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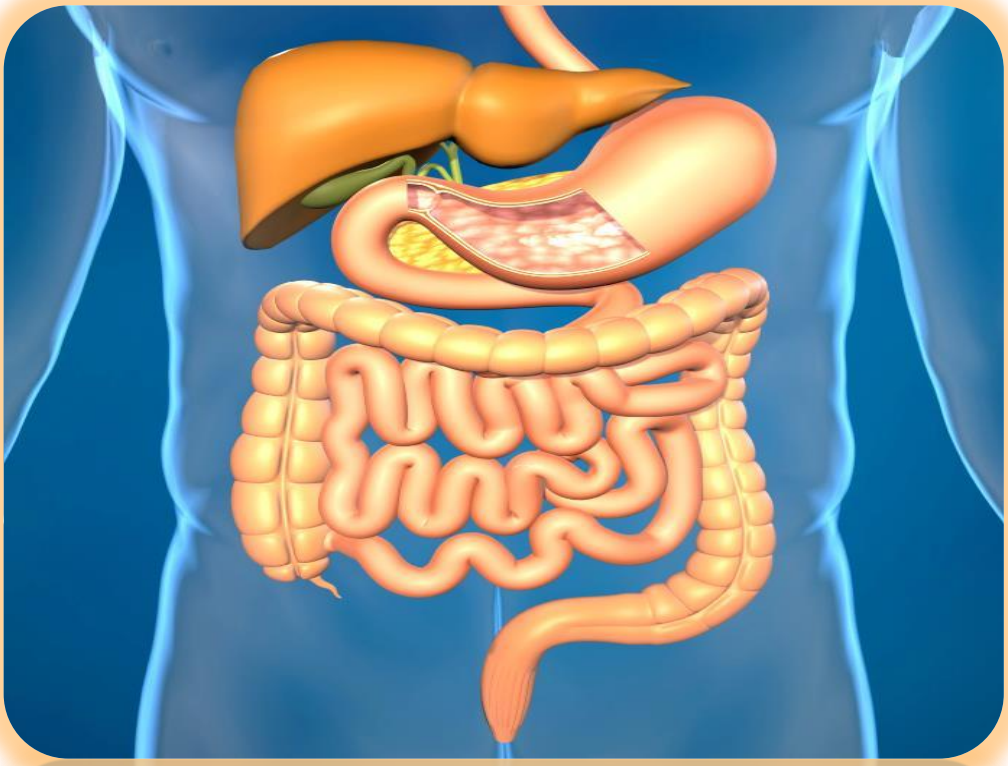


Lecture: Anatomy of Pancreas & biliary system (6)

Done by: Mohammed Alwahibi

Reviewed by: Ashwag Al:harbi

If there is any mistake or suggestions please feel free to contact us:

Anatomyteam32@gmail.com

Both - Black

Male Notes - BLUE

Female Notes - GREEN

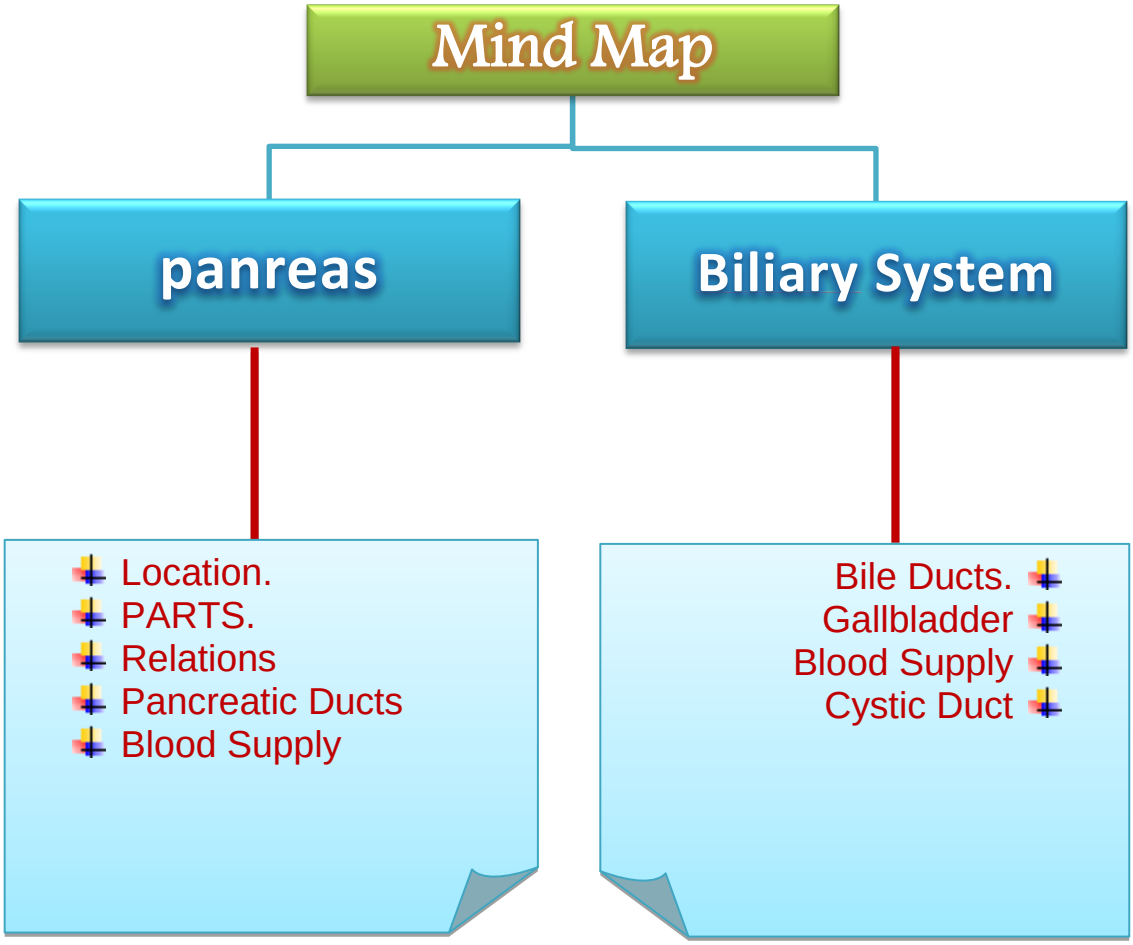
Explanation and additional notes - ORANGE

