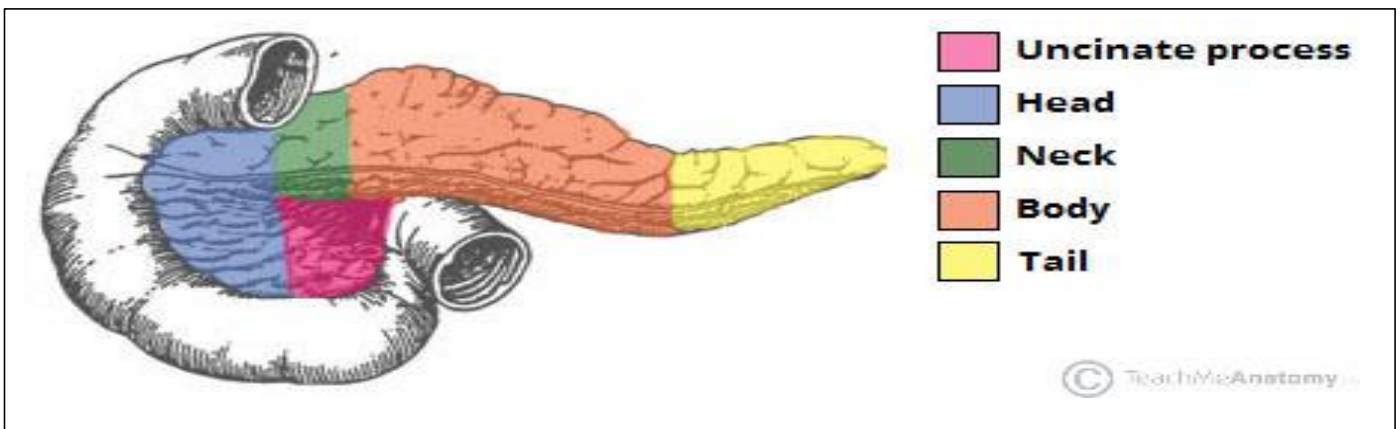
## °Anatomy of the pancreas

Pancreas is a soft **lobulated organ** located retroperitoneally across the posterior abdominal wall, it sits behind the stomach across the back of the abdomen.

°Measures in length : 15cm .

°It is described as an organ having :

- (1) **Head** ;disc-shaped and lies within the concavity of the duodenum.
- (2) **Neck**.
- (3) **Body**.
- (4) **Tail** , reaches hilum of the spleen .



°Part of the head extends to the left behind the superior mesenteric vessels, it is called **Uncinate process**.

°Behind the uncinate process is the Rt renal vein .

•Relations :

Part	Anterior	Posterior
Head	Attachment of transverse mesocolon . Transverse colon .	Common bile duct . IVC <span style="color:red">★</span>
Body	Attachment of transverse mesocolon . Transverse colon . Lesser sac(anterior to it ;stomach)	Aorta . Splenic a.&v. Lt kidney . Lt suprarenal gland . Lt renal v.
Neck	Hepatic a.	Portal vein .

°Splenorenal lig(aka lienorenal lig) : b/w the spleen and Lt kidney , derived from the peritoneum ; remnant of the dorsal mesentery .

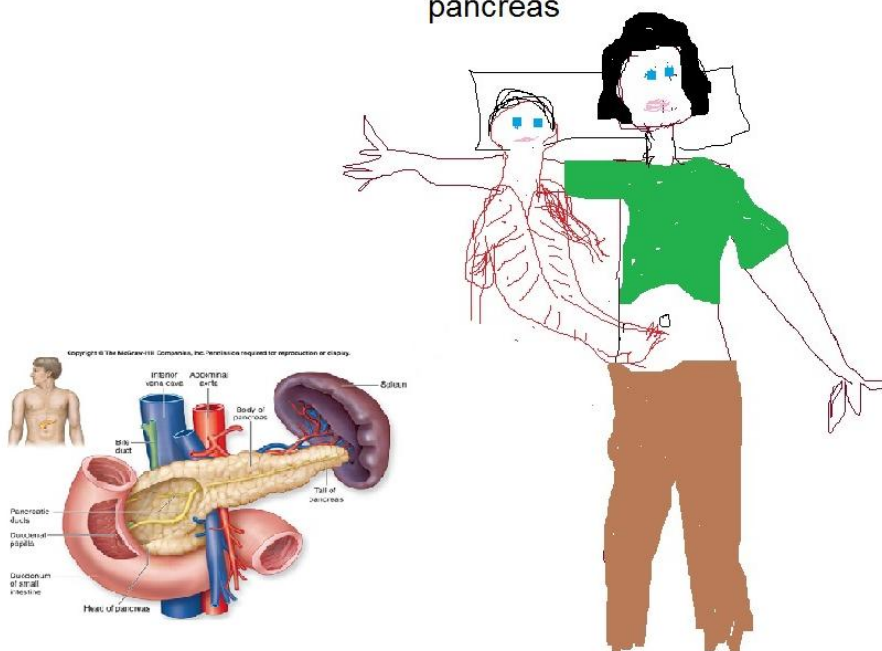
Passing b/w the two layers of the lig :

