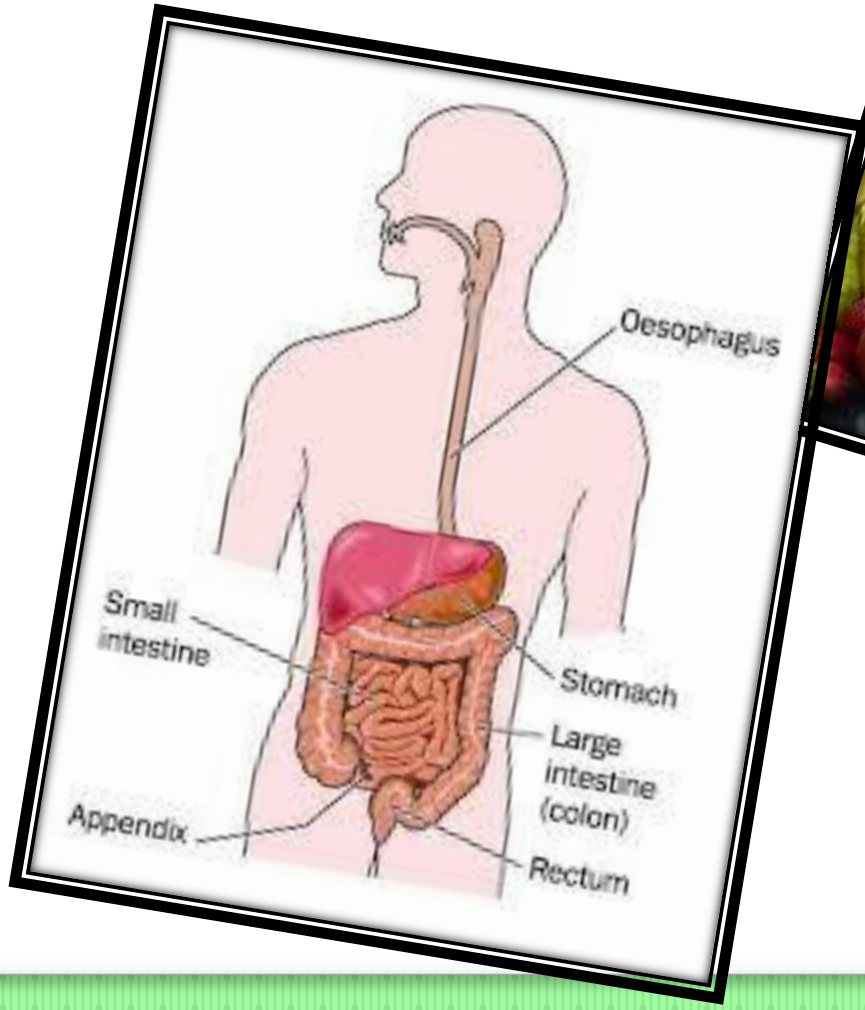
# Human nutrition




Biology = bio + logy
Bio= life logy = life
It is the study of life .

Life = living organism = plants , animal
Animal =human = organism = organ system =organ =tissue =cells
Hence cell is called basic fundamental structural and functional unit of life

Cell is made up of =1.cell membrane
2. cytoplasm
3.cell organelles.
For survival of life requires constant supply of energy
Energy is obtained from 2 process . 1.nutrition
2. respiration

# nutrition

It is the sum total of all processes through which
-food is taken in ( ingestion )
-digested ( digestion )
-absorbed ( absorption )
-utilised ( assimilation )
-The undigested matter is eliminated outside the body
( egestion / defecation )

1.Nutrition is the sum of the processes by which an organism consumes and utilises food substance

2.WHO defines nutrition as the intake of food ,considered in relation to the body's dietary needs.

3.The term nutrition includes the process like ingestion ,digestion, absorption, assimilation , egestion.

# INGESTION

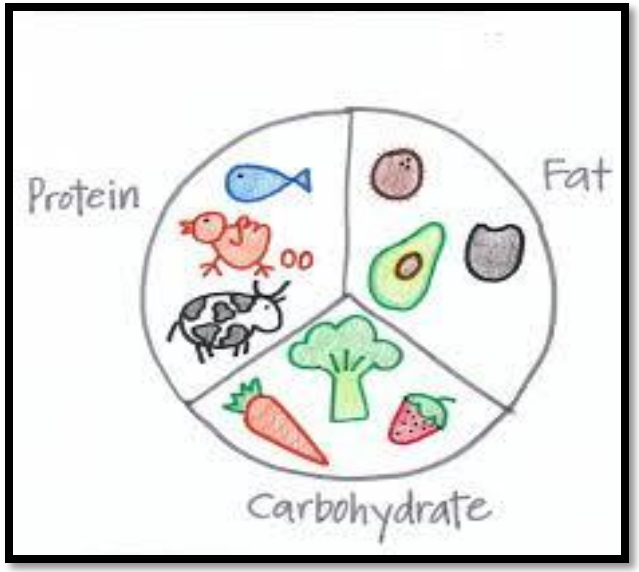
Taking food inside the body

# digestion

Complex
Non-diffusible
Non-absorbable

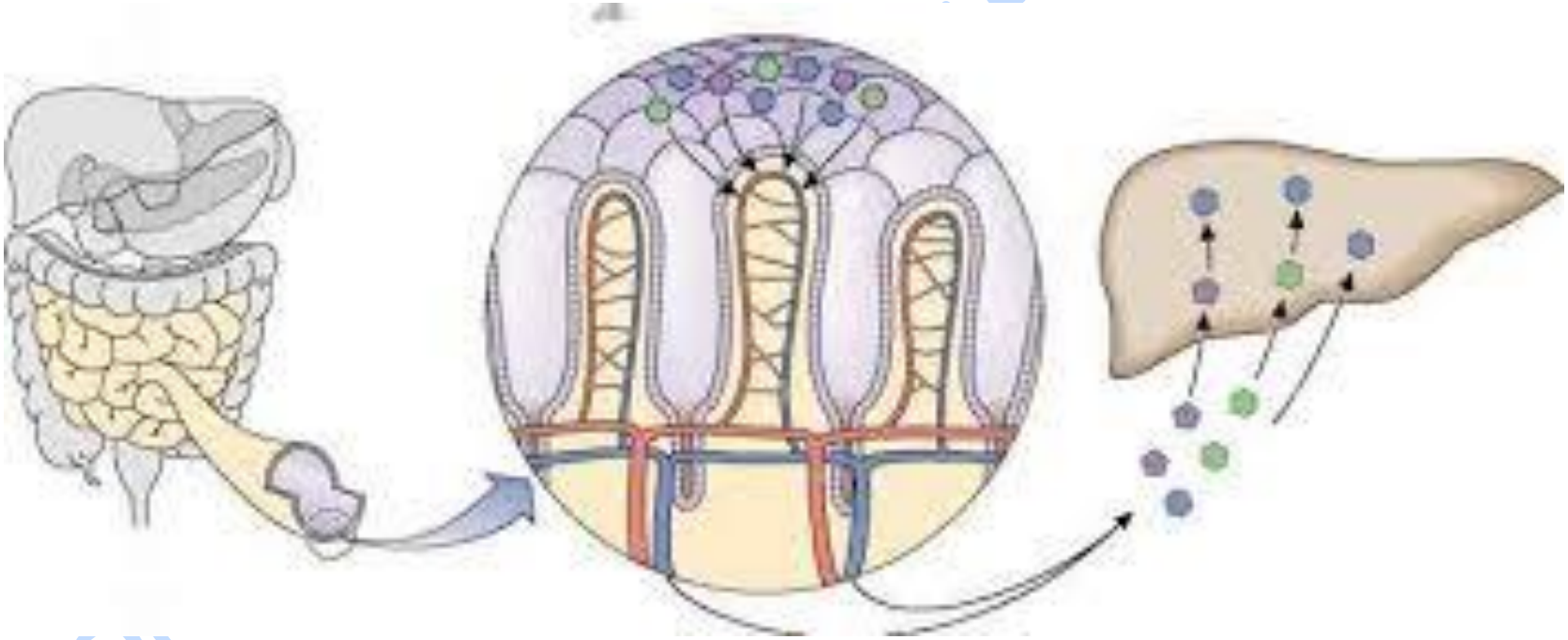
*Conversion by enzymes* →

simple
diffusible
absorbable



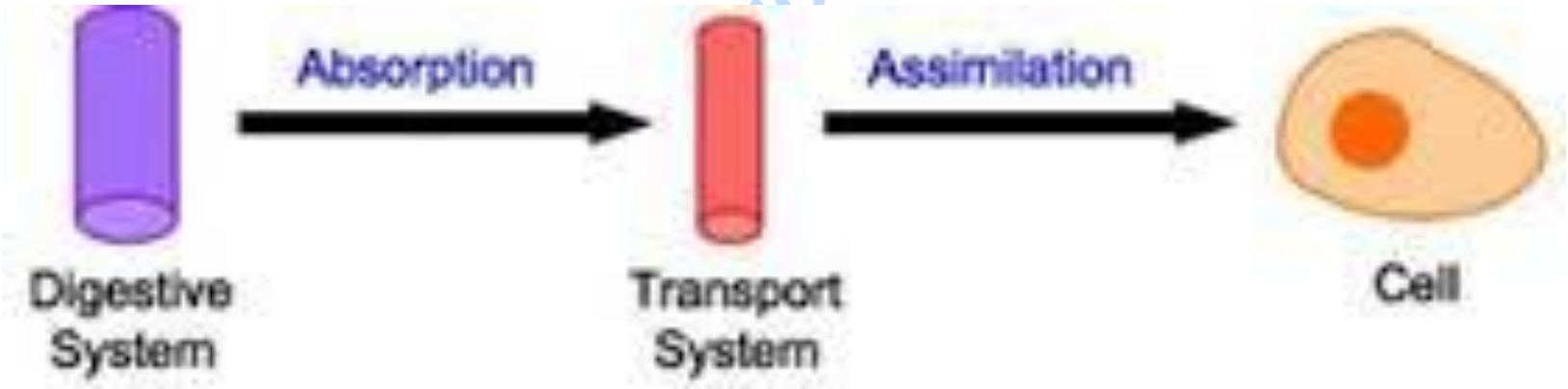
# ABSORPTION

the simple substances get diffused into the blood



# ASSIMILATION

It is defined as the process by which protoplasm is synthesized into each cell of the body by utilizing simple food