Very Important note - Red

Objectives:

At the end of the lecture, the student should be able to describe the:

- **Location, surface anatomy, parts, relations & peritoneal reflection of the pancreas and gall bladder.**
- **Blood supply, nerve supply and lymphatic drainage of pancreas and gall bladder.**
- **Course of each of common hepatic, cystic and common bile duct and pancreatic ducts.**


Mind Map
panreas
Biliary System
Location.
PARTS.
Relations
Pancreatic Ducts
Blood Supply
Bile Ducts.
Gallbladder
Blood Supply
Cystic Duct

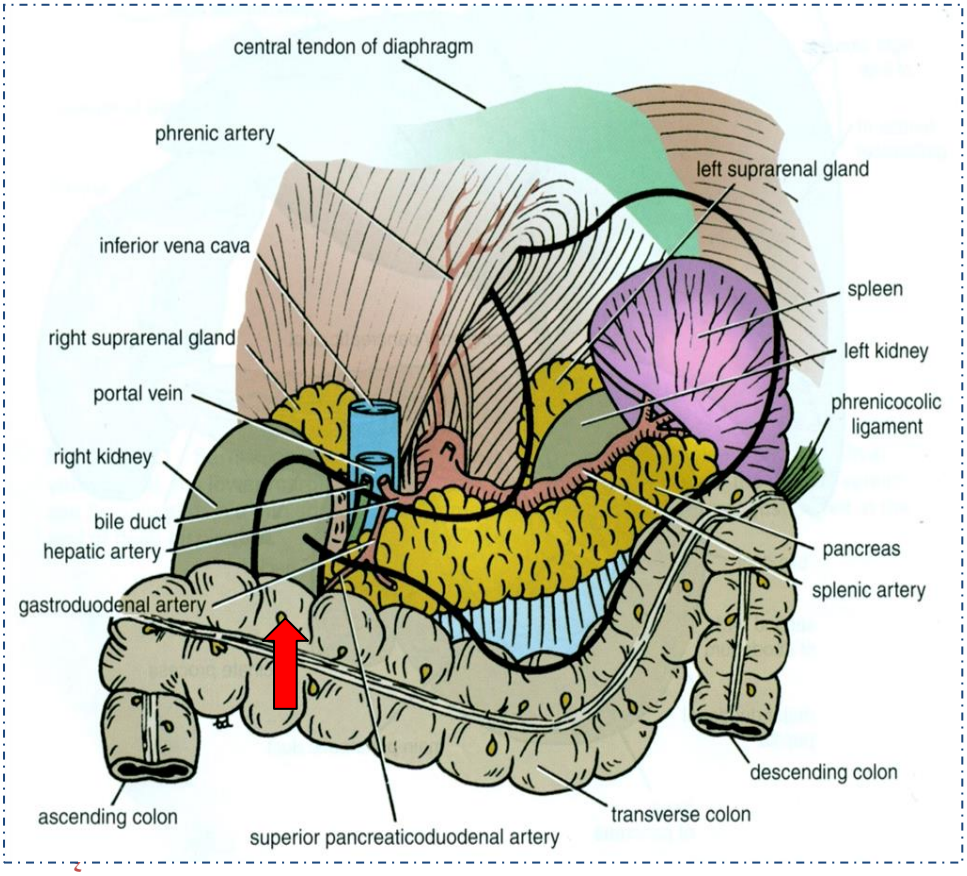
Pancreas

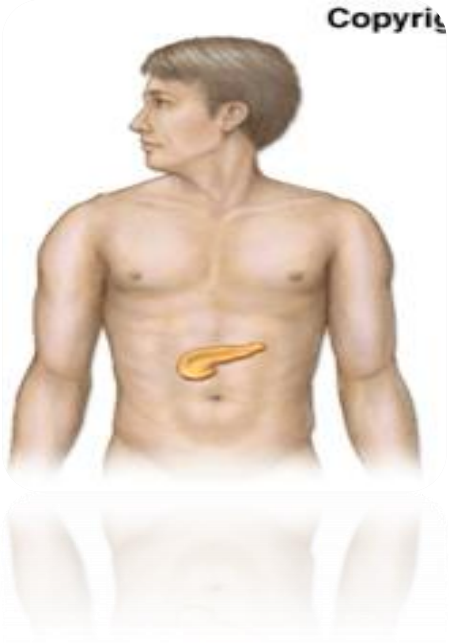
PANCREAS: LOCATION

- **A soft, lobulated elongated gland with both exocrine and endocrine functions.**
- **6-10 inch in length and 60-100 gram in weight.**

