كليه الرشيد الجامعه

قسم الصيدله

المرحله الاولى

LECTURE 3
THE DIGESTIVE SYSTEM

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The Digestive System

➢Comprises all the organs which are concerned in :

- Ingestion (taking of food)
- Mastication (chewing)
- Deglutition (swallowing)
- Digestion and absorption of food .
- Elimination of the body of the undigested and undigestable constituents .

➢It consist of :

I. Digestive tract .

II. Associated organs .

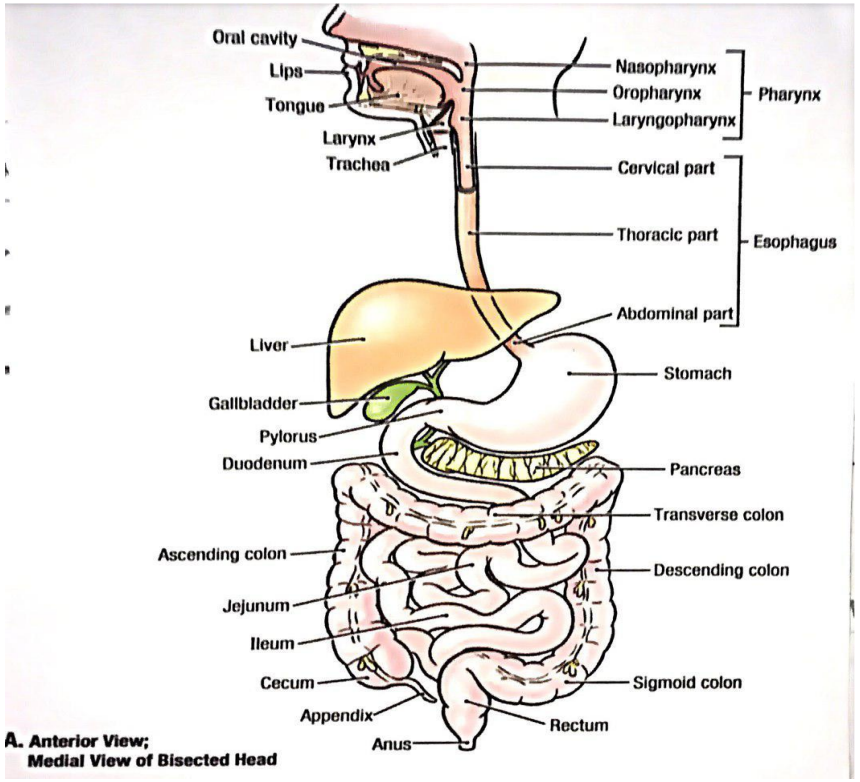
The Digestive System

I. The digestive tract

- A tube – like nature with variable diameters .
- Lined by mucous membrane
- Begins in the mouth , passes through the heed , neck , chest , crosses the diaphragm to the abdomen and exits the anus

<u>Parts of the digestive tract</u>

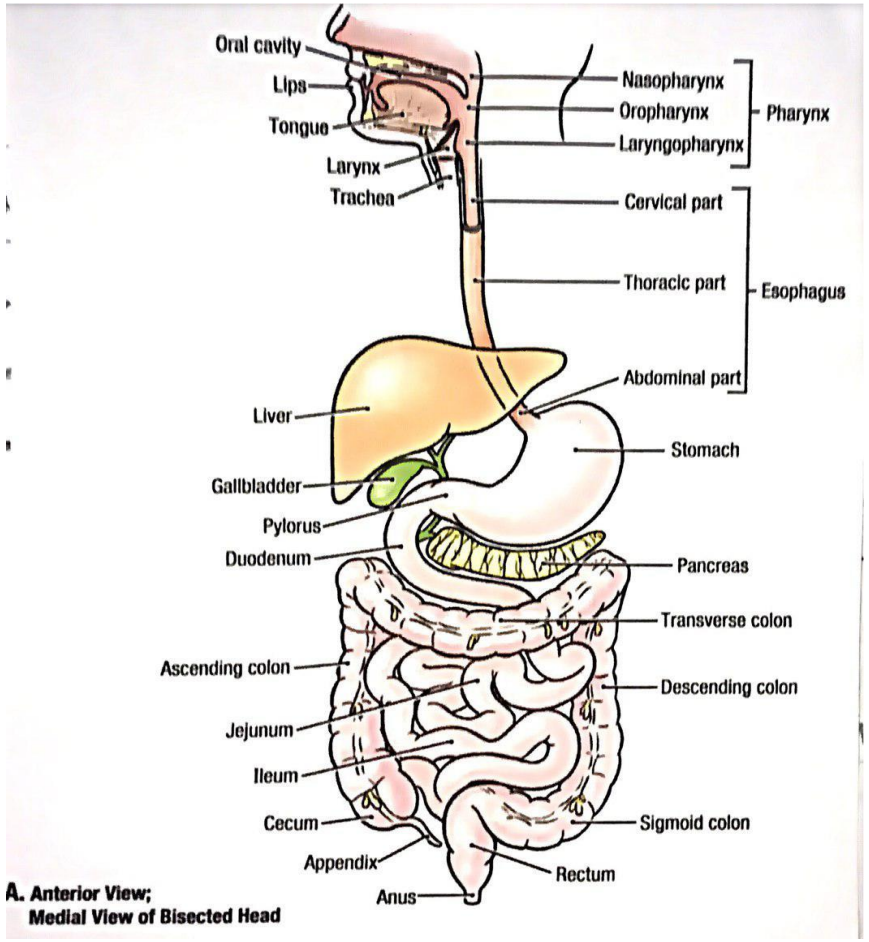
1. the mouth
2. The pharynx
3. The esophagus
4. The stomach
5. The small intestine
6. The large intestine
7. The anal canal



The Digestive System

II. The Associated organs

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



The mouth

- The oral cavity is divided into two portions by the upper and lower dental arches

1. Outer smaller portion : the oral vestibule
2. Inner larger portion : the oral cavity proper

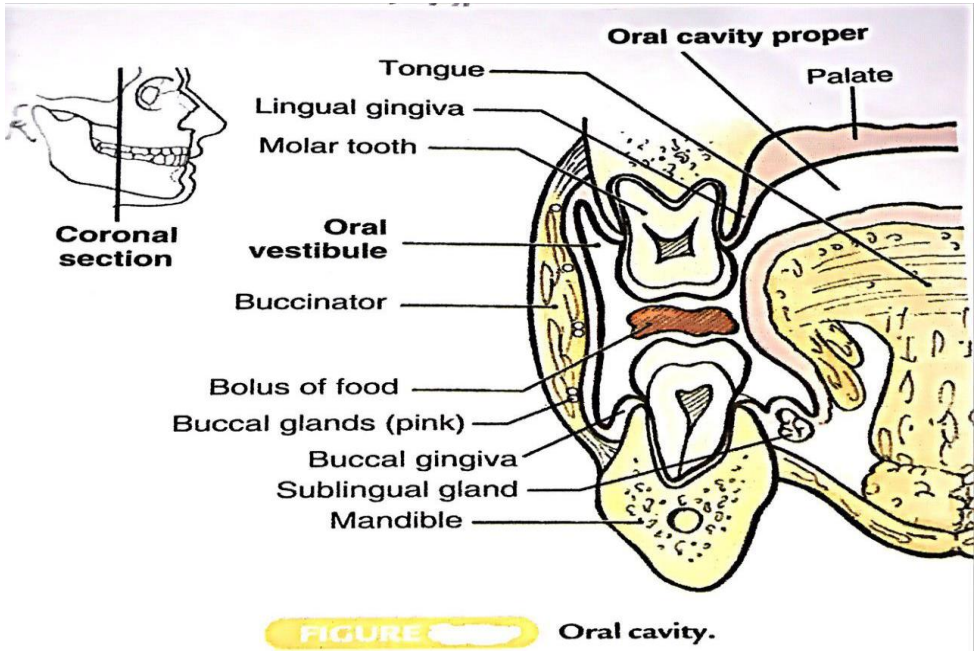


FIGURE Oral cavity.

