كليه الرشيد الجامعه

قسم الصيدله

المرحله الاولى

التشريح العام

General Anatomy

الدكتور طارق جواد الربيعي

M.B.,Ch.B.,D.G.S.M.R.C.S.

Lecture4

Organs Associated with the Digestive system

Organs Associated with the Digestive system

These organs include :

1. The salivary glands
2. The pancreas
3. The liver
4. The gallbladder and biliary passages.

Organs Associated with the Digestive system

- These organs are located outside the digestive tract .
- The excretory ducts from the salivary glands open into the oral cavity
- Pancreas , liver , and gallbladder and biliary passages are located in the abdominal cavity ,deliver their secretory products via their ducts into the duodenum .
- Products of these organs facilitate transport and digestion of food within the digestive system

The salivary glands

They are exocrine glands , produce saliva ,which is delivered by their ducts into the oral cavity .

Saliva: is clear , colorless fluid secreted into the mouth salivary and mucous glands of about (1-1.5) liter/day

Functions of saliva

1. Keeps the mouth moist.
2. Necessary for speech .
3. Maintains oral hygiene.
4. Necessary for mastication.
5. Digestion of starch .
6. Preserves health of teeth and soft tissues of the mouth.
7. Necessary for taste.
8. Needed for swallowing .
9. Acts as a chemical buffer .

The salivary glands

The salivary glands are of two groups .

A. Major salivary glands.

There are three pairs :

1. Parotid salivary glands .
2. Submandibular salivary glands .
3. Sublingual salivary glands.

B. Minor salivary glands

Found in the mucosa and sub mucosa through the oral cavity

The salivary glands

The secretion of salivary glands

1. The parotid salivary gland : mostly serous
2. The submandibular salivary gland : mixed serous and mucous.
3. The sub 1igual salivary gland: mostly mucous
4. The minor salivary glands: mucous except for the serous glands at the bases of the circumvallate papillae on the dorsum of the tongue

- The salivary glands are composed of :

1. Serous cells: that produce clear , watery secretion rich in amylase.
2. Mucous cells: that produce thick , sticky opalescent material rich in mucin

The parotid salivary glands

(para=around , otic=ear.)

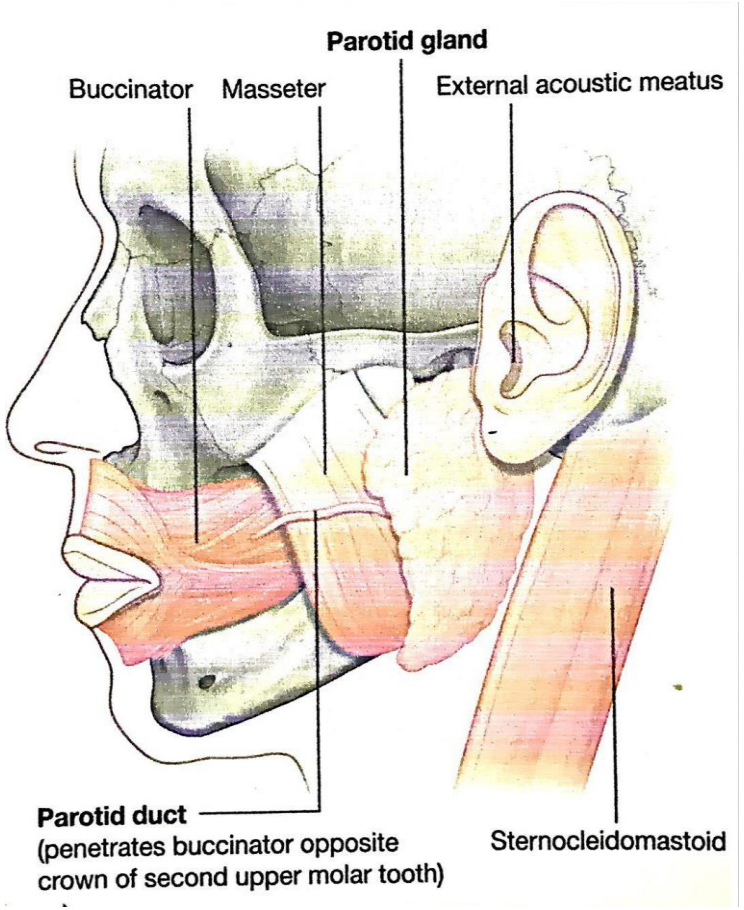
- Are the largest of the three pairs of the major salivary gland , consist mainly of serous acini .

<u>Site:</u>

On each side is entirely outside the boundaries of the oral cavity in a shallow triangular-shaped trench formed by :

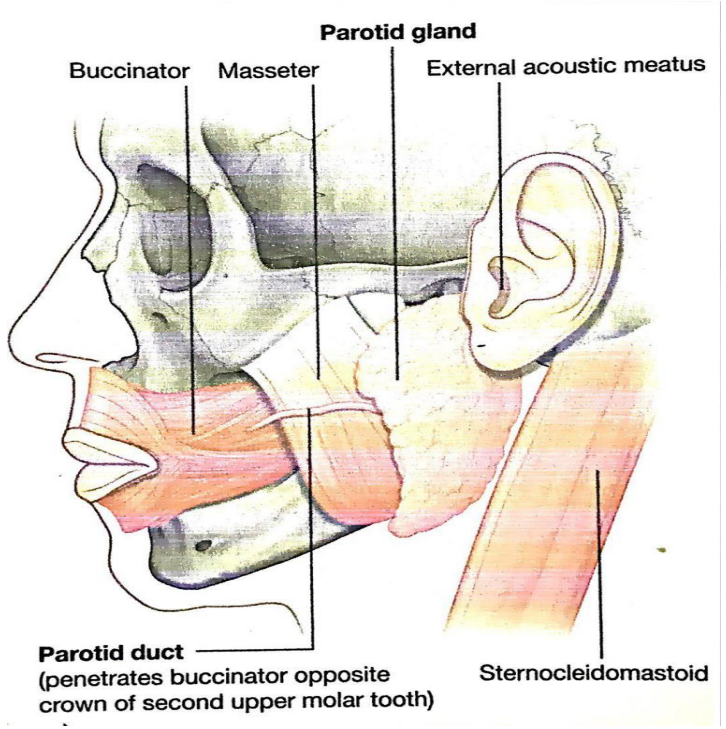
1. The sternocleidomastoid muscle behind .
2. The ramus of the mandible in front
3. Superiorly , the base of the trench is formed by the external acoustic meatus and posterior aspect of the zygomatic arch

- The gland normally extends anteriorly over the masseter muscle
- And inferiorly over the posterior bell of the digastric muscle .