Location:

- **Located in epigastrium & Left upper quadrant of abdomen.**
- **Retro-peritoneal in position**
- **Lies across the posterior abdominal wall in an transverse /oblique direction at transpyloric plane(2L vertebra).**





PANCREAS: PARTS

- It is divided into:
  - Head.
  - Neck.
  - Body.
  - Tail.

Head

- Disc shaped, lies within the concavity of the duodenum
- Related to the 2nd and 3rd portions of the duodenum on the right & continues with the neck on the left
- Includes uncinate process (part extending to the left behind the superior mesenteric vessels).

Neck

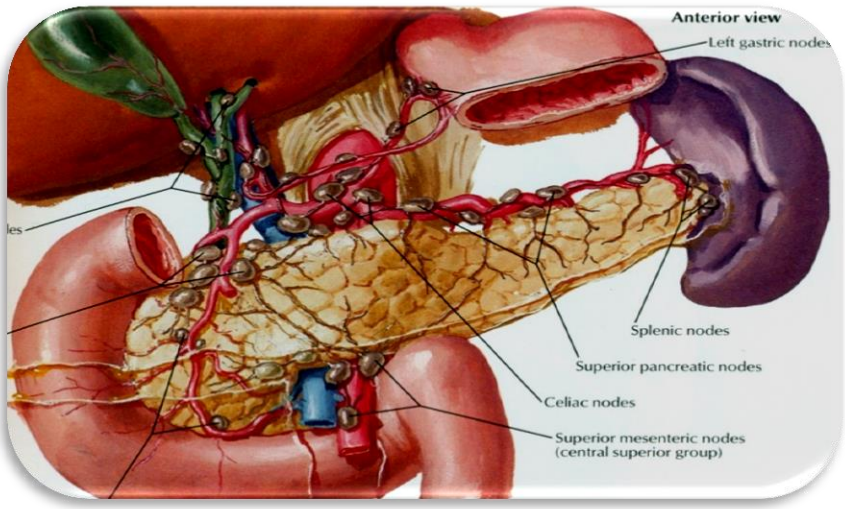
- Lies in front of origin of superior mesenteric artery and the confluence of the portal vein
- The superior mesenteric vessels emerge from its inferior border

Body

- Triangular in cross section, runs upward and to the left.
- The splenic vein is embedded in its posterior

Tail

- Narrow, short segment, ending at the splenic hilum
- Lies in the splenicorenal ligament (may get injured during splenectomy), at the level of the T12 vertebra
- Anteriorly, related to splenic flexure of colon



PANCREAS: Relations

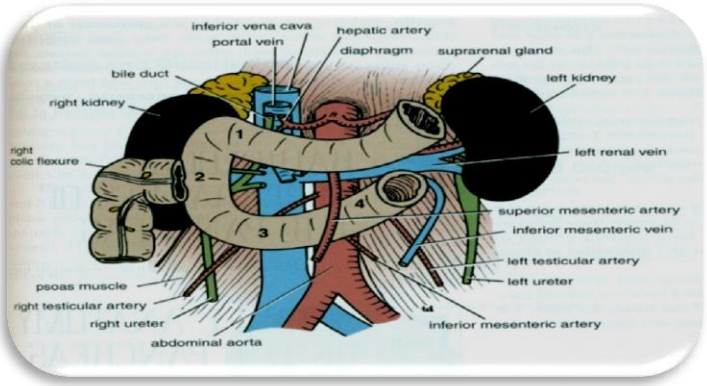
Anterior

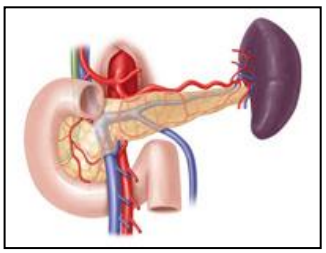
Stomach separated from it by lesser sac

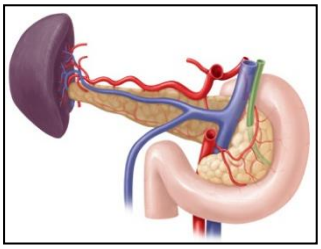
Transverse colon & transverse mesocolon

Posterior

- Bile duct, portal & splenic veins, inferior vena cava, aorta & origin of superior mesenteric artery
- Left psoas muscle, left adrenal gland, left renal vessels & upper 1/3rd of left kidney
- Hilum of the spleen.







