

# Chapter 10: Digestive System

## Digestive System: Overview

The digestive system is responsible for breaking down food into simpler substances that the body can absorb and use. It consists of organs and glands that work together to process food through digestion, absorption, and assimilation.

## Major Organs and Their Functions

1. **Mouth:** Digestion starts here. Teeth chew the food (mechanical digestion), and saliva contains amylase to break down starch (chemical digestion).
2. **Esophagus:** A muscular tube that uses peristalsis to move food from the mouth to the stomach.
3. **Stomach:** Secretes gastric juice (containing HCl and pepsin) to break down proteins into peptides. Churns food into a semi-liquid form called chyme.
4. **Small Intestine:** Main site for digestion and absorption. Pancreatic juice (contains enzymes like amylase, trypsin, and lipase) and bile (from the liver) help digest carbohydrates, proteins, and fats. Villi increase surface area for nutrient absorption.
5. **Large Intestine:** Absorbs water and forms feces. Contains beneficial bacteria that help in fermentation.
6. **Rectum and Anus:** Stores and expels waste.

## Digestive Glands and Their Enzymes

- **Salivary Glands:** Produce saliva containing amylase (digests starch).
- **Gastric Glands:** Secrete gastric juice (HCl and pepsin) for protein digestion.
- **Liver:** Produces bile, stored in the gallbladder, which emulsifies fats.
- **Pancreas:** Produces pancreatic juice containing enzymes (amylase, trypsin, lipase) for digesting carbs, proteins, and fats.
- **Intestinal Glands:** Secrete intestinal juice for final digestion.

## Processes Involved

1. **Digestion:** Breaking down complex food into simpler molecules.
2. **Absorption:** Villi in the small intestine absorb nutrients into the bloodstream.
3. **Assimilation:** Cells utilize absorbed nutrients for energy, growth, and repair.

## Peristalsis

Peristalsis is the rhythmic contraction and relaxation of muscles in the digestive tract that pushes food forward. It occurs throughout the alimentary canal, from the esophagus to the intestines.

## Key Enzymes and Functions

- **Amylase:** Starch to maltose.
- **Pepsin:** Proteins to peptides.
- **Lipase:** Fats to fatty acids and glycerol.
- **Trypsin:** Proteins to peptides.
- **Maltase:** Maltose to glucose.

## Conclusion

The digestive system ensures that food is broken down, absorbed, and utilized by the body, with various organs and glands playing specific roles in these processes.