The parotid salivary glands

The parotid duct passes anteriorly across the external surface of the masseter muscle and then turns medially to penetrate the buccinators muscle of the check and open into the oral vestibule adjacent to the crown of the second upper molar tooth

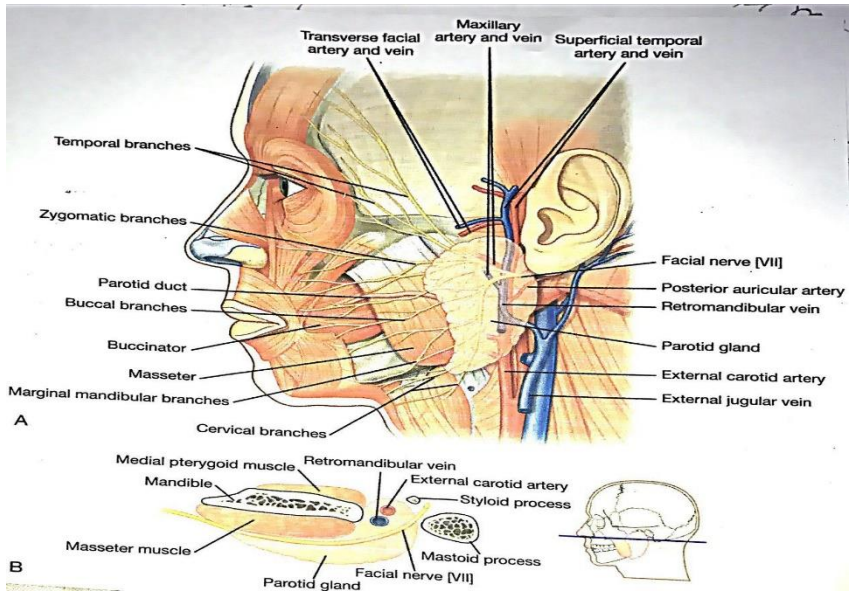


The parotid salivary glands

Important relationships

Several structures enter and pass through or pass just deep to it , they are .

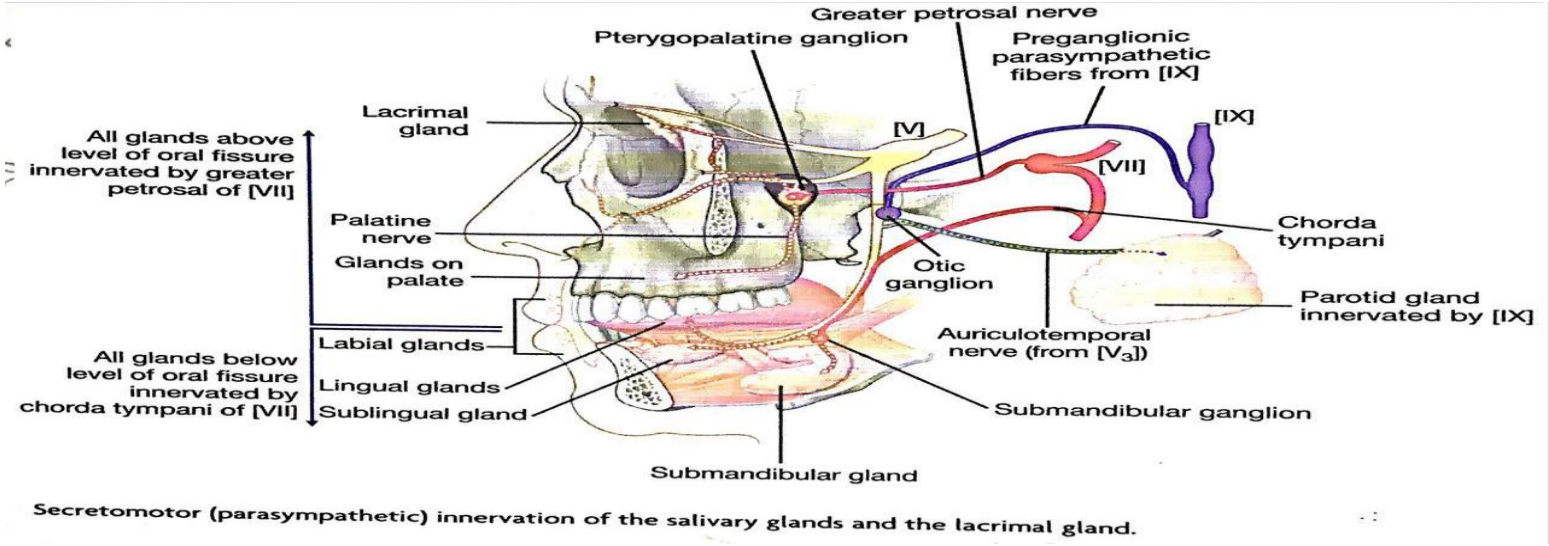
1. The facial nerve[VII]
2. the external carotid artery and its branches.
3. The retromandibular vein and its tributaries.



The parotid salivary glands

Innervation

1. Sensory innervation by the auriculotemporal nerve branch of the mandibular division of the trigeminal nerve[v]
2. Secretomotor parasympathetic innervation by a branch from the glossopharyngeal nerve[IX]