# EGESTION

Removal of undigested food

# Human digestive system

## Alimentary canal ( 8-10 meters)

1. mouth
2. Buccal cavity
3. Pharynx
4. Oesophagus
5. Stomach
6. Small intestine
7. Large intestine
8. anus

## Associated digestive glands

1. Salivary gland
2. Liver
3. pancreas

# mouth

- transverse slit
- bound by upper and lower lip
- buccal cavity /
- Oral cavity

**Function- ingestion**

# Buccal cavity / oral cavity

- internally lined by mucus membrane

Made up of

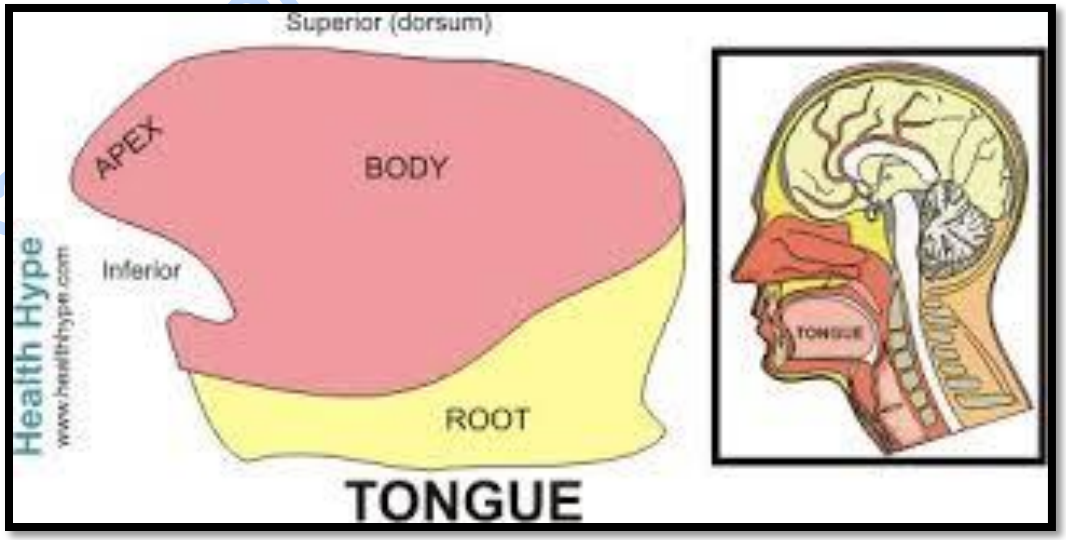
1. Roof- palate bone
2. Lateral wall-cheeks
3. Floor-tongue

Contains

1. Tongue
2. Teeth
3. Salivary gland

# tongue

- Muscular -fleshy
- shape- roughly triangular
- location- lies along the floor of the buccal cavity



The tongue is attached to floor of the oral cavity by the

**FRENULUM**

## Tongue -papillae

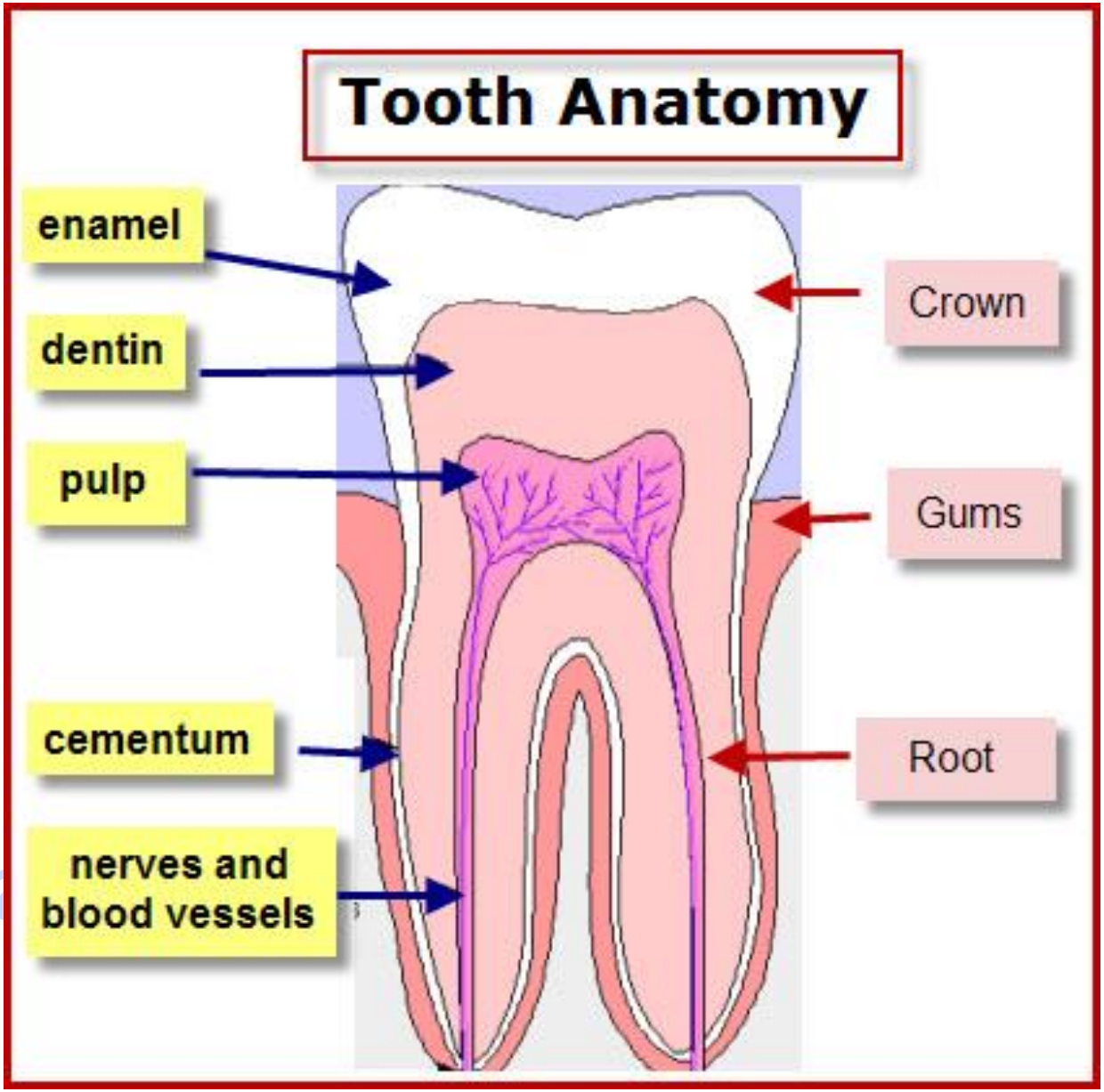
The upper surface of the tongue bears numerous projections -PAPILLAE.

Sensory receptor –taste bud – detect taste of the food


## Tongue - function

1. Taste food
2. Mix saliva with food
3. Swallowing
4. speech

# teeth


Tooth Anatomy
enamel
dentin
pulp
cementum
nerves and blood vessels
Crown
Gums
Root

## dentition

The study of teeth with respect to their number ,arrangement , development etc. Is known as dentition