PANCREAS: Pancreatic Ducts

Main duct (of Wirsung)

- Runs the entire length of pancreas beginning from the tail.
- Receives many tributaries from 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 duodenal wall
- The ampulla opens into the lumen of the duodenum by means of a small Papilla, (Major duodenal papilla).
- The terminal parts of both ducts and the ampulla are surrounded by circular muscle, known as the sphincter of the hepatopancreatic ampulla (sphincter of Oddi).

Accessory duct (of Santorini)

- Drains superior portion of the head
- Empties separately into 2nd portion of duodenum at (minor duodenal papilla)

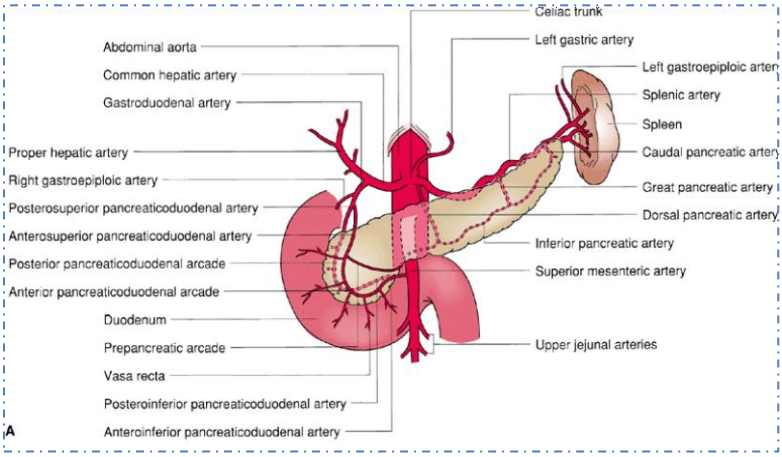
PANCREAS: Supply

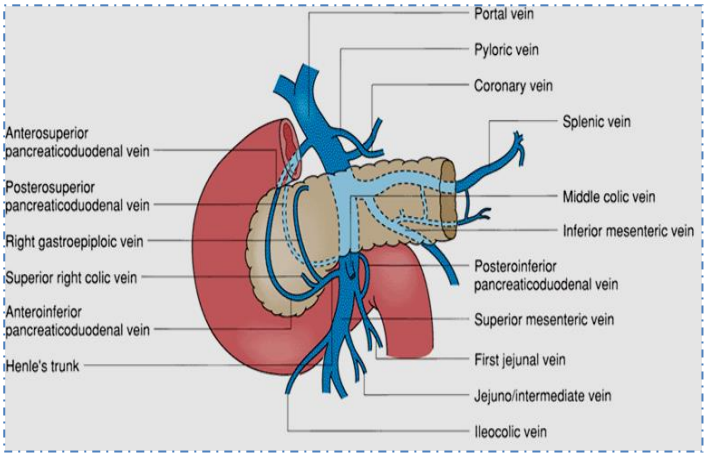
Arteries

- **Head & neck: Supplied by branches from:**
- **Celiac trunk through Superior pancreatico-duodenal artery**
- **Superior mesenteric artery through Inferior pancreatico-duodenal artery**
- **Body and tail: Supplied by Splenic artery through 8-10 branches**

Veins

- **Head & neck: Drained by anterior and posterior venous arcades that form the superior & inferior pancreaticoduodenal veins which follow the corresponding arteries.**
- **Body and tail: Drained by splenic vein, which is a tributary of portal vein**



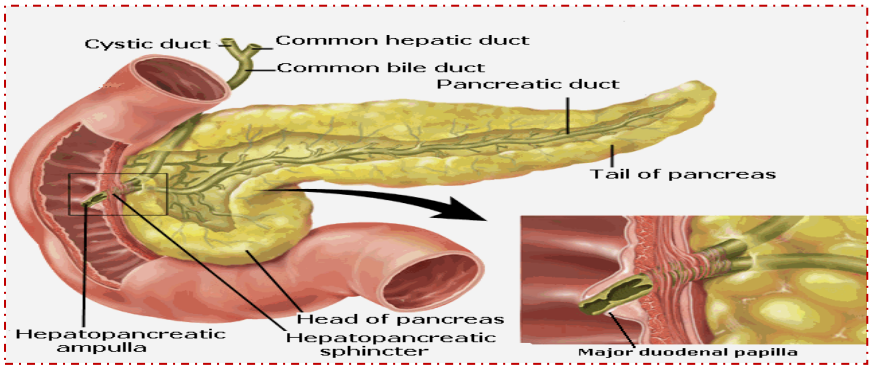


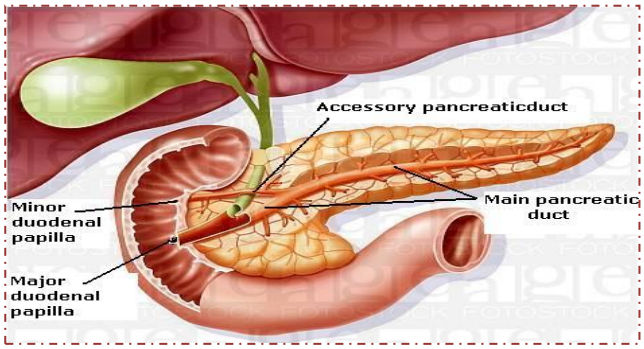
Lymphatic Drainage

- **Rich network that drains into pyloric, hepatic and splenic nodes**
- **Ultimately the efferent vessels drain into the celiac & superior mesenteric lymph nodes.**