- (1) Lienal vessels > Splenic a.&Splenic v.
- (2) Tail of the pancreas .

•Blood supply & Venous Drainage

Arterial Supply	Venous Drainage
Splenic a. Sup&Inf pancreaticoduodenal arteries .	Splenic v. Sup&Inf pancreaticoduodenal veins .

pancreas



Never forget the basic relations of pancreas to different BVs !

[1] Pillow : IVC & Head of the baby : Head of the pancreas .

<Never forget ! **IVC & Common bile duct are post to the head of pancreas**>

[2] Mother' arm : Portal vein & Baby's neck : Neck of the pancreas .

[3] Umbilicus of the mother : Splenic hilum & Baby's legs : Tail of the pancreas .

[4] The bed : Lt renal v. , splenic a.&splenic v. & Baby's body : Body of the pancreas .

Most people have just one pancreatic duct. However, some have an additional **accessory pancreatic duct**.

Opening of the accessory pancreatic duct into the descending second section of the duodenum -->Minor duodenal papilla .

•Function of the pancreas :

°The pancreas is made up of two types of glands:

1-An **exocrine gland** that secretes digestive enzymes and Sodium bicarbonate into the duodenum through the main and accessory pancreatic ducts. Both ducts are **usually interconnected**.

2-An **endocrine gland**, which consists of the islets of Langerhans, secretes hormones into the bloodstream.

Islets of Langerhans are named for the German physician Paul Langerhans, who first described them in 1869. The normal human pancreas contains about 1,000,000 islets.

### **Cells of islets of Langerhans**

1-**Beta cells** ( $\beta$ -cells), they make about 65-80% of the cells in the islets and produce Insulin.

2-**alpha cells** ( $\alpha$ -cells), 15-20%, they produce an opposing hormone, Glucagon which releases glucose from the liver and fatty acids from fat tissue.

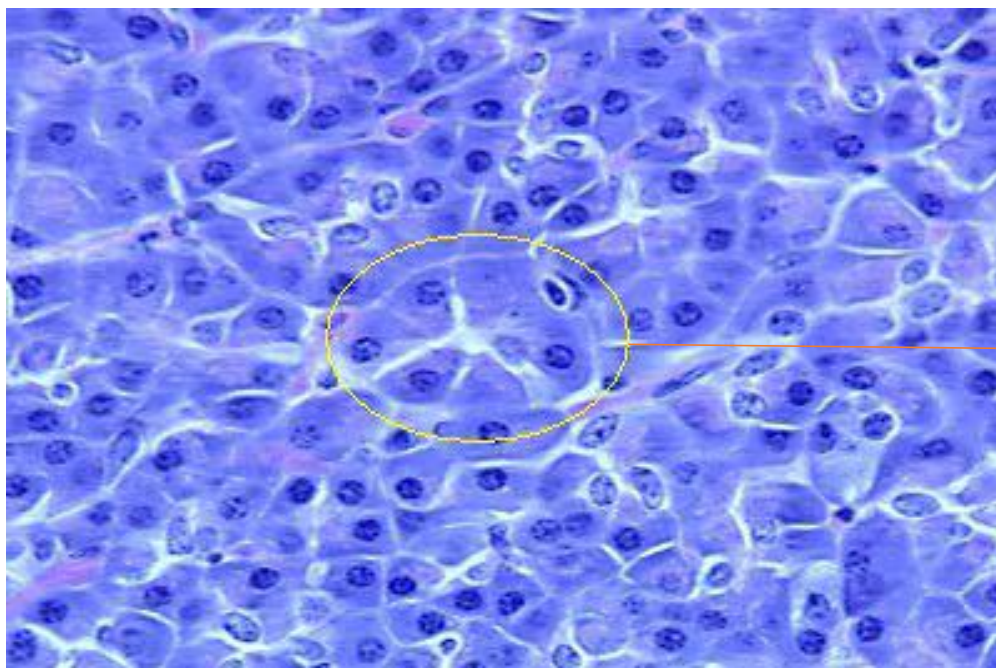
3-**Delta cells** ( $\delta$ -cells), 3-10%, they secrete somatostatin a strong inhibitor of somatotropin, insulin, and glucagon; its role in metabolic regulation is not yet clear. Somatostatin is also produced by the hypothalamus and functions to inhibit secretion of growth hormone by the pituitary gland.