## diphyodont

Human being shows 2 sets of teeth

1. Temporary Milk teeth /deciduous teeth / -20
2. Permanent teeth /adult teeth-32

## heterodont

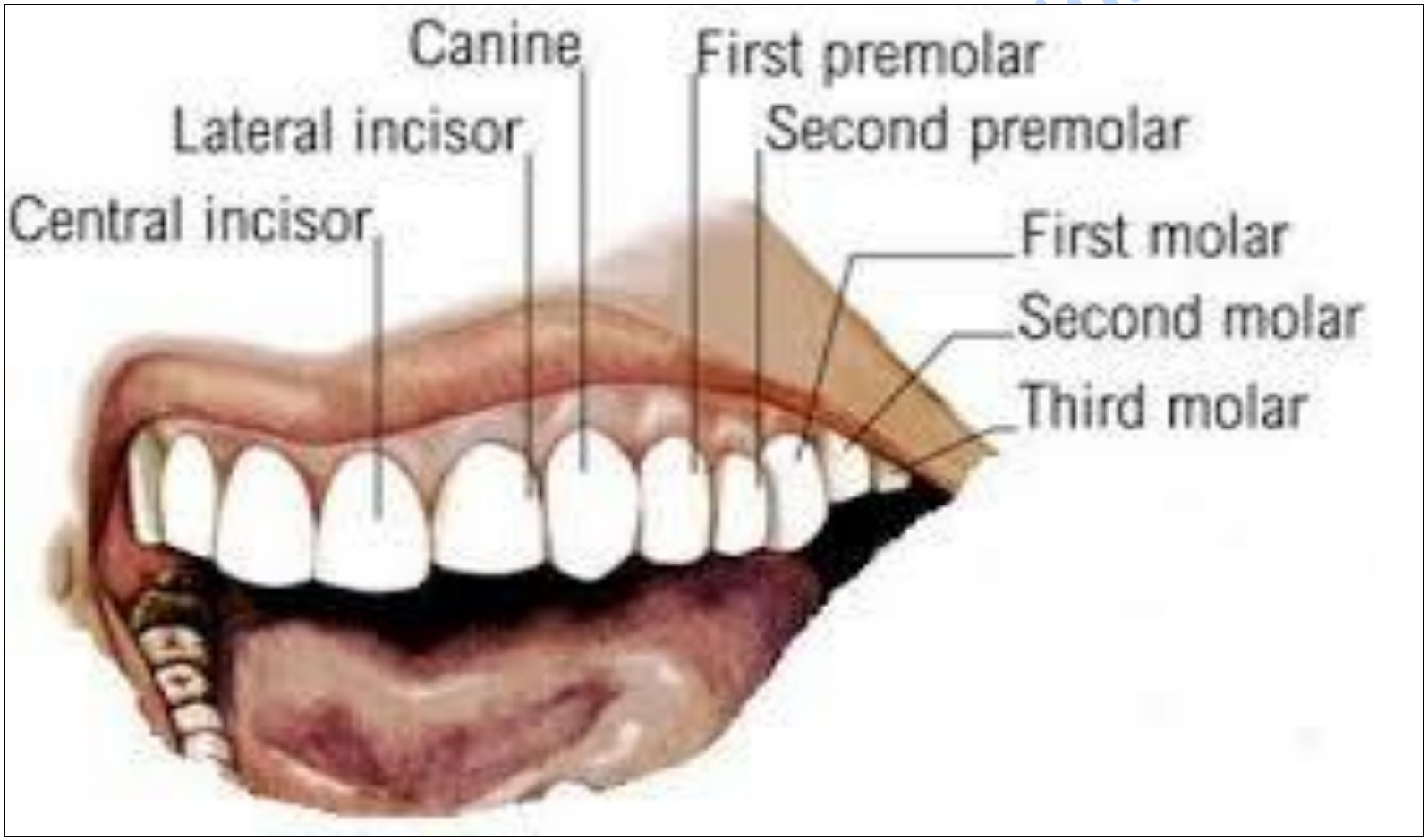
Four different type of teeth

## thecodont

Each tooth is embedded in jawbone

# Dental formula

$$I\frac{2}{2}C\frac{1}{1}P\frac{2}{2}M\frac{3}{3}=16$$

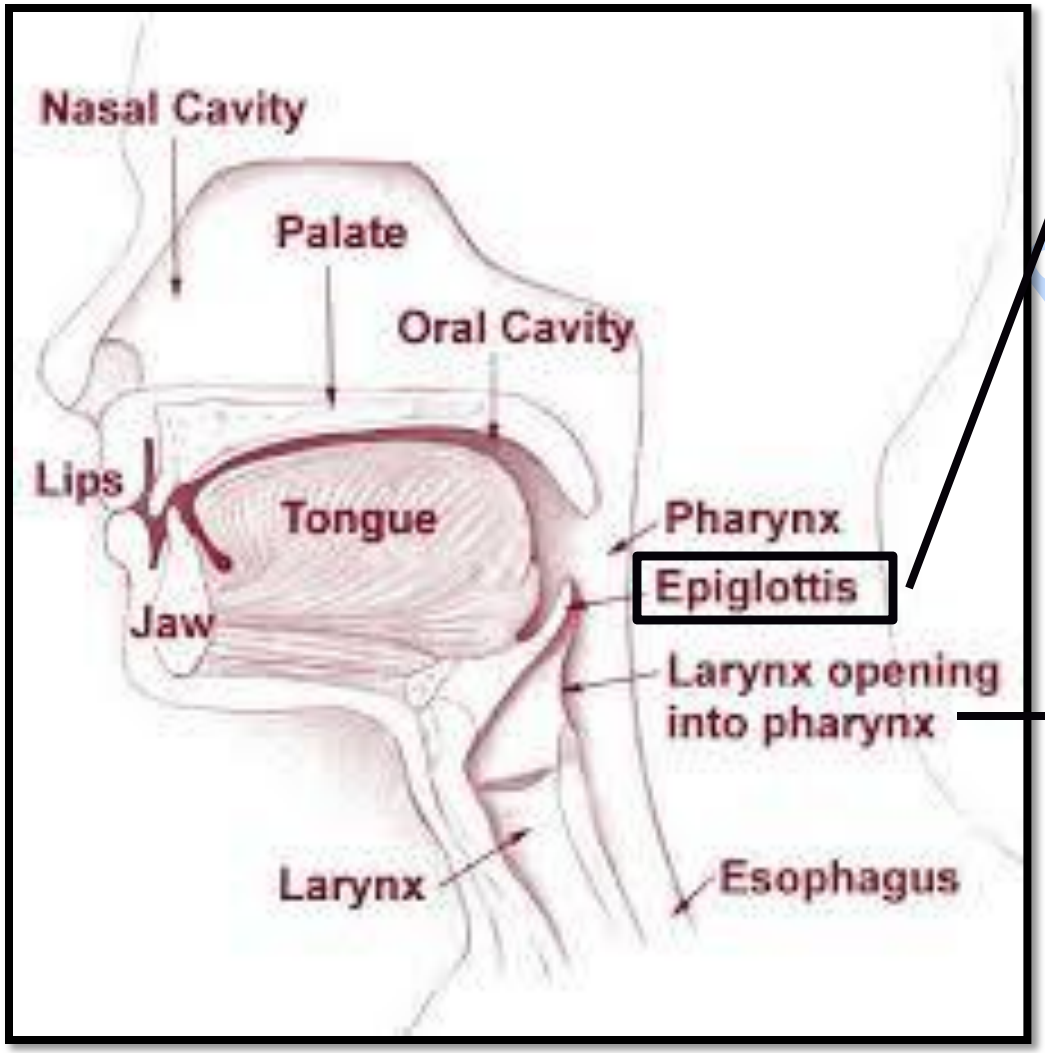


# Teeth - function

It masticate the food into small particles and help to mix food with saliva

# pharynx

Meeting point of digestive and respiratory system




Epiglottis – cartilagenous flap - prevents entry of food into respiratory system