The mouth
The oral vestibule

- Horseshoe – shaped
- Bounded between the deep surfaces of the lips and cheeks and the dental arches .

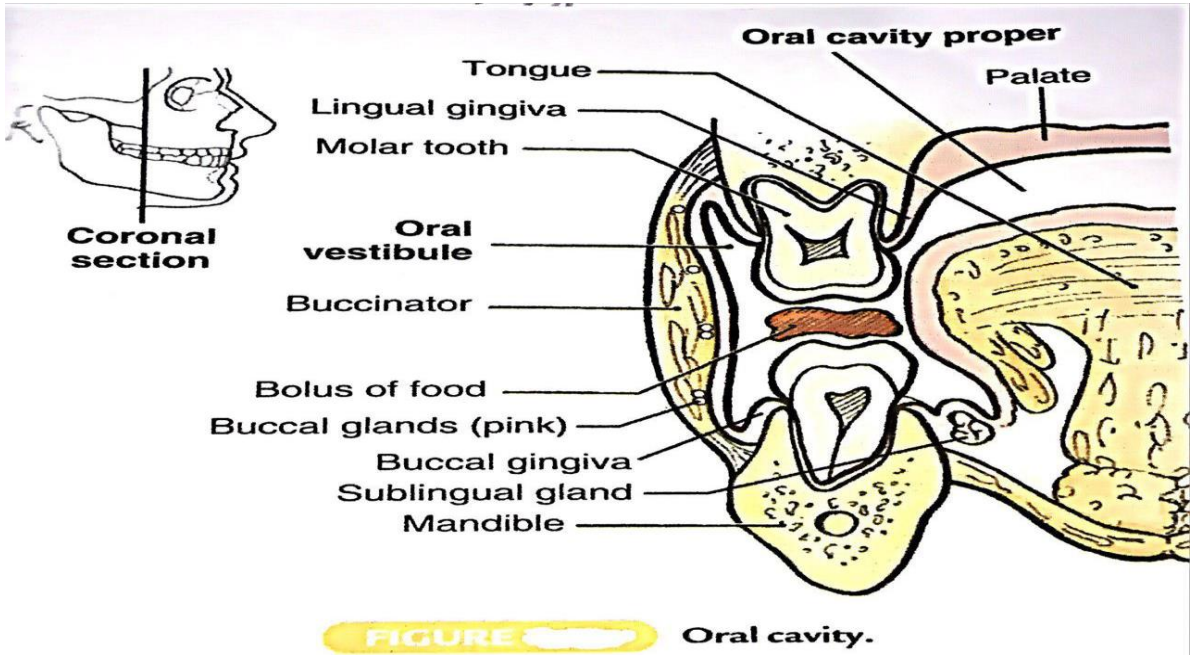
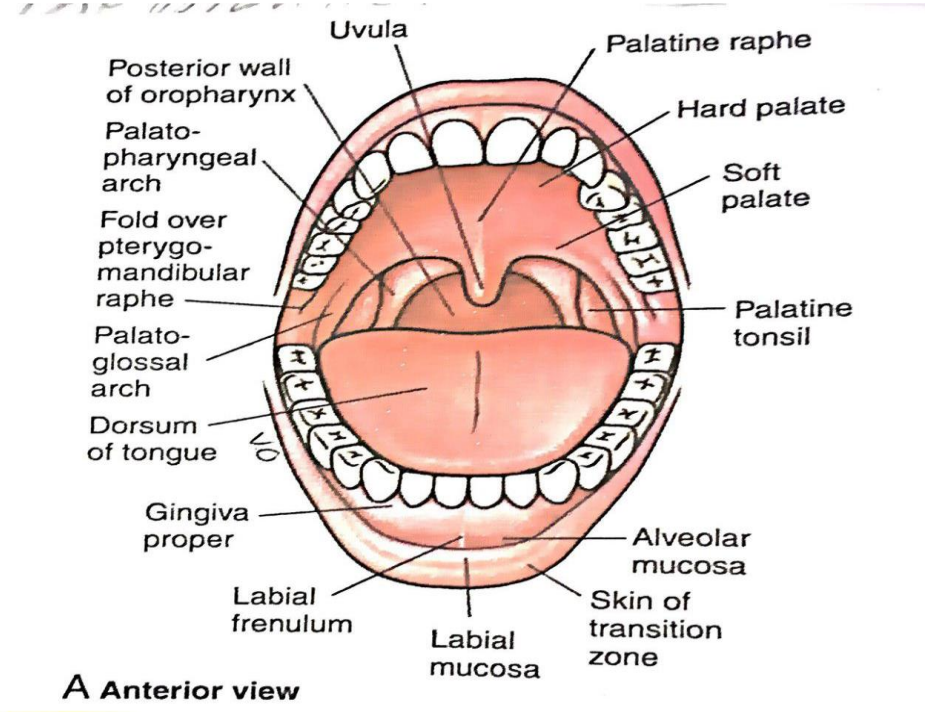


FIGURE Oral cavity.

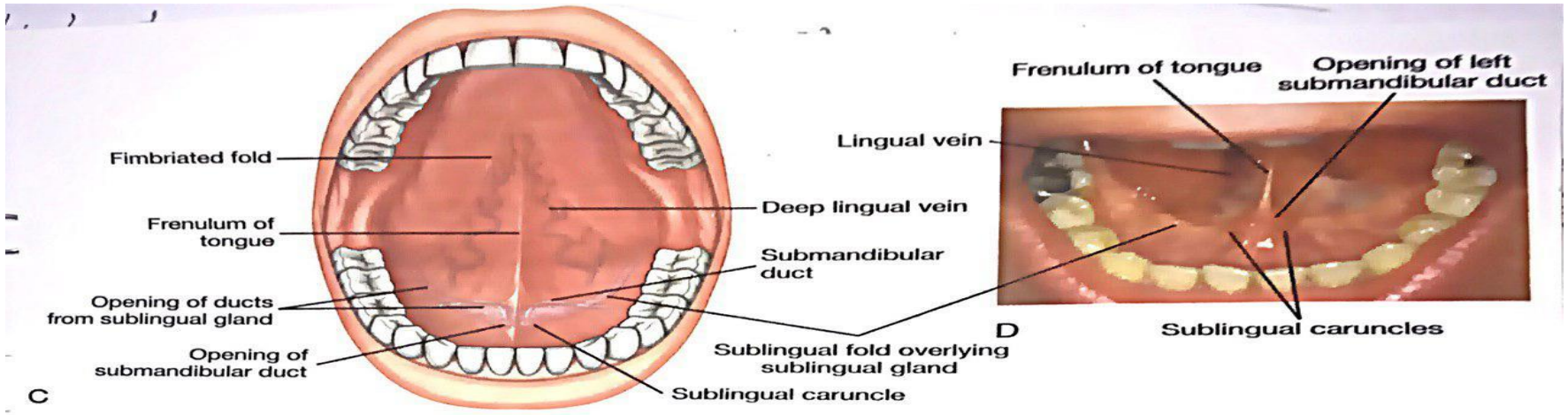
The mouth
the oral cavity proper

- Enclosed by the dental arches
- Continuous with cavity of the oropharynx at the oropharyngeal isthmus .