## •Histology of the pancreas

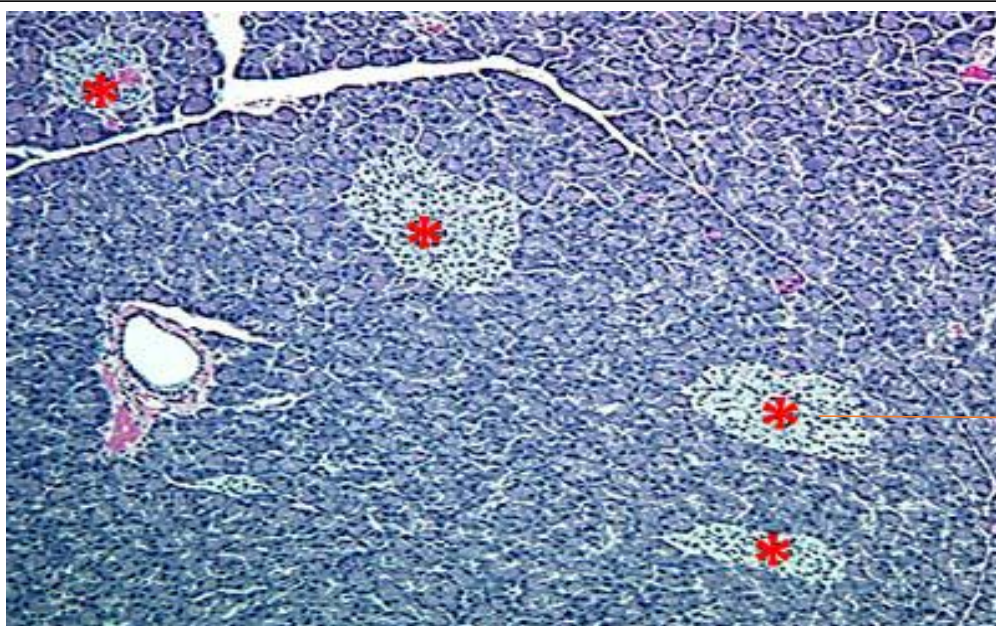
°The pancreas is divided into **lobules** by connective tissue septae. Lobules are composed largely of grape-like clusters of **exocrine cells** called **acini**, which secrete **digestive enzymes**.

°Exocrine secretions from acini flow successively through: intercalated ducts> intralobular ducts> interlobular ducts> the duodenum through the main pancreatic duct.

°Embedded within the pancreatic exocrine tissue are **Islets of Langerhans**, the endocrine component of the pancreas. Islets contain several cell types and are richly vascularized.



Acini



Islets of Lang.



*Deepest thanks to everyone trusted my work , or criticized it .  
To everyone sent me a feedback full of kindness .  
This is the last of my notes , my deepest wishes of good luck to  
you , reader .  
Apologies to those who didn't find these notes useful .*

اللَّهُمَّ تَقَبَّلْ الْعَمَلَ مَعَ قَلْتِهِ وَالْجُهْدَ مَعَ ضَالَّتِهِ وَالسَّعْيَ مَعَ شَوَائِبِهِ .  
وَأَخِرُ دَعْوَاهُمْ أَنْ الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