

The Digestive System

Biology

Function of the Digestive System

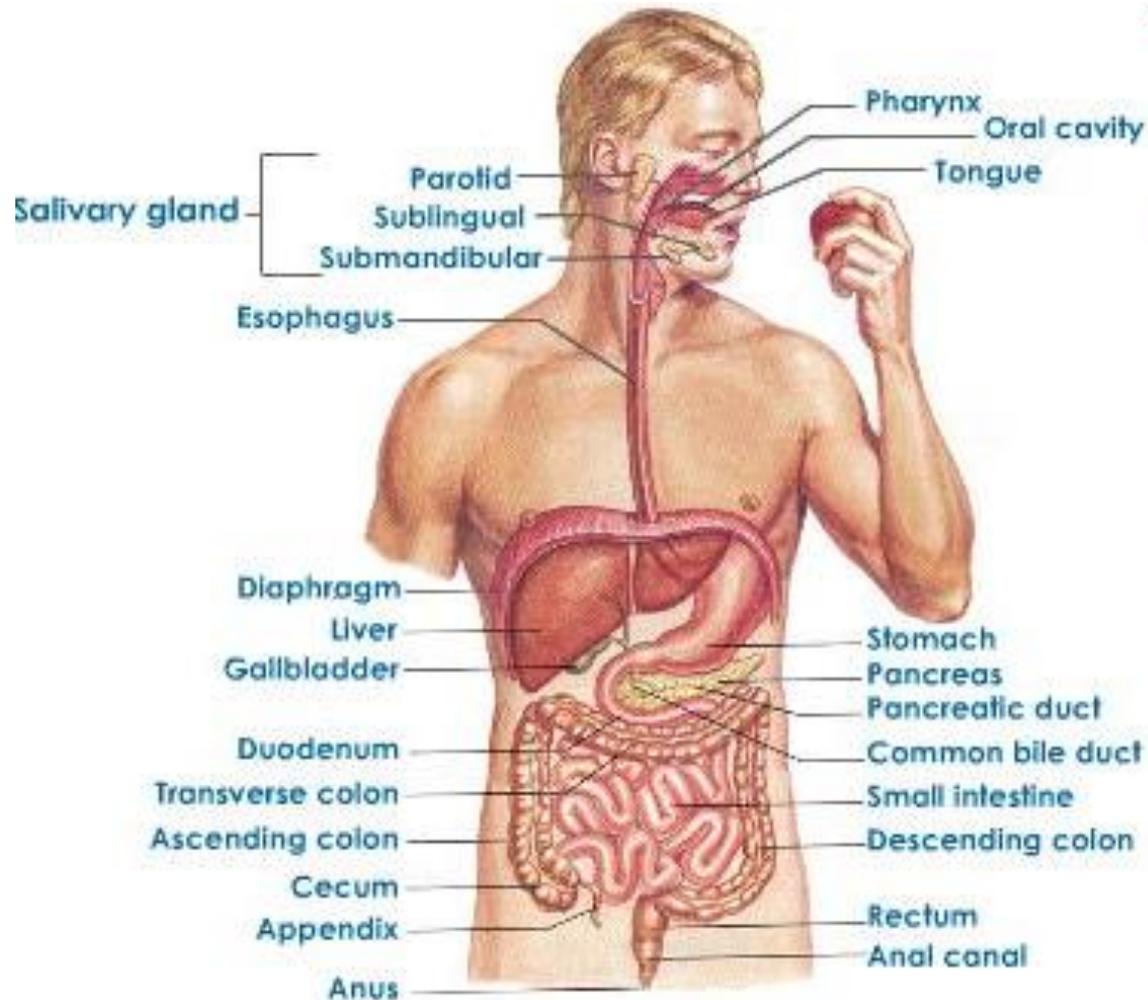
- **Break food down into small molecules that can be passed to the cells that need them.**
- **Why Is this important?**
 - Provides materials and energy for all life processes.

Function of the Digestive System (not on outline)

- **Vocabulary:**

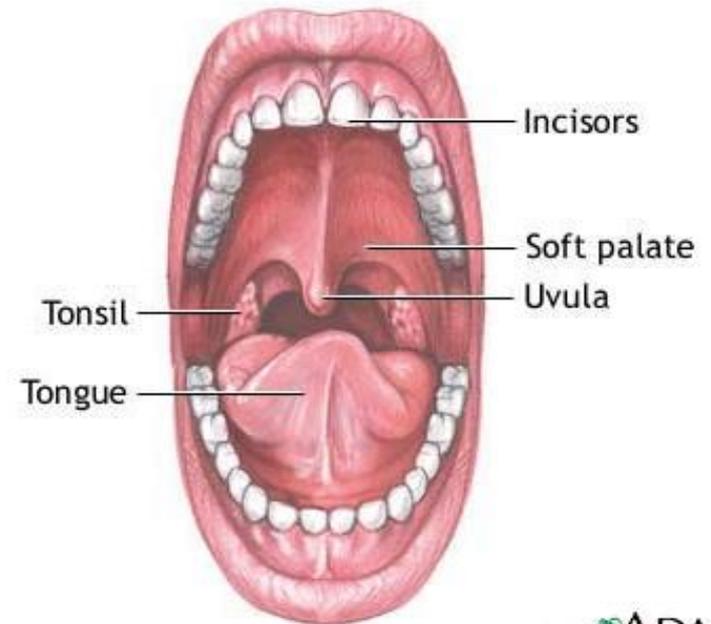
- **Intracellular: digestion inside cells.**
- **Extracellular: digestion in a body system and nutrients are then passed to the cells.**
- **Mechanical: Physically breaking food into smaller pieces.**
- **Chemical: breaking food into molecules by breaking chemical bonds.**

Structure of the Digestive System



Mouth

- Function: to begin mechanical and chemical digestion
- Structures:
 - TEETH are responsible for mechanical digestion by crushing, cutting, and tearing food.



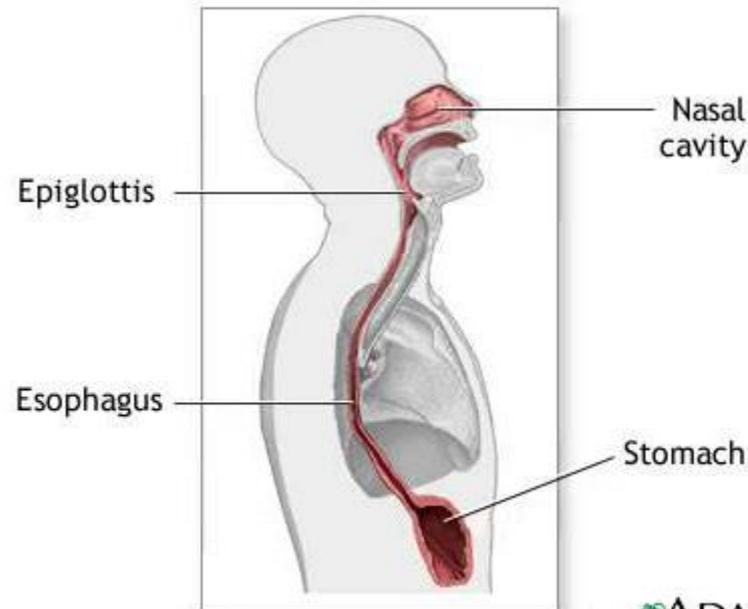
Mouth

- Structure:
 - SALIVA moistens the food and makes it easier to chew.
 - Enzymes: Saliva contains an enzyme called amylase that breaks down starches into sugar.
 - Does the mouth do Chemical, Mechanical or Neither type of digestion?