Innervation

- **Sympathetic fibers (with predominantly inhibitory effect) from the thoracic splanchnic nerves.**
- **Parasympathetic fibers (stimulate both exocrine and endocrine secretions) from the vagus.**

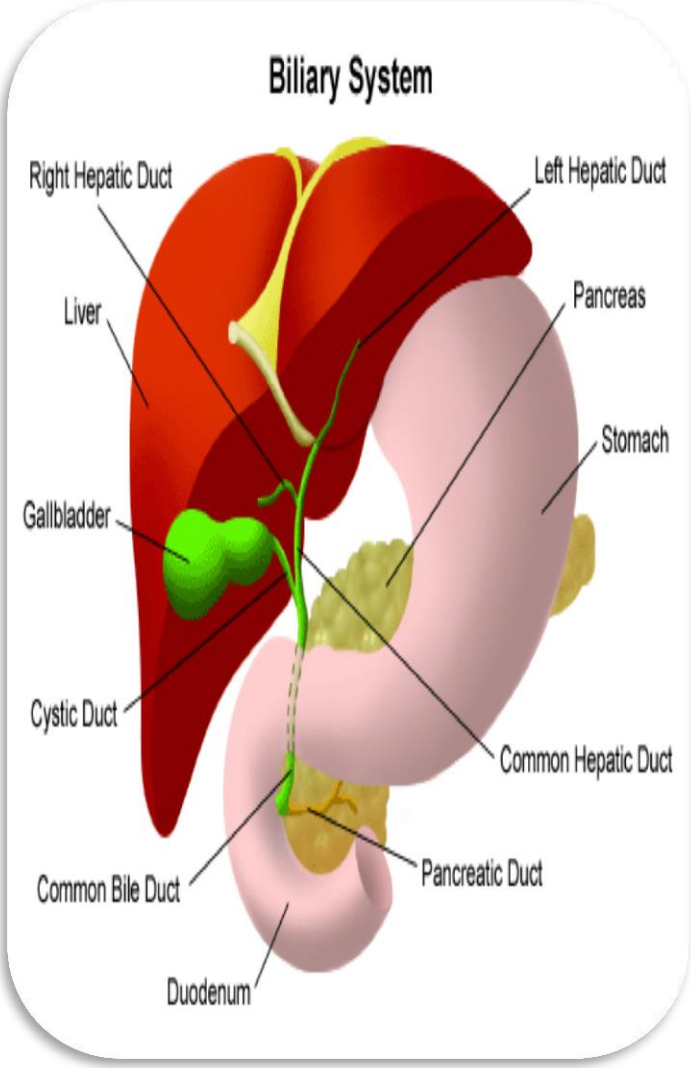




Biliary System

The biliary system consists liver, gall bladder & bile ducts that are involved in the production, storage & transportation of bile.

Bile is secreted by the liver cells at a constant rate of about 40 ml per hour. When digestion is not taking place, the bile is stored and concentrated in the gallbladder; when needed, it is delivered to the duodenum via bile ducts.

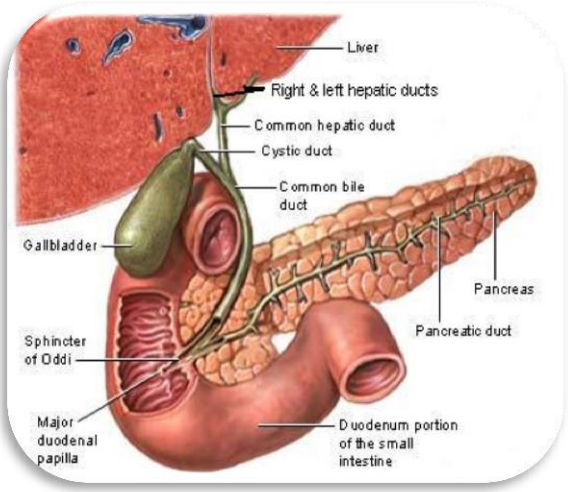


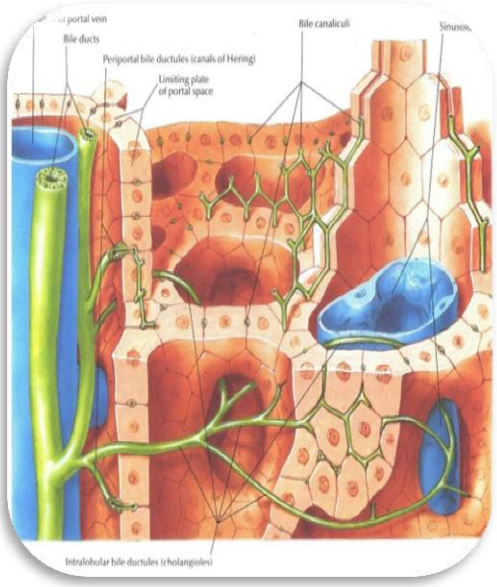
The bile ducts consist of:

