

Anatomy

Main and Accessory Organs of the Digestive System

The digestive system consists of **main (alimentary canal) organs** and **accessory digestive organs**. Together, they help in ingestion, digestion, absorption, and elimination of food.

Main Organs (Alimentary Canal)

These organs form a **continuous tube** through which food passes:

1. **Mouth (Oral Cavity)**
 - Entry point of food
 - Performs ingestion and mastication (chewing)
 - Begins chemical digestion of carbohydrates (saliva)
2. **Pharynx**
 - Common passage for food and air
 - Helps in swallowing (deglutition)
3. **Esophagus**
 - Muscular tube
 - Transports food from pharynx to stomach by peristalsis
4. **Stomach**
 - J-shaped muscular organ
 - Stores food and mixes it with gastric juices
 - Begins protein digestion
5. **Small Intestine**
 - Primary site for digestion and absorption
 - Divided into:
 - **Duodenum**
 - **Jejunum**
 - **Ileum**
6. **Large Intestine**
 - Absorbs water and electrolytes
 - Forms and stores feces
 - Includes:
 - Cecum
 - Colon (ascending, transverse, descending, sigmoid)
 - Rectum
 - Anal canal

Accessory Organs of Digestion

These organs assist digestion but **food does not pass through them directly**:

1. **Teeth**
 - Mechanical digestion by cutting and grinding food
2. **Tongue**
 - Helps in mixing food with saliva
 - Assists in swallowing and taste
3. **Salivary Glands**
 - Secrete saliva containing enzymes
 - Types:
 - Parotid
 - Submandibular
 - Sublingual
4. **Liver**
 - Produces bile for fat digestion
 - Plays a role in metabolism and detoxification
5. **Gallbladder**
 - Stores and concentrates bile
 - Releases bile into the duodenum
6. **Pancreas**
 - Produces digestive enzymes and bicarbonate
 - Aids in digestion of carbohydrates, proteins, and fats

Histological Layers of the Digestive Tract

The wall of the digestive (alimentary) tract, from the **esophagus to the anal canal**, is organized into **four basic histological layers**. These layers are arranged from the **lumen outward** and work together to carry out digestion, absorption, and movement of food.

1. Mucosa (Innermost Layer)

The **mucosa** lines the lumen of the digestive tract and is primarily involved in **secretion, absorption, and protection**. It consists of **three sublayers**:

a) Epithelium

- Directly lines the lumen.
- Type varies according to function:
 - **Stratified squamous epithelium** in the mouth, pharynx, esophagus, and anal canal (protection).
 - **Simple columnar epithelium** in the stomach and intestines (secretion and absorption).
- Contains specialized cells such as goblet cells for mucus secretion.

b) Lamina Propria

- A thin layer of **loose connective tissue**.
- Contains blood vessels, lymphatic vessels, nerves, and immune cells.
- Supports the epithelium and helps in nutrient absorption and immune defense.

c) Muscularis Mucosae

- A thin layer of **smooth muscle**.
- Produces local movements of the mucosa.
- Helps increase contact between food and the absorptive surface.

2. Submucosa

- Lies beneath the mucosa.
- Made of **dense connective tissue**.
- Contains:
 - Larger blood vessels and lymphatics.
 - Submucosal glands (in some regions).
 - **Submucosal (Meissner's) nerve plexus**, which controls glandular secretion and local blood flow.

3. Muscularis Externa

- Responsible for **movement of food** through the digestive tract (peristalsis and segmentation).
- Usually composed of **two layers of smooth muscle**:
 - **Inner circular layer** – constricts the lumen.
 - **Outer longitudinal layer** – shortens the tract.
- Between these two layers lies the **myenteric (Auerbach's) nerve plexus**, which regulates gut motility.
- In the stomach, an **additional inner oblique layer** is present for stronger mixing movements.

4. Serosa or Adventitia (Outermost Layer)

The outer covering depends on the location of the digestive organ:

a) Serosa

- Present in intraperitoneal organs (e.g., stomach, small intestine).
- Consists of **connective tissue covered by mesothelium**.
- Reduces friction between abdominal organs.

b) Adventitia

- Present in retroperitoneal organs (e.g., esophagus, parts of the colon).
- Made of connective tissue only.
- Anchors the organ to surrounding structures.