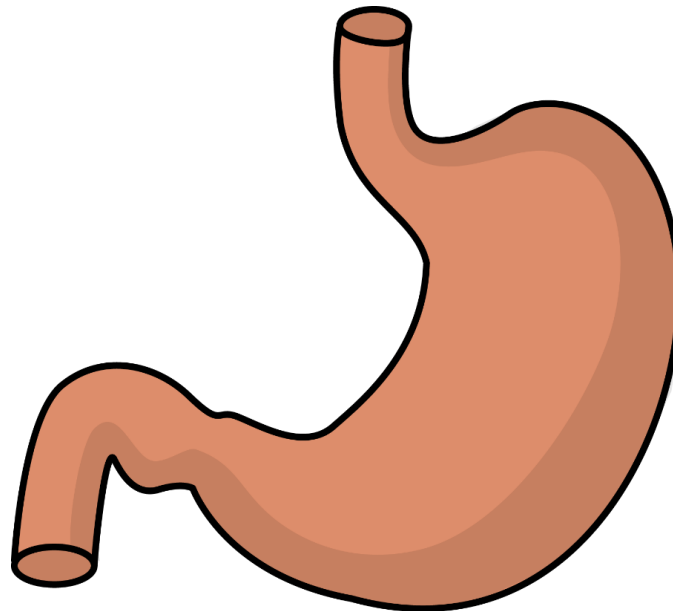




ANATOMY OF DIGESTIVE SYSTEM



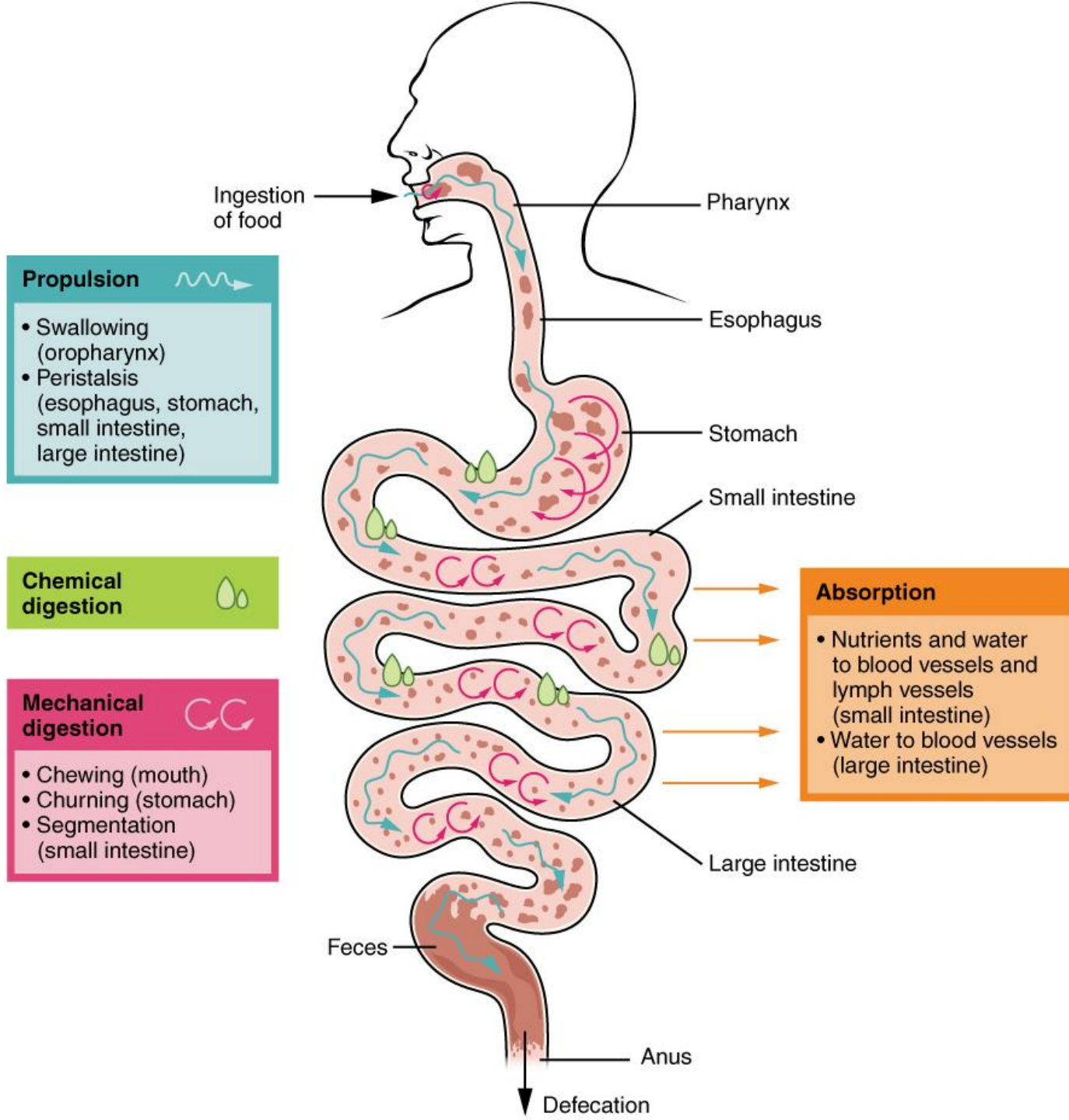
OBJECTIVES:

By the end of this lecture, student should

- understand the functions and general Structure of the digestive system

Functions of the Digestive System

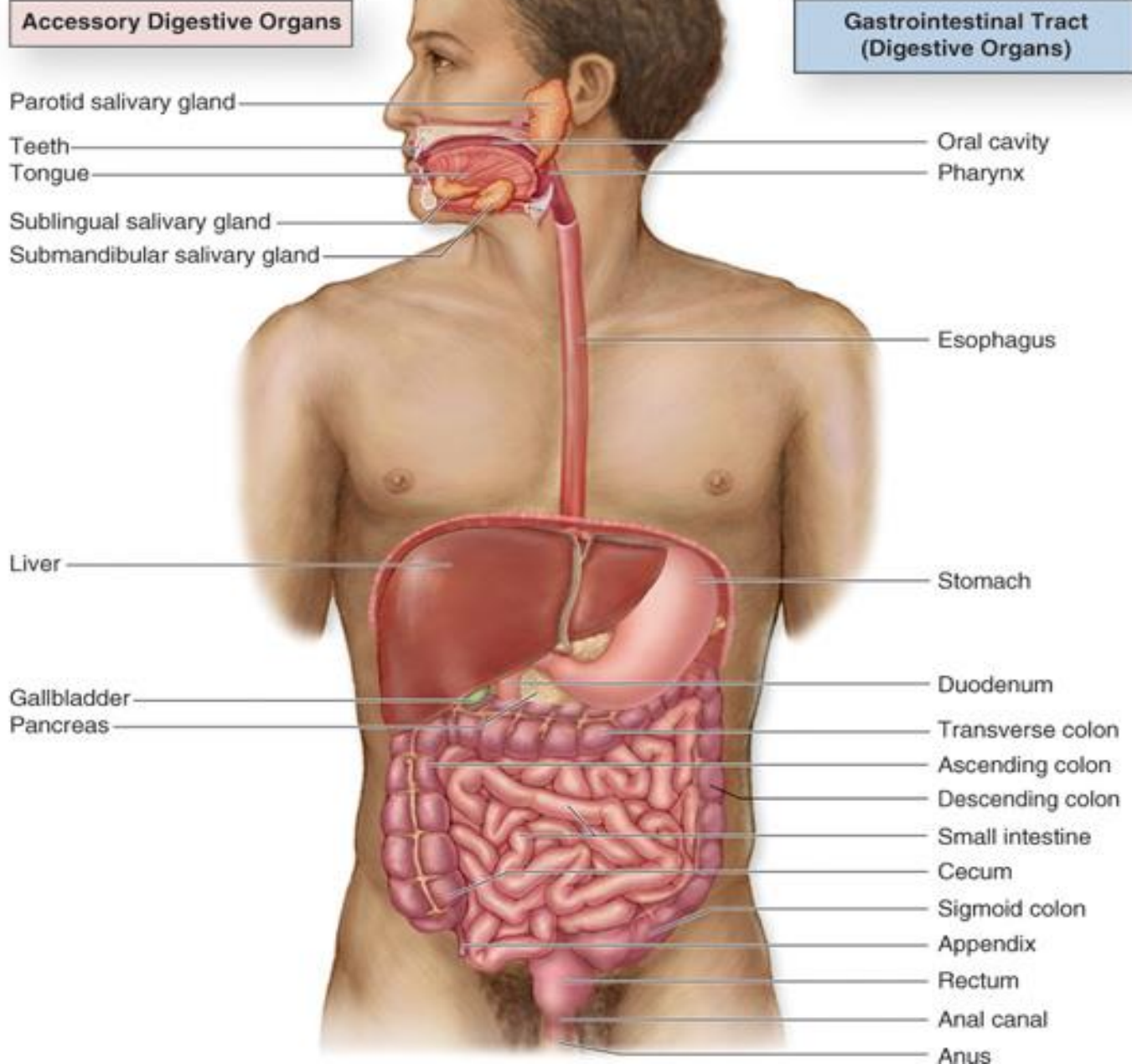
- ❖ **Ingestion:** the entry of food into the alimentary canal through the mouth.
- ❖ **Propulsion:** the movement of food through the digestive tract either voluntarily (swallowing) or involuntarily (peristalsis).
- ❖ **Mechanical Digestion**
Physical breakdown of food in preparation for chemical digestion and includes chewing, mixing, and churning
- ❖ **Digestion:** Enzymes breakdown complex food molecules into simpler building blocks (nutrients)
- ❖ **Absorption:** Passage of nutrients into the bloodstream.
- ❖ **Defecation:** undigested materials are removed from the body as faeces.