Esophagus

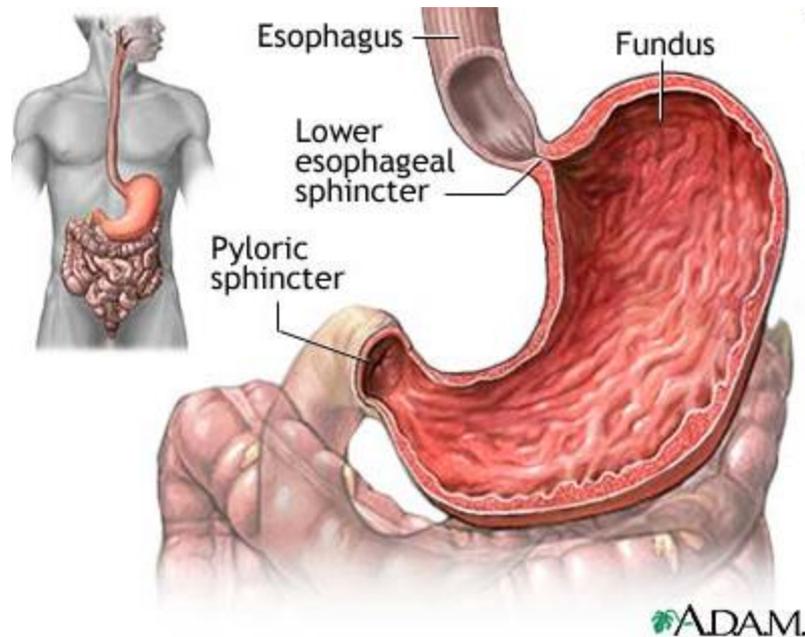
- Also known as the food tube.
- Function: Moves food from the mouth to the stomach.

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Stomach

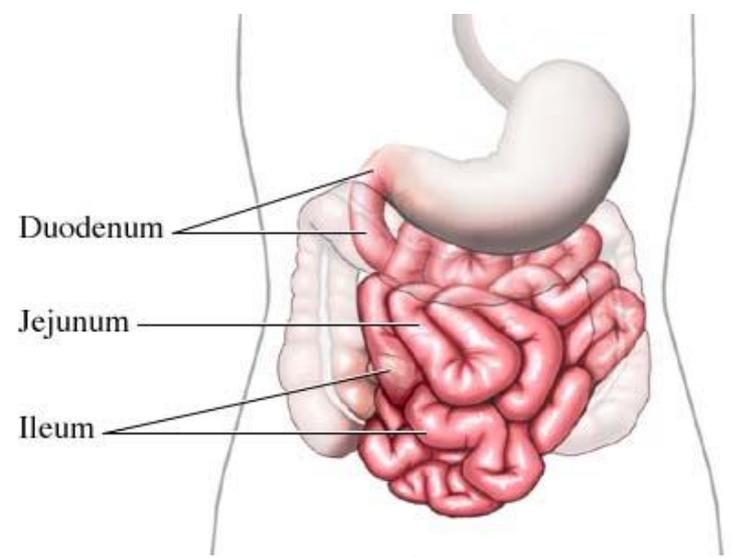
- Function: continues both the mechanical and chemical digestion of food.
- Structure: the stomach is a large, muscular sac.



Stomach

- The stomach's hydrochloric acid and an enzyme called pepsin help break down proteins. This is chemical digestion.
- The stomach's muscles contract to churn and mix stomach fluids and food. This is mechanical digestion.

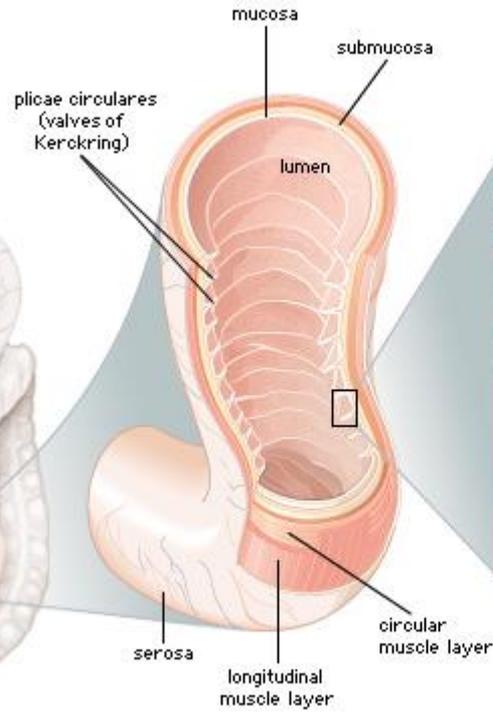
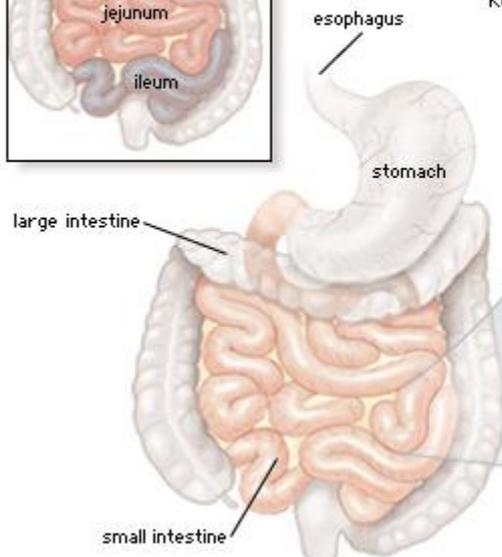
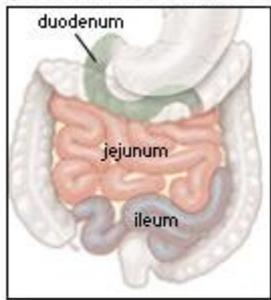
Small Intestine



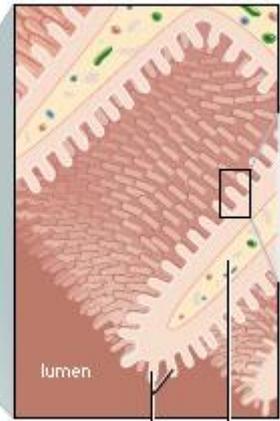
- Function: Nutrients are absorbed from here.
- Structure: long, narrow tube approx. 20 feet long with villi (vill-i).
- The first part of the small intestine, called the duodenum (do-a-dee-num), completes the chemical digestion of food.
- The rest of the small intestine absorbs nutrients.