The mouth
walls of oral cavity

1. Lateral walls : the cheeks
2. The roof : hard and soft palate
3. The floor : the muscular oral diaphragm and the anterior two thirds of the tongue



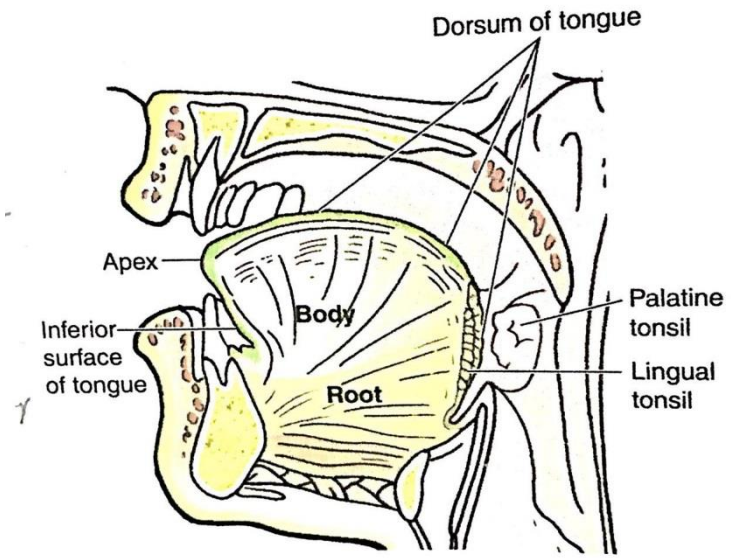
Submandibular and sublingual glands. **A.** Medial view. **B.** Posterior view. **C.** Anterior view. **D.** Anterosuperior view.

The mouth
the tongue

Is a muscular structure

Parts of the tongue :

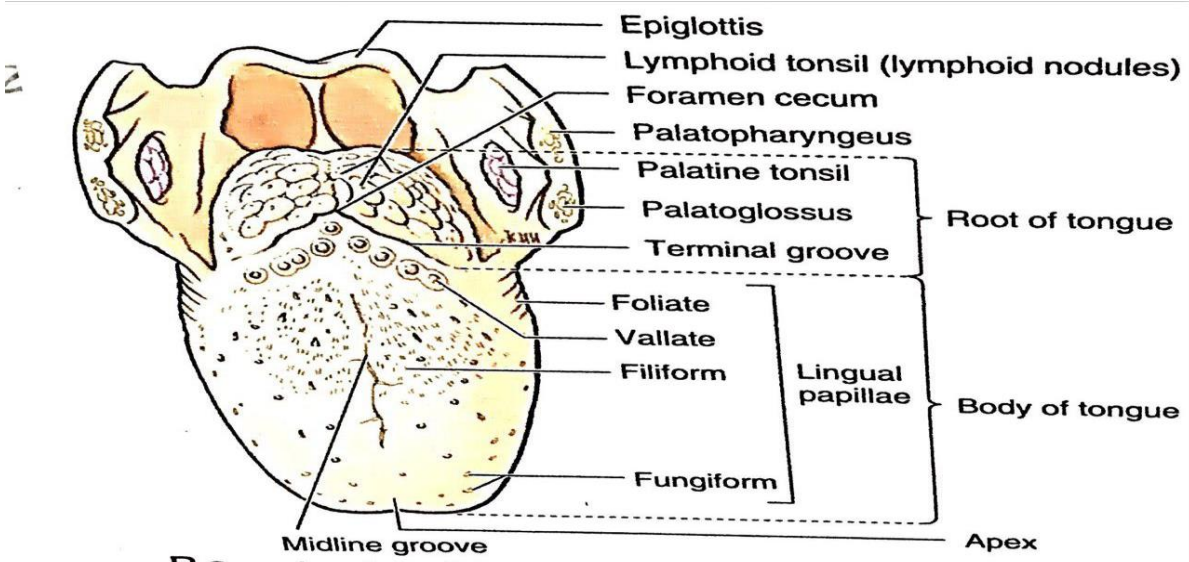
1. Oral part : anterior two thirds horizontally directed
2. Pharyngeal part : forms the anterior wall of the pharynx and is vertically directed .



A Median section of mouth

The mouth
the tongue

- The oral part has two surfaces : superior and inferior
- On the superior surface lingual papillae are found ; projections that increase the surface area and serve for taste
- On the pharyngeal part : there are collection of lymphoid tissue : the lingual tonsil



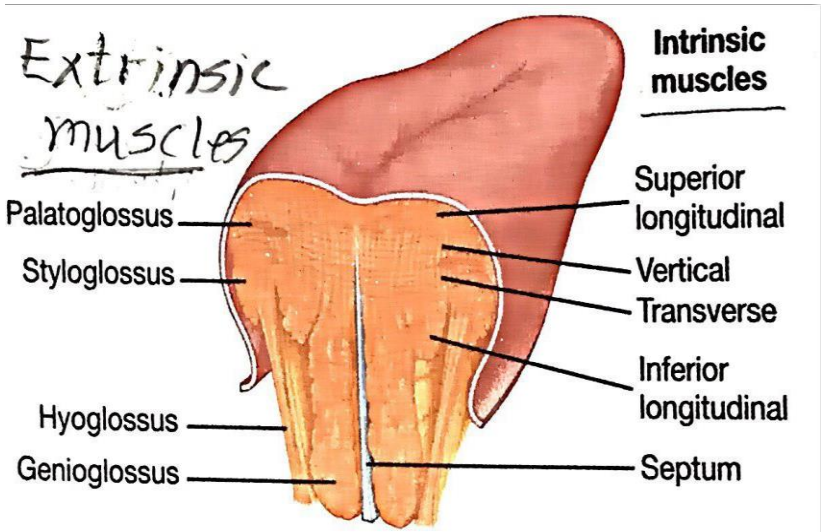
Tongue. A. Parts. B. Features of dorsum of tongue.

The mouth
muscles of the tongue

Are of two groups

1. Intrinsic : originate and insert within the substance of the tongue
2. Extrinsic : originate outside the tongue

Nerve supply : the hypoglossal nerve [XII]



Muscles of the tongue.

The mouth
functions of the tongue

1. Essential for mastication .
2. Swallowing
3. Modification of sounds produced in the larynx , to make distinct articulated speech
4. Taste

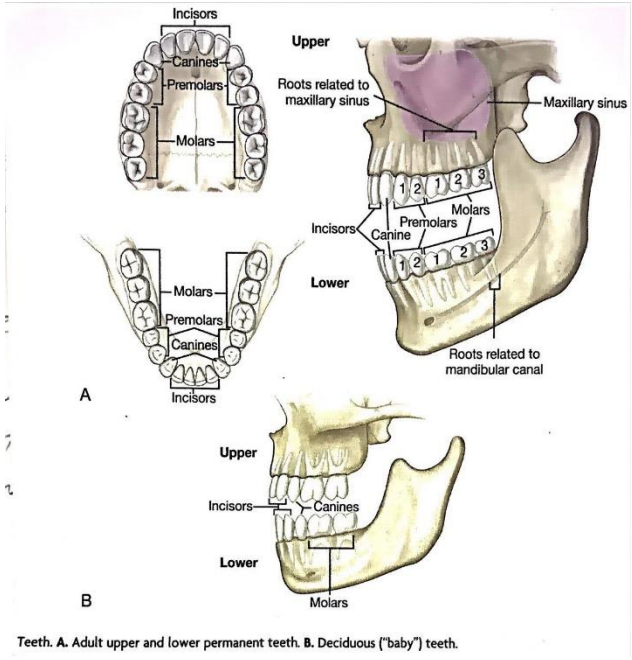
The mouth
the teeth

Are attached to sockets in the alveolar arches above (maxilla) and below [mandible]

➢The permanent teeth

There are 32 teeth , 16 above 16 below , eight teeth on each side . They are :

- Two incisors
- One canine
- Two premolars
- Three molars



Teeth. A. Adult upper and lower permanent teeth. B. Deciduous ("baby") teeth.