General Structure of the Digestive System

❖ Composed of two separate categories of organs:

- digestive organs
- accessory digestive organs.



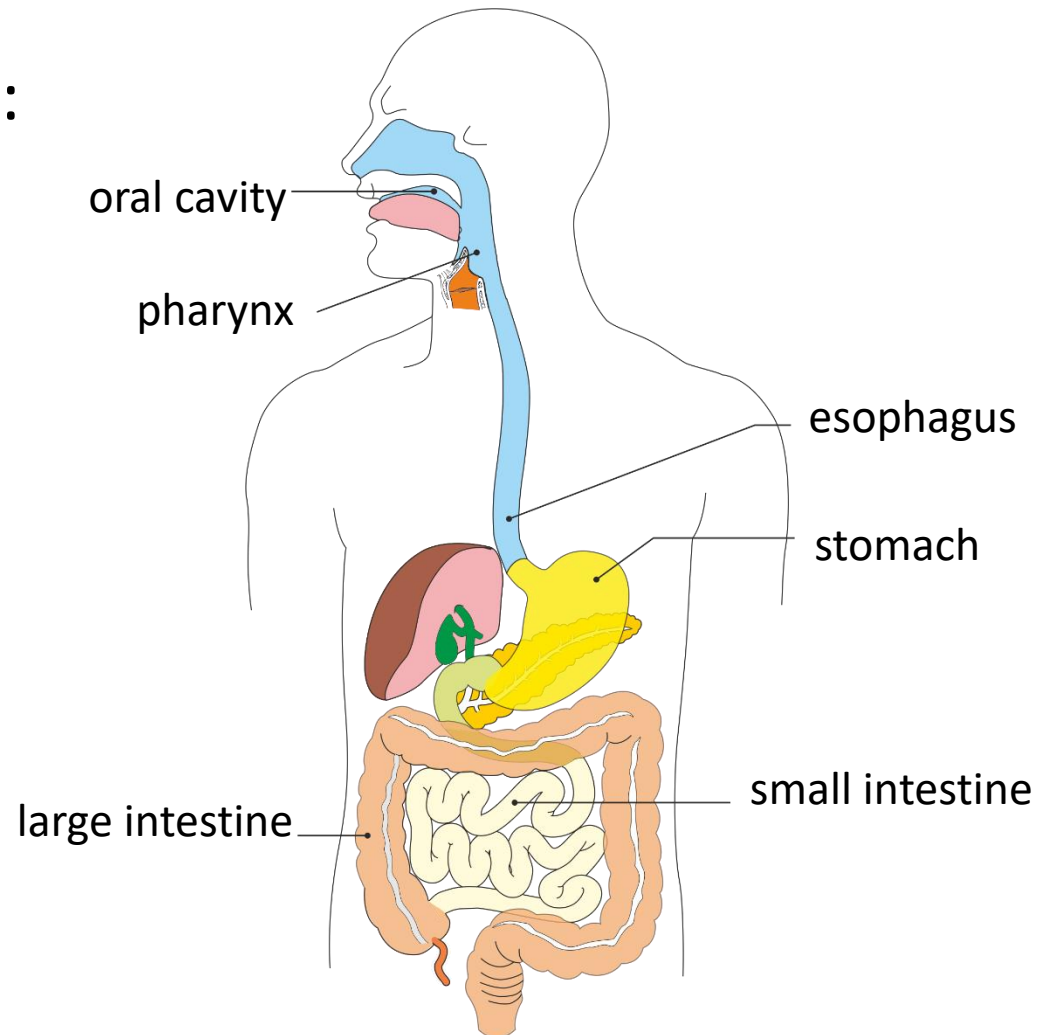
Digestive organs

- ❖ Digestive organs collectively make up the **gastrointestinal (GI) tract**, also called the **digestive tract** or alimentary canal.
- ❖ **The GI tract organs** is continuous tube about 30 feet (9–10 meters) from mouth to anus.

Digestive organs

Digestive organs include:

- oral cavity
- pharynx
- esophagus
- stomach
- small intestine
- large intestine



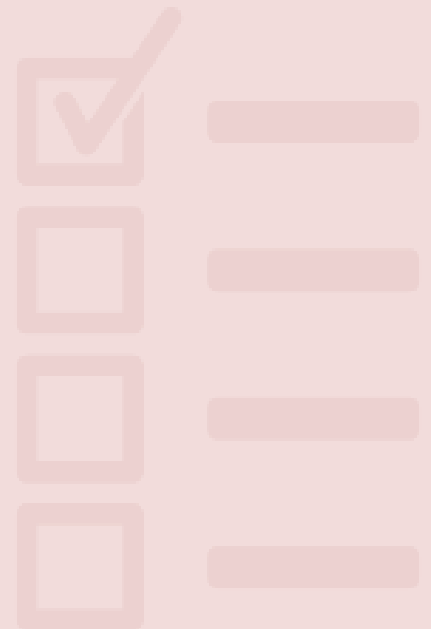
Accessory digestive organs:

Assist the GI tract in the digestion of food,
Include:

- Teeth
- Tongue
- Salivary glands
- Liver
- Gallbladder
- Pancreas

1. Which of these organs is not considered an accessory digestive structure?

- A. mouth
- B. salivary glands
- C. pancreas
- D. liver



Which of the following is an accessory organ of digestion?

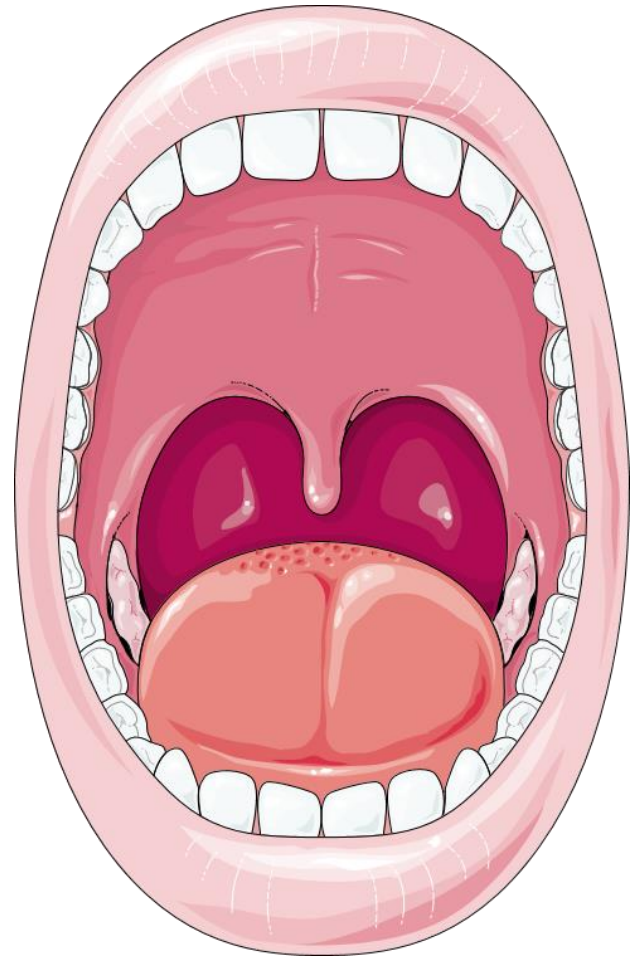
- A. Stomach
- B. Liver
- C. Colon
- D. Oesophagus



The digestive organs

Oral Cavity (mouth)

- ❖ Entrance to the GI tract
- ❖ Bounded anteriorly by the **teeth** and **lips**
- ❖ Bounded posteriorly by the **oropharynx**
- ❖ Superior boundary (roof) is formed by the **hard and soft palates**.