- **Bile canaliculi**
- **Interlobular ducts**
- **Intrahepatic ducts**
- **Right and left hepatic ducts**
- **Common hepatic duct**
- **Cystic duct**
- **Common bile duct (Bile duct)**

The Bile Ducts

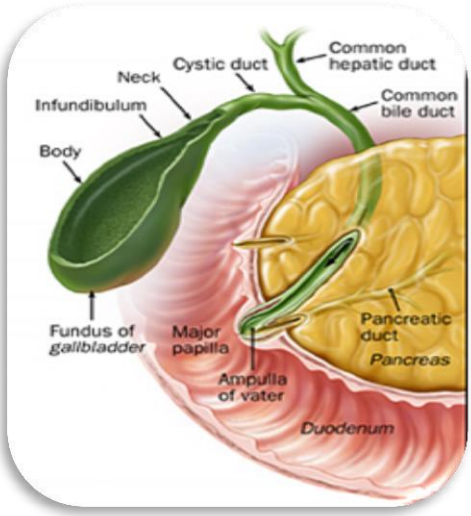
The smallest vessels the bile canaliculi open into the interlobular ducts situated in the portal canals of the liver.





The interlobular ducts join one another to form progressively larger ducts and, eventually, at the *porta hepatis* form the right and left hepatic ducts.

The right hepatic duct drains the right lobe of the liver and the left duct drains the left lobe, caudate lobe, & quadrate lobe. After a short course, the hepatic ducts unite to form the common hepatic duct



The common hepatic duct, about 1.5 in. (4 cm) long, descends within the free margin of the lesser omentum. It is joined on the right side by the cystic duct from the gallbladder to form the common bile duct (bile duct)

The common bile duct is about 3 inches long.

- In its course:

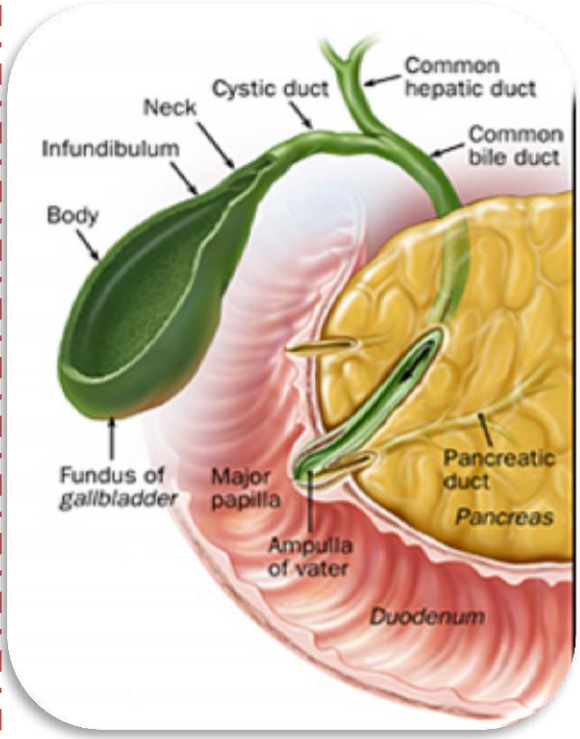
  -First it lies in the right free margin of the lesser omentum.
  -Then it runs behind the first part of the duodenum.
  -Then it lies in a groove on the posterior surface of the head of the pancreas. Here, the bile joins the main pancreatic duct and opens into 2nd part of duodenum

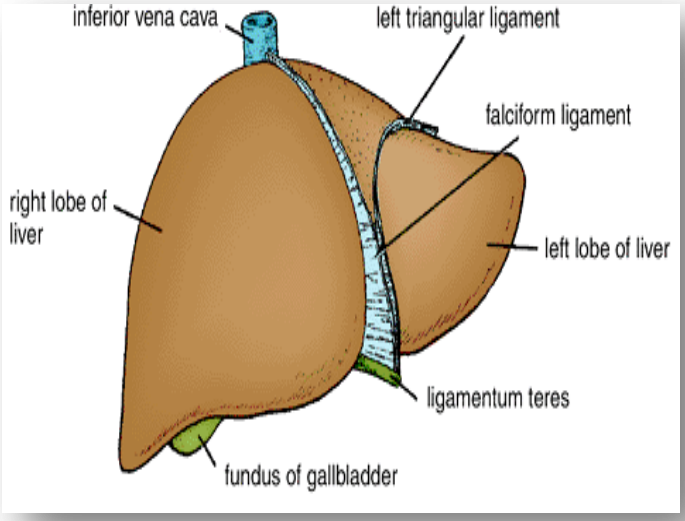
Gallbladder

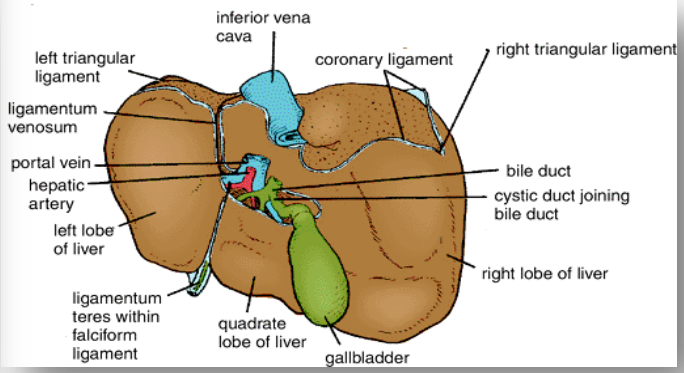
- A pear-shaped sac, with a capacity of 30 to 50 ml, lies on the undersurface of the liver.