➢The deciduous teeth

Emerge from the gingivae between 6 months and two years ,

➢There are 20 teeth , on each side they are

- Two incisors
- One canine
- Two molars

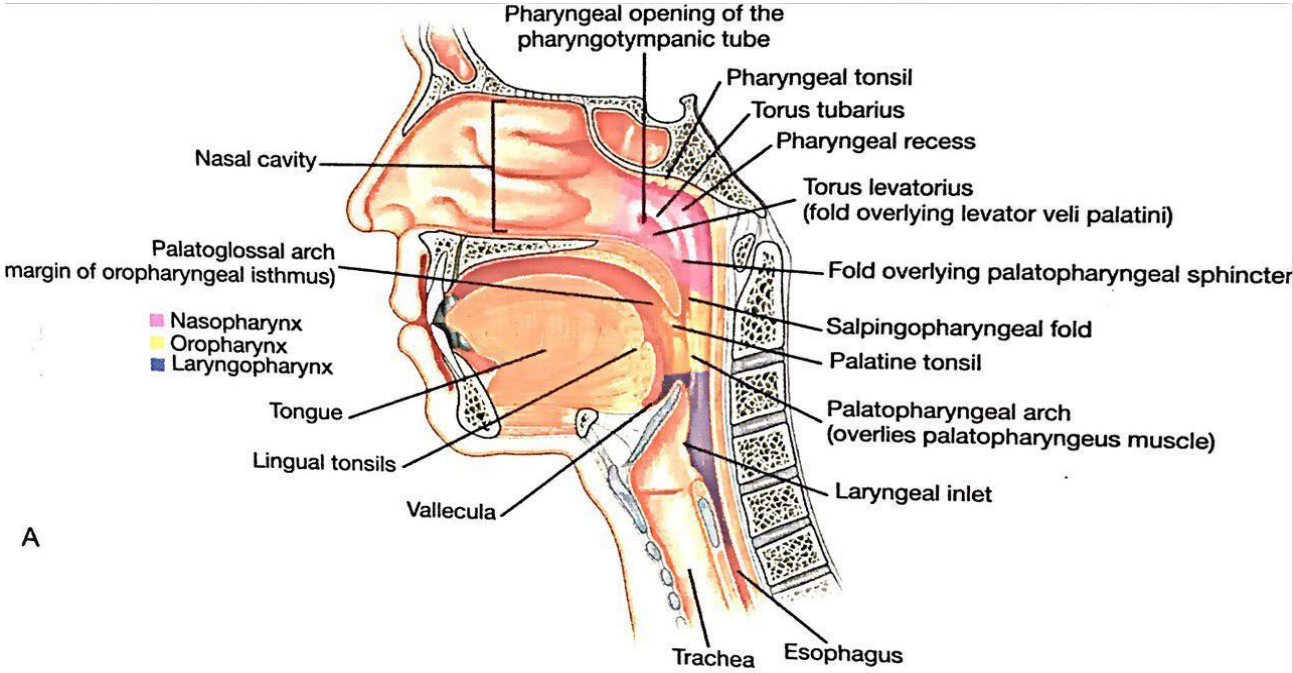
The pharynx

Is funnel – shaped , with musculomembranous wall

- (12-14cm) long
- Wide upper end (3.5 cm) lies under the skull
- Narrow lower end (1.5 cm) which becomes continuous with the esophagus at the level of the sixth cervical vertebra
- Is situated behind the :

1. Nasal cavity
2. Oral cavity
3. Larynx

and these openings replace part of the anterior wall



The pharynx
regions of the pharynx

1. Nasopharx

- Opens at the choanae (posterior nasal aperture) anteriorly
- Communicates with the middle ear via the tympanopharyngeal tube .
- Has collection of lymphoid tissue at its posterior wall :- the pharyngeal tonsil ; when enlarge and inflammed it is call : adensids

2. Oropharynx

- Opens at the oropharyngeal isthmus

anteriorly with the oral cavity

- It is a common passway of air and food .

3. Laryngopharynx

Behind the larynx, opens to it anteriorly and is guarded by the epiglottis

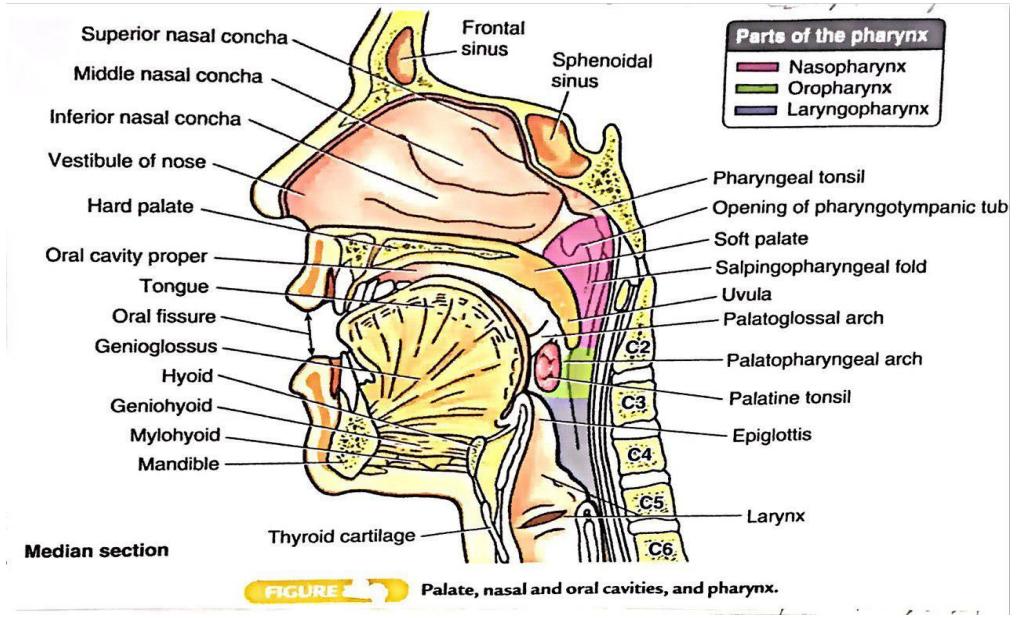


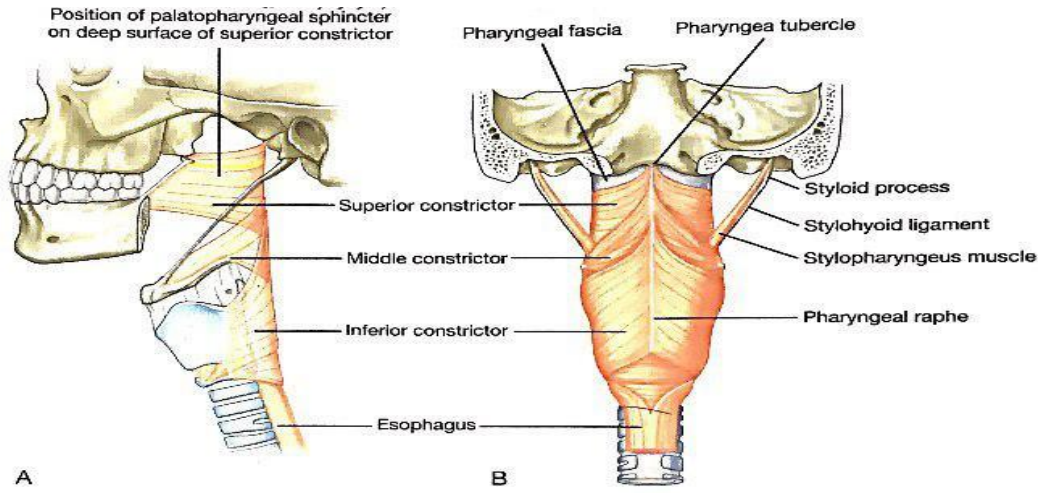
FIGURE Palate, nasal and oral cavities, and pharynx.

The pharynx
muscles of the pharynx

Two groups :

1. Circular : three constrictor muscles : superior , middle , and inferior
2. Three longitudinal muscles

Nerve supply : glossopharyngeal nerve[IX] and vagus nerve [X]



Constrictor muscles of the pharynx. **A.** Lateral view. **B.** Posterior view.