Oral Cavity (mouth)

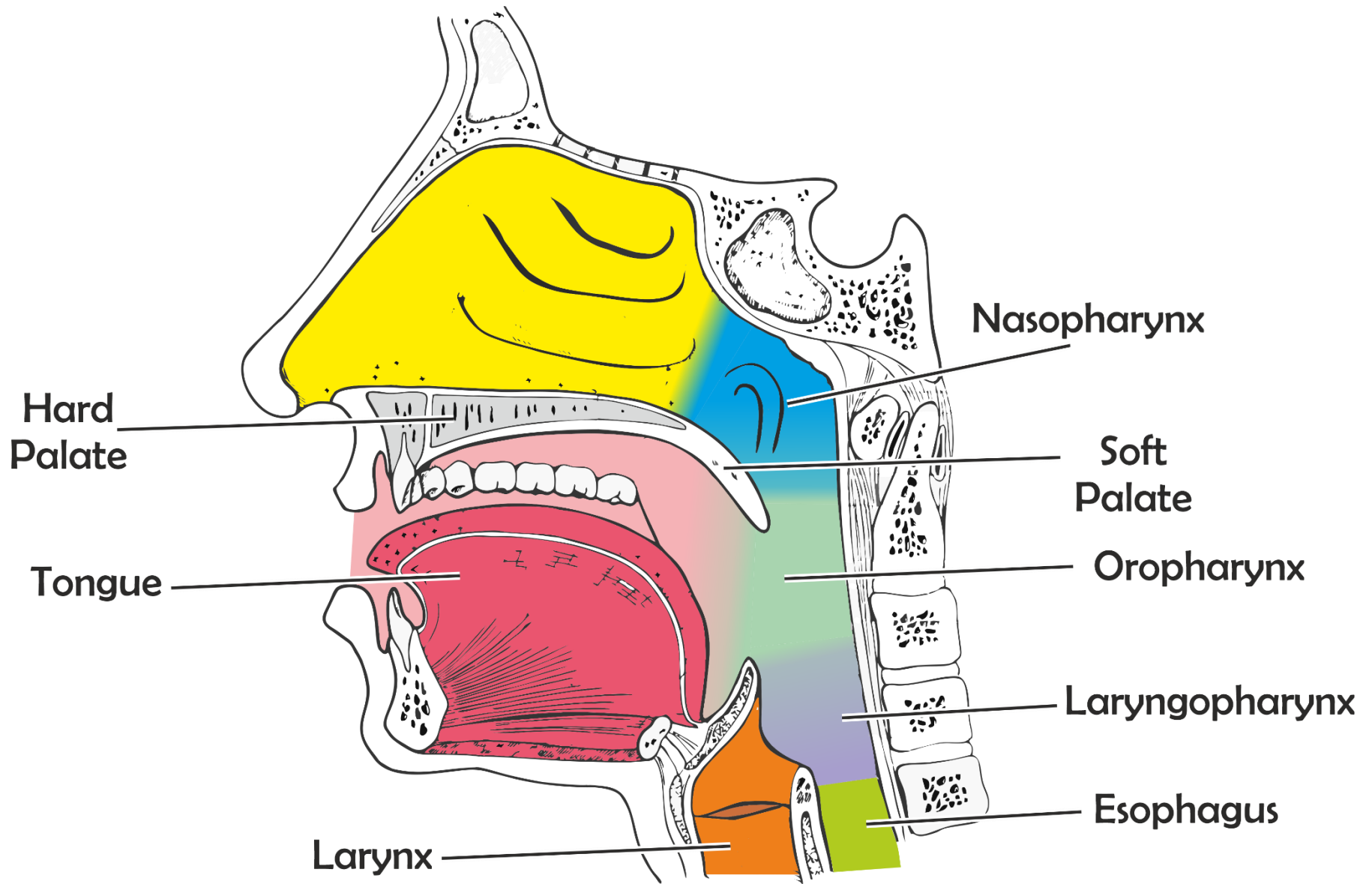
❖ Initial site of digestion:

- mechanical digestion (via mastication)
- chemical digestion (via enzymes in saliva).

The roof of the oral cavity is formed by the _____?

- A. vestibule.
- B. hard and soft palate.
- C. gingiva.
- D. tongue.
- E. pharynx.





Pharynx

- Review

Esophagus

- Tubular passageway
- About 25 cm in adult
- Connects Pharynx to stomach

Esophagus

Superior esophageal sphincter:

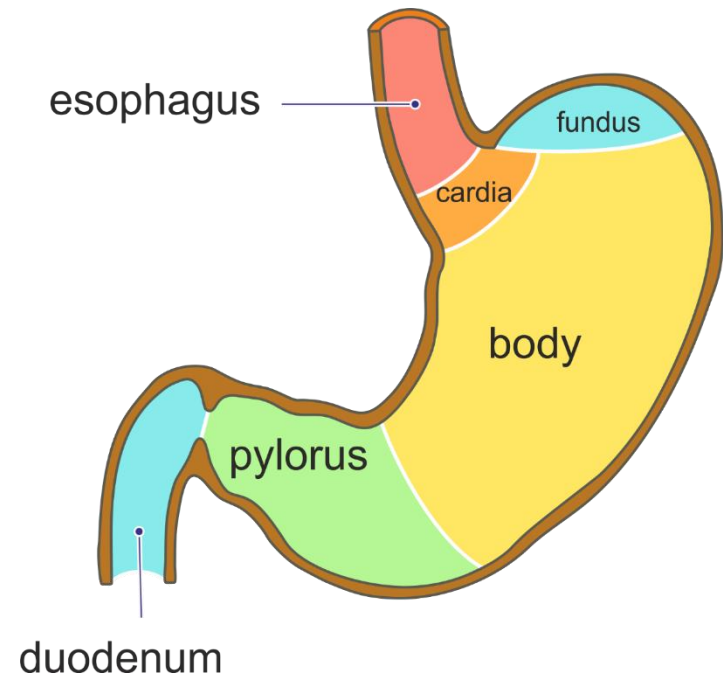
- between pharynx and esophagus
- **Skeletal** muscle

Inferior esophageal sphincter

- between esophagus and stomach
- **smooth** muscle
- Also called cardiac sphincter

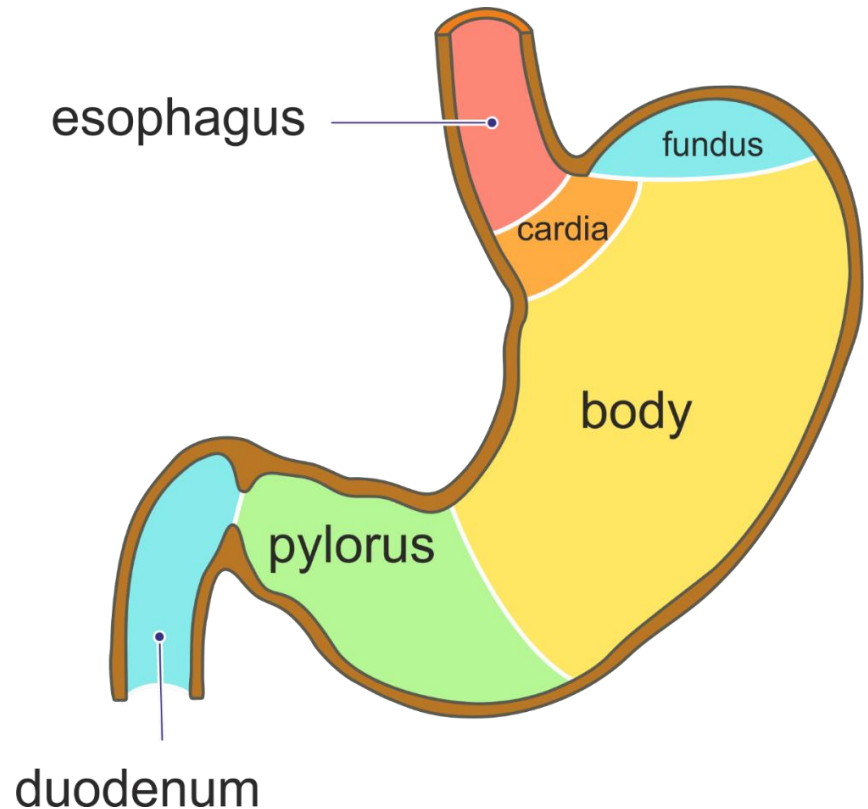
Stomach

- ❖ J-shaped elastic sac which is the widest part of the digestive system
- ❖ The stomach is divided into 5 regions:
 - **Cardia**
 - **Fundus**
 - **Body**
 - **Pylorus**
 - **Pyloric sphincter**



Regions of the stomach

1. **Cardia:** the point where the oesophagus connects to the stomach
2. **Fundus:** dome-shaped superior portion
3. **Body:** mid-region
4. **Pylorus:** lower funnel-shaped region
5. **Pyloric sphincter:** separates stomach and small intestine.