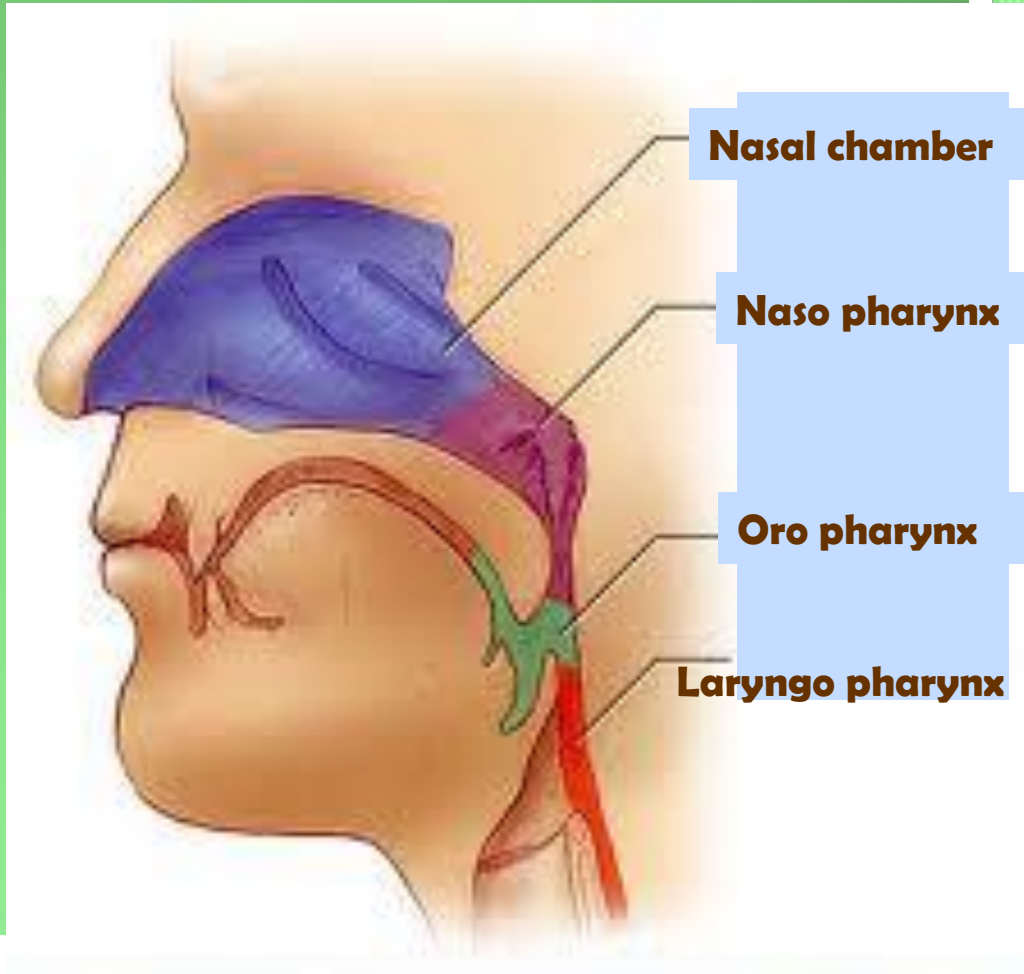
glottis

# Pharynx

12 cm length

Common passage

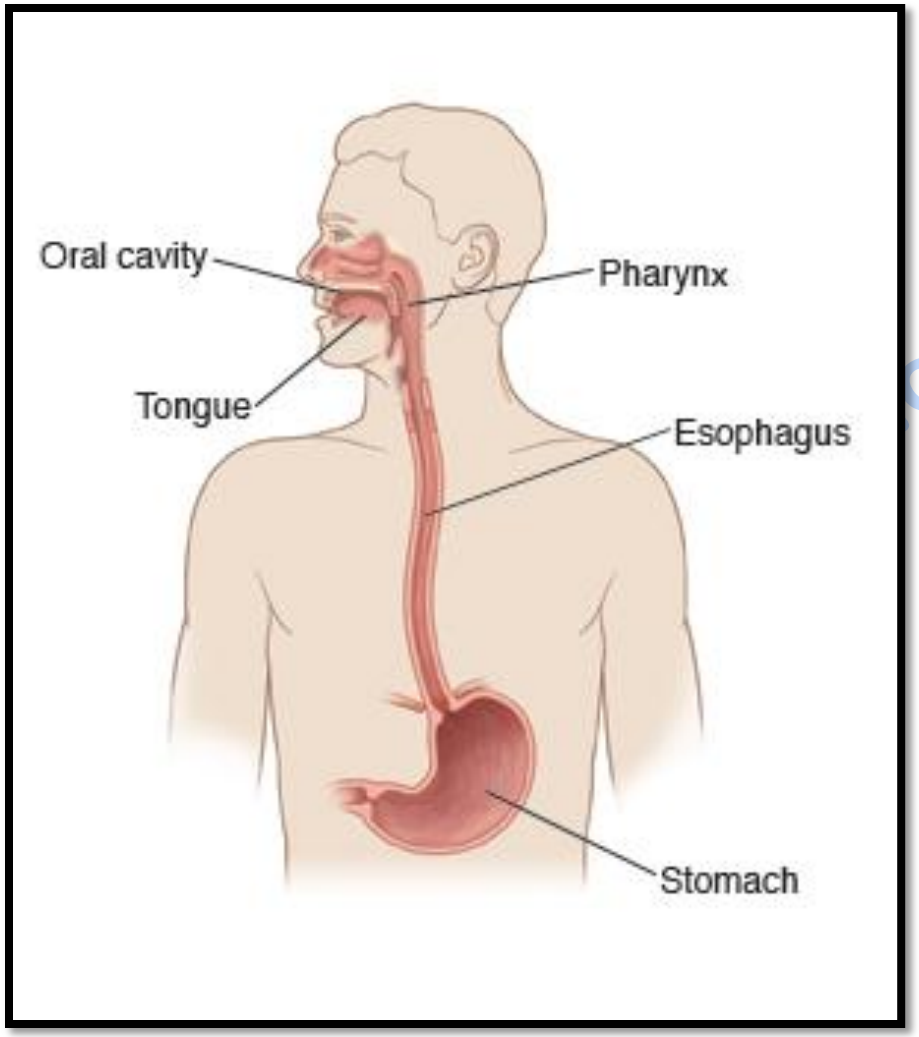
Tonsil



# Pharynx - function

It passes food into oesophagus

# oesophagus



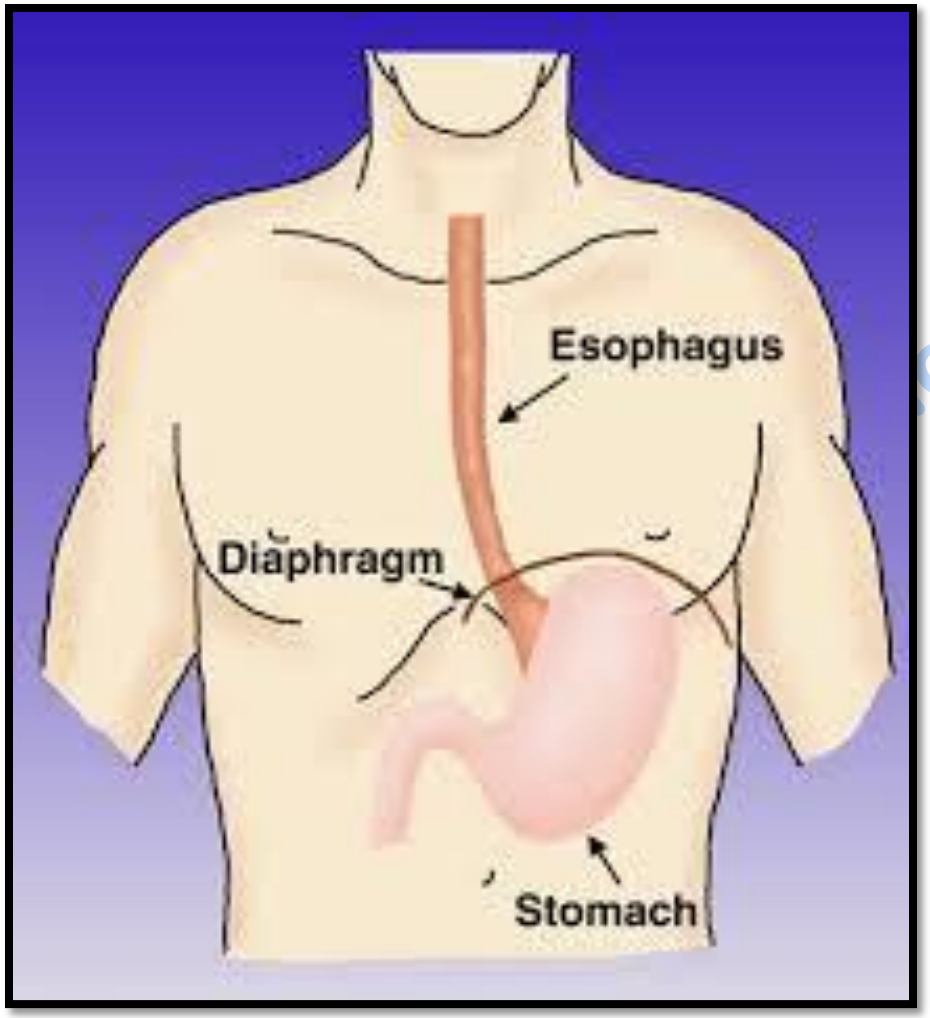

•25 cm- long, thin , narrow tube

• connecting tube from pharynx to stomach

internally lined by
- mucus membrane

- mucus membrane secrete mucus which helps in smooth passage of food

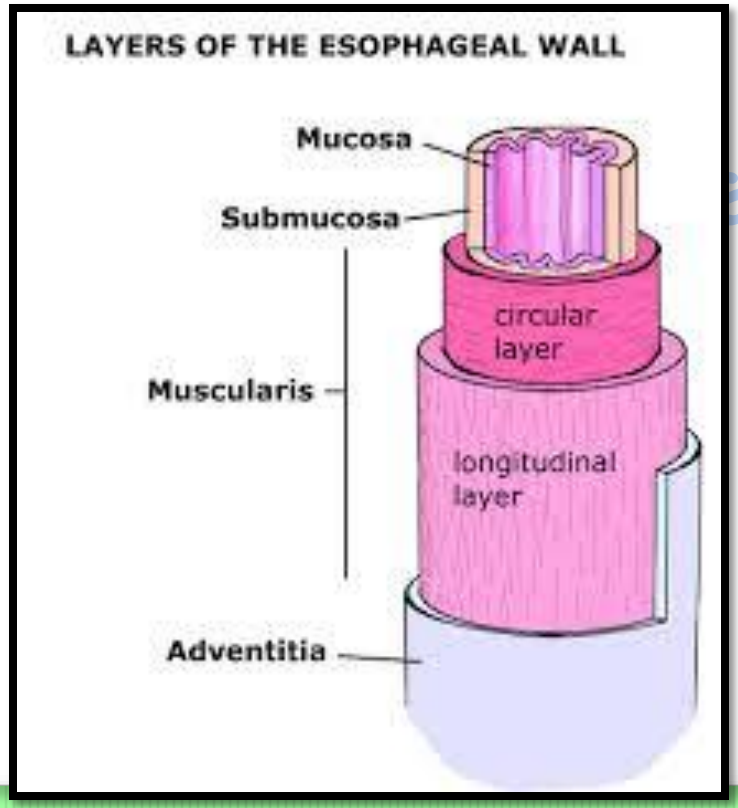
# oesophagus

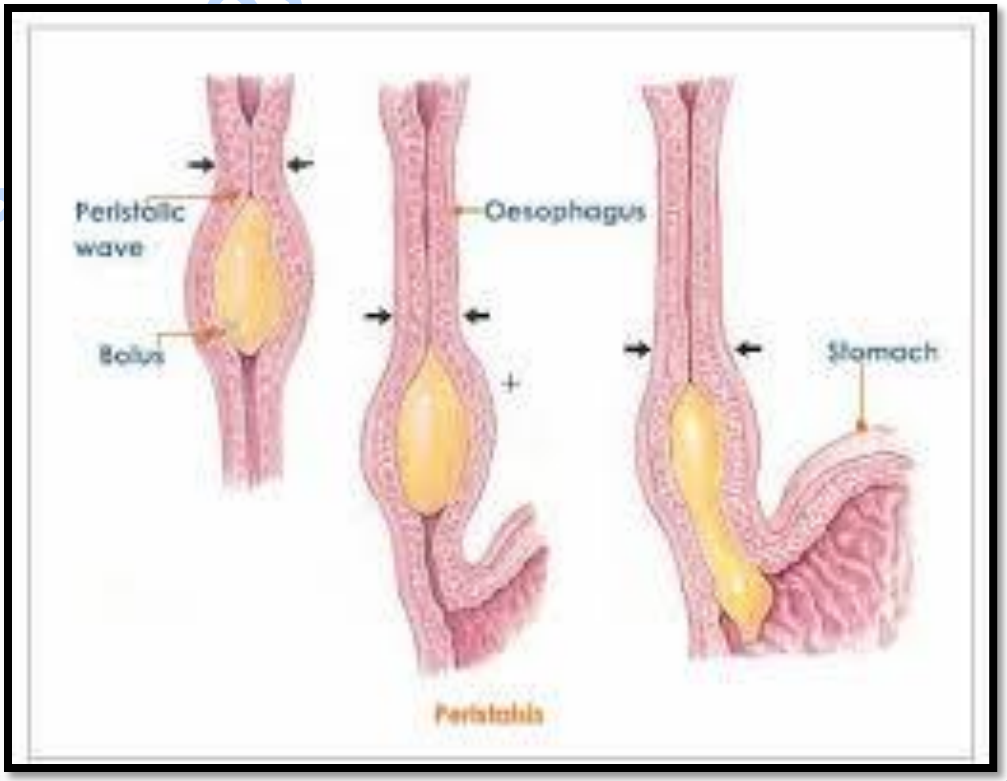



It passes through the thoracic cavity , pierces the diaphragm leads to the stomach