The esophagus

- Is a muscular tube (25cm) long .
- Extend from the pharynx to the stomach .
- Courses from the neck to the chest behind the trachea in the midline , and passes through the diaphragm to the abdomen .

The gastro – esophageal sphincter

No anatomical sphincter at the lower end of the esophagus , but the circular layer of muscles serves as physiological sphincter which prevents the contents of the stomach to reach the esophagus .

- Nerve supply vagus nerve [X]

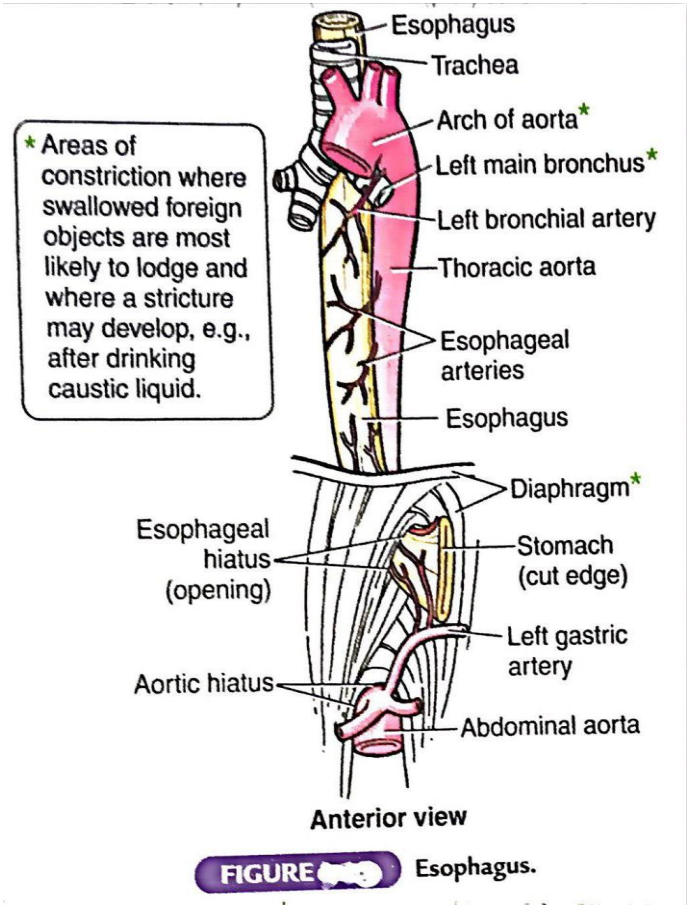
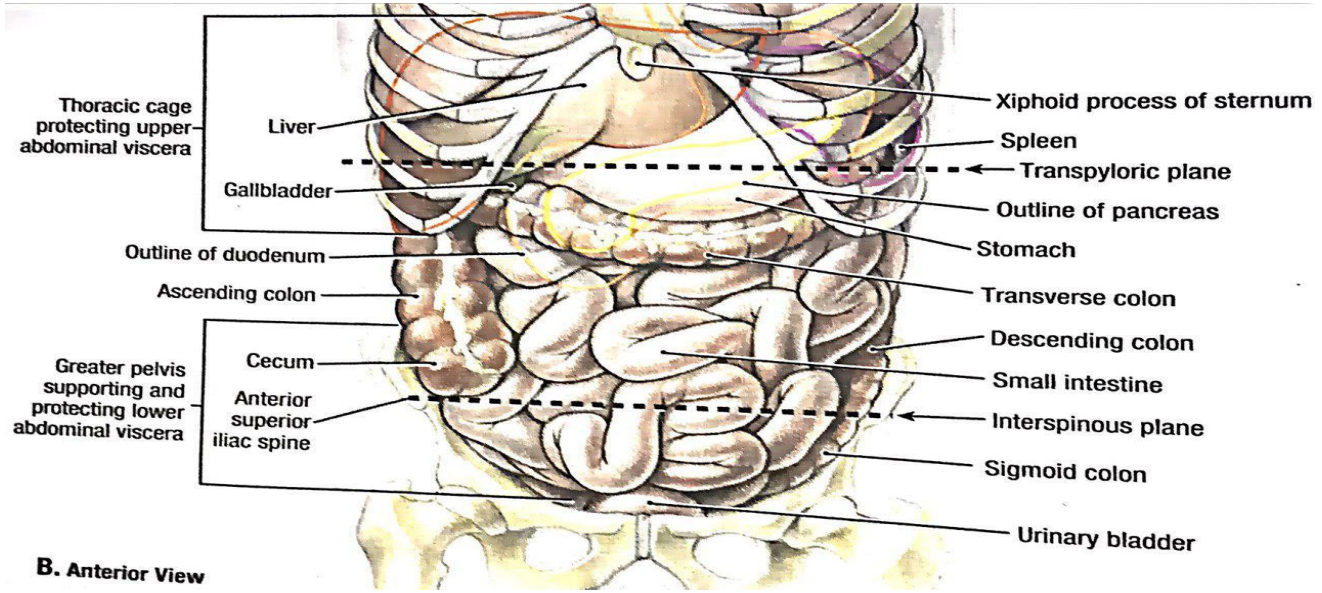


FIGURE Esophagus.

The stomach

- Is the most dilated part of the gastrointestinal tract .
- Has a J-like shape
- Positioned between the abdominal esophagus and the small intestine .
- Situated in the upper part of the abdomen extending from beneath the left costal margin region into the epigastric and umbilical regions .
- Much of the stomach is under cover of the lower ribs



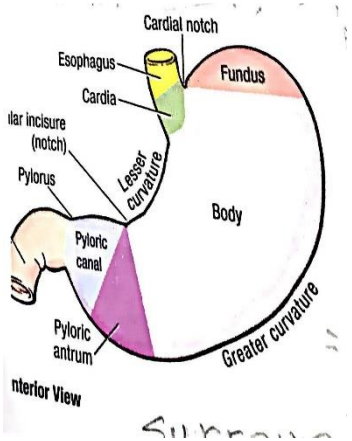
The stomach
regions of the stomach

1. The cardia : which surrounds the opening of the esophagus into the stomach .
2. The fundus of stomach : which is the area above the level of the cardiaic orifice .
3. The body of the stomach : which is the largest region of the stomach .
4. The pyloric part : which is divided into

a. Pyloric antrum : which is marked on the surface by the pyloric constriction

b. Pyloric canal : which contains a thickened ring of gastric circular

Muscle : the pyloric sphincter , which surrounds the distal end of the stomach , the pyloric orifice



The stomach

The stomach **has two orifices**

1. Cardiac : with the esophagus
2. Pyloric : into the duodenum .

And has two curvatures

1. The lesser curvature

Forms the right border of the stomach extends from the cardiac orifice to the pylorus it is suspended from the liver by the lesser omentum .