Small Intestine Structure

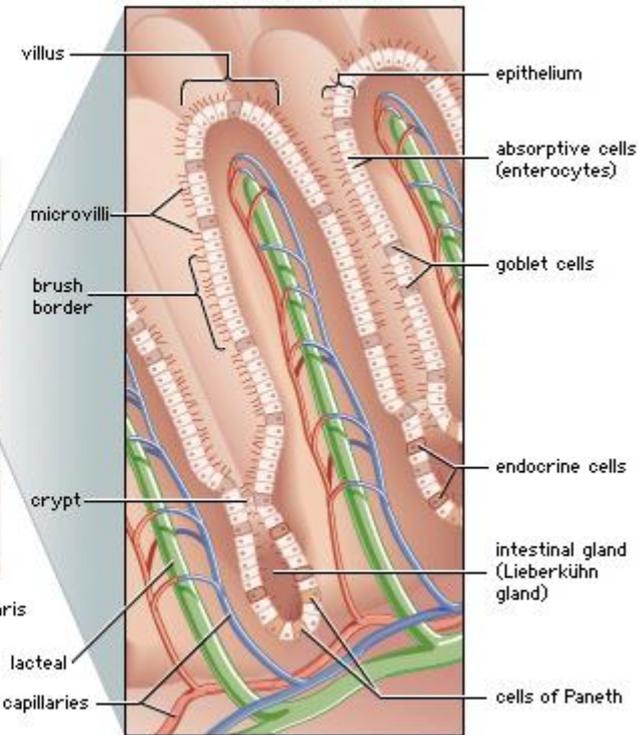
Regions of the small intestine



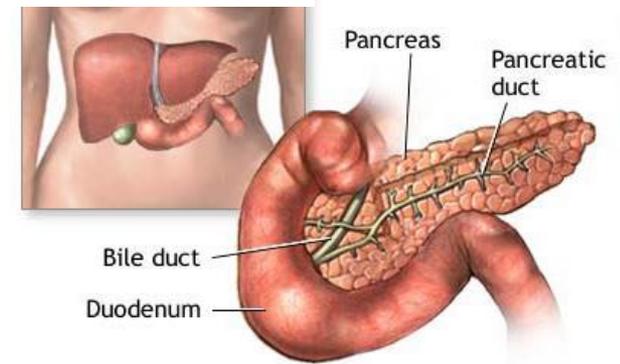
Enlargement of plicae circulares



Structure of a villus

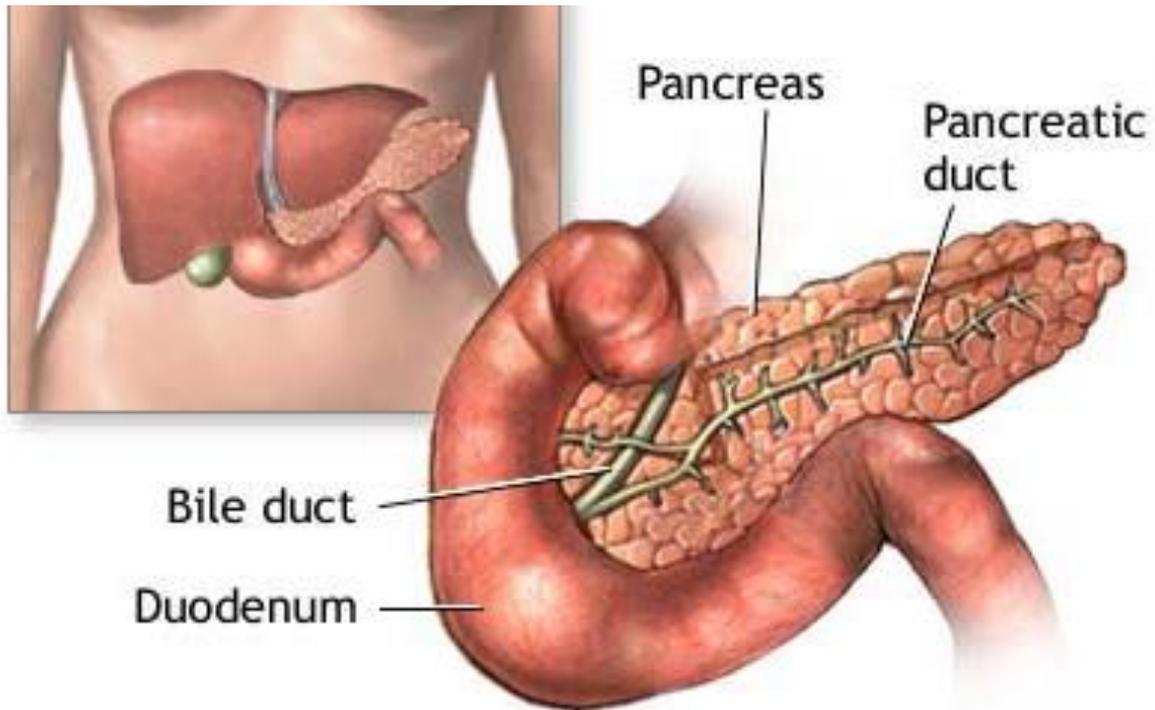


Pancreas

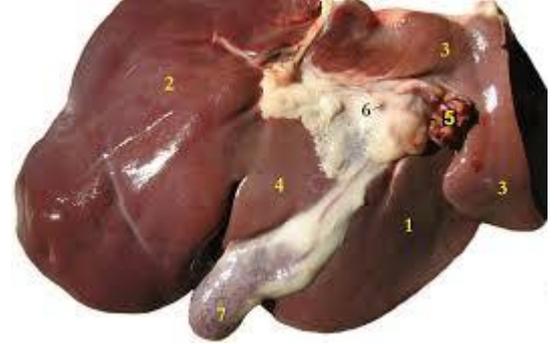


- Function: adds enzymes and other chemicals to the first part of the small intestine (duodenum).
 - The enzymes break down carbs, proteins, and lipids.
 - A chemical, sodium bicarbonate, neutralizes stomach acid.

Pancreas

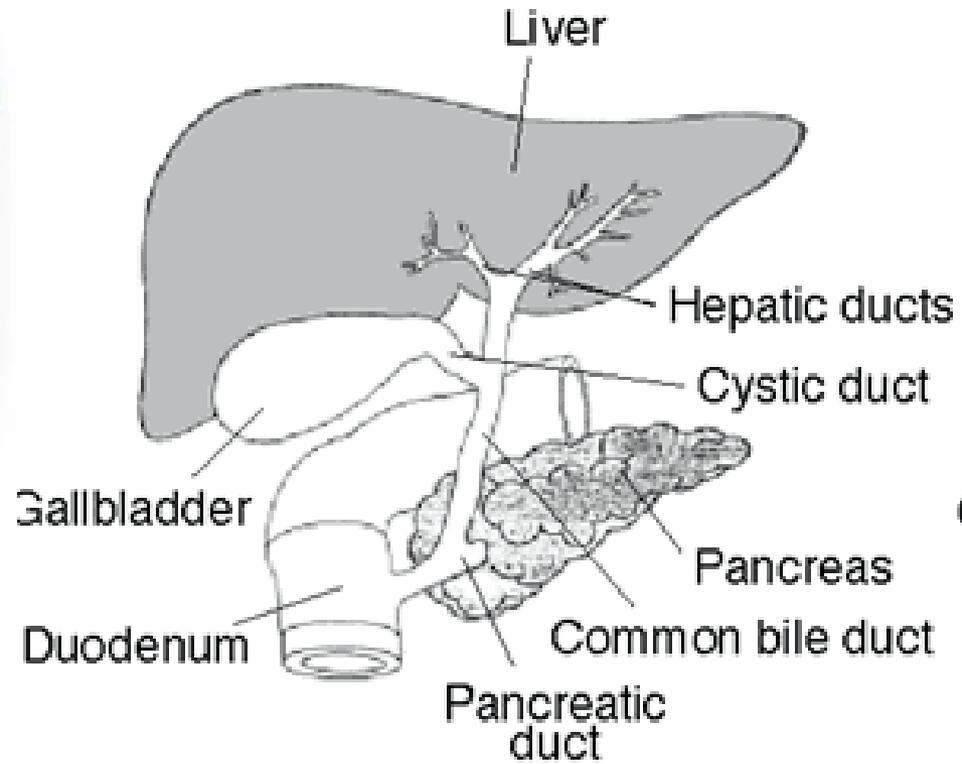
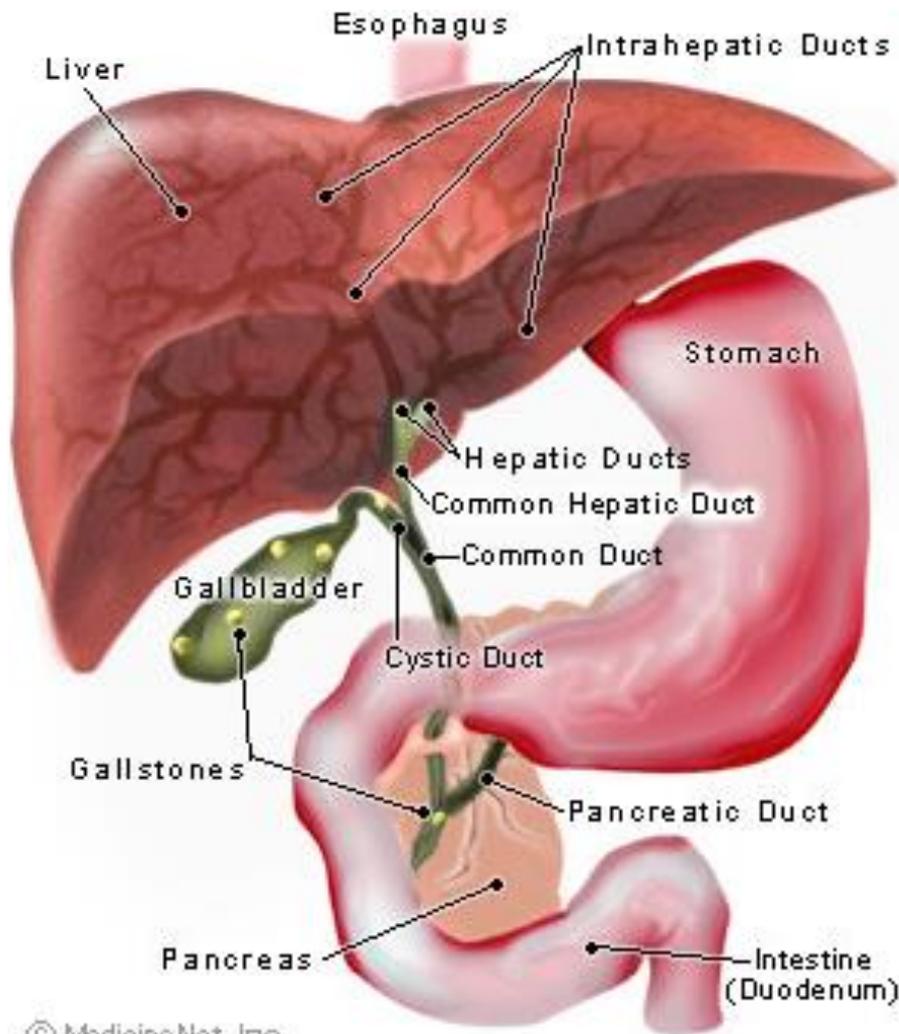


Liver



- Function: produces bile, which helps dissolve fat.
- This is also added in the first part of the small intestine.
- Alcohol kills the liver; drugs kill the liver; caffeine harms the liver... all in the attempt to detoxify.