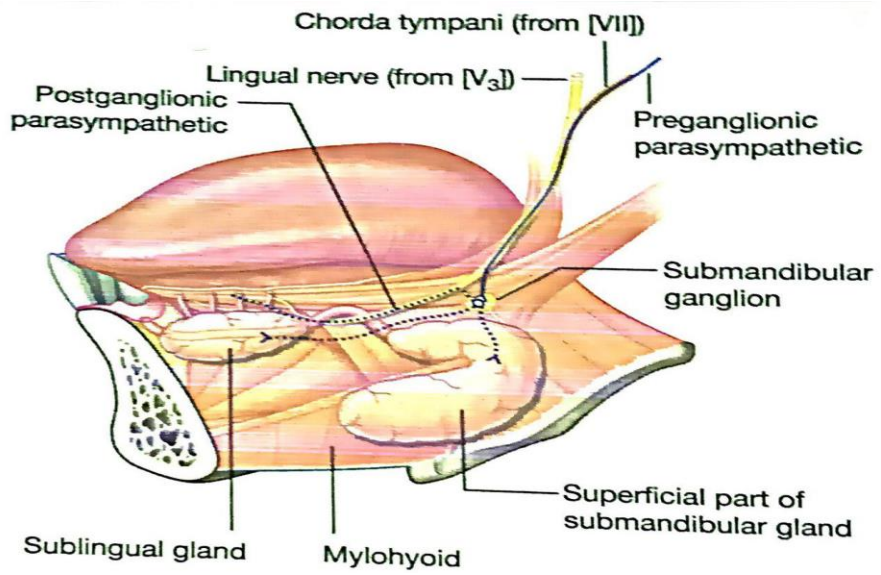
Secretomotor (parasympathetic) innervation of the salivary glands and the lacrimal gland.

The submandibular salivary glands

- Consist of a mixture of serous and mucous acini .

Site

- Each gland lies at the lower border of the body of the mandible
- Is divided by the mylohyoid muscle into superficial and deep parts;
- The deep part of the gland lies beneath the mucous membrane of the mouth on the side of the tongue .
- The submandibular duct emerges from the anterior and of the deep part of the gland and runs forward , and opens into the floor of the mouth by a small papilla



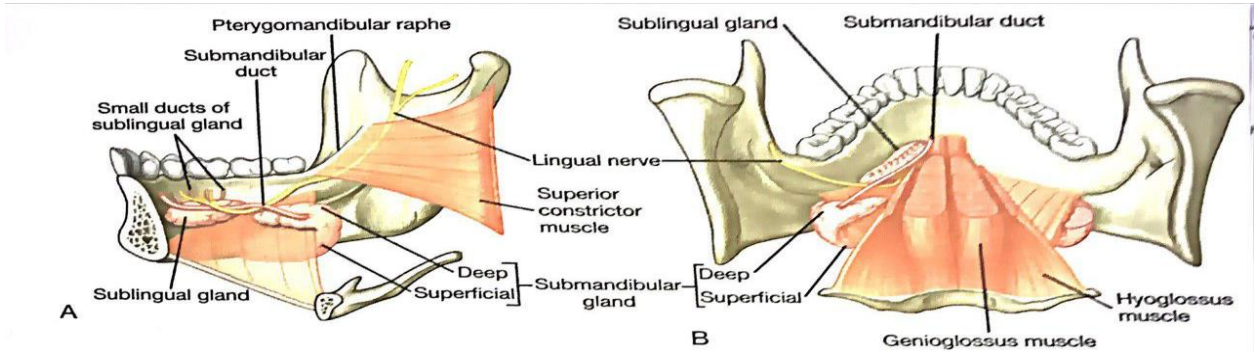
The sublingual salivary glands

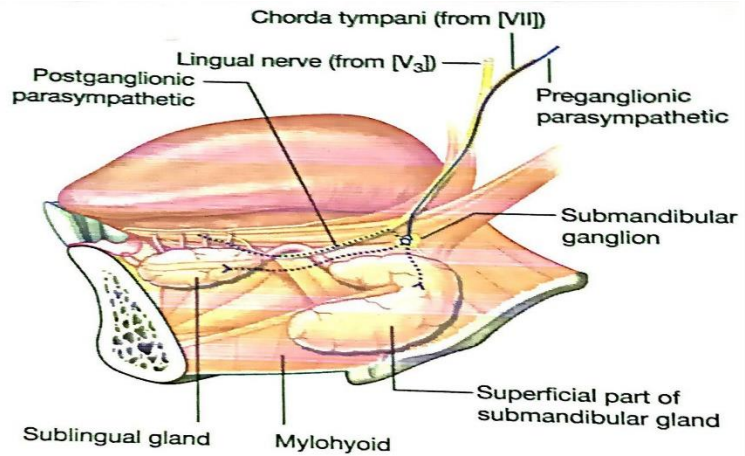
have both serous and mucous acini , with mucous predominating .

Site lie beneath the mucous membrane of the floor of the mouth .

The sublingual ducts(8-20) open into the mouth on the summit of the sublingual fold.

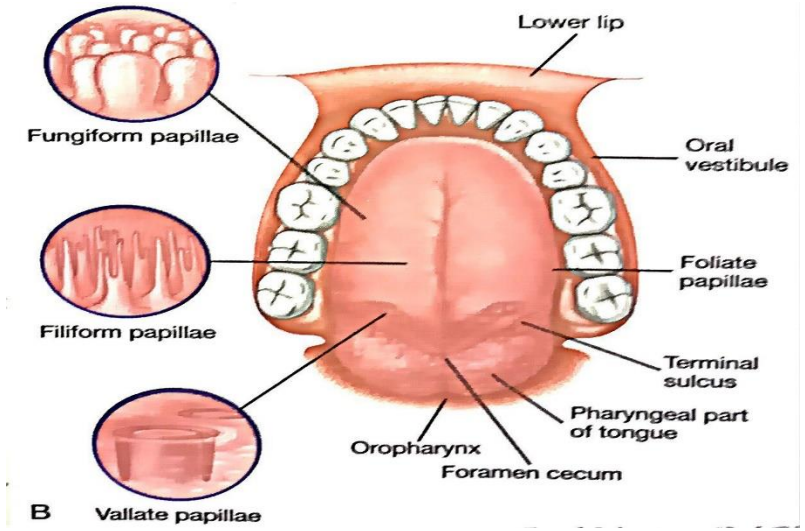
Innervation: (secretomotor parasympathetic) for both submandibular and sublingual salivary glands is the chorda tympani nerve a branch of the facial nerve [VII]





The minor salivary glands

- Are found in the mucosa and submucosa throughout the oral cavity scattered or grouped together in the palate , lips and cheeks
- Secretion from these glands accounts for about 10% of the total volume of the saliva
- Their secretion is mucous except for the serous glands at the circumvallate papillae