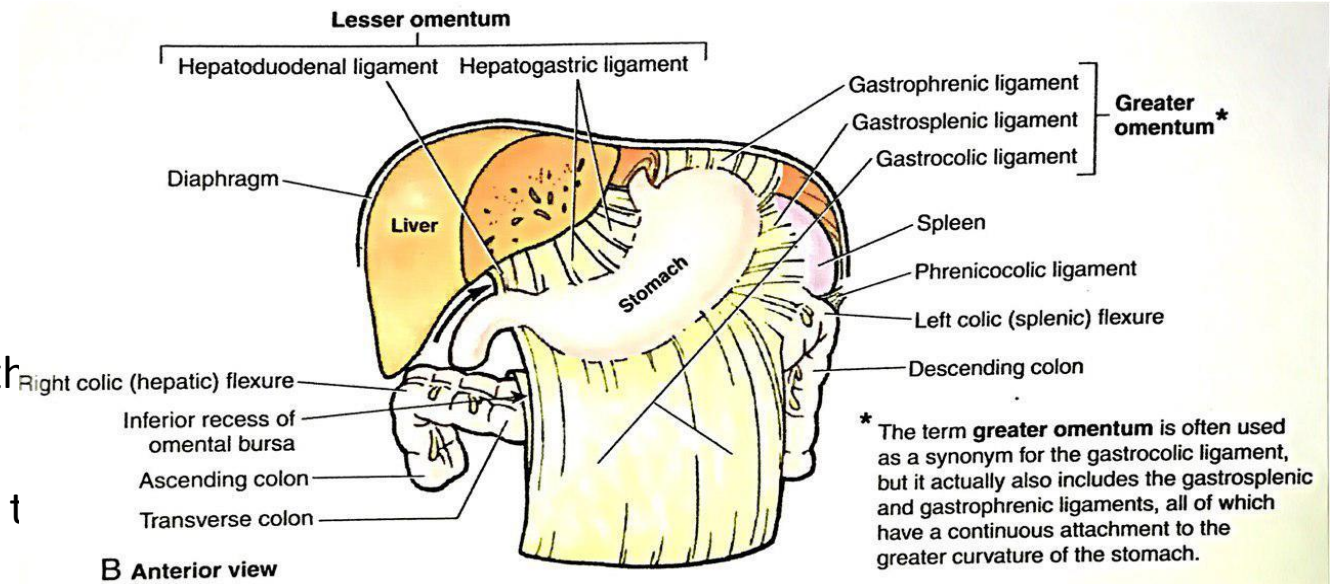
2**. The greater curvature** :

Extends from the left of the cardiac over the dome of the fundus and along the left border of the stomach to th pylorus .

- The greater omentum is attached to it and extends to t transverse colon .

And has two surfaces .

1. Anterior
2. Posterior



Abdominal contents and peritoneum. A. The anterior thoracic and abdominal walls have been cut away to show the undisturbed . **B.** Stomach, lesser and greater omenta, and associated peritoneal ligaments. *Arrow,* site of omental foramen.

The stomach

Functions of the stomach .

1. Stores food [has a capacity of about (1500 ml)in the adult]
2. Mixes the food with the gastric secretions to from a semifluid chyme
3. Controls the rate of delivery of the chyme to the small intestine .

The stomach

Arterial blood supply

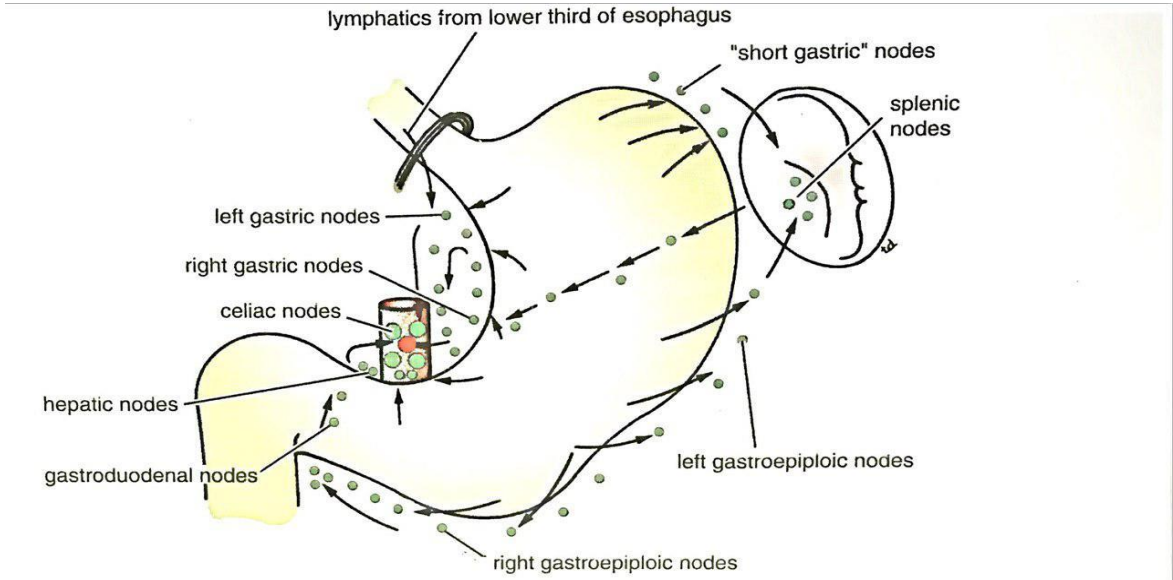
By branches of the celiac artery

Nerve supply :

By anterior and posterior vagal trunks

Lymphatic drainage

All lymphatic drain eventually to lymph nodes around root of the celiac artery on the posterior abdominal wall



Lymph drainage of the stomach. Note that all the lymph eventually passes through the celiac lymph nodes.

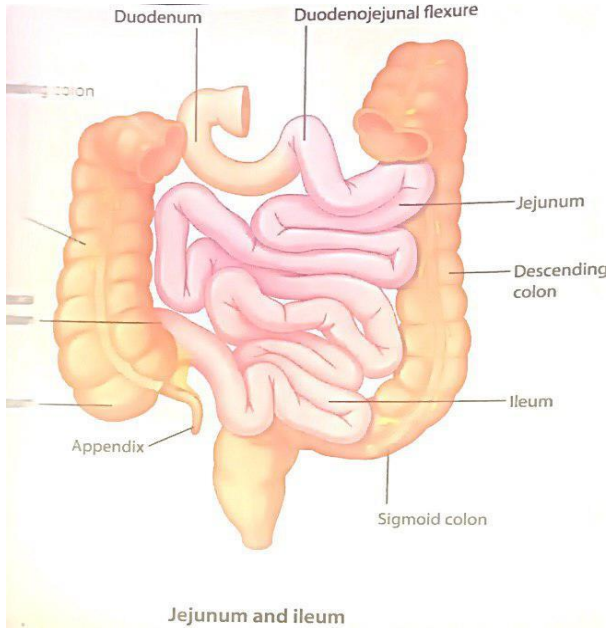
The small intestine

- Is the longest part of the gastrointestinal tract (6-7m long)
- This hollow tube with a narrowing diameter extends from the pyloric orifice of the stomach to the cecum (ileocecal fold)
- Parts of the small intestine

1. Duodenum
2. Jejunum
3. Ileum

Functions of small intestine

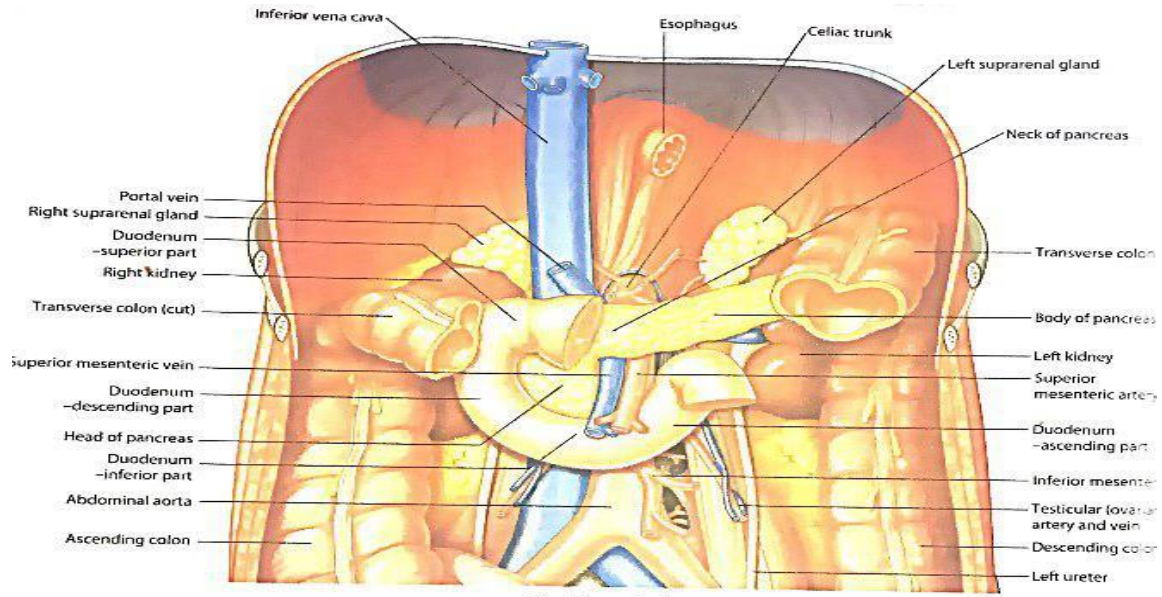
1. Digestion of food
2. Absorption of food