Liver

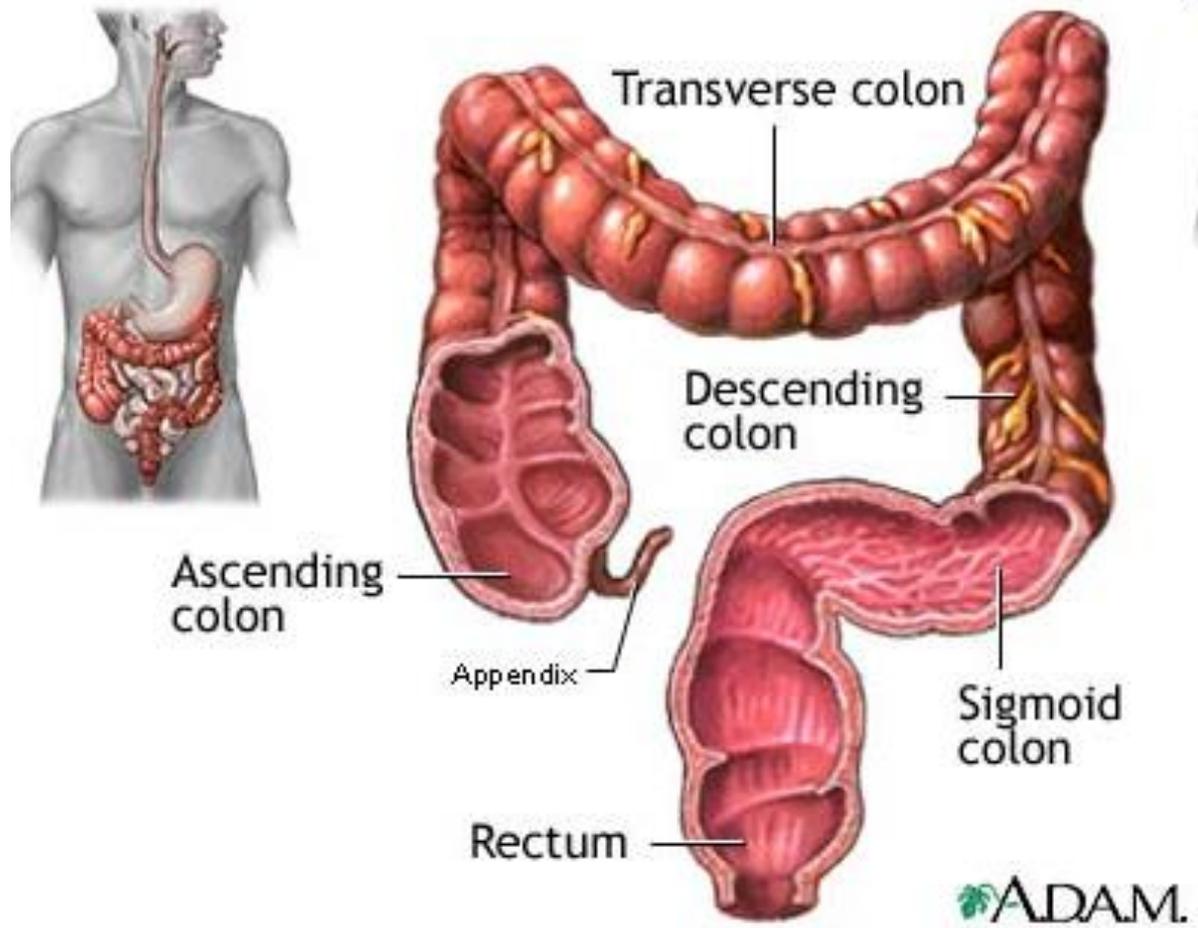


Large Intestine



- Function: absorb water.
- By the time food leaves the small intestine, it is basically nutrient-free. Water is left behind, and the large intestine removes this water.
- After most of the water has been removed, the food exits the body through the rectum and anus.

Large Intestine



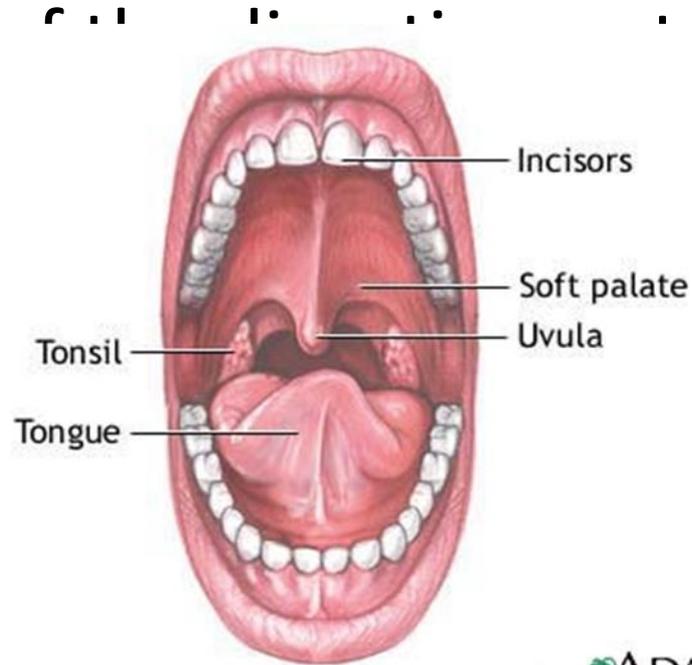
Let's take a break!

- We are going to model what happens in your stomach.

1. Break the bread into small pieces

- What organs are involved in this process?

- Is digestion occurring here?

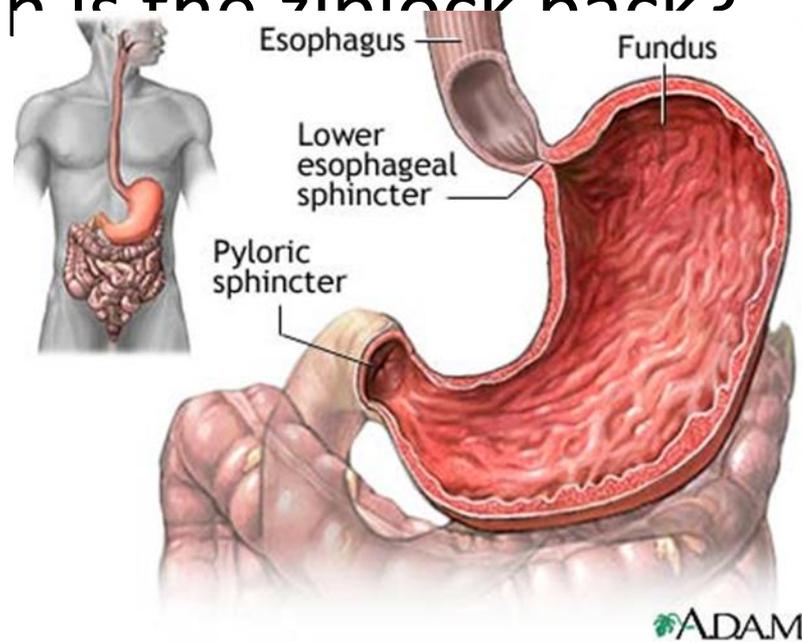


What are his

t kind?

2. Put the bread into the ziplock bag.

- What organ is the ziplock bag?

