

Nutrients, Enzymes and Digestion Lesson 3: Ingestion

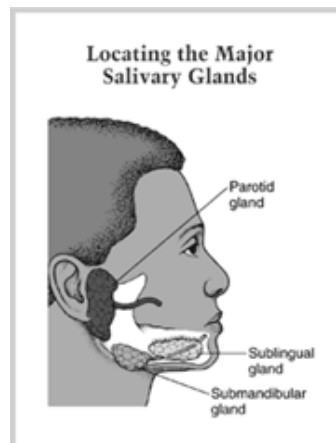
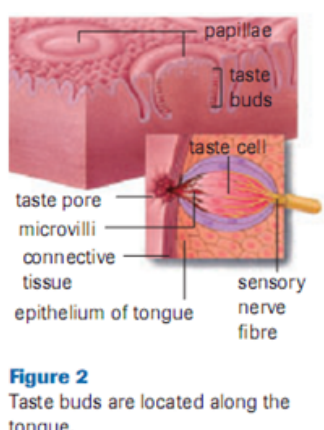
There are four components of the digestive process:

1. Ingestion - the taking in of nutrients
2. Digestion - the breakdown of complex organic molecules into smaller components by enzymes
3. Absorption - the transport of digested nutrients to the cells of the body
4. Egestion - the removal of food waste from the body

The Mouth

- Ingestion begins with putting food in the mouth
- The mouth has **teeth**, a **tongue** and **salivary glands** to help with ingestion and digestion
- Teeth are important structures for **physical digestion**
- chewing food into smaller pieces helps **increase surface area** for chemical digestion
- Salivary glands produce saliva which is a mixture of water and enzymes
- the water dissolves particles so that they can be tasted by chemical receptors on the tongue
 - the water also lubricated food so it can be swallowed
- an enzyme called **salivary amylase** is secreted in saliva
 - this begins the chemical digestion of starch

<http://www.tvdsb.on.ca/westmin/science/Sbi3a1/digest/enzymes.htm>



Esophagus

- The tube connecting the mouth with the stomach
- **epiglottis** - covers the opening to the trachea (windpipe)
- swallowing food causes the epiglottis to cover the trachea
- The **bolus** of food stretches the walls of the esophagus stimulating the smooth muscle which begins wavelike contractions that moves food down the esophagus
- **Peristalsis** - The rhythmic, wavelike contraction of smooth muscle
- Peristalsis moves food along the entire digestive tract
- Swallowing and **egestion** are the only voluntary control we have over food movement in digestion

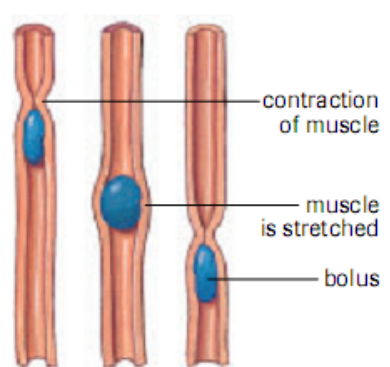
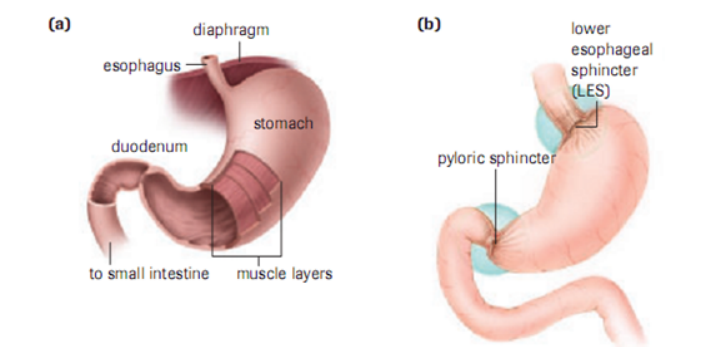


Figure 4
Rhythmic contractions of muscle
move food along the digestive tract.

Stomach

- Site of food storage and initial protein digestion
- Alcohol is absorbed in the stomach, but no nutrients are absorbed
- **Sphincter muscles** - rings of muscle that encircle places along the digestive tract
 - **cardiac sphincter** - contracts to close the opening to the stomach or relaxes to open
 - aka the Lower esophageal sphincter (LES)
 - **pyloric sphincter** - regulates the movement of food from the stomach to the small intestine



- The wall of the stomach is made up of 3 different types of cells:
 1. **Mucous cells** - secrete a protective coating
 2. **Parietal cells** - secrete **hydrochloric acid (HCl)**
 3. **Peptic (Chief) cells** - secrete **pepsinogen**, the inactive form of the protein digesting enzyme **pepsin**.
- Pepsinogen is changed to pepsin when it comes into contact with HCl in the stomach
- Approx. 500ml of stomach (gastric) juices are secreted following a meal
- The stomach has a pH of approximately **2**. This kills most bacteria present in food.
- The mucous lining of the stomach prevents HCl from corroding the stomach and prevent pepsin from digesting the proteins in the stomach wall.
- If the mucous lining breaks down then the cells are exposed to HCl and pepsin, which destroys cells causing an ulcer.



http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter26/animation_organs_of_digestion.html