• What is pasteurization? Why do we still use it?
• What is a GMO?
Digestive System

*When can we start eating?*
What is Digestion?

- The **break down of food** into molecules that are **small enough to be absorbed** and used by the body
What is Digestion?

• This involves:
  • **Ingestion** and **propulsion** of food along digestive tract
  • **Break down** of food
  • **Absorption** of nutrients
  • **Elimination** of **waste** (fecal matter)
• The digestive system can be broken down into two main parts:
  • The **digestive tract**
  • The **path** that food travels along
  • The **digestive glands**
  • These produce the **chemical secretions** necessary to digest (break down) the food
• **Mechanical transformation:**

  • **Physically** breaking down food into **smaller** bits **without** changing its **chemical** nature.
Mechanical vs Chemical

- **Chemical transformation:**
  - Complex molecules are broken down into **simpler** molecules that can be **absorbed** by the body;
  - Chemical nature is **changed**
The digestive tract is made up of:

- The **mouth**
- The **pharynx**
- The **esophagus**
- The **stomach**
- The **small intestine** (ileum)
- The **large intestine** (colon)
The digestive glands:
- The salivary glands
- The gastric glands
- The liver
- The pancreas
- The intestinal glands
• **Mouth:**
  - **Ingestion** of food
    - This is where **food enters** the digestive tract
  - **Mechanical breakdown** of food through **mastication** (chewing)
  - **Chemical breakdown** of starches thanks to **saliva**
  - **Deglutition** (swallowing)
• During swallowing:
  • **Uvula** moves up to block the **nasal cavity**
    • So no food goes up your nose
  • **Epiglottis** covers the **trachea** (airway)
    • So no food goes into your lungs
Pharynx:
- The next step in the digestive tract
- Moves food from mouth to esophagus
Esophagus:
- Propels food **towards the stomach**
- Uses **peristalsis**; a type of muscular contraction to move the food down the esophagus

Never Google “worm GIFs”
Functions of the Digestive Tract

• Stomach:
  • **Churning** of food to **mix** the chewed up **food** with **secretions** from digestive glands
  • Secretion of **gastric juices (hydrochloric acid and enzymes)** to break down proteins
We refer to the partially digested food as **chyme**.

It has the consistency of cottage cheese... yum!
Functions of the Digestive Tract

- **Small intestine:**
  - More chemical breakdown of food:
    - Release of *intestinal* and *pancreatic juices* to break down proteins, carbohydrates, and fats.
Functions of the Digestive Tract

- **Small intestine:**
  - Proteins $\rightarrow$ **amino acids**
  - Carbohydrates $\rightarrow$ **simple sugars** (glucose mostly)
  - Fats $\rightarrow$ **glycerol** and **fatty acids**

Also has **bile** from the **liver** to help breakdown fats (mechanical)
Functions of the Digestive Tract

- **Small intestine:**
  - **Absorption**
    - The *passage* of nutrients from the digestive tract into the *blood stream* (or *lymph*)
    - Most absorption occurs in the small intestine
    - Covered in many small folds called *villi* that increase the *surface area* for absorption
Functions of the Digestive Tract

- **Large intestine:**
  - Absorption of **water**
  - Only **waste** products left afterwards
- **Feces** is expelled from the **rectum** through the **anus**
Digestive Glands
Functions of the Digestive Glands

• Salivary Glands:
  • Secrete saliva
    • **Lubricates the mashed food**
    • Makes it easier to pass along the pharynx and esophagus
    • Starts the **chemical breakdown of starches**
    • Thanks to an enzyme called **amylase**
Functions of the Digestive Glands

- **Gastric Glands:**
  - Found on the inside lining of the stomach
  - Secrete the gastric juices
    - These contain hydrochloric acid and pepsin
    - Starts the chemical digestion of proteins
Functions of the Digestive Glands

- **Intestinal Glands:**
  - Found on the inside lining of the small intestine
  - Secrete the intestinal juices
  - Start the chemical digestion of fats
  - Also helps in chemical breakdown of proteins and carbohydrates
  - And helps neutralize the acid of the stomach
Functions of the Digestive Glands

- **Pancreas:**
  - **Secretes the pancreatic juices**
  - Helps in **chemical breakdown of fats, proteins and carbohydrates**
  - Also secretes **insulin**
  - The **hormone** responsible for regulating **blood sugar**!
Functions of the Digestive Glands

• Liver:
  • Produces **bile**
  • Helps in **mechanical breakdown of fats**
  • **Emulsifies the fat** (breaks it up into smaller molecules)
The whole point of digestion is to extract the required nutrients from the food we eat.

In doing so, the digestive process is breaking each macronutrient into its components:

- Carbs → simple sugars
- Proteins → amino acids
- Fats → glycerol and fatty acids
- Water .... Stays as water