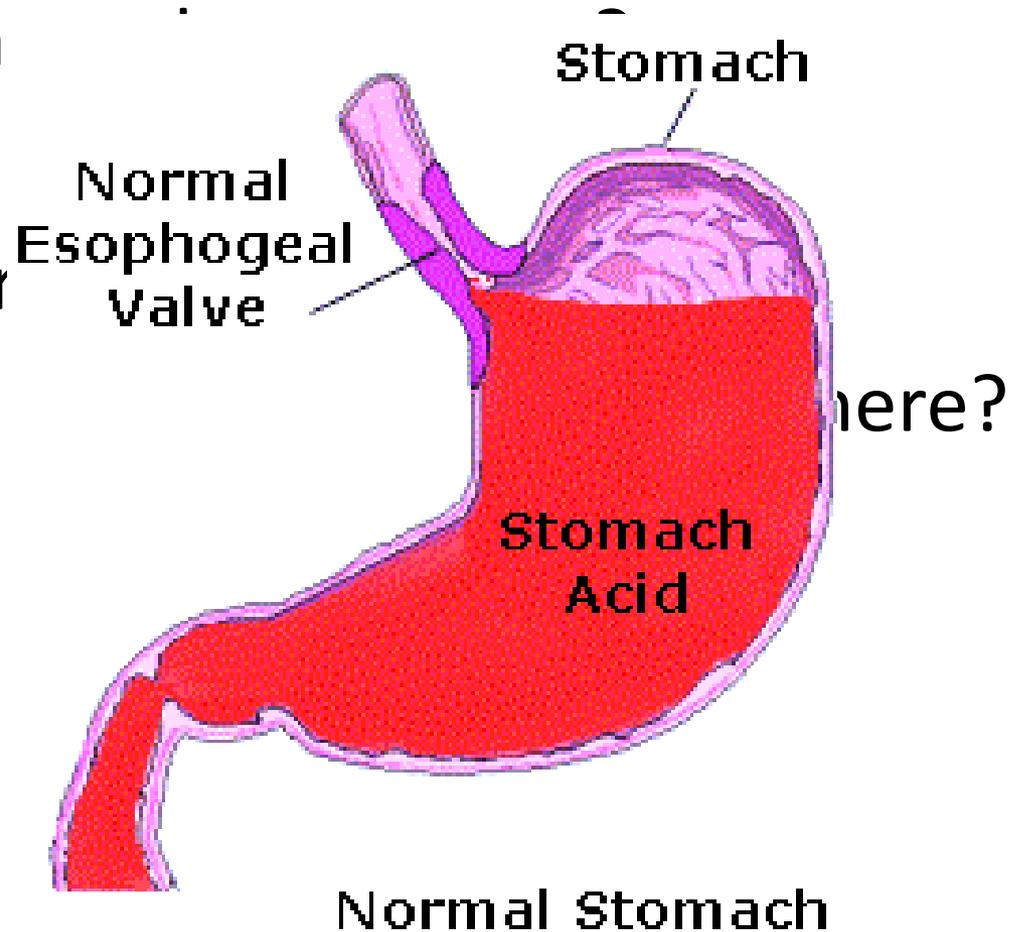


3. Add 1 cup of soda to the bag.

- What does th

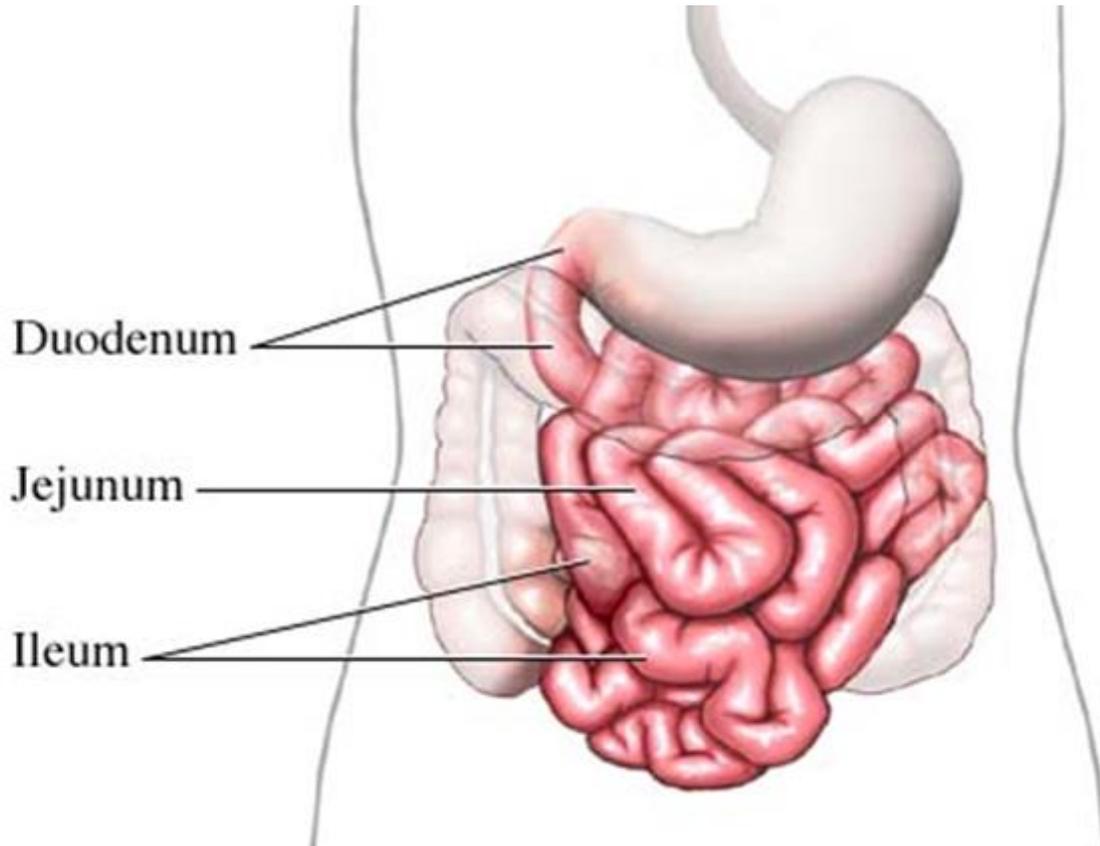
4. Mix up the br

- What kind of



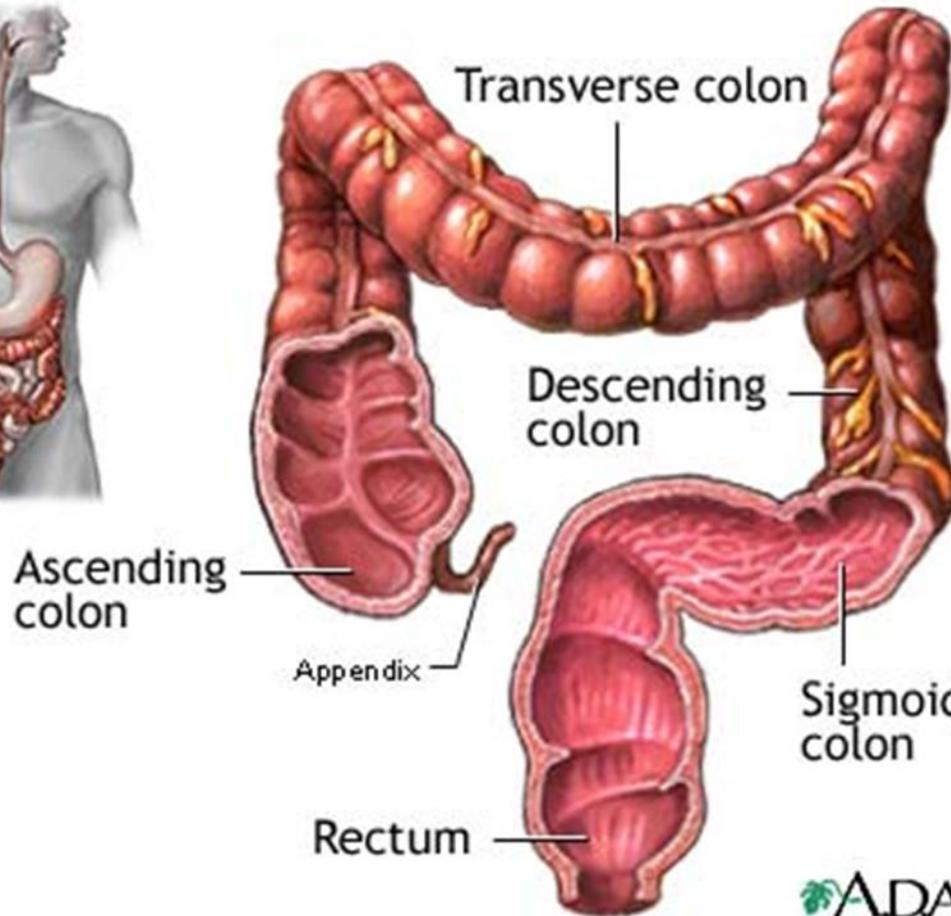
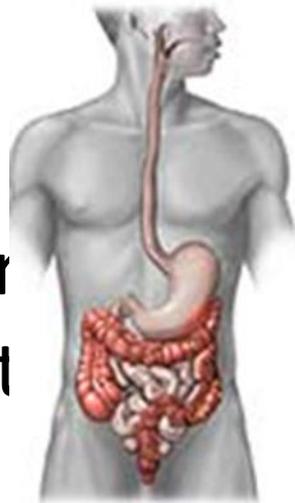
5. Cut a small corner of your bag and empty the contents into the nylon sock.

