

## UNIT - 3

### Digestive System :-

The digestive system is made up The Gastro Intestinal tract (GI tract)

the digestive system includes The mouth, Pharynx, Esophagus, Stomach, small Intestine, Large Intestine, Rectum and Anus.

It also include The salivary glands, Liver, Gallbladder and pancreas with which make digestive Juice and Enzymes that help the body digest food.

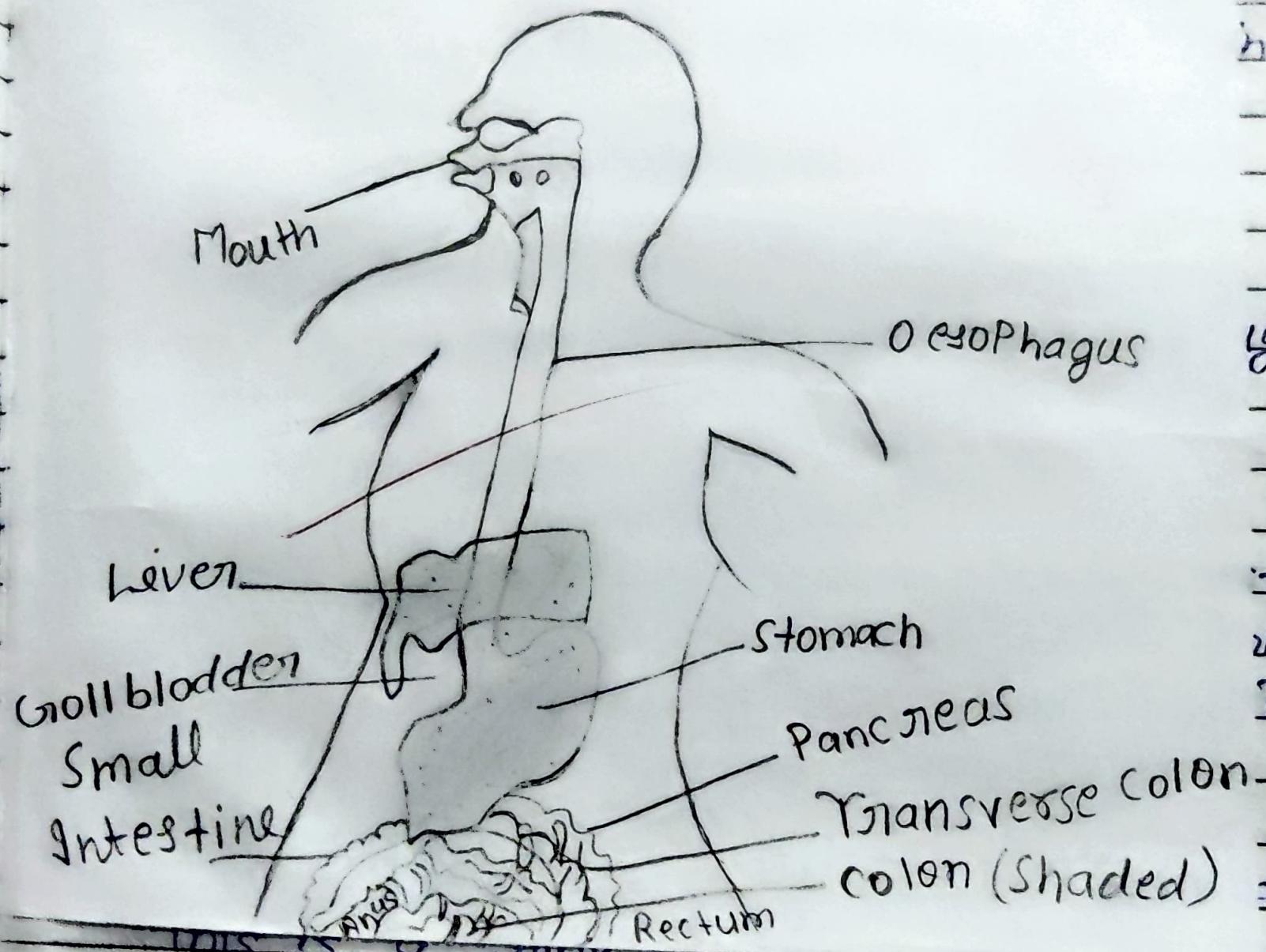
The digestive system break down food into nutrients such as Carbohydrates, fat and Protein.

They can then be absorb into the blood so the body can use them for energy growth and repair.

Here How it work:-

The activity of digestive system can be follow under The five main process -

1. Ingestion :- This is The taking of food into The alimentary tract.



e.g. → Eating and Drinking.

2. Propulsion: This mix and move and carry along the alimentary tract.

3. Digestion:-

This consist of mechanical breakdown of food by the chewing. chemical digestion of food into small molecules by enzymes present in secretion produce by glands.

4. Absorption:-

This is the process by which digestive food content pass through tract into the blood from circulation and use by body cell.

5. Elimination:- The passes of undigested food or unnecessary material out of the digestion tract and into the environment.

Alimentary Canal:-

It also known as GI tract.

This is a long tube through which food passes. It is starting from mouth and the last part of the anus. It around 5 meter long. Various organ involve and perform different function.