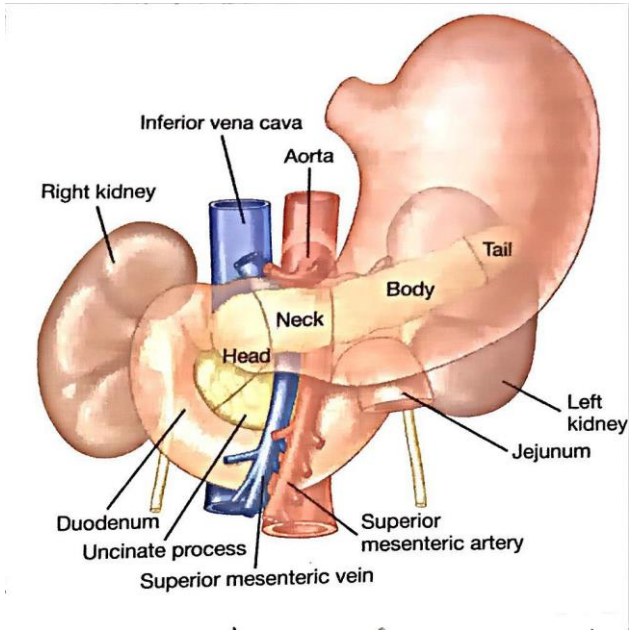
The pancreas

The pancreas is both exocrine and endocrine gland

Site

- It crosses the transpyloric plane
- Lies in the epigastric region and upper abdomen
- It lies mostly posterior to the stomach , in the posterior abdominal wall , from the duodenum on the right , to the spleen on the left .
- It is mostly retroperitoneal .
- Pancreas is an elongated , soft ,

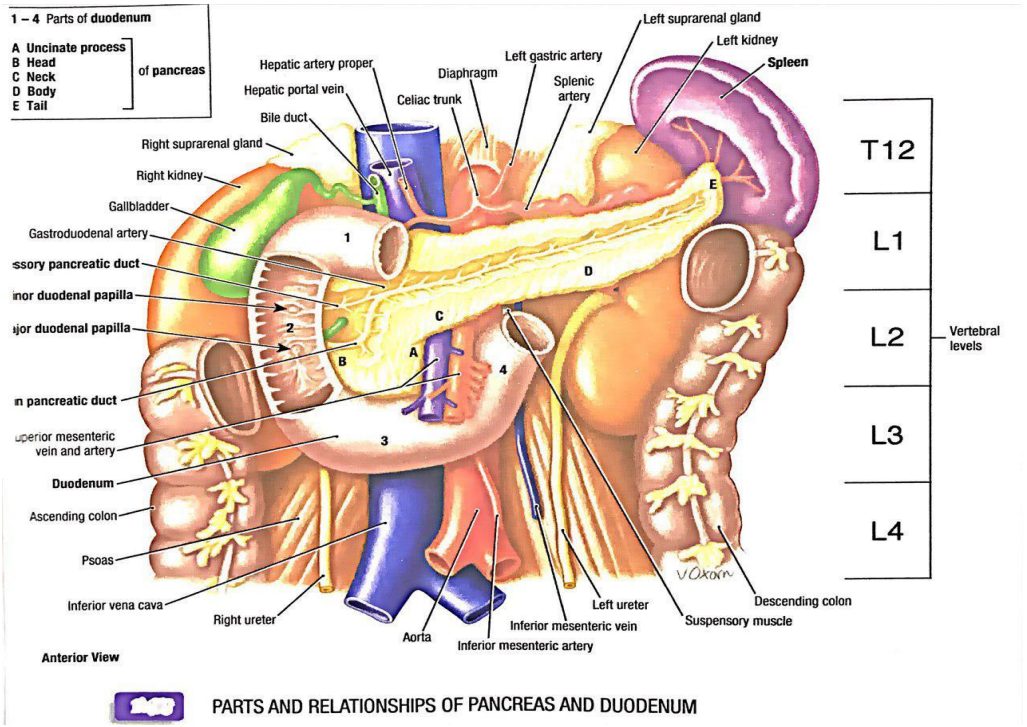
  yellowish colored gland , flat in shape
- Measures about (17 cm)long
- Weighs about (90 gm)



The pancreas

Parts of the pancreas

1. The head of pancreas : lies within the C-shaped concavity of the duodenum
2. The neck of pancreas : is anterior to the superior mesenteric vessels
3. The body of pancreas : extends from the neck to the tail of pancreas
4. The tail of pancreas : passes between layers of the splenorenal ligament to reach the spleen



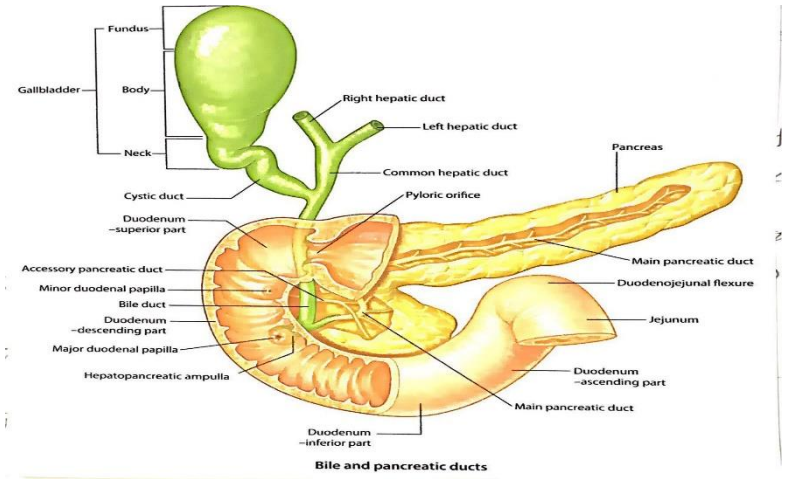
PARTS AND RELATIONSHIPS OF PANCREAS AND DUODENUM