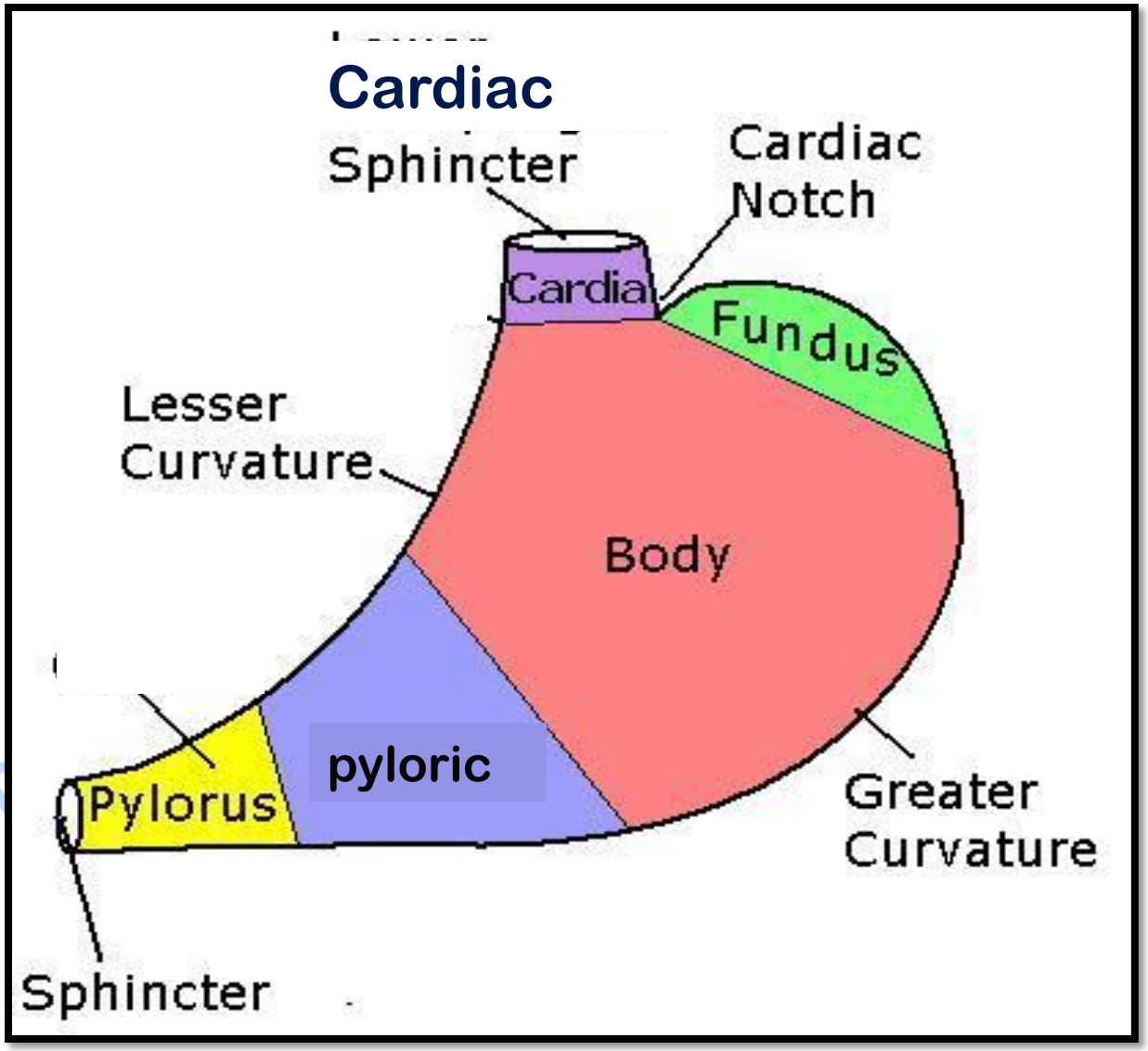
Oesophagus is made up of longitudinal and circular muscle which do rhythmic contraction and relaxation

This rhythmic wave of contraction and relaxation is called **PERISTALSIS** . Which helps to move food.



# stomach



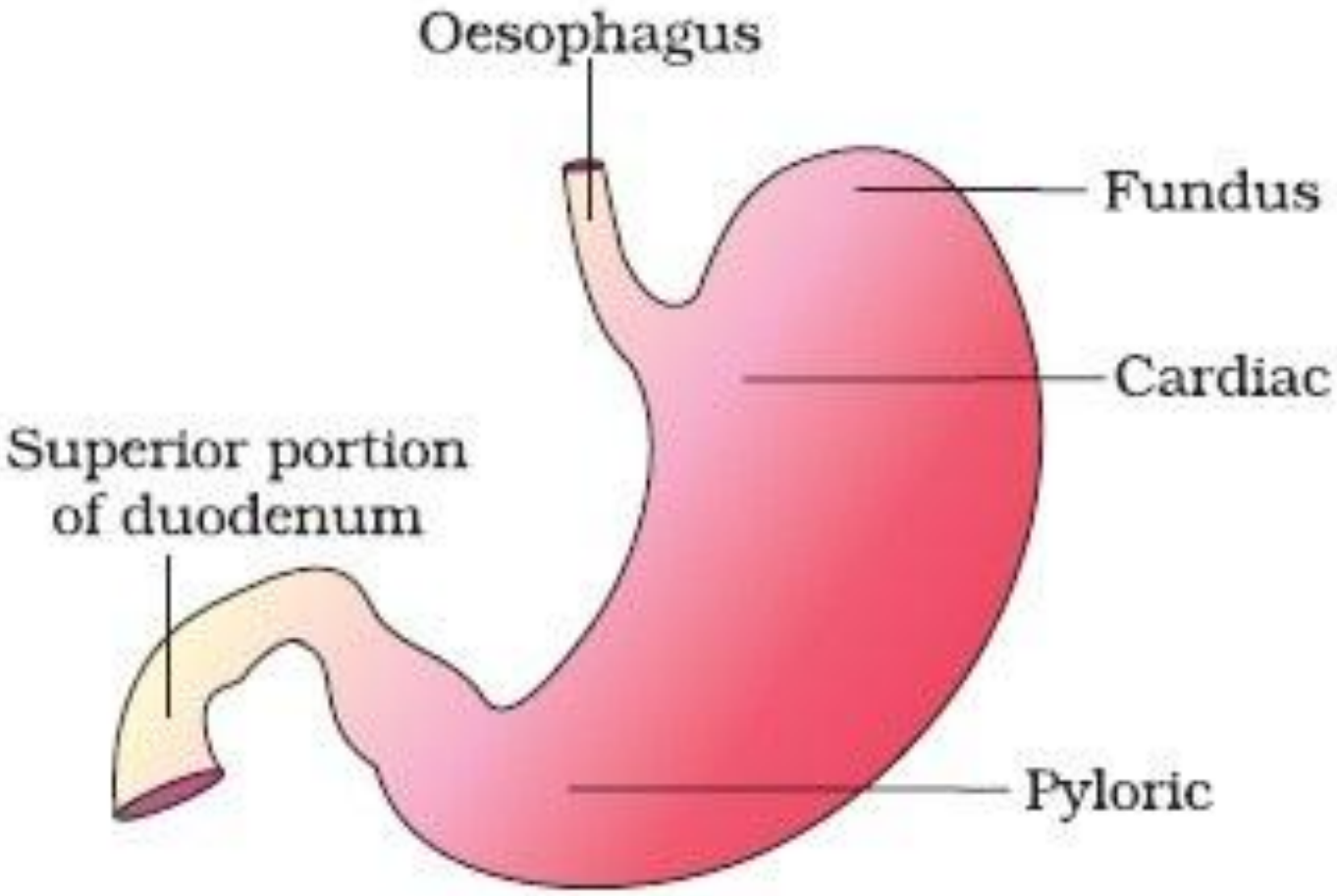



**Figure 3**. Anatomical regions of human stomach

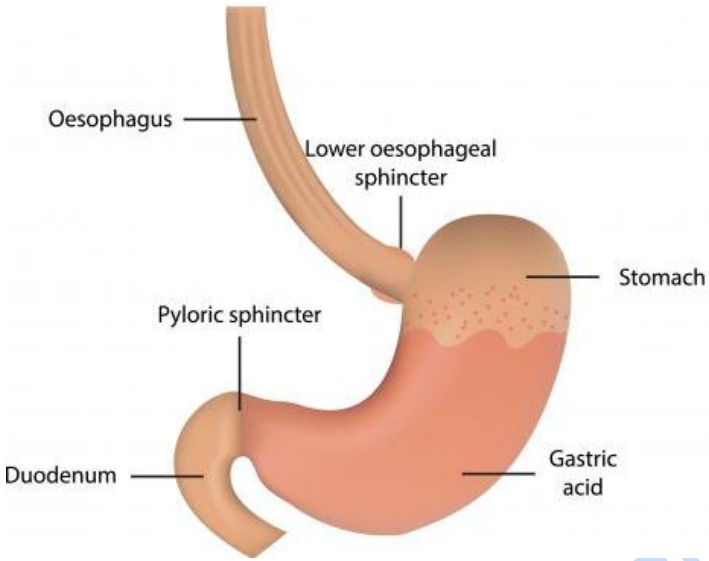
# Stomach

It is muscular sac like 'J ' shaped organ
Size = 25 to 30 cm
Location = upper left portion of the abdominal cavity