Functions of the Stomach

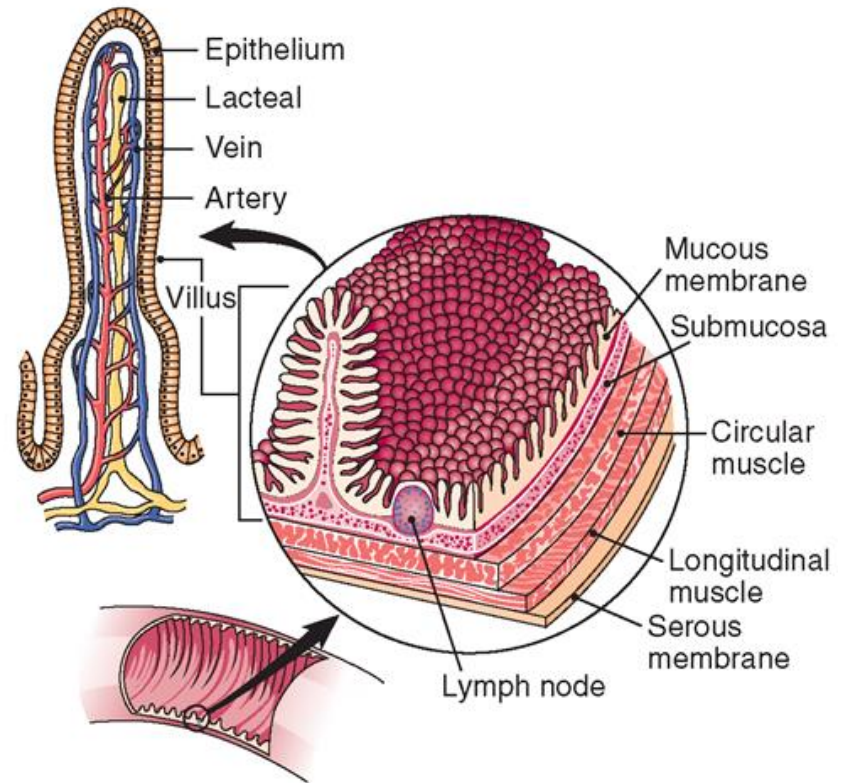
- Storing food and releases it gradually into the small intestine
- Digestion (Chemical , Mechanical):
 - Chemical: The stomach secretes acid and enzymes that digest food
 - Mechanical: peristaltic contractions mix food with stomach juices.

Small Intestine

- Most **chemical digestion** takes place in the small intestine
- Responsible for **absorbing** most of the nutrients.
- Ingested nutrients spend at least 12 hours in the small intestine.

Intestinal villi

- Villi are finger-like projections into the intestinal cavity
- Villi greatly increase intestinal absorptive surface area.



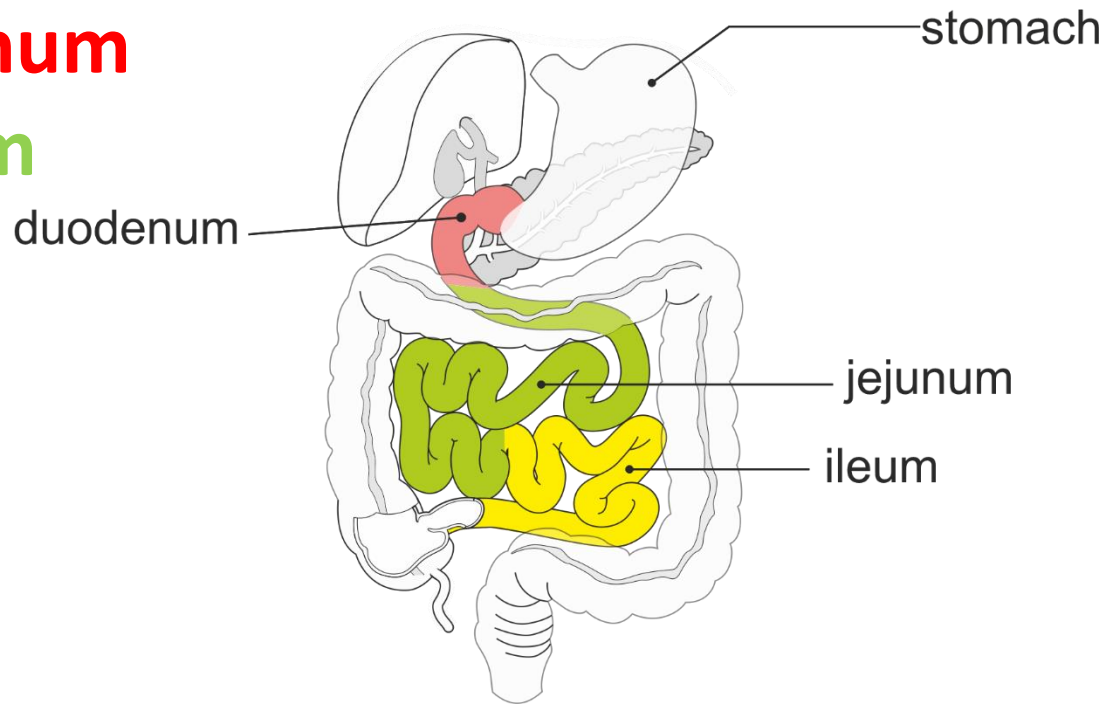
Small Intestine

- ❖ thin-walled tube
 - coiled
 - about 7 meters in length.
- ❖ Extends from the pylorus of the stomach to the cecum of the large intestine