The part of Alimentary Canal -

1. Mouth

2. Stomach

3. Oesophagus
4. Stomach
5. Small intestine
6. Large intestine
7. Rectum
8. Anus

Helping organ  $\hat{=}$  Various secretion  
 of reduced into the  
Alimentary Alimentary canal by the  
 gland. They consist of -

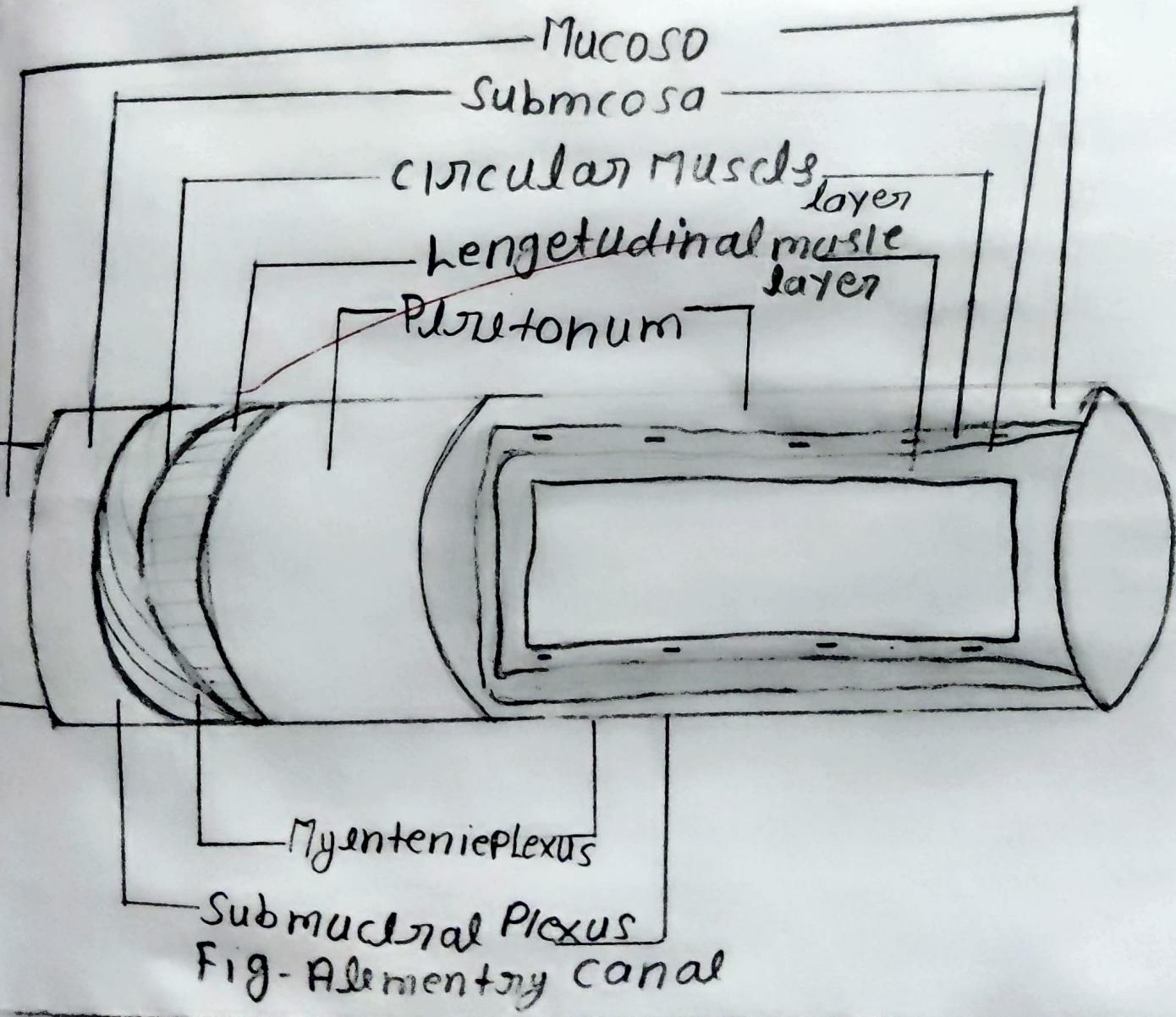
- (1) Three (3) Pair of salivary gland
- (2) The Pancreas
- (3) The liver and Gallbladder

Organ of the digestive system  $\hat{=}$

Alimentary canal / Gastro Intestinal tract

Also Known as The Gastro Intestinal tract and G.I. tract. This is essentially a long tube through food process. It commences at the mouth and terminates at the Anus and the various organ along its length different function although structures vary they are remarkably similar. The parts are

- (1) Mouth
- (2) Pharynx
- (3) Oesophagus
- (4) Stomach
- (5) Small intestine
- (6) Large intestine
- (7) Rectum and Anal canal



Accessory Organ  $\Rightarrow$  Various organ secretion are produced into the alimentary tract some by glands in the lining membrane of the organs. Gastric juice is secreted by glands in the lining of the stomach and some glands situated outside the tract. The latter are necessary organ of digestion and their secretion passing through to enter the tract.

They consist of -

- 1- 3 pairs of salivary glands
- 2- The pancreas
- 3- The liver and Biliary tract

### Basic Structure of Alimentary canal:

This layer of the walls the alimentary canal flowing constant written from the Oesophagus on words.

This basic structure does not apply so obviously to the mouth and Pharynx which are considered in the organs from the Oesophagus on words modification of structure which are associated specific function -

The wall of are form by 4 layers of tissue -

1- Serosa - It is outer covering and

outer most layer.