Parts ( GTB )
1.Upper = cardiac region
2.Lower =pyloric region

Parts ( NCERT )
1. cardiac region
2. Fundic
3. pyloric region

# Stomach




Parts ( GTB )

1.Upper = cardiac region / cardia

- First part of stomach
- Oesophagus opens into this part

- Junction of oesophagus and cardiac part is surrounded by cardiac sphincter
- Function of cardiac sphincter= to prevent backflow of food from stomach to oesophagus ( regurgitation )

2.fundus- it is the dome shaped region above left of cardia

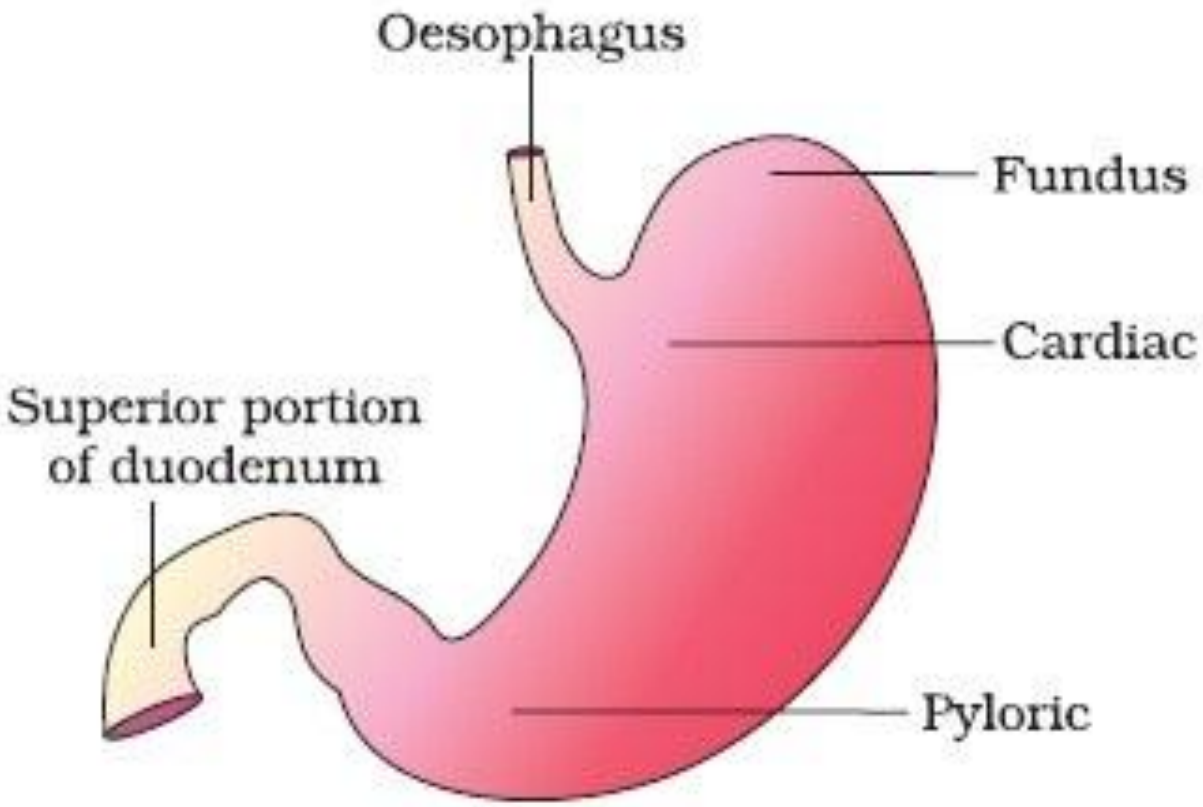



**Figure 3.** Anatomical regions of human stomach

3.Body - it forms the large central portion of stomach that stores the food

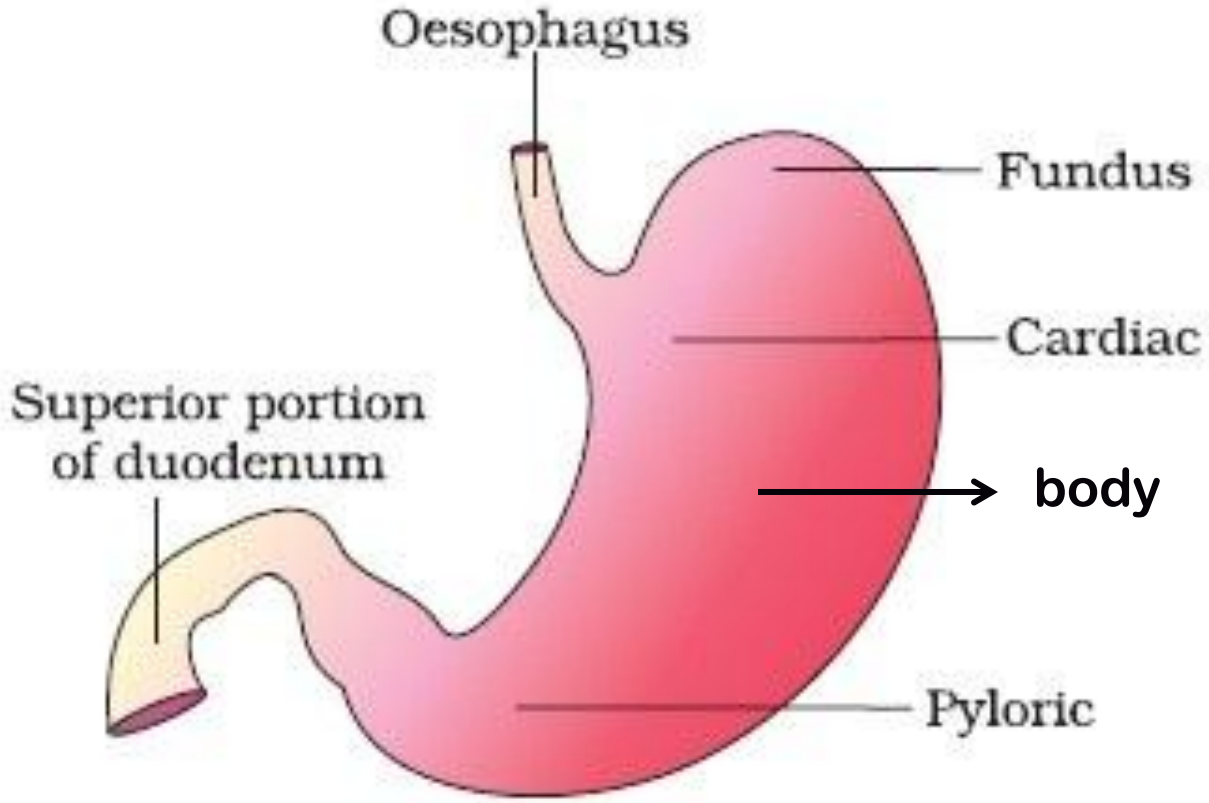
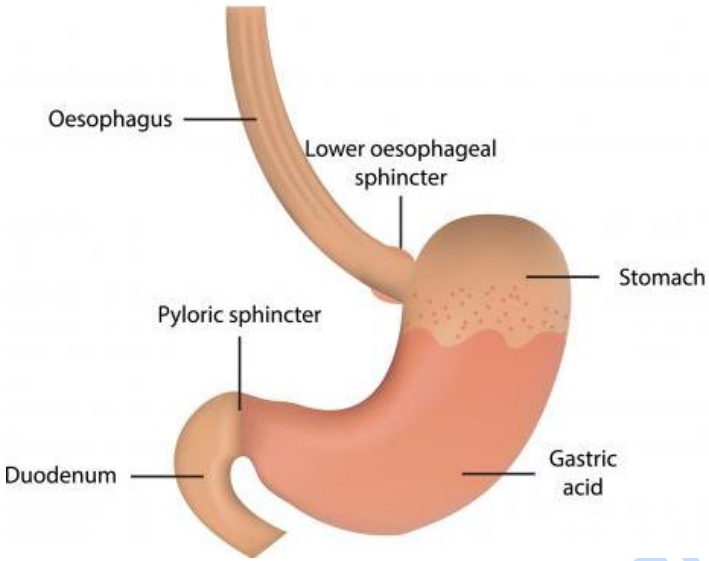



**Figure 3.** Anatomical regions of human stomach

# Stomach




Parts ( GTB )