Small Intestine

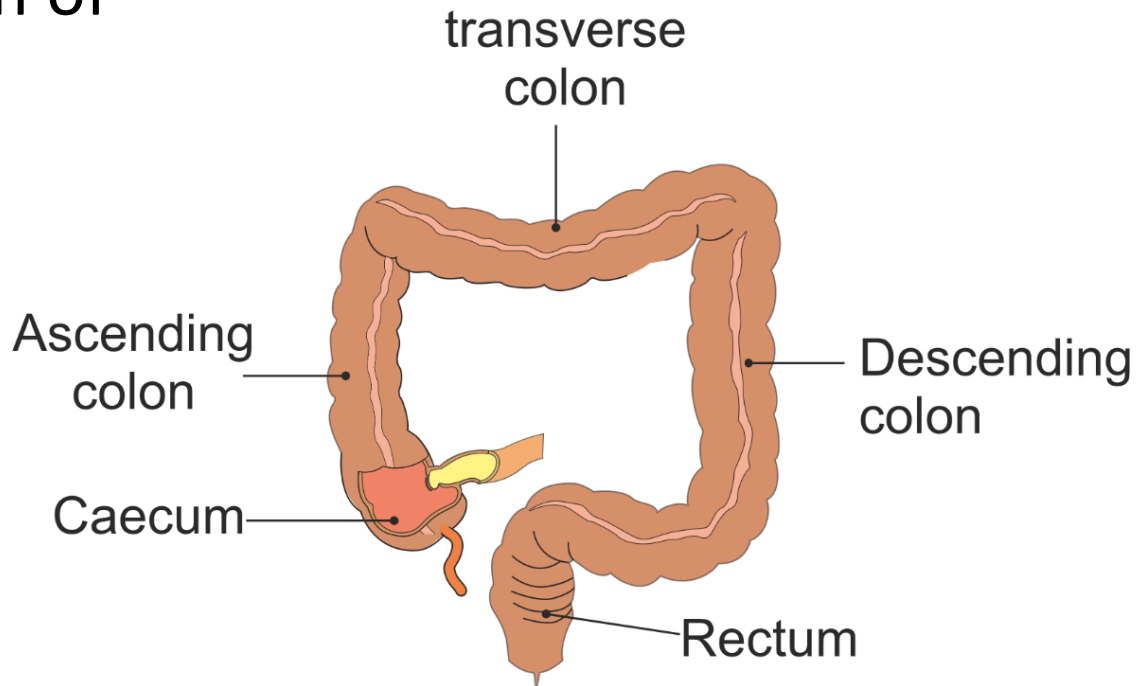
Three regions of the small intestine

- **The duodenum**
- **The jejunum**
- **The ileum**



Large Intestine

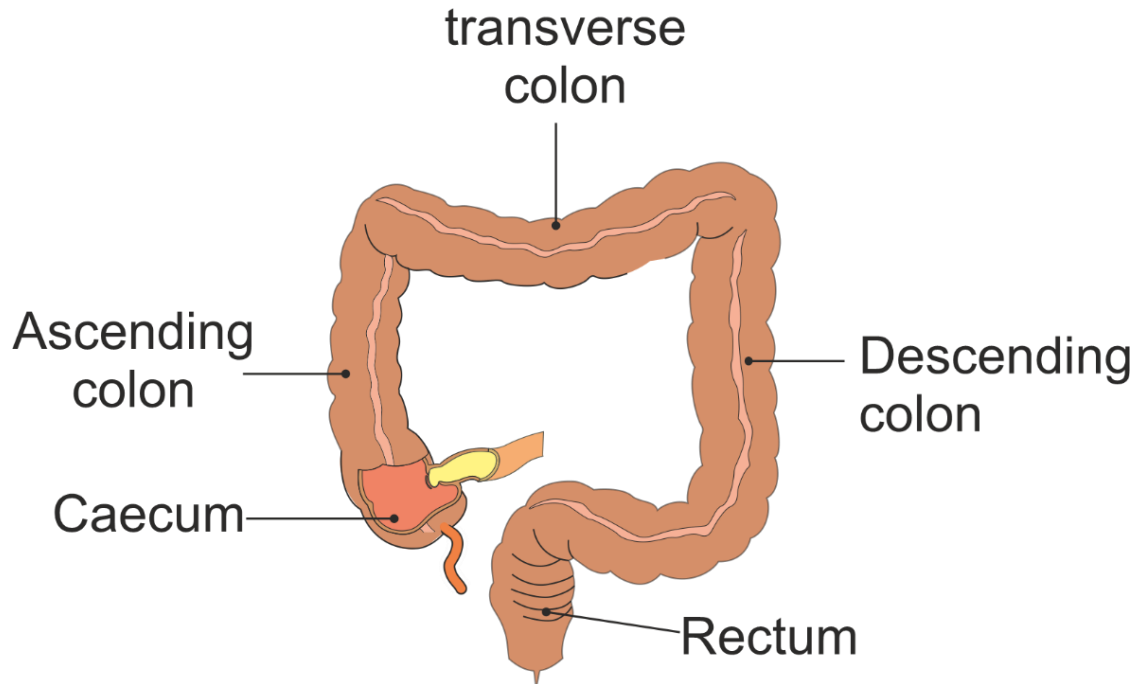
- ❖ The last part of the gastrointestinal tract
- ❖ Approximate length of 1.5 meters.



Large Intestine

❖ Composed of four segments:

1. Cecum,
2. colon,
3. rectum,
4. anal canal



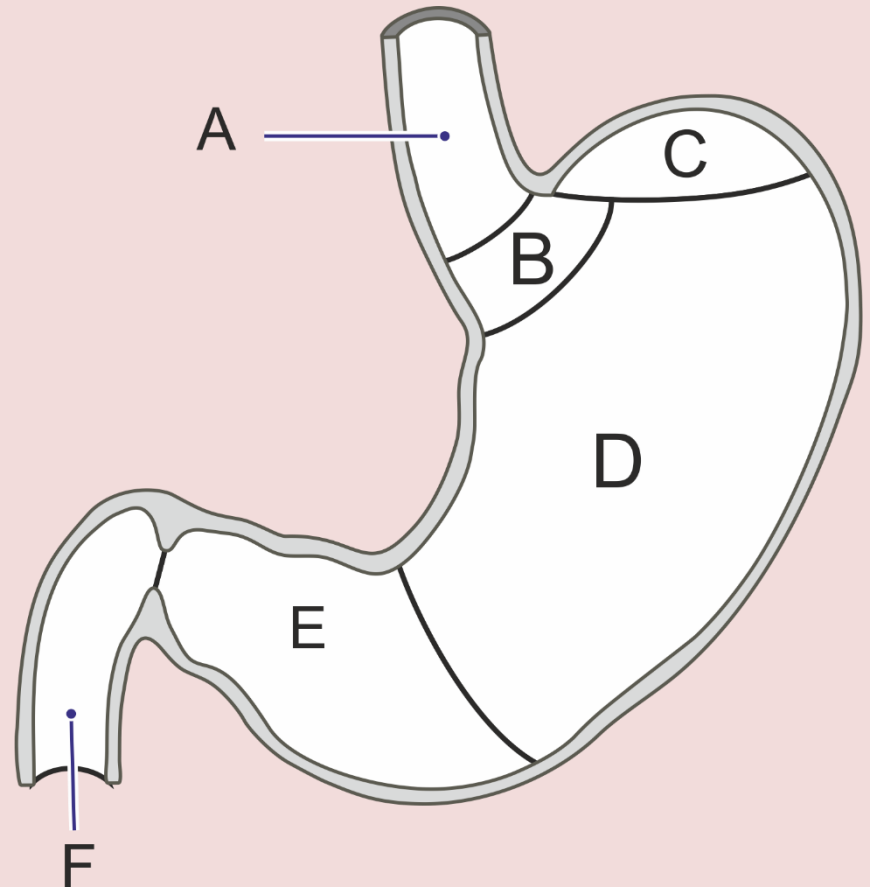
Large Intestine

- ❖ Absorbs excess water from the remaining undigested material.
- ❖ Watery material that first enters the large intestine gradually solidifies and becomes feces.
- ❖ Stores fecal material until the body is ready to defecate.



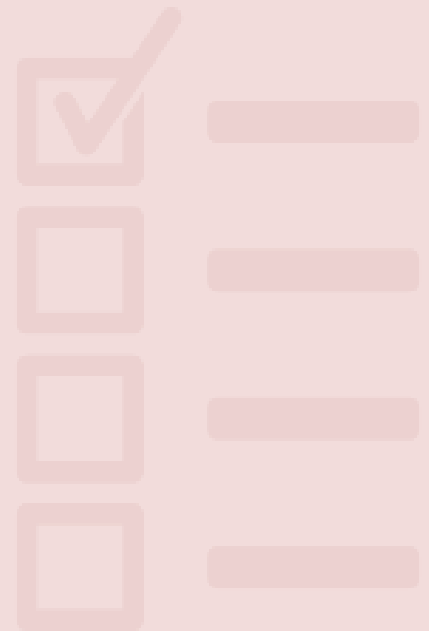
Fill in the spaces

- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____



Finger-like projections into the intestinal cavity are called _____

- A. Villi
- B. Conchae
- C. Rugae
- D. Papillae



Accessory digestive organs

Accessory digestive organs:

Assist the GI tract in the digestion of food,
Include:

- Teeth
- Tongue
- Salivary glands
- Liver
- Gallbladder
- Pancreas

Teeth

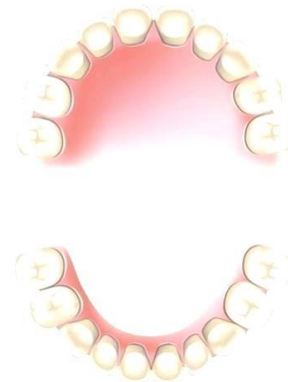
- ❖ Collectively known as the **dentition**.
- ❖ Responsible for **mastication** (first part of the mechanical digestion).



Two sets of teeth

- 20 deciduous teeth, also called “milk teeth,” erupt between 6 months and 30 months after birth.
- These teeth are eventually lost and replaced by 32 permanent teeth.