In The thorax its consist of loose connective tissue and organ covered by serous membrane.

The other name are called by peritoneum and Adventitia

Peritoneum:

2- Muscular layer or Muscle layer :-

Some exceptions this consist two layer of smooth muscles -

- ① Sub - Mucosa
- ② Mucosa

① Sub - Mucosa :- This layer of loose areolar connective tissue containing collagen and smooth almost fiber.

② Mucosa :-

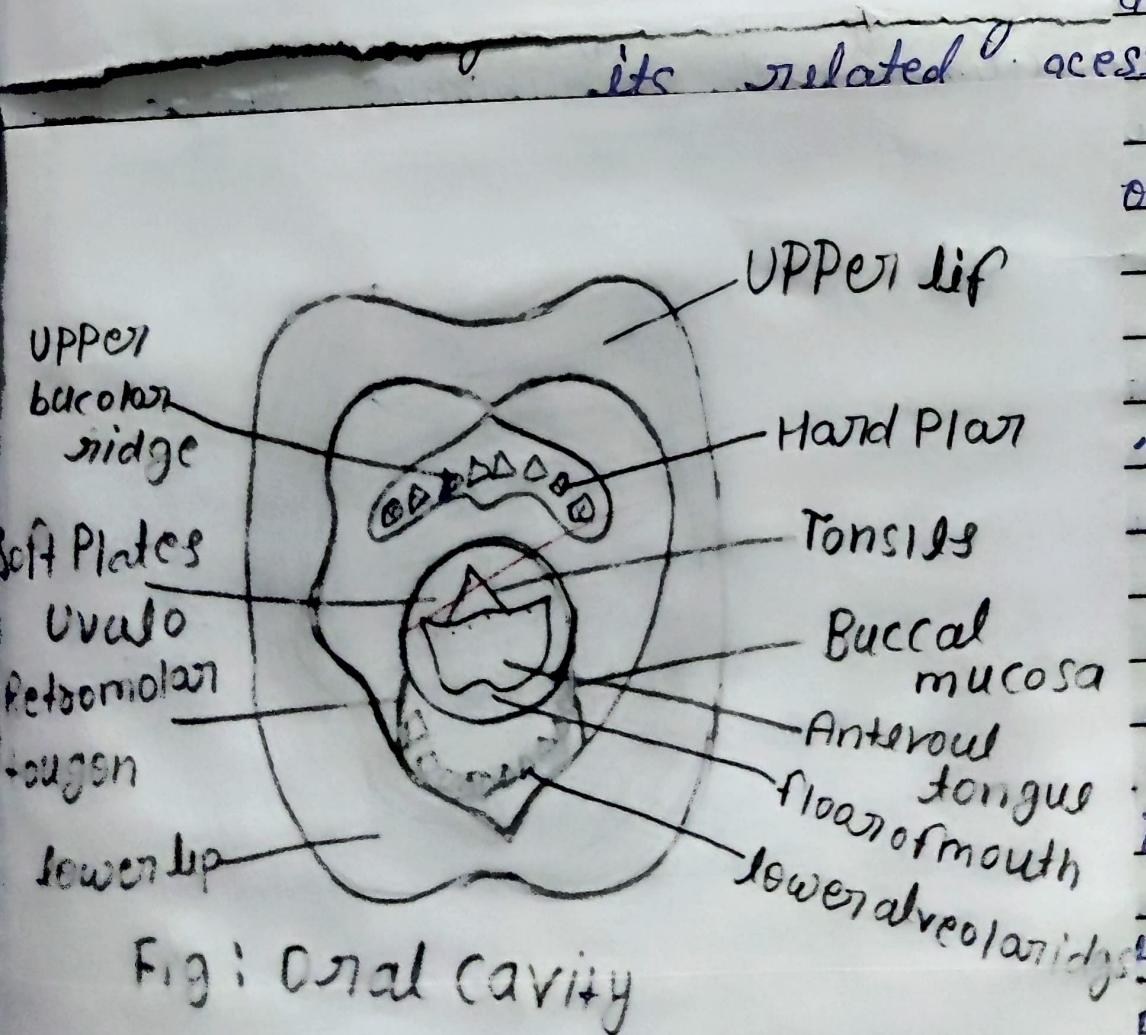
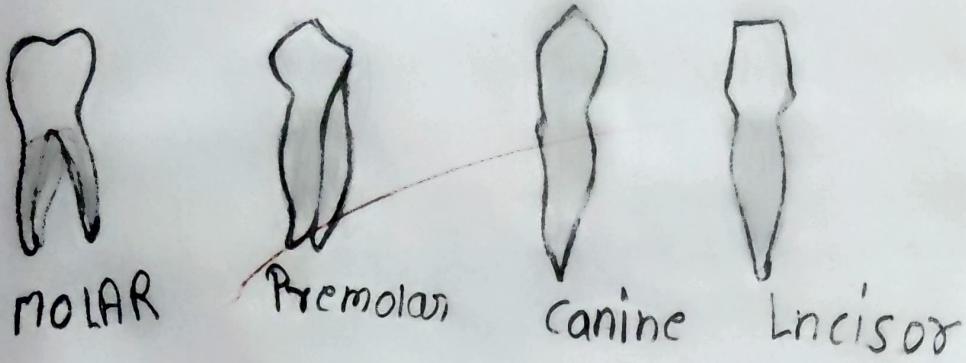
this consist of Three layer of tissue

1- Mucous membrane form by calaminar epithelium is The intermost layer

function :- ① Protection ② Secretion

absorption :- ③ Absorption

Lamina propria :- consisting of loose connective tissue which supports the blood vessels that the inner epithelial layer.