Divided into the fundus, body, neck.

- **Fundus:** rounded and projects below the inferior margin of the liver, where it comes in contact with the anterior abdominal wall at the level of the tip of the ninth right costal cartilage.
- **Body**: lies in contact with the visceral surface of the liver
- **Neck** becomes continuous with the **cystic duct**
- The **peritoneum completely surrounds the fundus** of the gallbladder and binds the body and neck to the visceral surface of the liver.







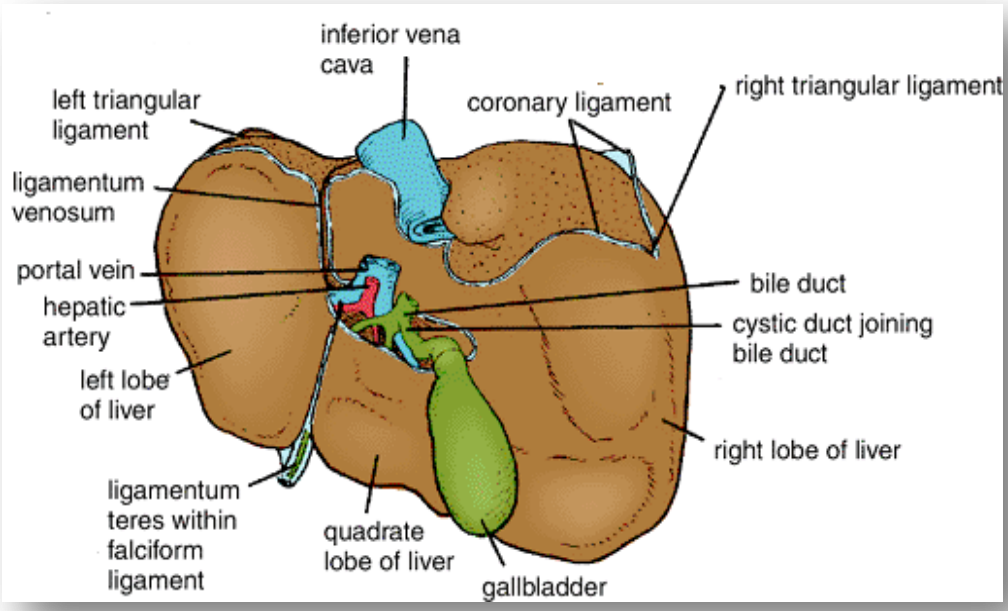
Gallbladder: Relations

Anterior

- Anterior abdominal wall
- Inferior surface of the liver

Posterior

- Transverse colon
- 1st & 2nd parts of the duodenum

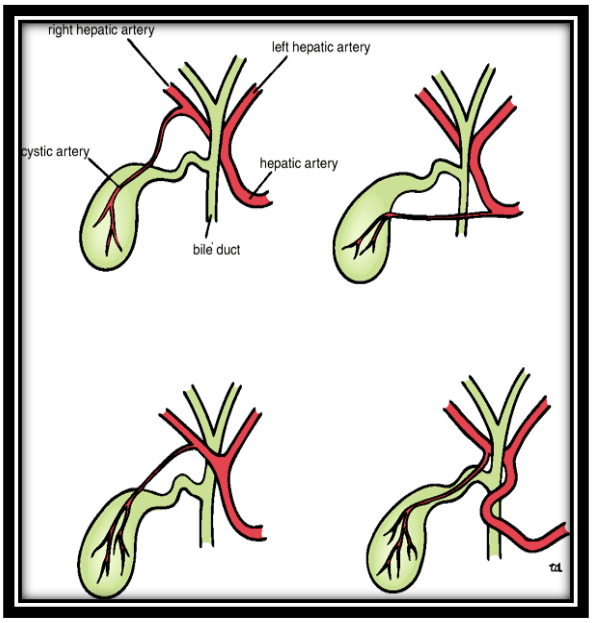


Functions

- Stores bile
- Concentrates bile
- Selectively absorbs bile salts, keeps the bile acid
- Excretes cholesterol
- Secretes mucus.

Gallbladder: Supply

- The cystic artery usually a branch of the right hepatic artery.
- The cystic vein drains directly into the portal vein.
- Several very small arteries and veins also run between the liver and gallbladder.



