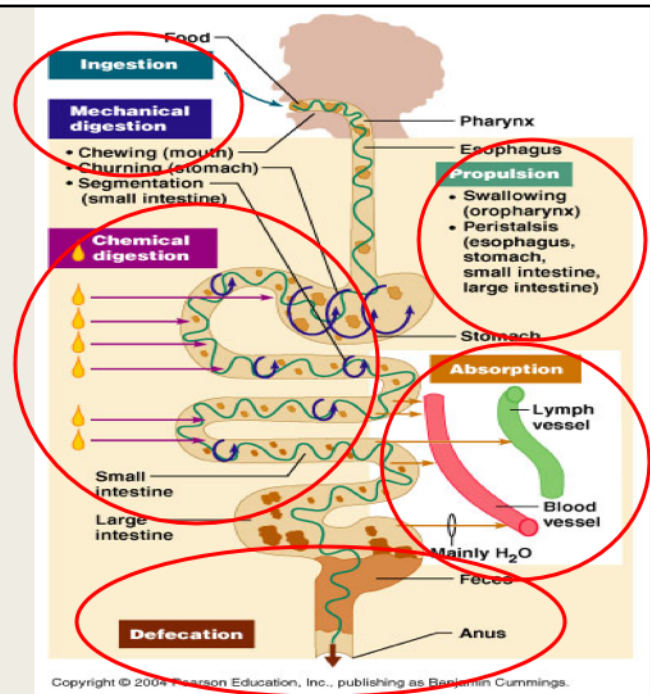




# DIGESTIVE SYSTEM

## Functions

- Ingest food and break it down into nutrient molecules for energy, growth, repair
- Absorb molecules into the bloodstream
- Eliminate indigestible remains



## Mechanical and Chemical digestion

### ■ Mechanical

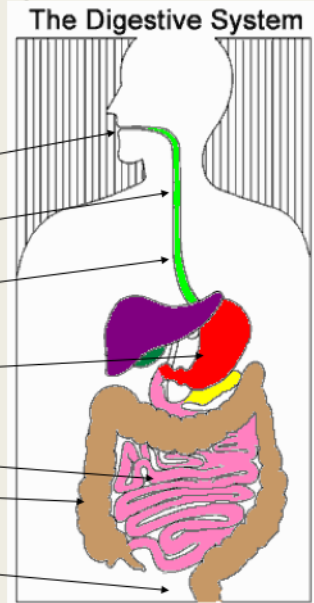
- *Chewing*
- *Tearing*
- *Grinding*
- *Mashing*
- *Mixing to increase surface area (increases absorption)*

### ■ Chemical

- *Enzymes break down macromolecules*

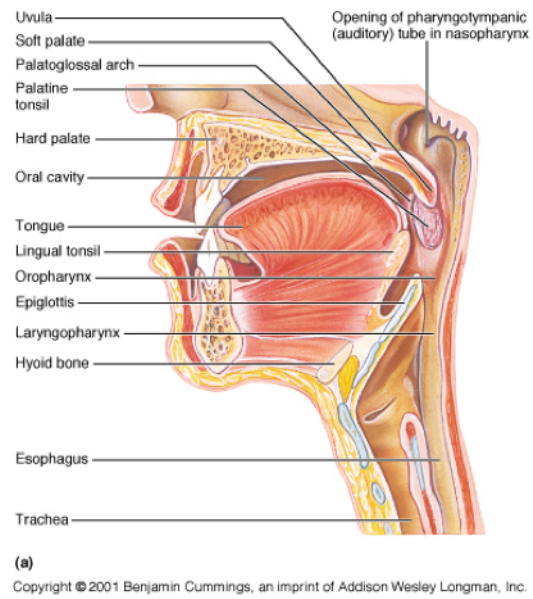
## Digestive System Organization

- **Gastrointestinal (GI) tract**
  - *Hollow organs joined in a long twisting tube*
  - *Direct **link/path** between organs*
  - *Structures*
- Mouth
- Pharynx
- Esophagus
- Stomach
- Small intestine
- Large Intestine
- Rectum



## Mouth

- **Teeth** mechanically break down food into small pieces.
- **Tongue** mixes food with **saliva** (contains amylase, which helps break down starch).