Muscularis Mucosa :- A thin layer of smooth muscles to provides innervation mucosal layer.

Mucous Membrane :- In parts of the tract that are subject to great wear and tear of mechanical injury, this layer consists of stratified squamous epithelium with mucous secreting gland just below the surface.

Nerve supply :- The alimentary canal and its related accessory organs are supplied by nerve from both divisions of the Autonomic nerve system.

Mouth :-

The mouth or oral cavity is bounded by muscles and bone.

Anteriorly :- By the lips.

Posteriorly :- It is continuous with the oesophagus.

Laterally :- By the muscles of the cheek.

Superiorly :- By the bony hard palate and muscular soft palate.

Inferiorly :- By The muscular ten  
at The soft tissue  
of The floor of The mouth.

Tongue :- The tongue is composed  
of involuntary muscles.  
It is attached by its base  
to The hyoid bone and by a  
fold of its mucous membrane  
covering to The floor of The  
mouth The superior surface  
consist of stratified scumus  
epithelium with numerous tissue that  
for sence of taste.

Blood supply :-

External artery and  
external jugular vein.

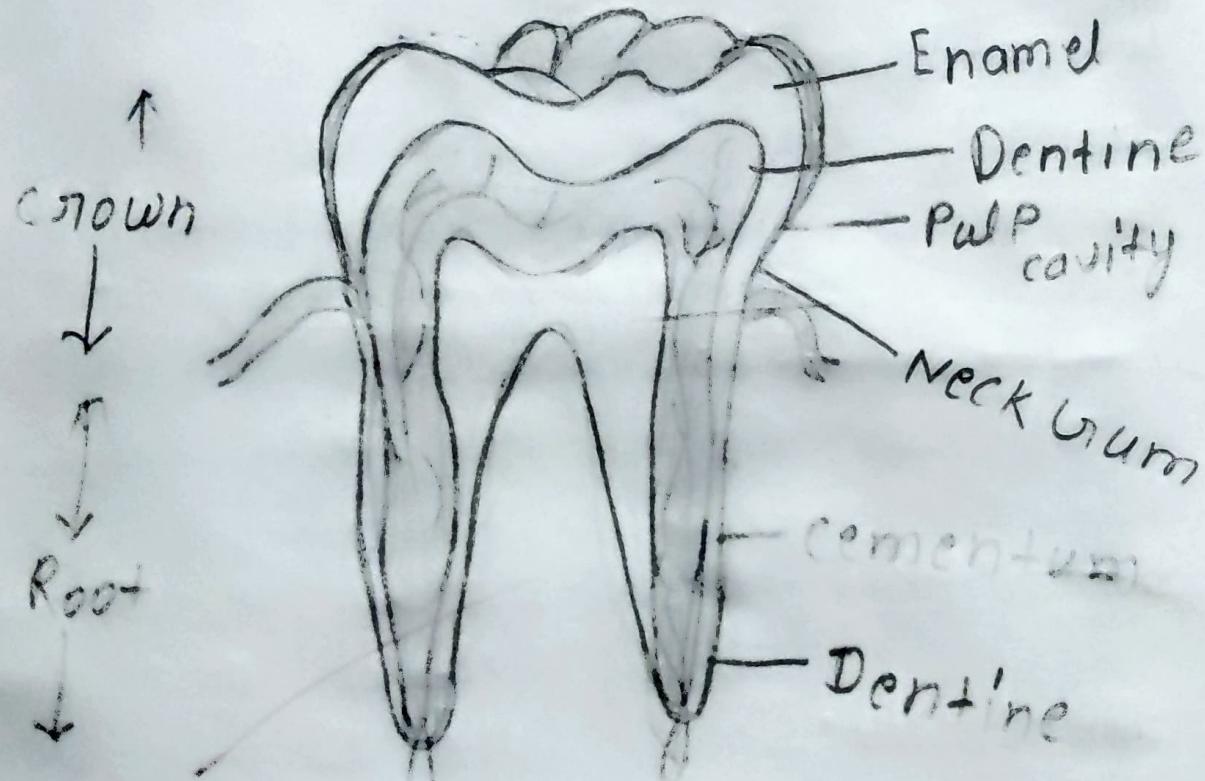
Function :-

the tongue play an important  
part in -

- (i) chewing
- (ii) swallowing
- (iii) speech
- (iv) Taste

✓ Teeth :- The teeth are imbeded in The  
alveolar ridge of all sockets of The alveolar  
ridge of The mandible and maxilla.

# Section of a teeth



Bodies are born with two sets -  
Temporary and Permanently teeth.

There are 20 temporary teeth of the body.  
Then in each jaw.

The begin to erupt at about 6 month of age. Should be present by 18 month.

The permanent teeth begin to replace of temporary teeth b/w the age of 6 and 13 years.

This Dentition consisting of 32 teeth is usually complete by the age of 20.

The third molar all the loss to erupt.

Structure of Teeth :- All thought the shape of different teeth very

The structure is the same and consist of-

1- The crown :- → the part that produce from the gum.

2- The Root :- The part imbedded in the bone.