Deciduous Dentition (Baby-Primary Teeth)



Upper Teeth

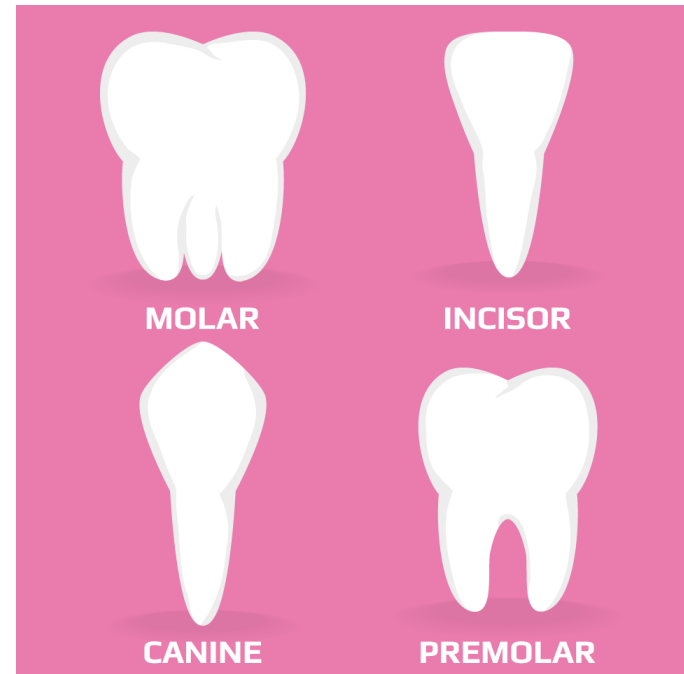
Lower Teeth

Permanent Dentition



Types

- **Incisors:** Front teeth adapted for cutting
- **Canine:** adapted for tearing and piercing
- **Premolars/Molars:** back teeth adapted for grinding



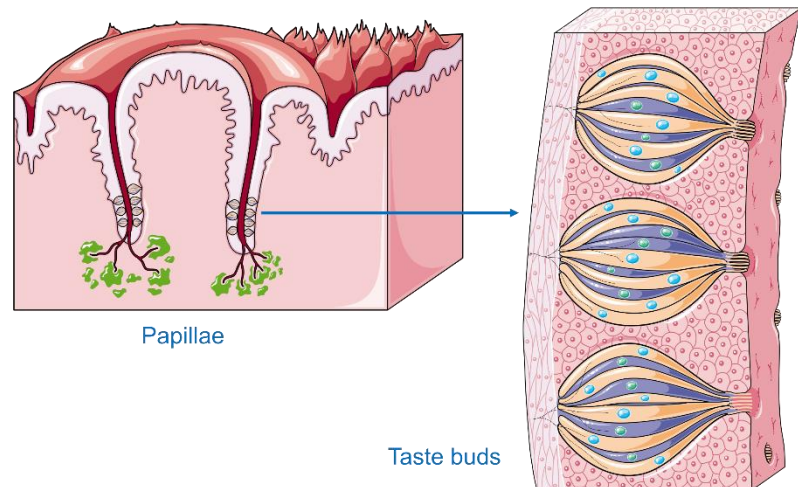
Tongue

- **Muscular organ** (Skeletal muscle).
- Inferior surface is attached to the floor of the oral cavity



Tongue

- The superior surface is covered by many small projections (papillae) that give the tongue its rough texture.
- Thousands of **taste buds** cover the surfaces of the papillae.



Functions of the Tongue

- **Mastication**

Manipulates and mixes food during mastication

- **Swallowing**

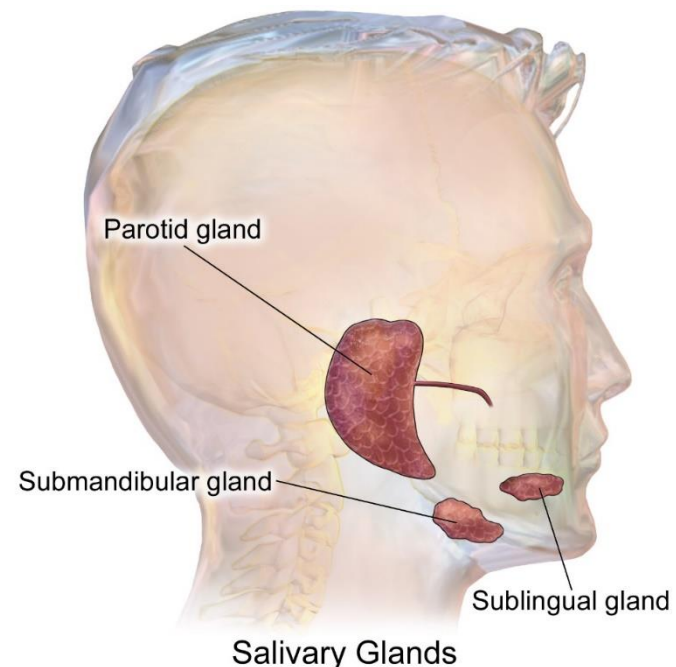
Performs important functions in swallowing.

- **Taste**

- **Speech**

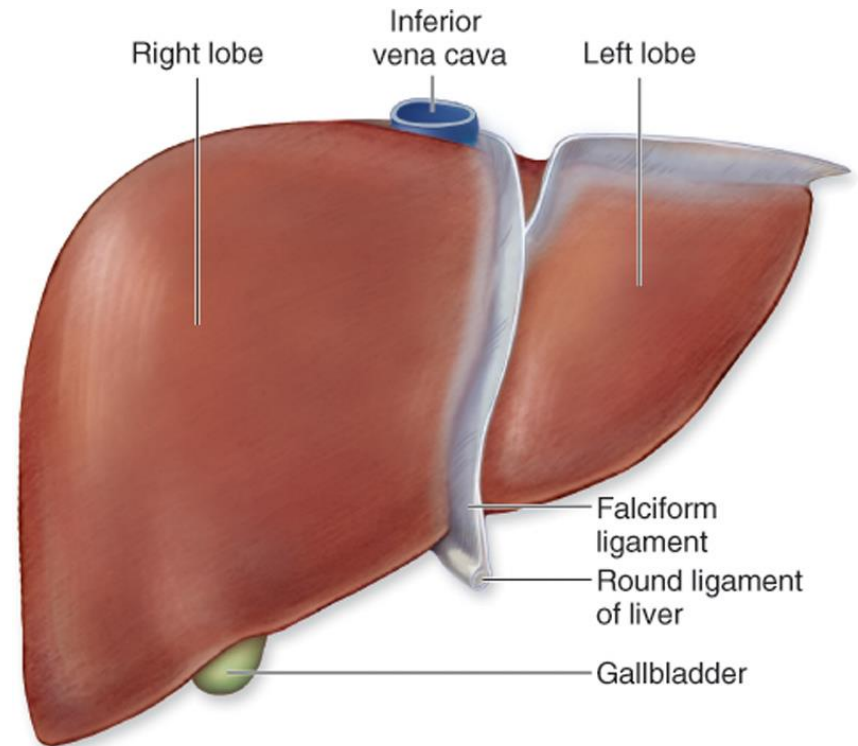
Salivary Glands

- ❖ Produce and secrete **saliva** (a fluid that assists in the initial activities of digestion)
- ❖ Humans have three **Three** pairs of salivary glands:
 - parotid glands
 - submandibular glands
 - sublingual glands



The liver

- Composed of four incompletely separated lobes
 - Right lobe
 - Left lobe
 - Caudate lobe
 - Quadrate lobe