The pancreas

The pancreatic duct

- The pancreatic duct begins in the tail of pancreas passes to the right through the body to the head of pancreas where it joins the common bile duct , the joining forms the hepatopancreatic ampulla . (Ampulla of Vater) which enters the descending (second) part of duodenum at the major duodenal papilla . Surrounding the ampulla is the sphincter of the papilla (sphincter of Oddi) which is a collection of smooth muscles.
- The accessory pancreatic duct empties into

the duodenum just above the major duodenal papilla at the minor duodenal papilla



Bile and pancreatic ducts

The pancreas

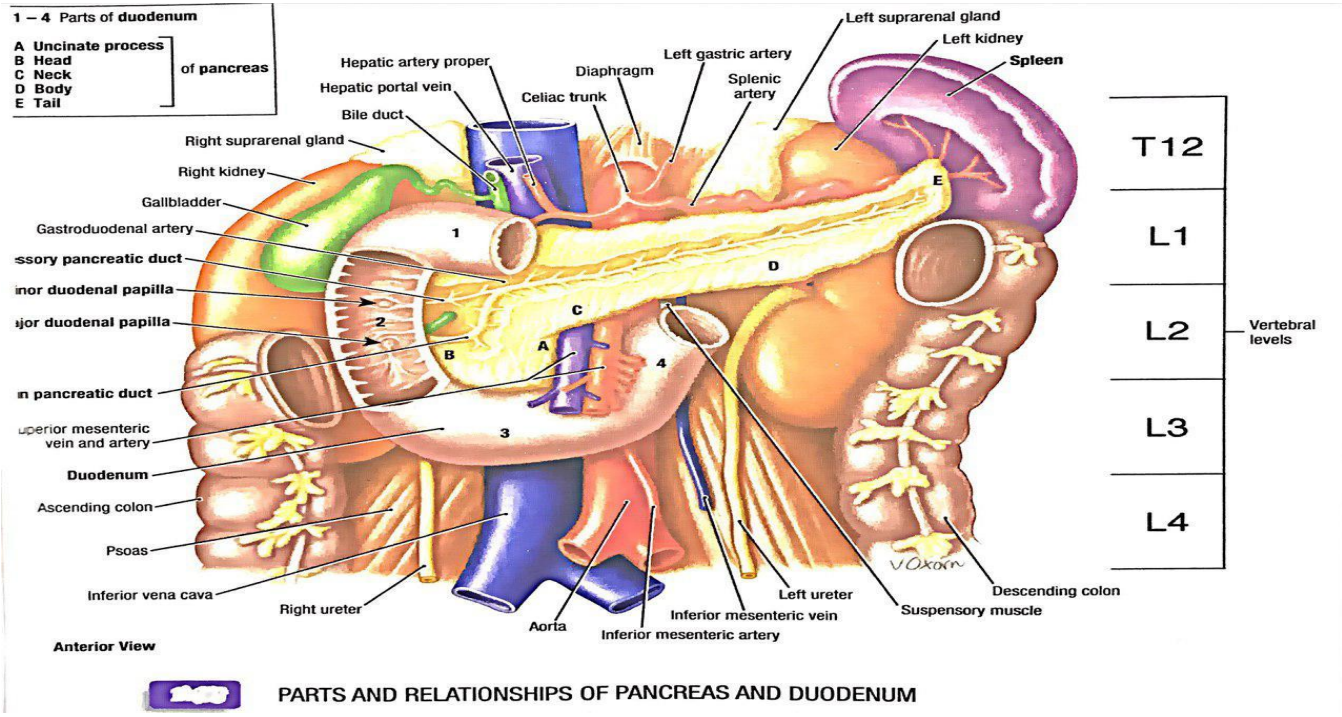
Relations of the pancreas

A. Anteriorly from right to left

1. Transverse colon
2. Attachment of the transverse mesocolon
3. The lesser sac
4. The stomach

B. Posteriorly from right to left :

1. The common bile duct
2. The portal and splenic veins
3. The inferior vena cava
4. The aorta
5. The origin of superior mesenteric artery
6. The left psoas muscle
7. The left suprarenal gland
8. The left kidney
9. The hilum of the spleen



The pancreas

functions of the pancreas

A. **The exocrine portion** of the gland produces a secretion that contains enzymes capable of hydrolyzing proteins , fats , and carbohydrate

B. **The endocrine portion of the gland**

The pancreatic islets (islets of Langerhans) produces the hormones (insulin) and (glucagon) which play a key role in carbohydrate metabolism

The pancreas

Arterial blood supply

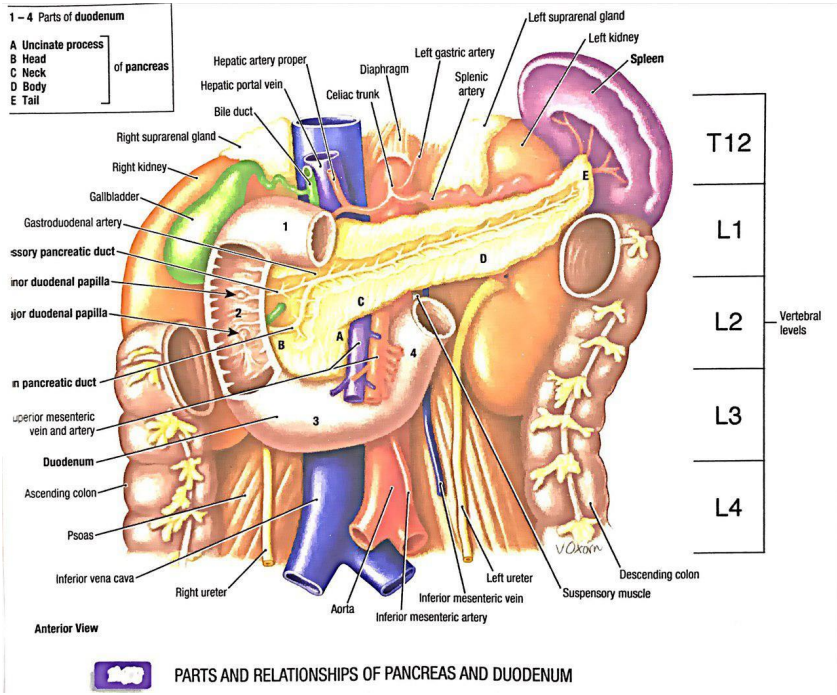
- Splenic artery
- Superior and inferior pancreatico-duodenal arteries

Venous drainage into portal vein

Lymphatic drainage to lymph nodes around the celiac and superior mesenteric arteries

Nerve supply

Sympathetic and parasympathetic (vagi) nerve fibers from the celiac plexus



PARTS AND RELATIONSHIPS OF PANCREAS AND DUODENUM

The liver

The liver is the largest gland in the body it is soft and pliable . It weighs about(1500 g)