4.Lower = pyloric region

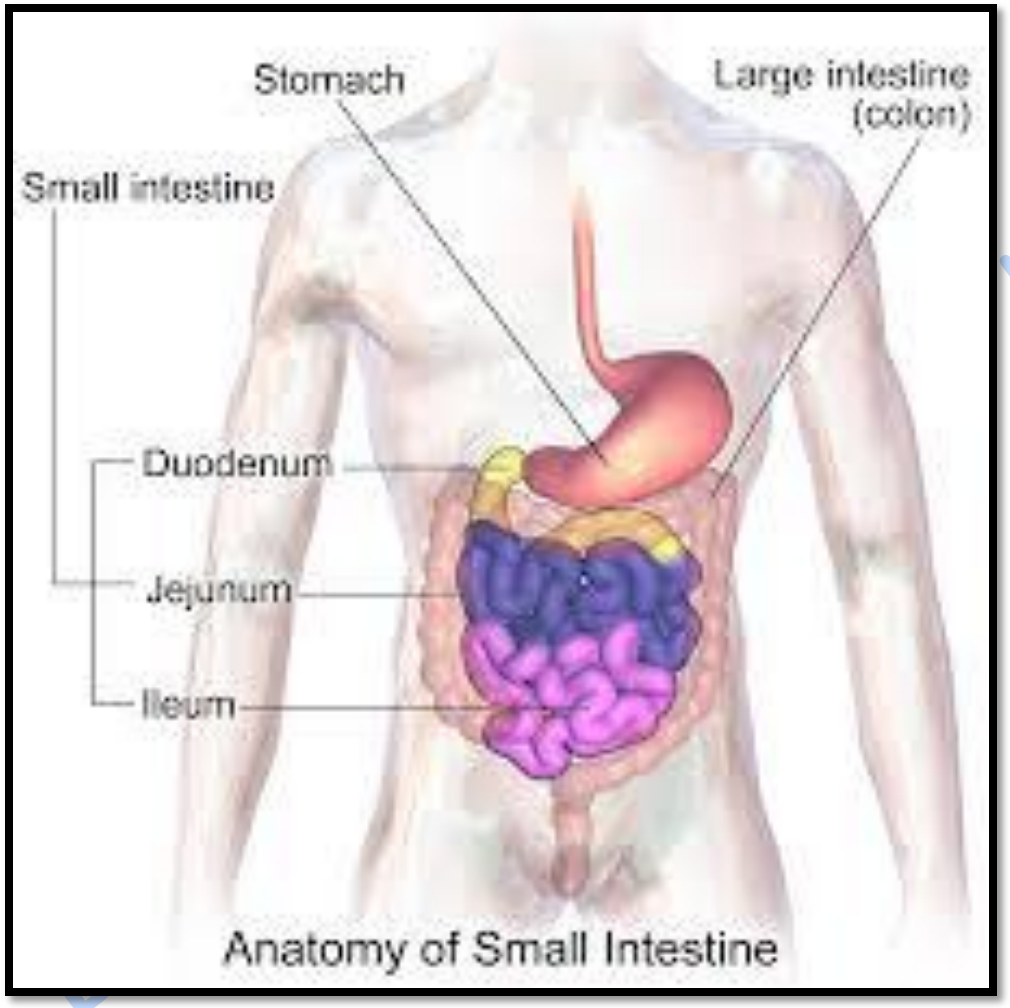
- Last part of stomach
- It opens into small intestine /duodenum

- Junction of pyloric part and duodenum is surrounded by pyloric sphincter
- Function of pyloric sphincter= to prevent backflow of food from small intestine to stomach

# Stomach - function

- Stomach stores and churn the food.
- It secrete gastric juice.
- The churning breaks up the food into smaller pieces and also facilites the mixing of the food with gastric juice
- Feeling of satiety = feeling of fullness of stomach

# Small intestine




- 6 meters long
- 2.5 cm broad
- Coiled in abdomen
- Divided into 3 parts

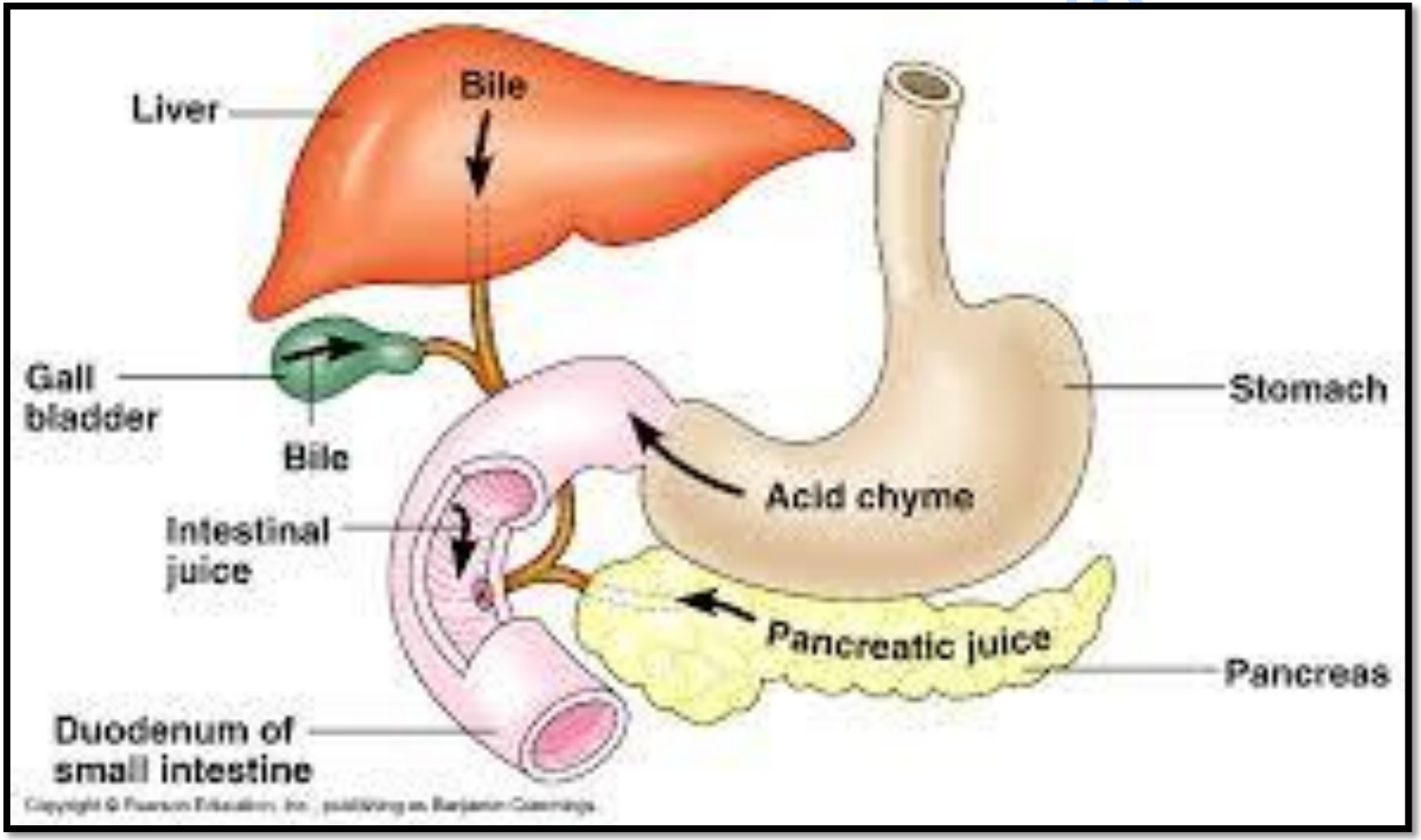
1. Duodenum
2. Jejunum
3. ileum

# mesentery

Coiled intestine are held together by connective tissue membrane called as mesentery . which also support the blood vessels ,lymph vessels and nerves

# duodenum

**Shape –u , long- 26 cm**



**jejunum**

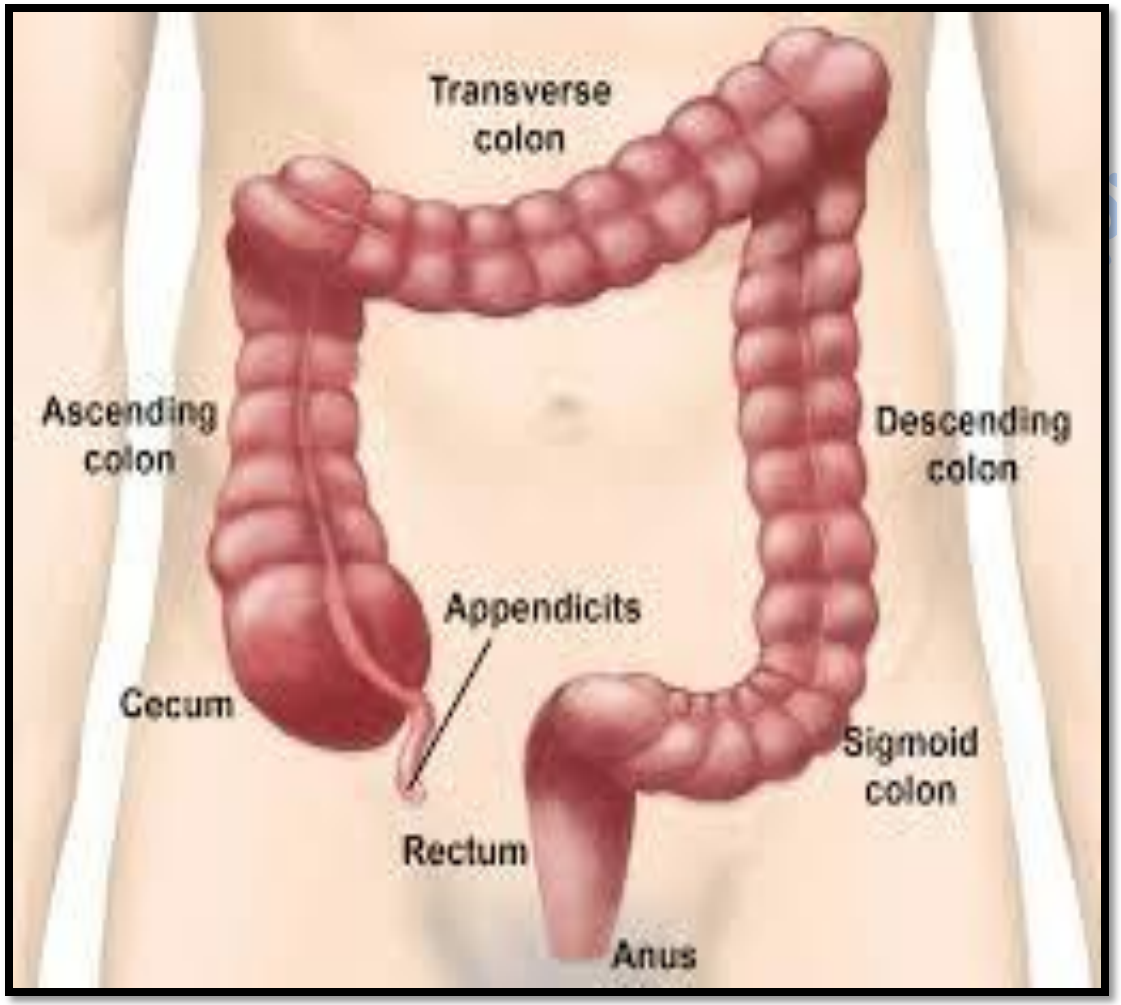
- 2.5 meters long
- Narrower than duodenum
- coiled