Nerve Supply

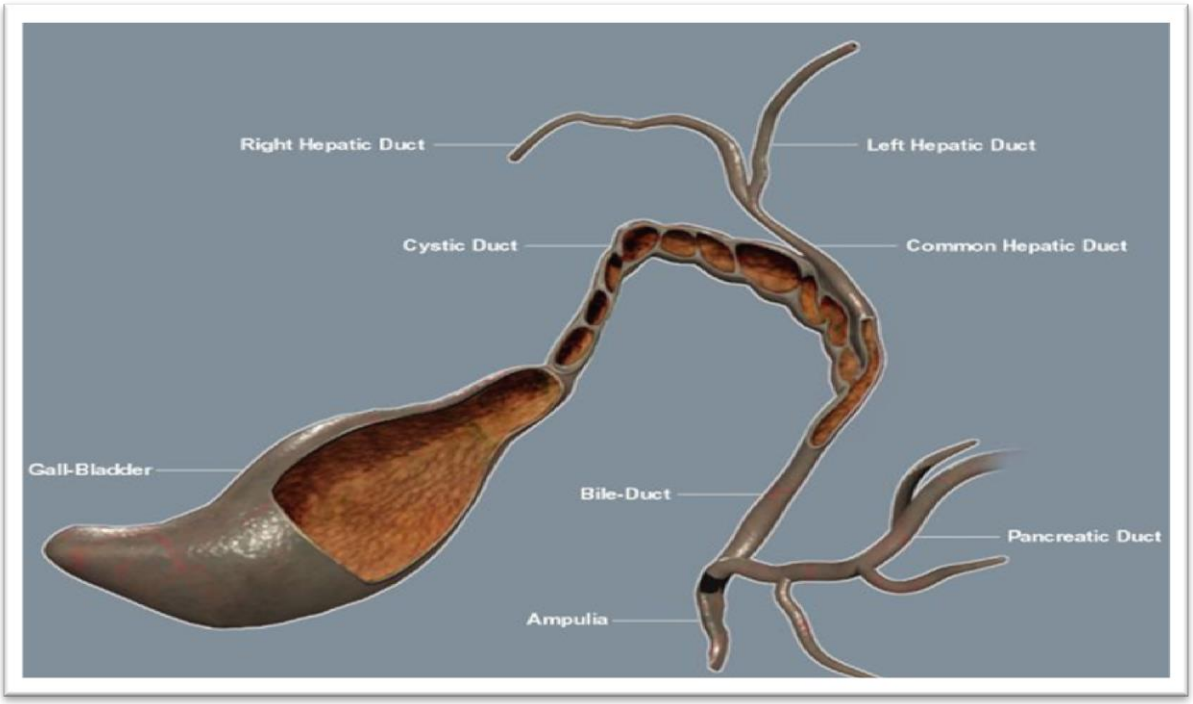
Sympathetic and parasympathetic vagal fibers form the celiac plexus.

Lymph Drainage

Cystic node → hepatic nodes → Celiac nodes.

Gallbladder: Cystic Duct

- S-shaped duct, about 1.5 in. (3.8 cm) long and connects the neck of the gallbladder to the common hepatic duct to form the bile duct
- Descends in the free margin of the lesser omentum.
  The mucous is raised to form a spiral fold that is continuous with a similar fold in the neck of the gallbladder. The fold is commonly known as the "spiral valve." The function of the spiral valve is to keep the lumen constantly open.



Questions:

Q1) pancreas has :
A- Exocrine function
B- Endocrine function
C- Both

Q2) The head of pancreas related to :
A- 1st & 2nd parts of duodenum
B- 2nd & 3rd
C- 3rd & 4th

Q3) Which one of the following in anterior relation with pancreas :
A- Stomach
B- Bile duct
C- splenic veins

Q4) The arterial supply of the body and tail of pancreas is :
A- superior pancreatico_duodenal artery
B- Splenic artery
C- Hepatic artery

Q5) The venous drainage of the head & neck of pancreas is :
A- splenic vein
B- Portal vein
C- Superior & inferior pancreatico_duodenal veins

Q6) The final lymphatic drainage of pancreas is :
A- Superior mesenteric lymph node .
B- Celiac lymph node
C- A+ B

Q7) The biliary system consists of :
A- Liver, gall bladder , bile duct
B- Pancreas , Liver, gall bladder
C- Spleen , gall bladder , bile duct

Q8) Bile is secreted by :
A- Panaceas
B- Liver
C- Spleen

Q9) The common bile duct formed by :
A- Common hepatic duct
B- Common hepatic duct + cystic duct
C- Cystic duct

Q10) The beginning of common bile duct will take place first at :
A- the right free margin of the lesser omentum
B- it runs behind the first part of the duodenum
C- in a groove on the posterior surface of the head of the pancreas

Q11) Which one of the following in posterior relation with gall bladder :
A- Inferior surface of liver
B- pancreas
C- transverse colon

Q	Answers
1	C
2	B
3	A
4	B
5	C
6	C
7	A
8	B
9	B
10	A
11	C

#Helpful links for more Qs:

http://www.quibblo.com/quiz/36EGLHm/Pancreas-Anatomy

http://www.medindia.net/medical-quiz/quiz-on-pancreas.asp

http://www.med.umich.edu/lrc/coursepages/m1/anatomy2010/html/gastrointestinal_system/duodenum_questions.html

GOOD LUCK

Anatomy Team Leaders:

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