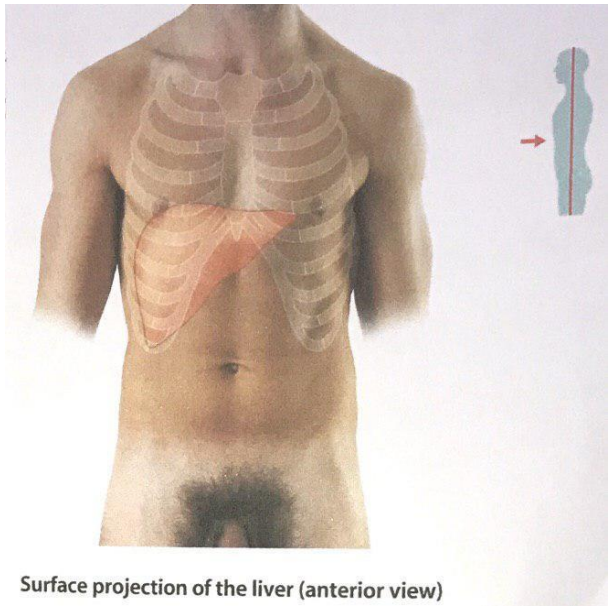
Site

- Liver occupies the upper part of the abdominal cavity just under the diaphragm .
- The greatest part of the liver is situated under cover of the right costal margin
- The right hemidiaphragm separates it from the :

pleura , lungs , pericardium and heart

- The liver extends to the left to reach the left

hemidiaphragm



Surface projection of the liver (anterior view)

The liver

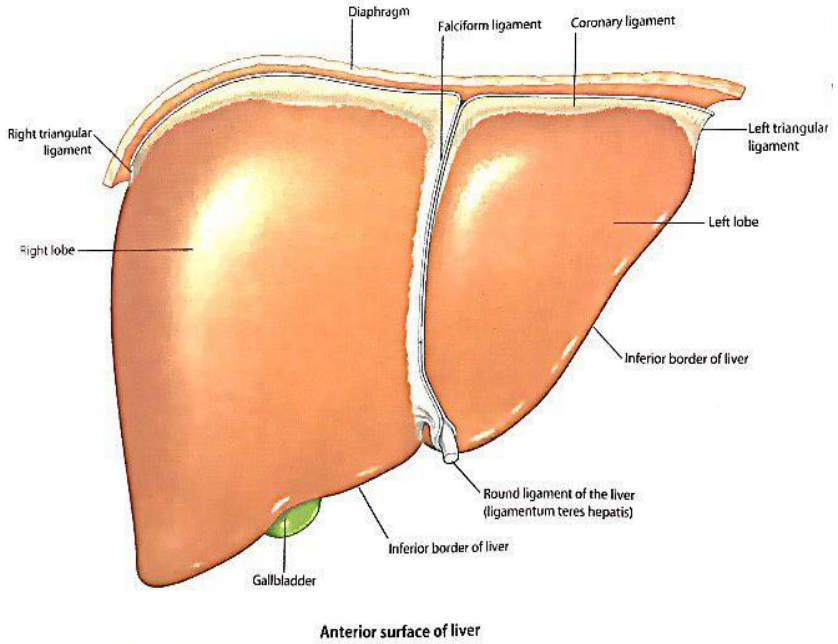
Surface of the liver (2 surfaces)

1. Diaphragmatic surface :

In the anterior , superior and posterior or direction

2. Visceral surface :

In the inferior direction



Anterior surface of liver

1. **<u>The diaphragmatic surface</u>**

- Is smooth and domed
- Lies against the inferior surface of the diaphragm
- Associated with it are

a. The subphrenic recess separates the surface from the diaphragm and is divided by the falciform ligament into right and left areas

b. The hepatorenal recess

On the right between the liver and the right kidney and right suprarenal gland

The liver

2. The visceral surface

Covered with visceral peritoneum , except the fossa for gallbladder , and the (porta hepatis). Structures related to this surface include

1. Esophagus
2. Right anterior part of the stomach
3. Superior part of the duodenum
4. Lesser omentum
5. Gallbladder
6. Right colic flexure
7. Right transverse colon
8. Right kidney
9. Right suprarenal gland