### Deciduous Teeth and Permanent Teeth :-

Jaw	Molars	Premolars	canine	Incisors
Temporary Teeth				
UPPER →	2	-	1	2

	Molars	Premolars	Canines	Incisors	
Lower →	2	-	1	2	
Permanent Teeth:					
Upper →	3	2	1	2	
Lower →	3	2	1	2	
"	2	1	-	2	
"	2	1	-	2	
"	2	1	2	3	
"	2	1	2	3	

the Neck : the narrow region where the crown meets with the root.

Blood Supply : the teeth get a blood supply by the branches of maxillary artery.

Nerve Supply : that is branches of maxillary Nerve.

Salivary Gland : Salivary gland release their secretions in to ducts that lead in to the mouth.

their are three main pairs.

Parotid glands : there are situated one on each side of the face below the external acoustic meatus. Each gland has a parotid duct opening into the mouth to the level of the second upper molar tooth.

Submandibular gland → these lie one on each side of the face under the angle of the jaw the two submandibular ducts open on the floor of the mouth one on each side of the frenulum of the tongue.

Sublingual glands : these glands lie under the mucous membrane of the floor of the mouth in front of the submandibular glands.

Composition of saliva → Saliva is the combined secretions from the salivary glands and of the small mucus-secreting glands of the oral mucosa. About 1.5 liters of saliva is produced daily and it consists of:

- Water
- Mineral salts
- Salivary amylase a digestive enzyme.

Mucus:

Antimicrobial substances:

### Functions of Saliva :-

- 1- Chemical digestion of polysaccharides
- 2- Lubrication of food.
- 3- Cleaning and lubrication of the mouth.
- 4- Non-specific defence.

Pharynx :- the Pharynx is divided for descriptive purpose into three parts :

- 1- the nasopharynx
- 2- Ozo pharynx
- 3- laryngo pharynx

Blood supply :- the blood supply to the pharynx is by several branches of the facial arteries.

### Oesophagus :-

the Oesophagus is about 25 cm long and about 2 cm in diameter. It lies in the median plane in the thorax in front of the vertebral column and behind the trachea and the heart. It is continuous with the Pharynx above and just below the diaphragm.

Structure of Oesophagus → therefore of tissue has shown in Oesophagus it's almost there are four layer of tissue as shown in Oesophagus it's almost internally in thorax outer covering the Adveteth consist of Allostic fiber tissue that attach the Oesophagus.

Blood Supply → Arterial the Thoracic region is supplied mainly by the pair of Oesophageal Artery.

Function of the Oesophagus : Mouth and pharynx

(1) Formation of Balus

2. Swallowing.

(i) Oral stage (ii) Pharyngeal stage

(iii) Oesophageal stage.

Stomach → Stomach is a J-shaped dilated portion of the alimentary tract situated in the Epigastric, Amlical and left hypochondriac region of the abdominal cavity.

Organ associated with the Organ →

1- Anterior :- Left lobe of liver and Anterior abdominal wall.

2- Posterior :-

Abdominal Aorta, spleen, left kidney and Adrenal gland.

3- Superior :- Diaphragm, Oesophagus, left lobe of liver.

4- Inferior :- Transverse column and small intestine to the left splur and diaphragm.

Right side :- Liver duodenum.

Structure of Stomach :- the stomach is continuous with the Oesophagus.

At the cardiac sphincter.

the duodenum at the pyloric

Sphincter. It have two curvature.

the hasure curvature is short lies on posterior surface of the stomach and is downward

condition and just before pyloric sphincter that is a greater and in the stomach is divided

into three region. ① the Fundous.

② the body and the pyloric and the digital end of Pyloric.

Wall of the stomach :- the four layers of tissue it complete the structure of the alimentary canal are the found stomach but with some modification -

1- Muscle layer :- this is consist of three layers of smooth muscles fibers -

- (i) Outer layer of the longitudinal fibers.
- (ii) A middle layer of Circular fibers.
- (iii) And inner layer of Oblique fibers.

Blood Supply :-

Arterial supply to the stomach is by the gastric artery. It is a branch of coeliac Artery.

Gastric juice and Function of the Stomach :-

Stomach size of the various with the balloon of food. It contains which may by 1.5 lit are more than an in adult.

when a meal has been inter the food in the stomach dilated.

Gastric juice :- About 2 liters of gastric juice secreted daily by specialized secretary gland in the mucosa. It consists of-

- Mucus secreted by mucous neck cell in the gland.
- Water mineral or salt.
- Hydrochloric acid.

### Function of Gastric juice →

- ① Hydrochloric acid (HCl)
- ② Incentive factor
- ③ Mucus prevent for any injury.

### Function of the Stomach →

(1) Temporary Storage → allowing time for digestive enzyme pepsins to act as-

(1) chemical digestive → Pepsin break proteins into polypeptides.

2. Mechanical break down

3- limited absorption → water, Alcohol and some Lipids and soluble ducts.