- What
- What



6. Now squeeze any excess moisture out of the mixture

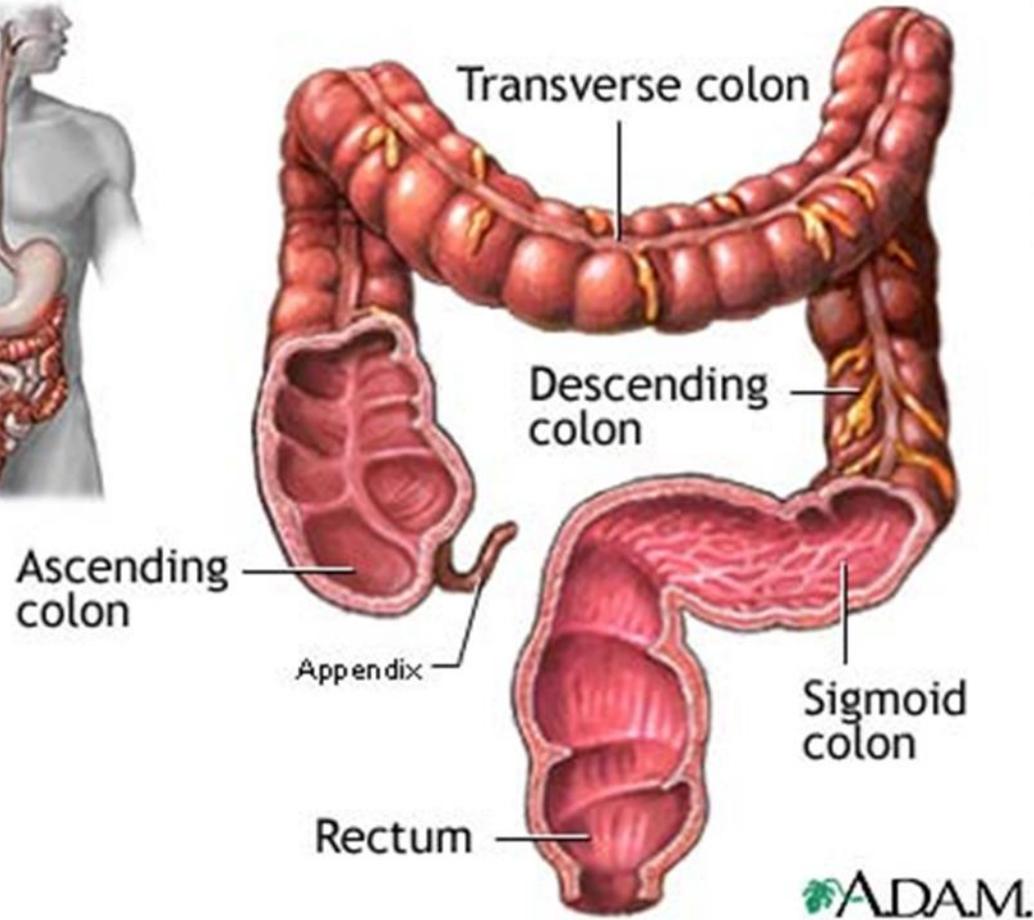
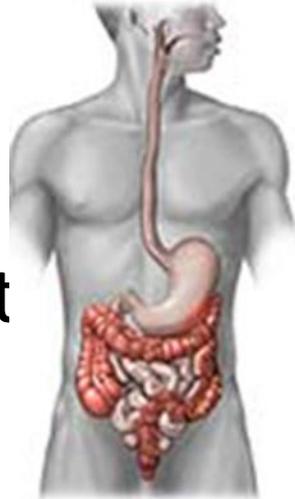
- When moist



remove

Cut the bottom off the nylon sock and squeeze the mixture into

- What



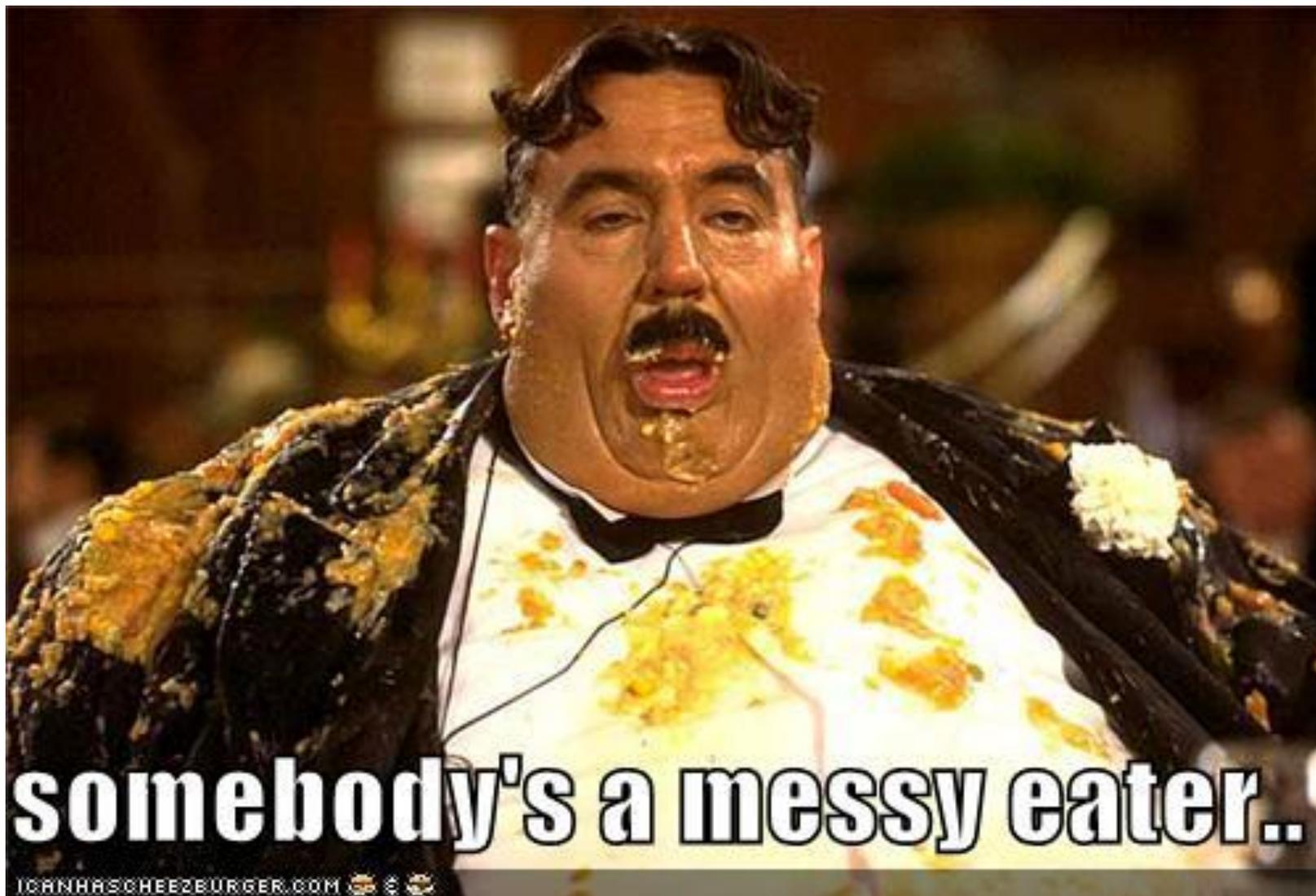
Cut the bottom tip off the bag and squeeze out the waste.