Jejunum and ileum

The small intestine
the duodenum

- The first part of the small intestine .
- C-shaped structure , adjacent to the head of the pancreas .
- It is 20 -25 cm long .
- It is retroperitoneal except its beginning



Duodenum in situ

The small intestine
the duodenum

Parts of the duodenum

1.The superior part (first part)

- Extends from the pyloric orifice of the stomach
- Anterior to the bile duct , portal vein , inferior vena cava .
- Most duodenal ulcers occur in this part

2.The descending part(second part)

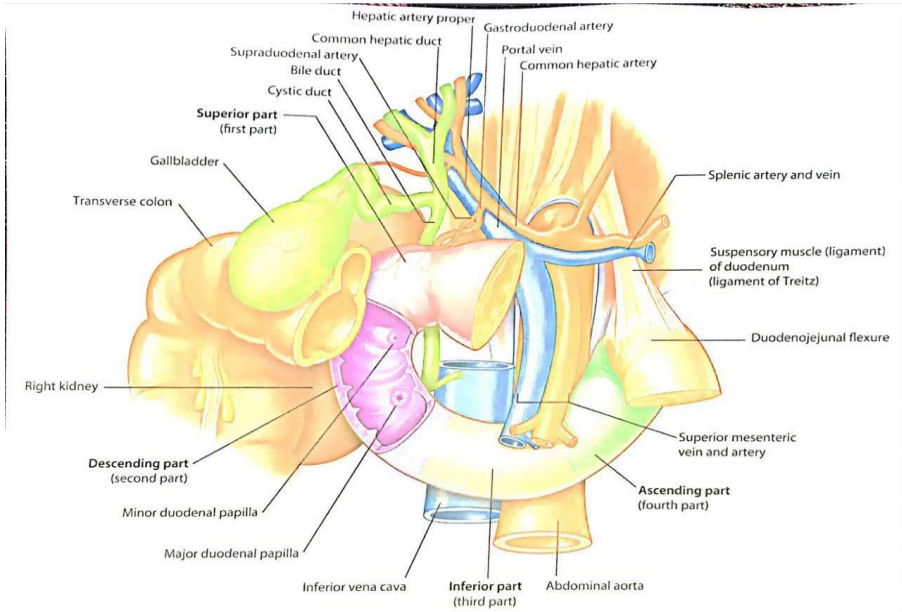
- Medial to it is the head of pancreas
- The bile duct and the pancreatic duct open into it at a common entrance (the major duodenal papilla)

3.The inferior part(third part)

- Crosses the infer vena cave , the aorta and the vertebral column .

4.The ascending part(fourth part)

- Passes upwards
- Terminates at the duodenojejunal flexure



Parts of the duodenum and related structures

The small intestine

The jejunum and ileum

- Make up the last section of the small intestine
- Jejunum represent the proximal two thirds
- Mostly in the left upper quadrant of abdomen
- Jejunum has larger diameter and thicker wall than ileum
- Ileum is mostly in the right lower

quadrant of the abdomen

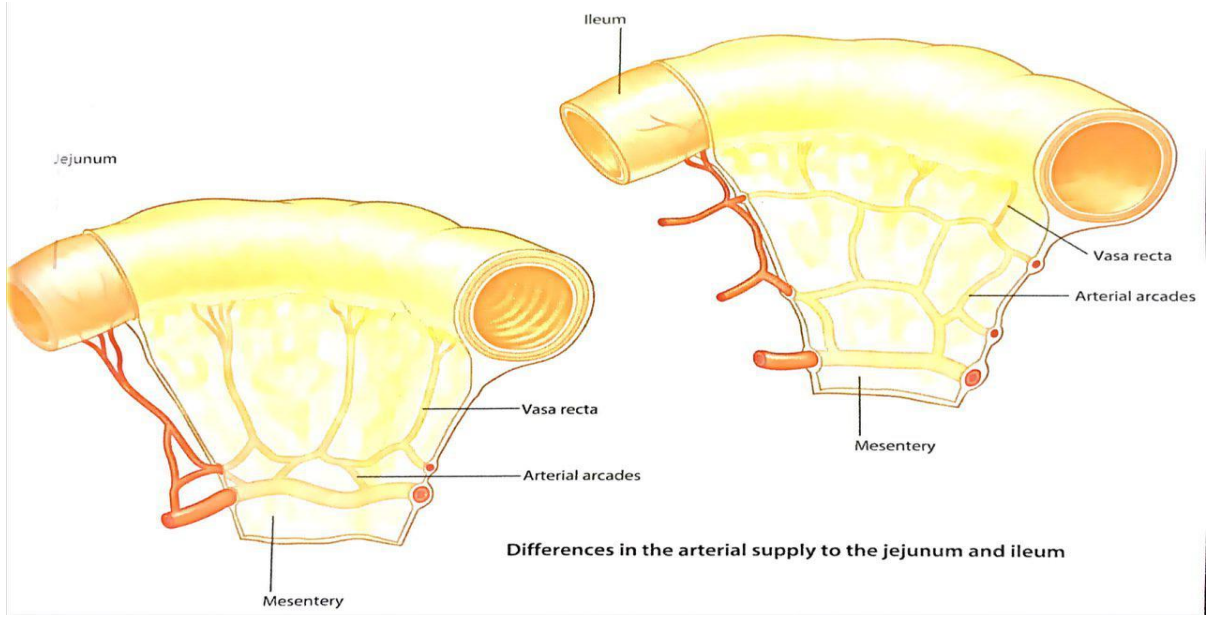
- Ileum opens into large intestine

where the cecum join the ascending

colon

- The ileocecal folds surround the

Opening, their function include preventing reflux from cecum to the ileum , and regulating the passage of contents from ileum to the cecum



Differences in the arterial supply to the jejunum and ileum

arterial blood supply : superior mesenteric artery

The large intestine

- Extends from the distal end of the ileum to the anus .
- It is approximately (1.5m)in adults.