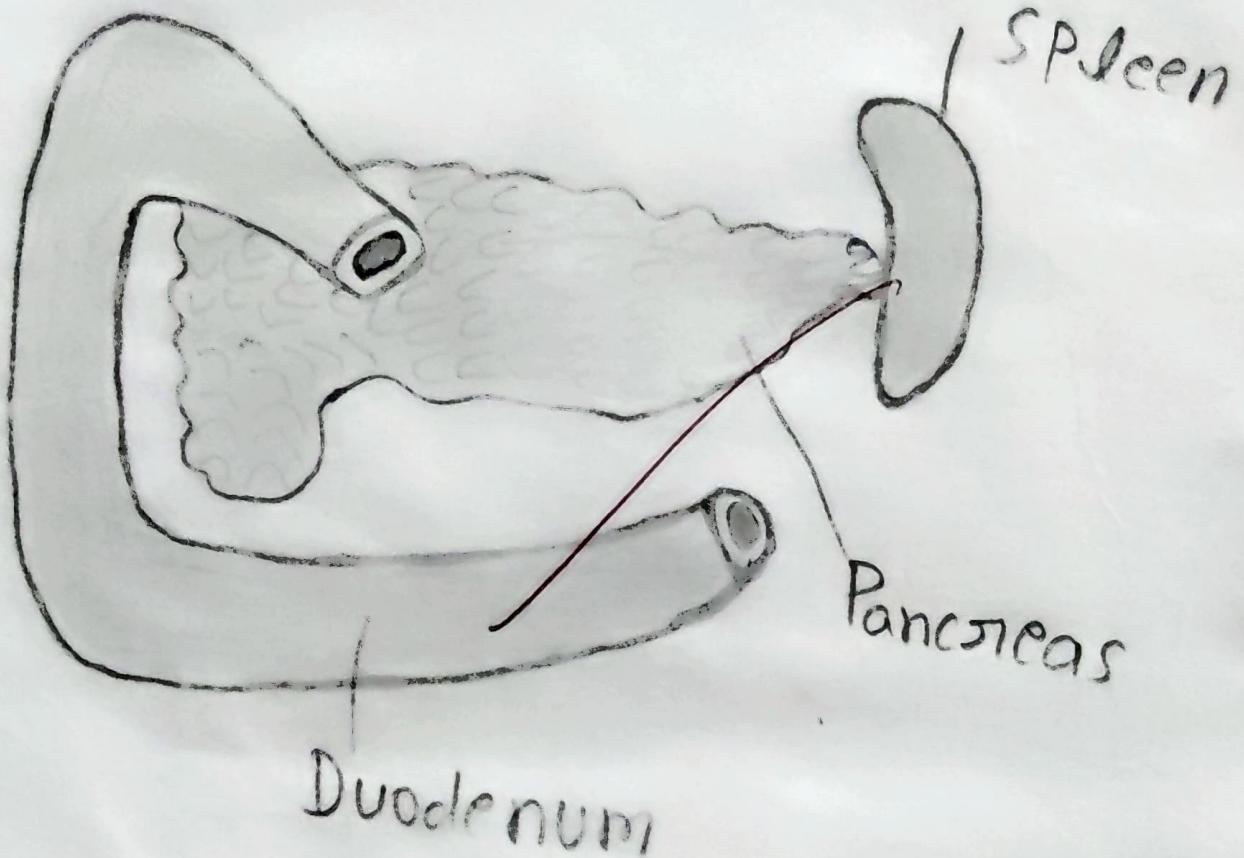


Fig - Position of Pancreas

# Pancreas →

the pancreas is a grey colour gland weighting about 60 gm.

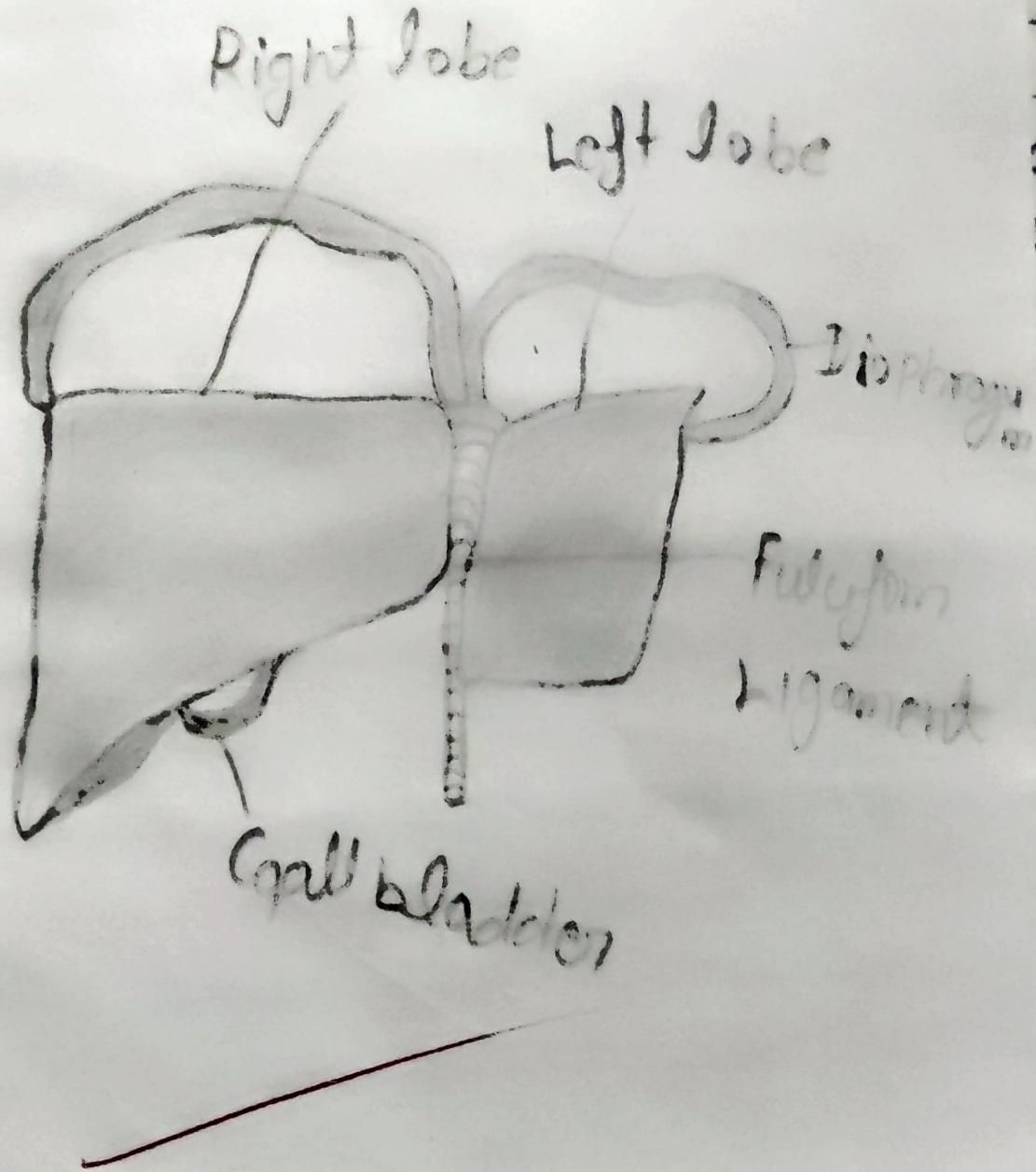
It is 12-15 cm long and situated in the epigastric and hypochondriac regions of the abdominal cavity.