- This
it?



What is

Hungry?



What did we learn?

- What did we learn from this stomach-modeling experience?

Function of the Digestive System (not on outline)

- **Vocabulary:**
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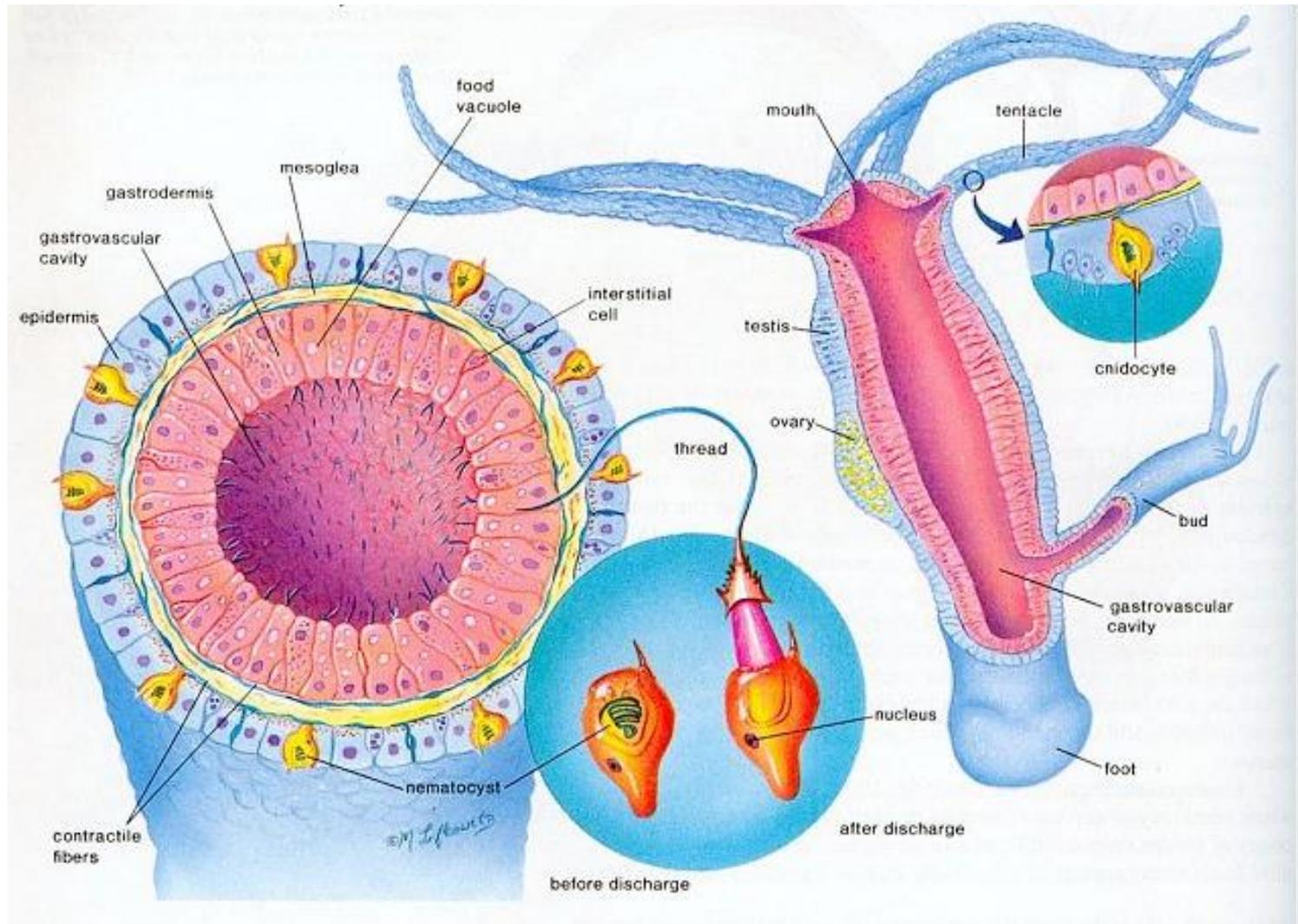
Hydra Digestion

- Hydra digest intracellularly and extracellularly.

Hydra Digestion

- Have a single opening that serves as both a mouth and an anus.
- Have a **gastrovascular cavity**, which is a simple digestive chamber with a single opening with some specialized digestive tissues.
- <http://www.cedarville.edu/personal/jwf/bio100/lecturequiz21b.swf>

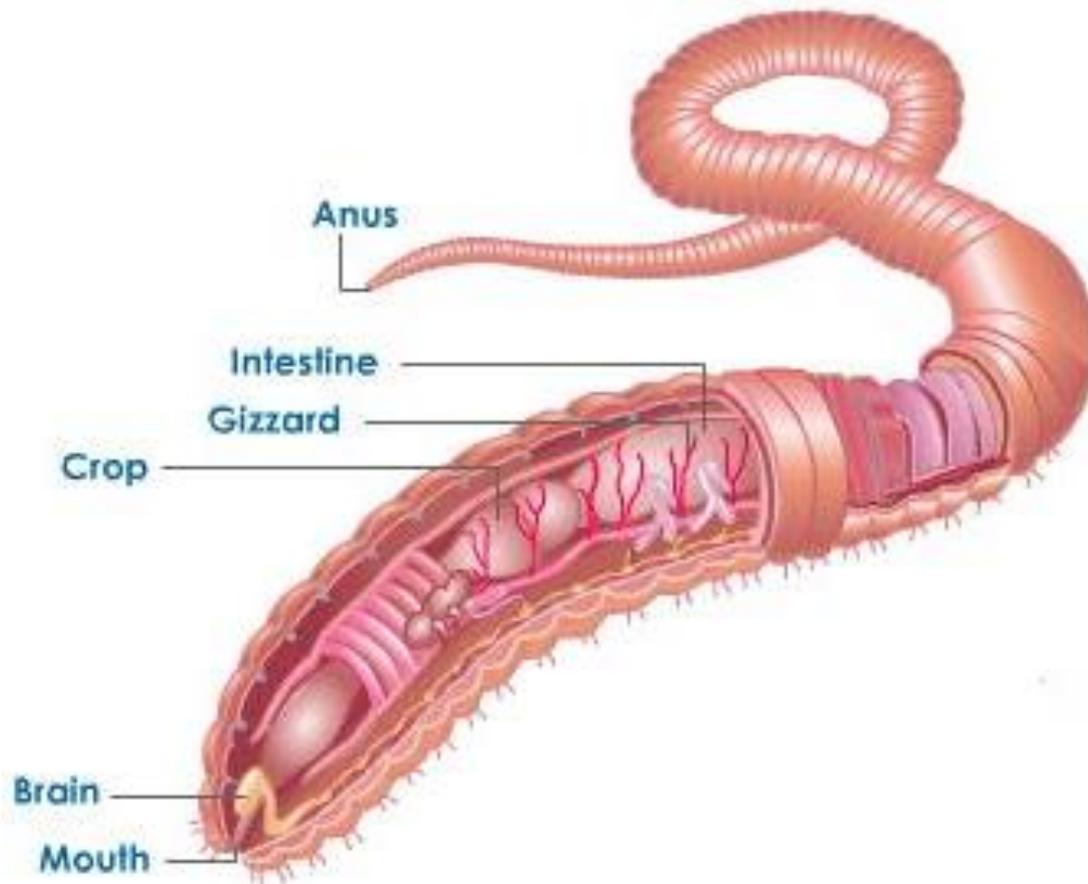
Hydra Digestion



Earthworm Digestion

- Earthworms have extracellular digestion because they have a digestive system.
- They have a mouth, gizzard, an intestine, and anus.
- The gizzard grinds up food.
 - What organs serve the same purpose in humans?
- Food is absorbed in the intestine.