Part of the large intestine

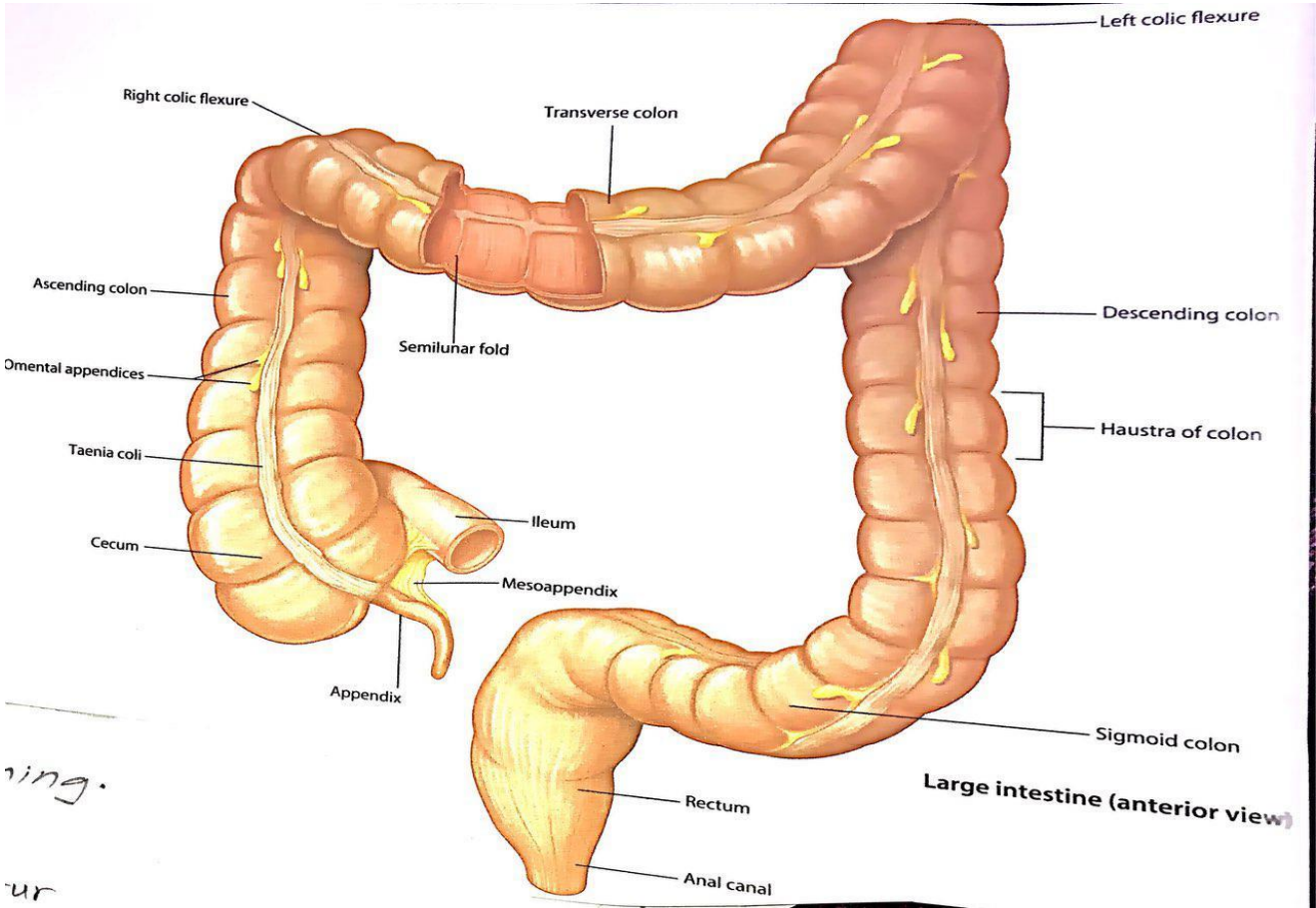
1.Cecum

2.Apendix

3.Colon

4.Rectum

5.Anal canal



Large intestine (anterior view)

The large intestine
the cecum and appendix

The cecum

- It is inferior to the ileocecal opening .
- Is in the right iliac fossa .
- It is an intraperitoneal structure
- Is continuous with the ascending colon at the entrance of the ileum .
- Appendix is attached to the posterolateral wall of the cecum

The appendix

- Is a narrow , hollow , blind-ended tube
- Connected to the cecum
- Has a large aggregation of lymphoid tissue

The large intestine
the colon

Extends superiorly from the cecum .

Parts of the colon

1. Ascending colon
2. Transverse colon
3. Descending colon
4. Sigmoid colon

- The ascending and descending segments are retroperitoneal
- The transverse and sigmoid segments are intraperitoneal
- The right colic flexure is the junction of the ascending and transverse colons
- The left colic fleuxure is the junction of the transverse and descending colons
- The sigmoid colon is s-shaped structure quite mobile , its beginning is continuous with the ascending colon at the level of pelvic inlet and is continuous with the rectum.

Arterial blood supply : superior and inferior mesenteric arteries .

The large intestine
the rectum and anal canal

- **The rectum** is retroperitoneal structure
- Continuous with sigmoid colon and with the anal canal inferiorly
- The rectum lacks distinct taeniae coli muscles omental appendices and sacculations (of the other parts of the large intestine)

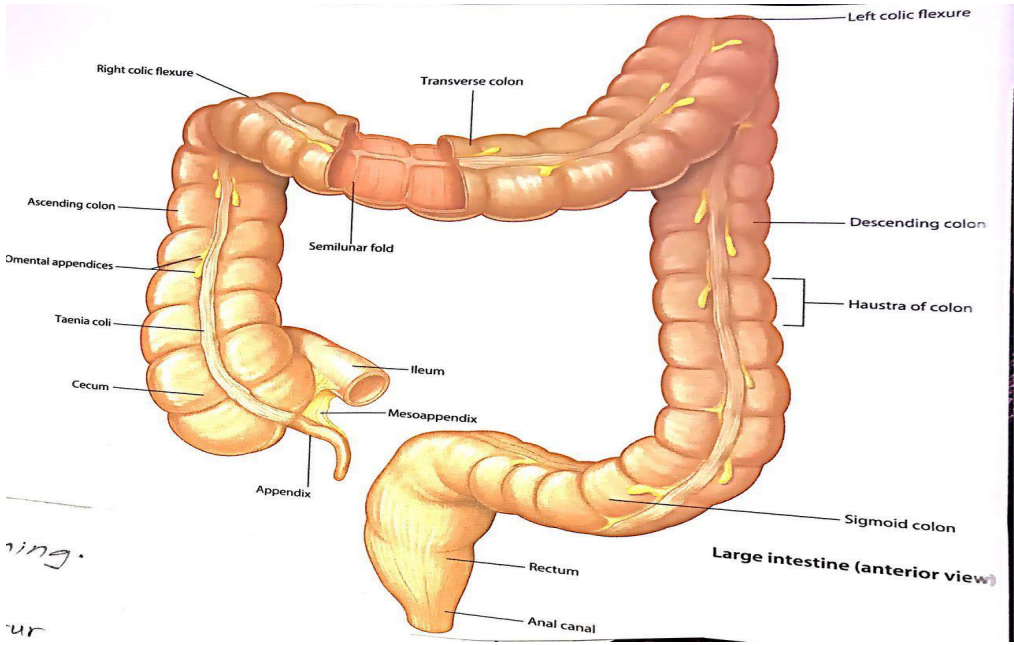
The anal canal

- Begins at the terminal part of the rectum
- Terminal at the anus after passing

the perineum

- As it passes through the pelvic floor it is

surrounded by the internal and external anal sphinctors which normally keep it closed



The large intestine
functions of the large intestine

1. Absorption of water and electrolytes
2. Storage of undigested material
3. Elimination of undigested and undigestable material from the body as feces in the process of defecation

Differences between small and large intestine

A. **External differences**

1. **Mobility** : the small intestine (except the duodenum) is mobile , whereas the ascending and descending parts of the colon are fixed .
2. **The caliber** : the caliber of the full small intestine is smaller than that of the filled large intestine
3. **The mesentery** : the small intestine (except the duodenum) has a mesentery
4. **The muscles** : the longitudinal muscle of the small intestine forms a continuous layer around the gut , in the large intestine (except the appendix) the longitudinal muscle is collected into three bands (the tiniae coli)
5. **Fatty tags** : the large intestine has fatty tags attached to its wall , called the (appendices epiploicae) ; where as the small intestine has none
6. **The wall** : the wall of the small intestine is smooth , whereas that of the large intestine is sacculted

Differences between small and large intestine

B. The internal differences

1. The folds : the mucous membrane of the small intestine has permanent folds called (plicae circulares) which are absent in the large intestine
2. The villi : the mucous membrane of the small intestine has villi , which are absent in the large intestine
3. The lymphoid tissue : aggregations of lymphoid tissue called(Peyer's patches) are found in the mucous membrane of the small intestine , these are absent in the large intestine