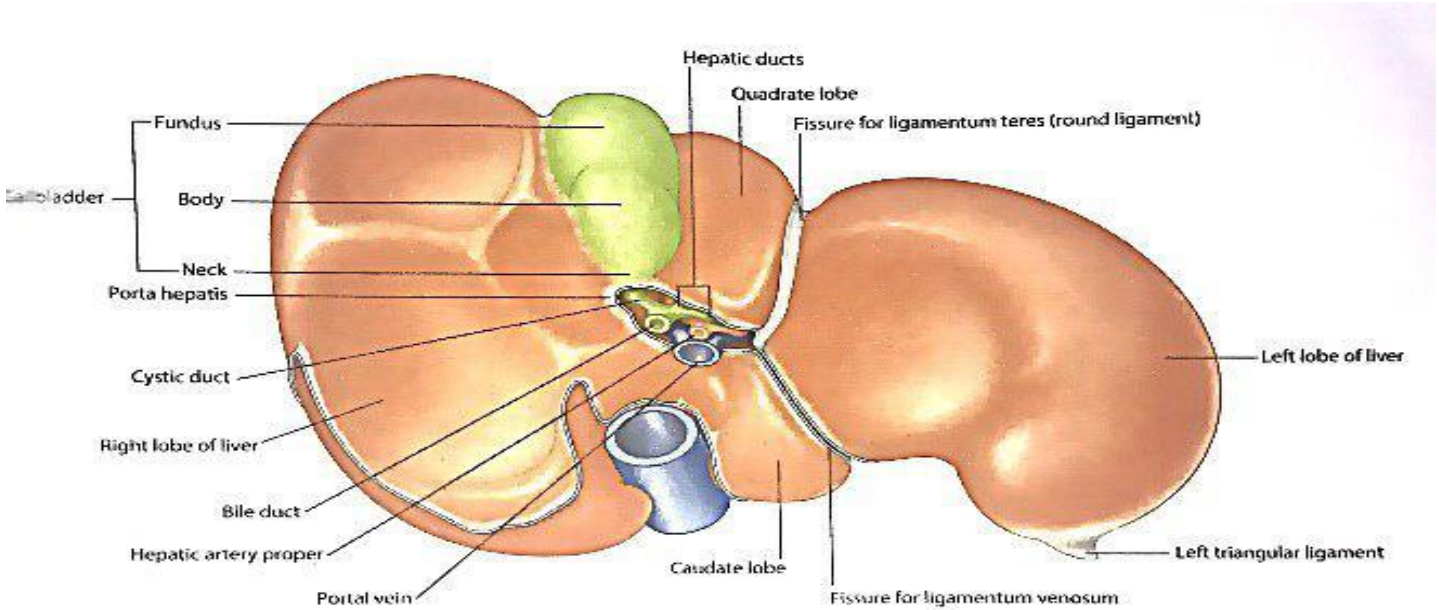
The porta hepatis serves as

A. Point of entry to the liver for :

1. Hepatic arteries
2. Portal vein

B. Exit point for

1. Hepatic duct
2. Lymphatics



Visceral surface of liver

The liver

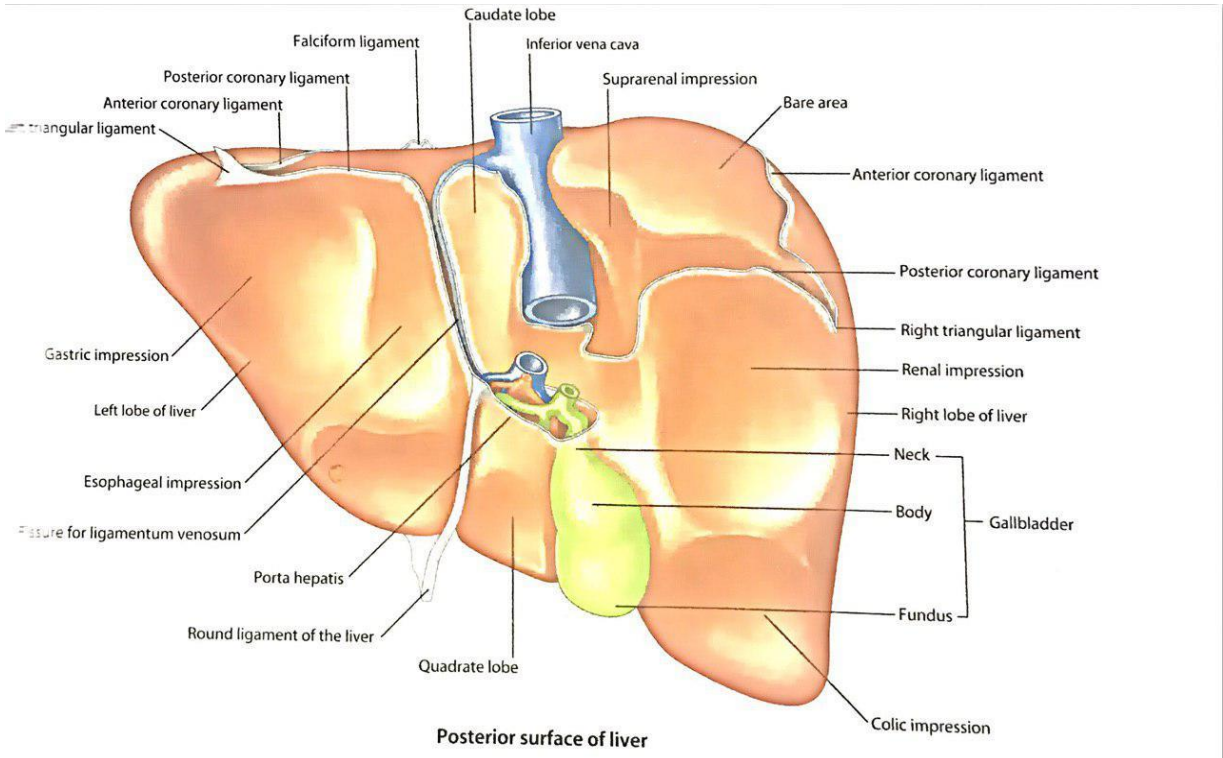
The liver is divided by fossae of gallbladder and inferior vena cava into :

1. Right lobe of liver
2. Left lobe of liver

The right lobe is larger than the left

- The(quadrate) and (caudate)

lobes arising from the right lobe of liver



Posterior surface of liver

The liver

Arterial blood supply:

Right and left hepatic arteries branches of the hepatic artery proper from the celiac trunk

- **The portal vein** carries poorly oxygenated blood from abdominopelvic portion of the digestive tract
- **Venous drainage**

Hepatic veins which open into the inferior vena cava just inferior to the diaphragm

- **Lymphatic drainage**

Lymphatics from porta hepatis drain into hepatic lymph nodes and then to celiac lymph nodes

- **Nerves of the liver**

From hepatic nerve plexus , which consist of sympathetic fibers from celiac plexus and parasympathetic fibers from the vagi

The liver
relationship of the liver

A. Anteriorly

1. Diaphragm
2. Right and left costal margins
3. Right and left pleurae
4. Lower margins of both lungs
5. Xiphoid process
6. Anterior abdominal wall in the subcostal angle

B. Posteriorly

1. Diaphragm
2. Right kidney
3. Right flexure of the colon
4. Duodenum
5. Gallbladder
6. Inferior vena cava
7. Esophagus
8. Fundus of the stomach

The liver
function of the liver

1. Involved in the metabolism of carbohydrates , proteins , and lipids
2. Production of bile (about one liter/day) which is released to the intestine via biliary passages. Bile is composed of
   a. Bile salts : breaks-up the fat droplets of food in the intestine
   b. Bilirubin (bile pigments): a waste product of hemoglobin (of RBC) breakdown
   c. Cholesterol
3. Storage of many vitamins(A,D,B12,K)
4. Synthesis of
   a. Enzymes
   b. Hormones
   c. Plasma proteins
   d. Prothrombin
   e. Fibrinogen
   f. Factors necessary for blood clotting
5. Storage of minerals
6. Removing harmful chemicals and foreign substances from the body
7. Certain cells of liver[kupffer cells] remove bacteria and foreign matter from the blood that gained entrance from lumen of intestine

Gallbladder and biliary passages
the gallbladder

Is pear-shaped (7-10 cm) long.