**ileum**

- 3.5 meters long
- Broader than jejunum
- Highly coiled

The ileum opens into the caecum of large intestine at ileocaecal junction

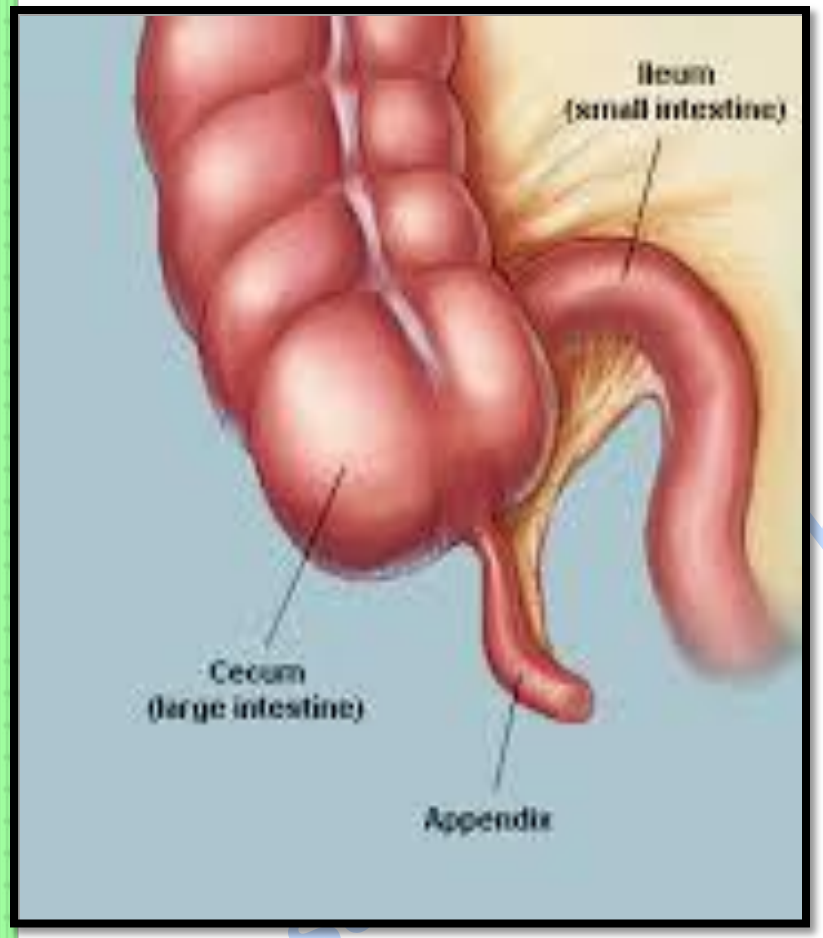
# large intestine




- 1.5 meters long
- 5 -7.5 cm broad
- Divided into 3 parts

1. caecum
2. colon
3. rectum

# caecum

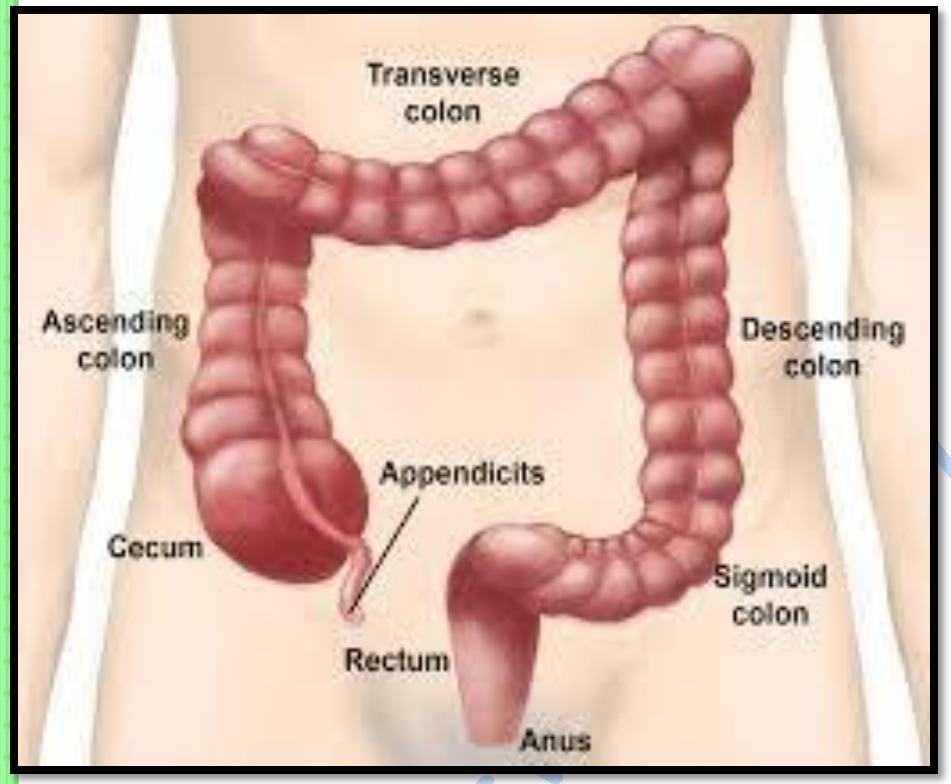



Caecum is a small, blind sac present at the junction of ileum and colon. It is 6cm in length. It hosts some symbiotic microorganisms.

# APPENDIX

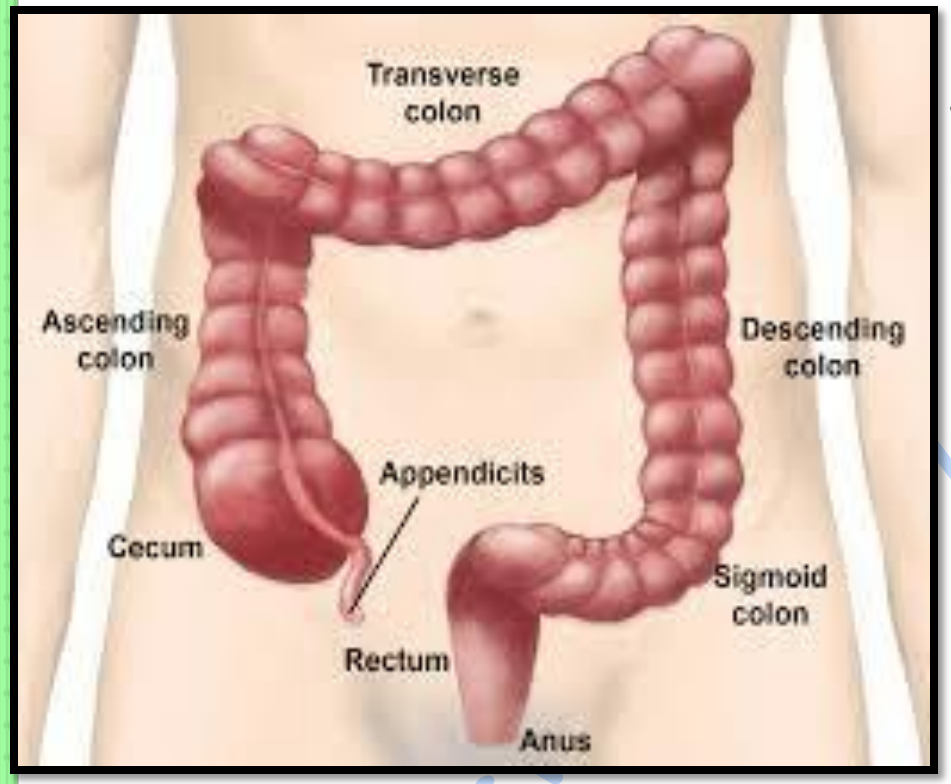
An elongated worm like vermiform appendix arises from the caecum. Appendix is vestigial organ in human beings and functional in herbivorous animals for the digestion of cellulose.

# colon




**Caecum opens into colon.**
**Colon is**
**tube like-organ consist of**
**three parts,**
**1.Ascending colon,**
**2. transverse colon and**
**3. descending colon.**
**The colon is internally lined**
**by mucosal cells.**

# rectum




It is posterior region of large intestine. It temporarily stores the undigested
waste material called faeces till it is egested out through anus.

# anus

**Anus : Anus is the terminal opening of** alimentary canal. It is guarded by anal sphincter. It expels faecal matter by a process called egestion or defecation.