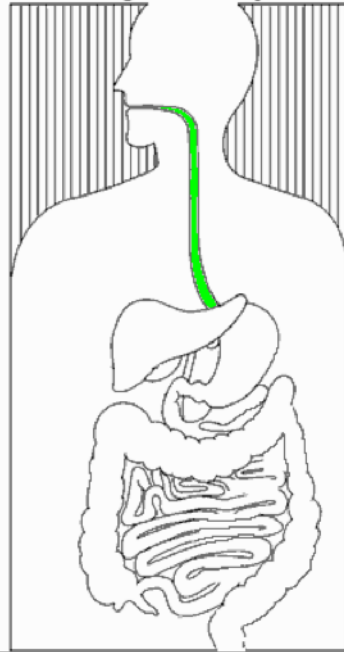


**Epiglottis** is a flap-like structure at the back of the throat that closes over the trachea preventing food from entering it. It is located in the Pharynx.

## Esophagus

- Secrete **mucus** for lubrication
- Moves food from the throat to the stomach using muscle movement called **peristalsis**
- **Heartburn** occurs if acid from the stomach gets into the esophagus

The Digestive System



Approximately 20 cm long

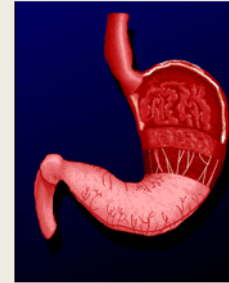
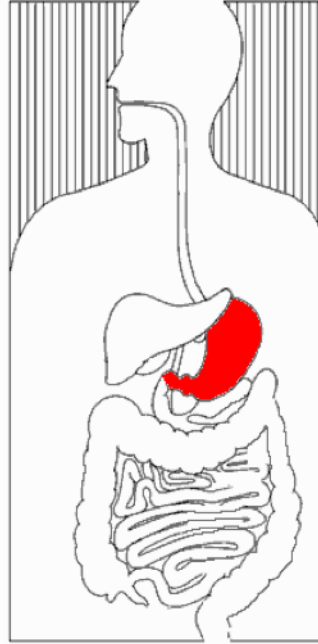
A good way to describe peristalsis is an ocean wave moving through the muscle.

These diagrams don't separate the esophagus from the mouth functions, you might want to talk about what happens in the mouth too.

## Stomach

- Mixes food with **digestive juices** that contain enzymes to break down **Proteins**.
- **Acid (HCl)** in the stomach kills bacteria.
- Food found in the stomach is called **Chyme**.

The Digestive System



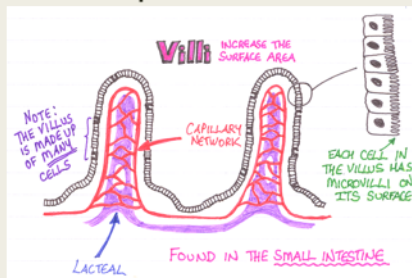
7

J-shaped muscular bag that stores the food you eat, breaks it down into tiny pieces.

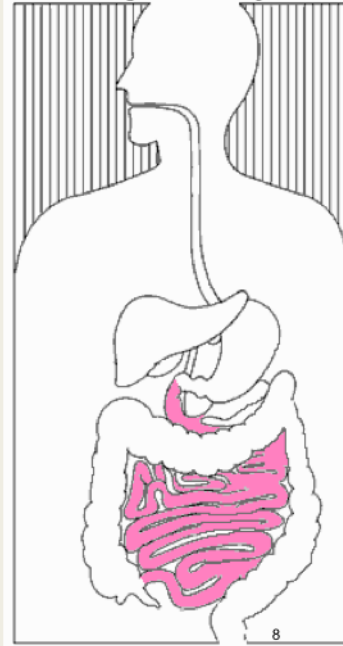
The stomach takes around 4 hours to do its job on the food, depending on what kinds of food are digested.