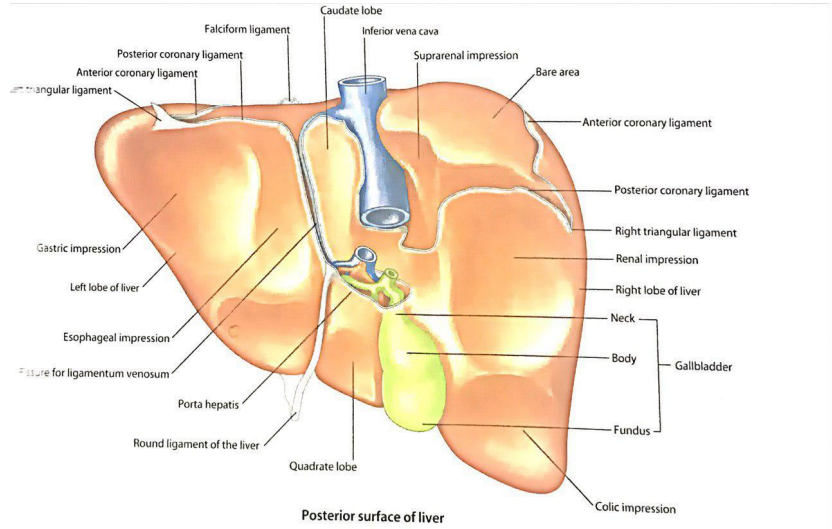
Site:

Lies in the gallbladder fossa , on the visceral surface of the liver

- Peritoneum surrounds the fundus of the gallbladder completely and binds its body and neck to the liver
- Its hepatic surface of the fibrous capsule of the liver

Function of the gallbladder

1. Reception of the bile from the liver
2. Storage of bile (has a capacity of about 30 ml)
3. Concentration of bile by absorbing water and salts



Posterior surface of liver

the gallbladder

Parts of the gallbladder

1. The funds

- The wide end , projects from the inferior border of the liver
- Usually located at the tip of the right ninth costal cartilage

in the midclavicular line

2. The body

- Contacts the visceral surface of the liver , the transverse

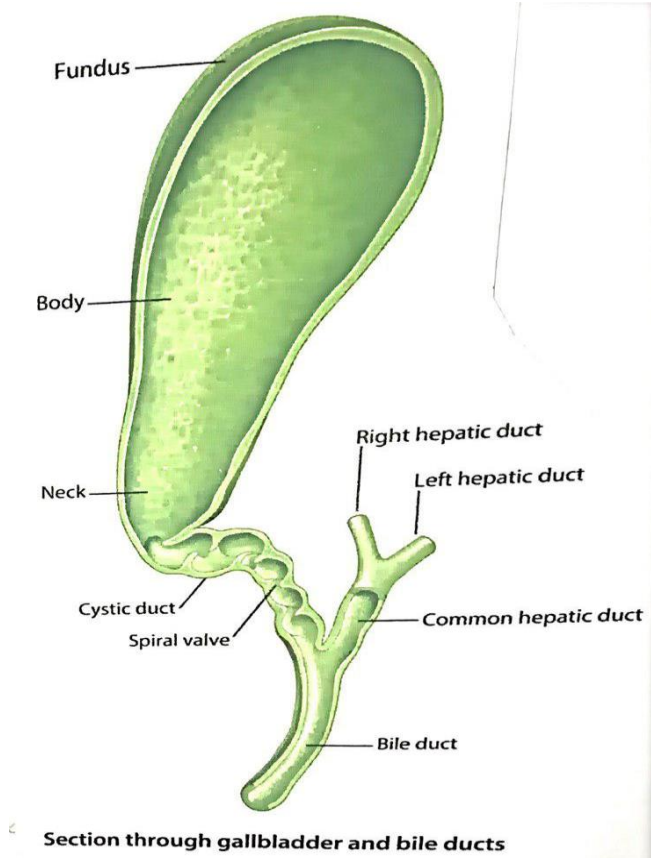
colon , and superior part of duodenum

3. **The neck**

- Is a narrow , tapered , and directed toward the

porta hepatis

- The neck makes an s-shaped bent and joins the cystic duct
- Internally , the mucosa of the neck spirals into a spiral fold(spiral valve)



Section through gallbladder and bile ducts

the gallbladder

Relations of the gallbladder

A. Anteriorly

1. Anterior abdominal wall
2. Inferior surface of the liver

B. Posteriorly

1. The transverse colon
2. The superior and descending parts of the duodenum

Hormonal control of the gallbladder

The gallbladder contracts in response to the hormone (cholecystokinin) which is produced by the mucous membrane of duodenum when food from the stomach is emtied, especially fatty food

The biliary passages

1. The right and left hepatic ducts

Drain the right and left lobes of the liver respectively , emerge from the liver at the porta hepatis .

2. The common hepatic duct

Which is formed by union of the right and left hepatic ducts shortly after leaving the porta hepatis

3. The cystic ducts

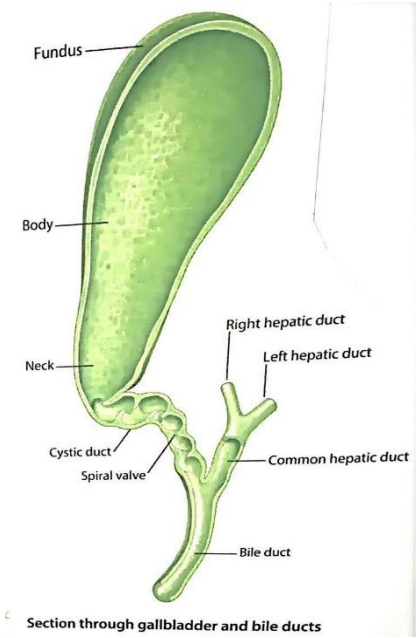
Join the common hepatic duct on its right side to form :

4. The bile duct

[formerly called : common bile duct (CBD)]

- It is formed at the free edge of the lesser omentum
- Descends posterior to the superior part of the duodenum
- Lies in a groove on the posterior surface of the head of pancreas

- It comes into contact with the main pancreatic duct on the left side of the descending part of the duodenum
- The two ducts run obliquely through the wall of this part of the duodenum , where they unite to form the hepatopancreatic ampulla (Ampulla of Vater)
- And open in the duodenum through the major duodenal papilla which is surrounded by sphinctor of Oddi



Section through gallbladder and bile ducts

THANKS