It consists of head a body and a narrow tail. the head lies in the curve of duodenum the body behind the and the tail lies in front of left kidney and just reaches spleen. the abdominal aorta lies behind the gland.

the pancreas is both exocrine and endocrine gland.

## 1) the Exocrine Pancreas →

the consists of a large number of lobules made up of small acini the of which consist of secretory cells. It is consist of pancreatic juice containing enzymes some in the form of inactive precursors the digest carbohydrates, proteins and fats.



## 2) the Endocrine pancreas →

Distributed  
throughout the gland are groups of  
specialized cells called the  
pancreatic islets (of Langerhans)  
the islets have no ducts so the  
hormones:

diffuse directly in the blood: the  
endocrine pancreas 'the hormones  
Insulin and Cytocagon which are  
control blood glucose level.'

## Blood Supply →

Splenic and Mesenteric  
Artery supply blood to pancreas'

## Liver

~~Liver is the largest gland in the body  
weighting about between 1 and 2.3 Kg.  
It is situated in the upper part  
of the Abdominal cavity occupying the  
greater part of the Right Hypochondriac  
Region. Part of the Epigastric region.  
the liver is cone - shape~~

## Organ associated with the Liver →

1) Superiorly and Inferiorly → Diaphragm

and Anterior abdominal wall.

2) Inferiorly → Stomach, bile ducts,  
duodenum, hepatic  
flexure of the colon.  
Right kidney and adrenal  
gland.

(iii) Posteriorly →

Esophagus, inferior vena  
cava, Aorta, gall bladder, vertebral  
column and diaphragm.

Laterally → Lower ribs and diaphragm.

Blood Supply →

Hepatic Artery gives  
blood to the liver and portal vein  
takes blood from the liver.

function of Liver →

- 1) Carbohydrate Metabolism.
- 2- Fat Metabolism.
- 3- Protein Metabolism.
- A-4- Detoxification of Amino acid.
- B-5- Transaminations.
- 6- Synthesis of plasma protein.
- 7- Break down of Erythrocytes and defence against microbes.

- 5. Drugs and Toxic substance
- 6. Production of heat
- 7. Secretion of bile
- 8. Composition of bile 500 ml and 1000 ml of bile secretion

† Bile consist of water mineral salt,  
Mucosa :

2. Bile pigments - Mainly bilirubin  
~~Conjugation~~

### Sensory Organ

the skin →

~~the skin is completely covered  
the body and is continuous with the  
membrane lining the body and its-~~

- (i) Protect the injury nerves ending at infections etc.
- (ii) contain the sensory nerve ending that known about pain and temperature.

Structure of skin → the skin is the largest organ in the body and has a surface area of about  $1.5 - 2 \text{ m}^2$  long in adult. In certain accessory structures glands, hair and Nails.

there are two main layer -

(1) the epidermis which covered the skin which course the base b/w the skin and structure is a subcutaneous are composed of -

• Epidermis → Epidermis is the outer most layer of the skin formed the waterproof protective wrap over the body surface which also serve as barriers to infection - the epidermis contains no blood vessels and cells in the deepest layer nourished.

the main type of cells which make up the epidermis are keratinocytes and melanocytes cells and miracle cells.