## Small Intestine

- Lining of intestine walls has finger-like projections called **villi**, to increase surface area.
- The villi are covered in **microvilli** which further increases surface area for absorption.



## The Digestive System



Small intestines are roughly 7 meters long

Nutrients from the food pass into the **bloodstream** through the small intestine walls.

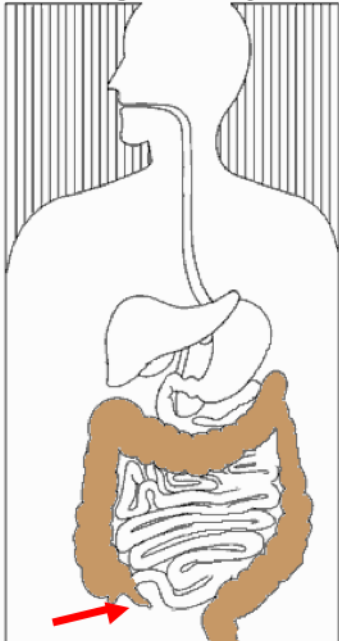
**Absorbs:** 80% ingested water, Vitamins, Minerals, Carbohydrates, Proteins, Lipids



## Large Intestine

- Accepts what small intestines don't absorb
- Absorbs water
- **Rectum** (short term storage for feces)
- Bacterial digestion
  
- Appendix
  - *"safe house" for good bacteria*

**The Digestive System**



Accept undigested parts

About **1.5 meters** long

Depending on the maturity of the group, you can talk about the feces leaving via the anus.

Mention the appendix at the bottom of the ascending colon and that it might have been used long ago but is not today

Mention the portions of the large intestine, ascending, transverse, descending, sigmoid, and rectum (last one if the audience is mature enough)

**Ferment carbohydrates**

Releases vitamins

Converts chyme into feces

## Accessory Organs - The Glands

### ■ Liver

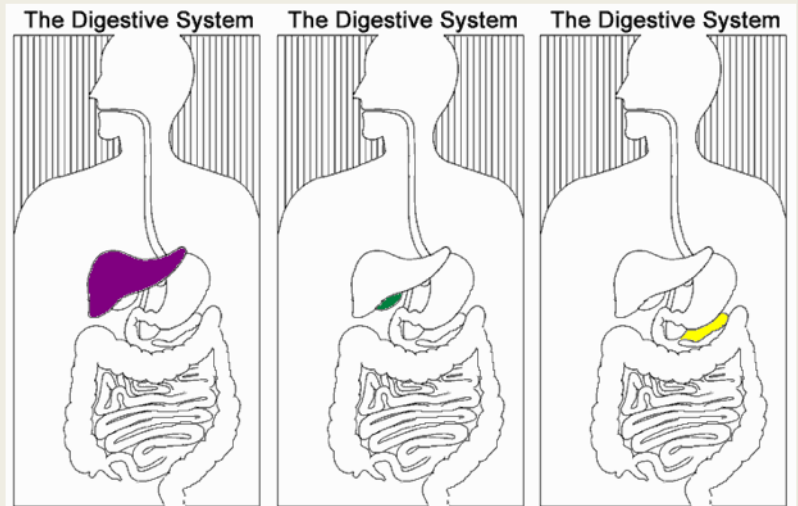
- Produces Bile
- Filters toxins and waste

### ■ Gall bladder

- Stores bile

### ■ Pancreas

- Digestive enzymes



**Liver** filters out **toxins** and waste including drugs, alcohol and poisons

**Gall Bladder** Stores **bile** from the liver, releases it into the **small intestine**

Fatty diets can cause **gallstones**. Removing the stones typically means removing the gallbladder, but that the body eventually adjusts to not having the bile stored.

**Pancreas** produces digestive enzymes to digest **fats, carbohydrates** and **proteins**

Regulates blood sugar by producing **insulin** and **glucagon**

**Type I** (no insulin produced) vs. **Type II** (body stops responding properly to the insulin it creates) diabetes

# Questions?

- Each table has 1 minute to come up with a question about this material!

Dietary Analysis workshop