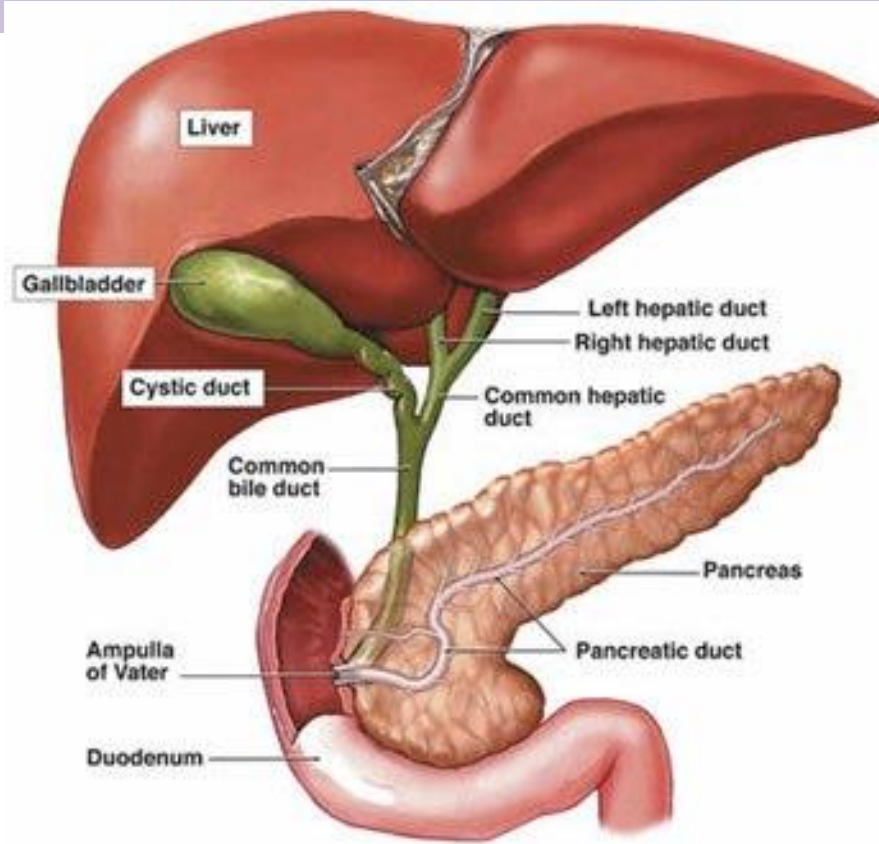


(a) Anterior view

Functions of The Liver

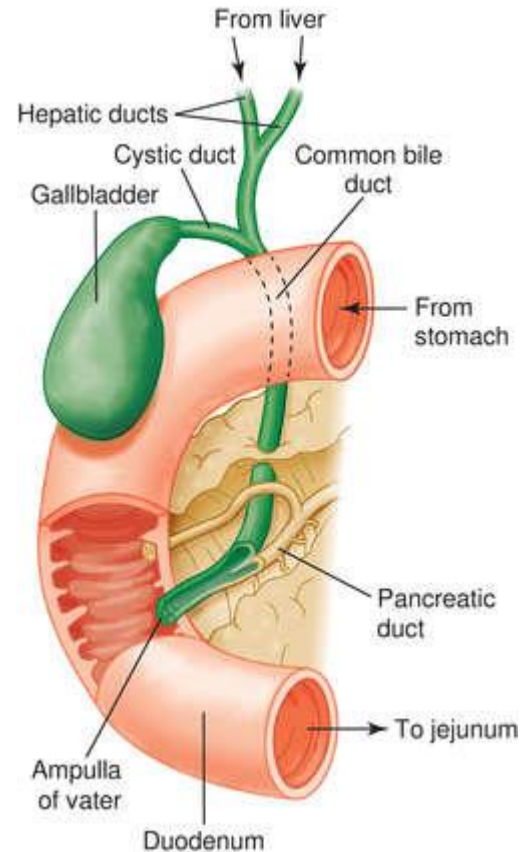
- ❖ Produce **bile**.
(bile is a greenish fluid that breaks down fats into small droplets to assist in their chemical digestion)
- ❖ **Detoxify** drugs, metabolites, and poisons.
- ❖ **Store** excess nutrients and vitamins and release them when they are needed.
- ❖ **Synthesize blood plasma proteins** such as albumins, globulins, and proteins required for blood clotting.
- ❖ Help break down and **recycle** components of aged and damaged **erythrocytes** .

Biliary System



Gallbladder

- The **gallbladder** is a pear-shaped sac
- Stores **concentrate bile** until it is needed for digestion
- **Cystic duct** connects the gallbladder to the **common bile duct**
- During a meal it contracts, secreting bile into the small intestine.



Pancreas

- **Mixed** gland because it exhibits both endocrine and exocrine functions
 - **Endocrine** functions are performed by the **pancreatic islets**.
 - **Exocrine** activity results in the secretion of digestive enzymes, collectively called **pancreatic juice**, into the duodenum.

Pancreas

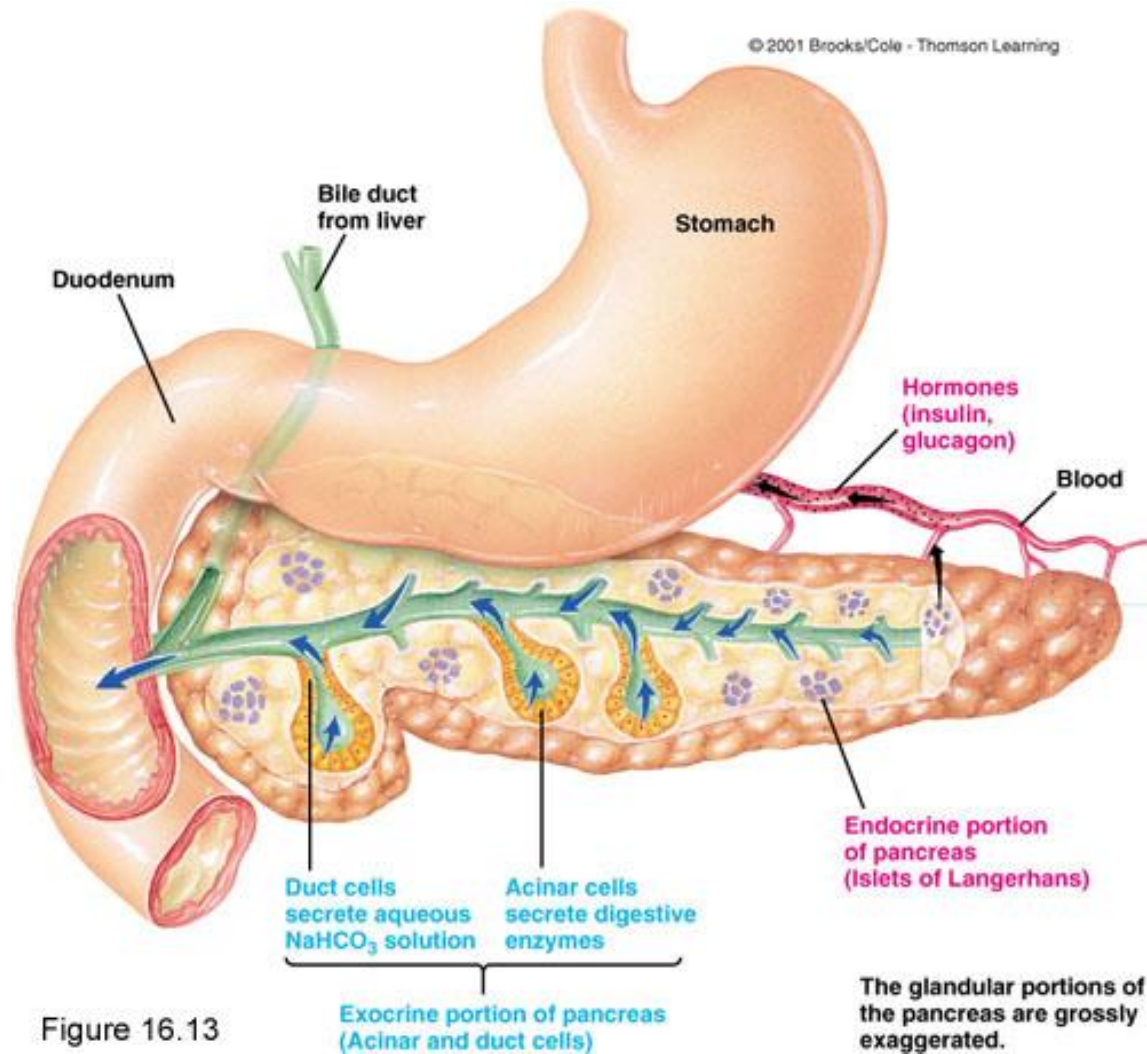
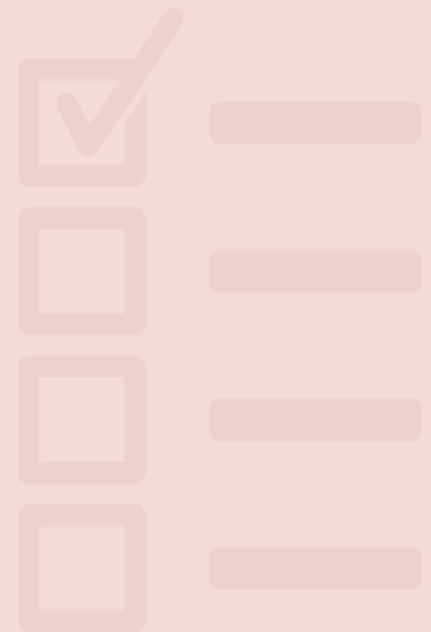