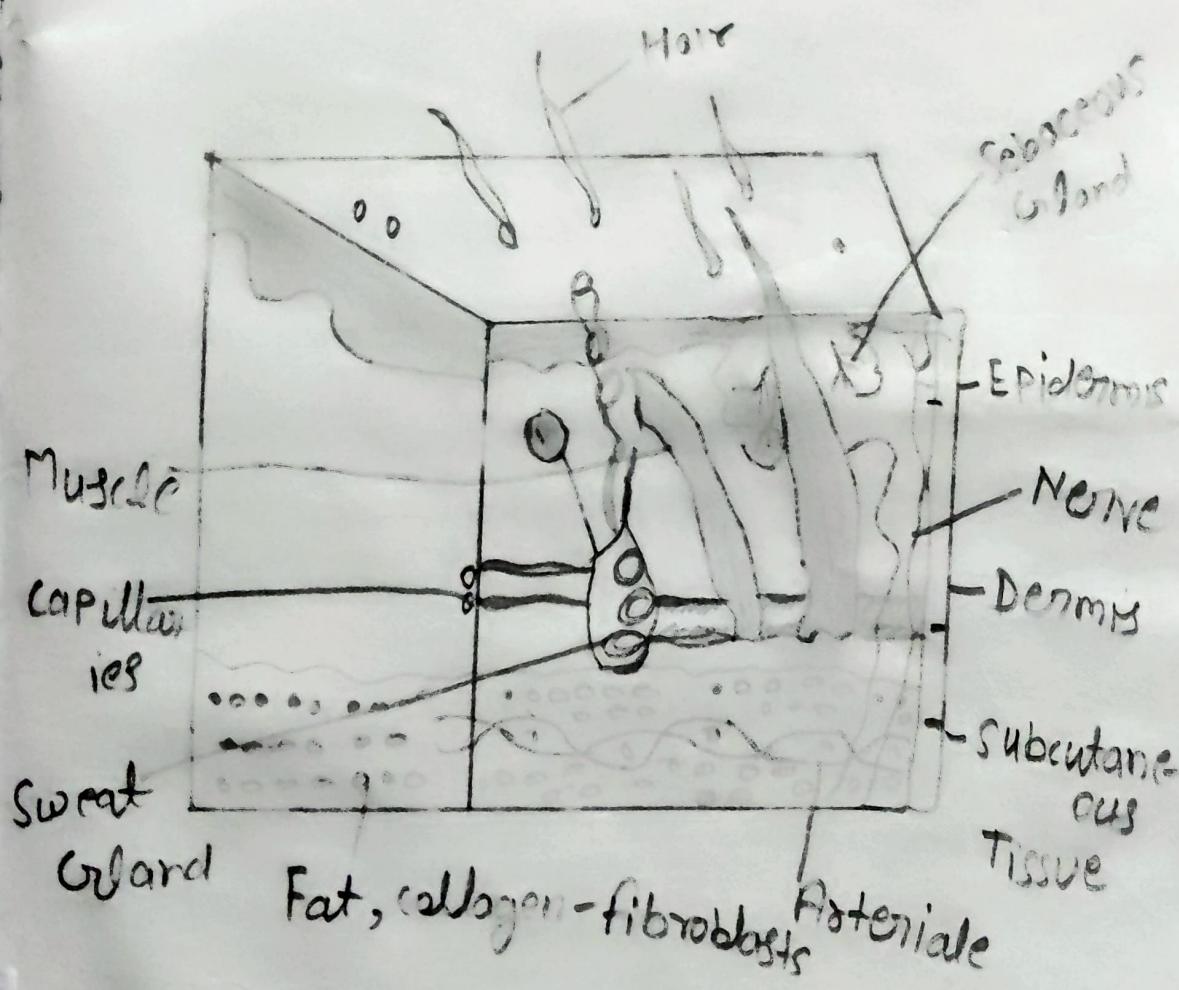
the epidermis helps the skin to regulate body temperature.

Dermis →

The dermis is the layer of skin the epidermis that consist of epithelial tissue and the body project from stress and strain the structure of the dermis are -

- (1) Blood and lymph vessels
- 2- Sensory nerve endings
- 3- Sweat gland and their ducts.
- 4- Hair. Erector pili muscles and sebaceous.

# The SKin



Blood and lymph vessels → Arterioles  
from the fine network with capillaries branches supply sweat gland hair follicle and the dermis lymph vessels from a network through out the dermis

Sensory and Nerve endings → the dermis layer found sensory specialized sensory nerve ending parts.

Sensory Receptors - Stimulus

Meissner's corpuscle - Light pressure

Free nerve ending - Pain

Sweat gland → these are widely distributed

through out the skin and are most numerous in the palms of the hands. They are formed from epithelial cell.

there are two type of sweat gland: eccrine gland: this gland play important role of sexual pattern.

Apocrine gland →

Open into the hair follicle and active and pituitary gland.

Nails → Human Nails are equivalent to the like the horns of Animals that is removal part and Autoremoval.

function of skin →

(1) Protection → the skin protect to the body from microorganism chemical physical agents and dehydration.

2. Regulate of Body temperature →

1- Body temperature remains constant amount 98.6 F 1h Calcius 37°C.

2- A wide range of environmental temperature.

3- Heat protection

4- Heat Loss

5- Activity of sweat gland.

6- Regulation of blood flow through the skin.

7- Control of body temperature.

8- fever, Hypothalamia and Hyperthalamia.



- Formation of vitamin D
- Absorption, excretion, wound healing

Eye →

The Eye is a specialized sense organ that helps to understand our environment. It is a unit composed of 3 parts: Receptors, sensory pathway and a brain center.

- It is a special in shape.
- It is about 2.5 cm in diameter.
- Situated in the orbital cavity.

Accessory organ and Eye protection:

Orbital Cavity →

(Bone sockets) house and protect the eye.

Adipose tissue → cushions the eye.

Lacrimal glands → produce tears that have a germicidal effect.

Eye brows → protect again foreign body eye micro organism to direct eye contact.

Eyelashes → secrete oils that prevent lids.