Figure 16.13



The _____ store and concentrate bile until it is needed for digestion

- A. Gallbladder
- B. Pancreas
- C. Liver
- D. Stomach



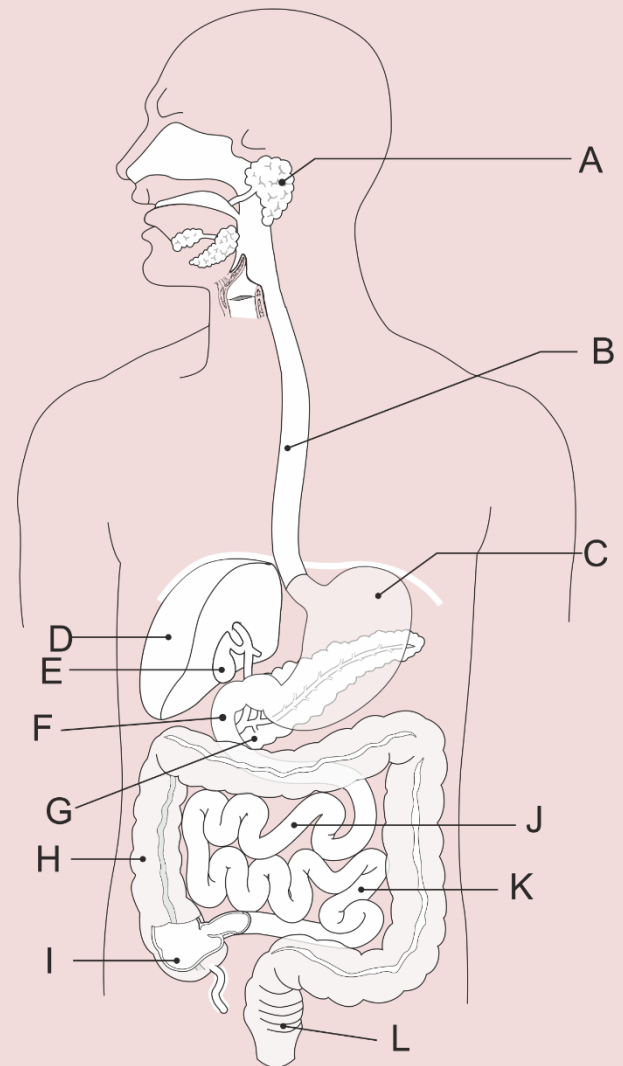
Identify the correct sequence of the movement of food through the body:

- A. Mouth → Pharynx → Oesophagus → Stomach → Small intestine → Large intestine
- B. Mouth → Oesophagus → Pharynx → Stomach → Small intestine → Large intestine
- C. Mouth → Pharynx → Oesophagus → Stomach → Large intestine → Small intestine
- D. Mouth → Pharynx → Stomach → Oesophagus → Small intestine → Large intestine



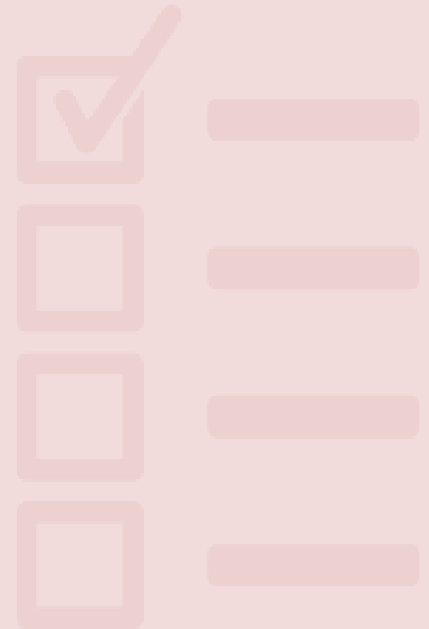
Fill in the space

- A.
- B.
- C.
- D.
- E.
- F.
- G.
- H.
- I.
- J.
- K.
- L.



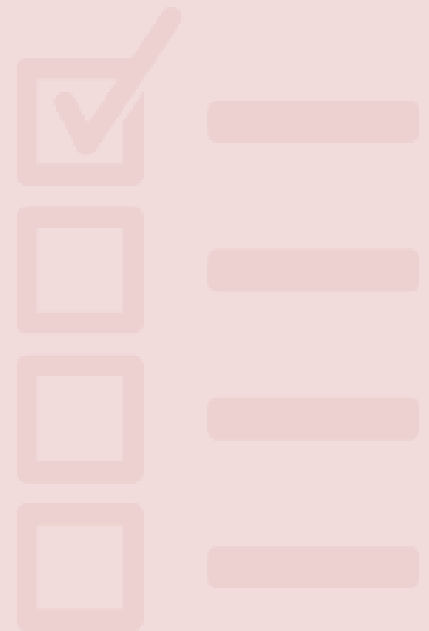
The portion of the small intestine that is closest to the stomach is the _____?

- A. ileum.
- B. colon.
- C. cecum.
- D. jejunum.
- E. duodenum.



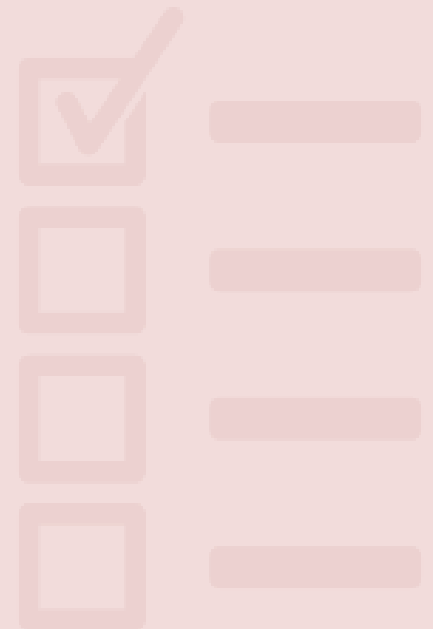
The terminal portion of the small intestine is known as the _____?

- A. Jejunum
- B. Ileum
- C. pyloric sphincter
- D. duodenum



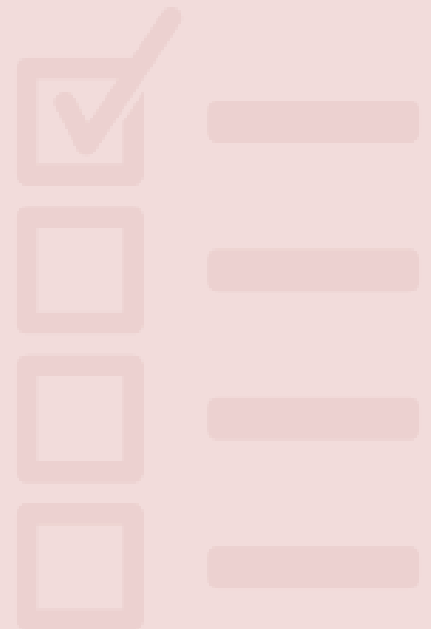
Synthesis of most blood plasma proteins such as albumins, globulins, and blood clotting proteins is a function of _____?

- A. Bone marrow
- B. Liver
- C. Kidney
- D. Pancreas
- E. Spleen



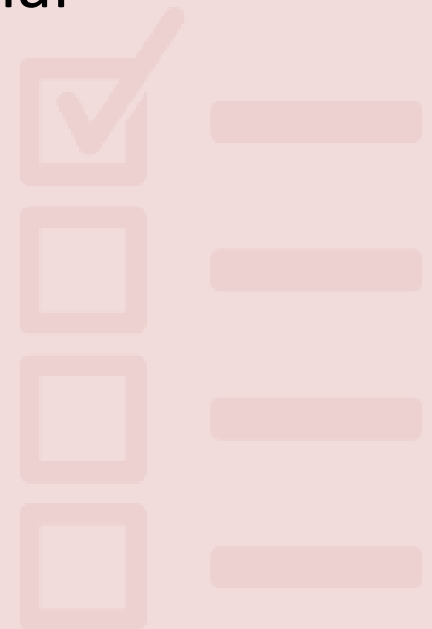
The first segment of the large intestine is _____?

- A. The jejunum
- B. The ileum
- C. The cecum
- D. The rectum



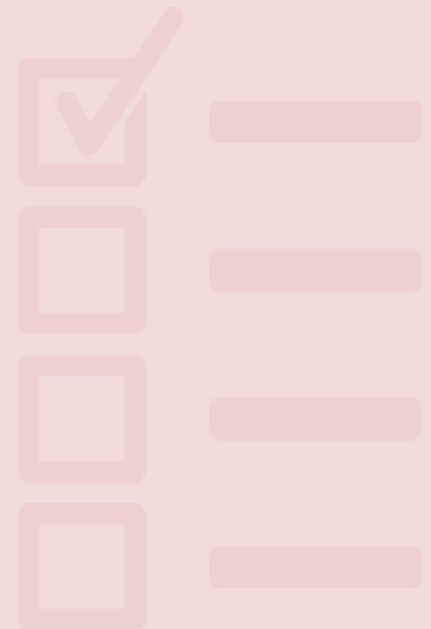
Segments of large intestine are:

- A. cecum, colon, rectum, anal canal
- B. ileum, colon, rectum, anal canal
- C. duodenum, jejunum, ileum and colon
- D. duodenum, jejunum, rectum, anal canal



The following are salivary glands:

- A. Parathyroid glands
- B. Thyroid glands
- C. Submandibular glands
- D. Pituitary glands
- E. Suprarenal glands



The liver composed of:

- A. Three incompletely separated lobes
- B. Four incompletely separated lobes
- C. Five incompletely separated lobes
- D. Six incompletely separated lobes
- E. Four completely separated lobes