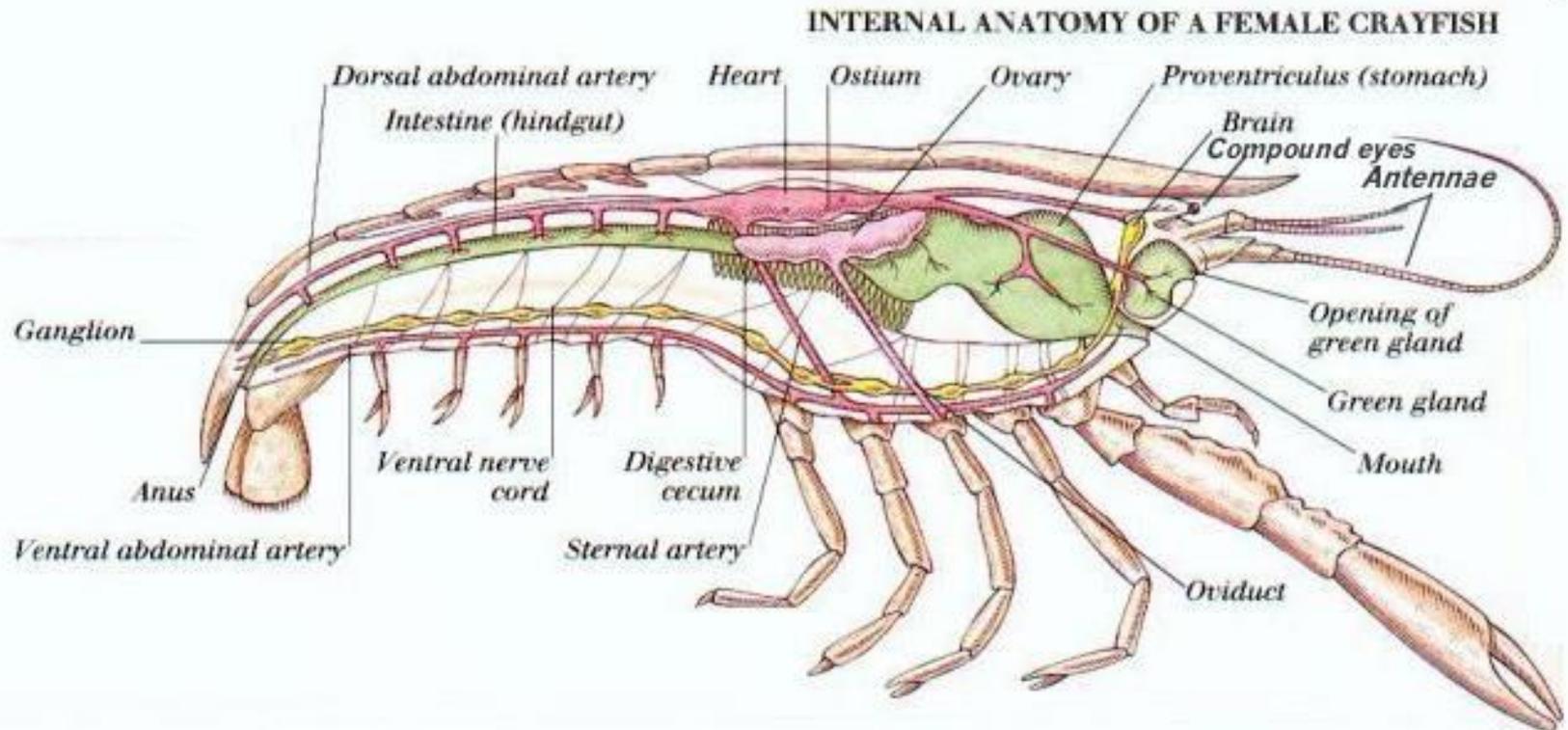
Earthworm Digestion



Crayfish Digestion

- Crayfish have extraxcellular digestion because they have a digestive system.
- They have a mouth, esophagus, stomach, an intestine, digestive glands, and an anus.

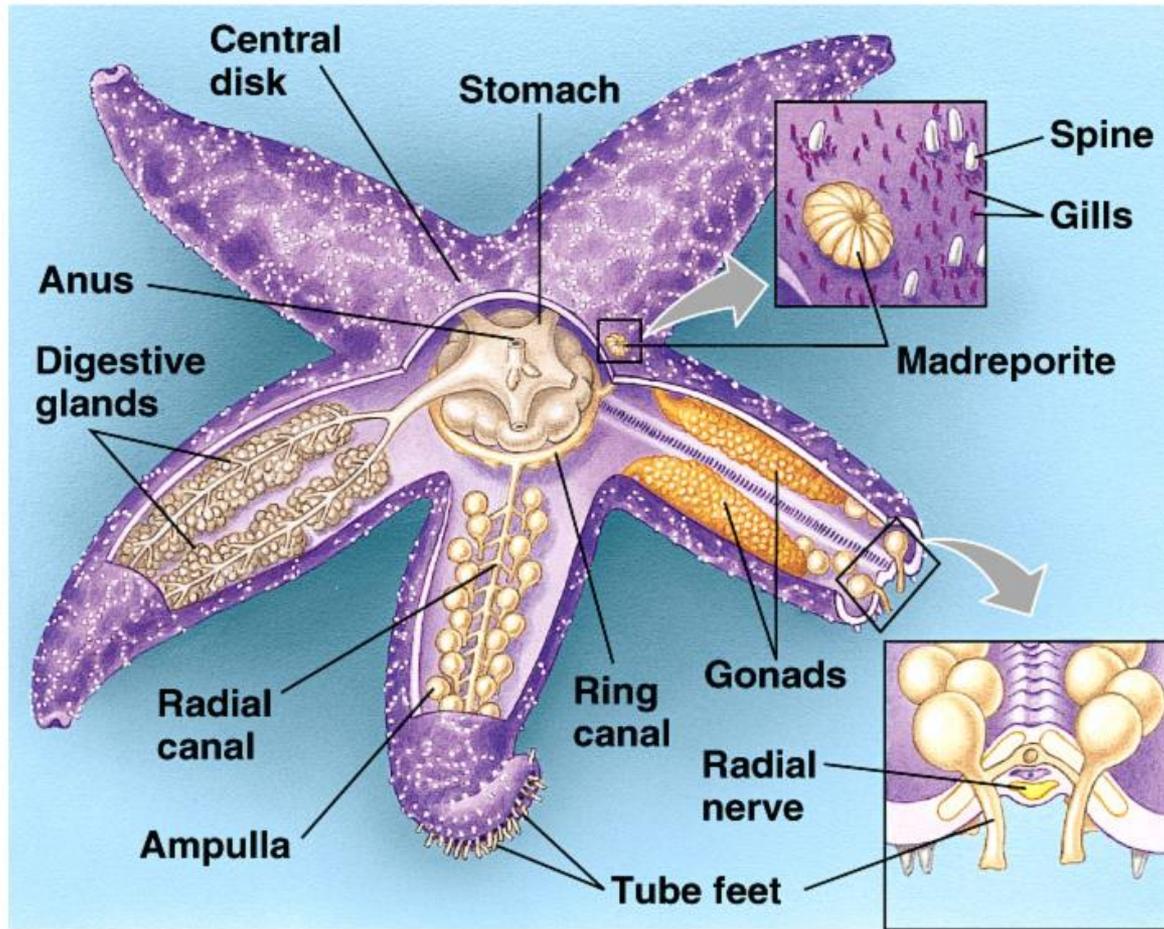
Crayfish Digestion



Sea Star Digestion

- Sea stars have extracellular digestion because they have a digestive system.
- They have a mouth, two stomachs, intestine, ceca, and an anus.
- The cardiac stomach **exits the sea star's body** and begins the digestion of food. The cardiac stomach is then brought back inside the body, and the partially digested food is moved to the pyloric stomach where it is digested more.
- Ceca produce digestive enzymes.

Sea Star Digestion



Plants

- Do plants eat?
- Do plants need energy?
- How do plants get the fuel to make energy if they don't eat?



How Plants get Nutrition

- How do plants make their own food?
 - Photosynthesis
- What ingredients are used in this process?
 - Water, Carbon dioxide and light energy!

Beyond Photosynthesis

- Carnivorous plants like venus flytraps either secrete enzymes to digest insects or wait for them to decompose and then absorb the nutrients.

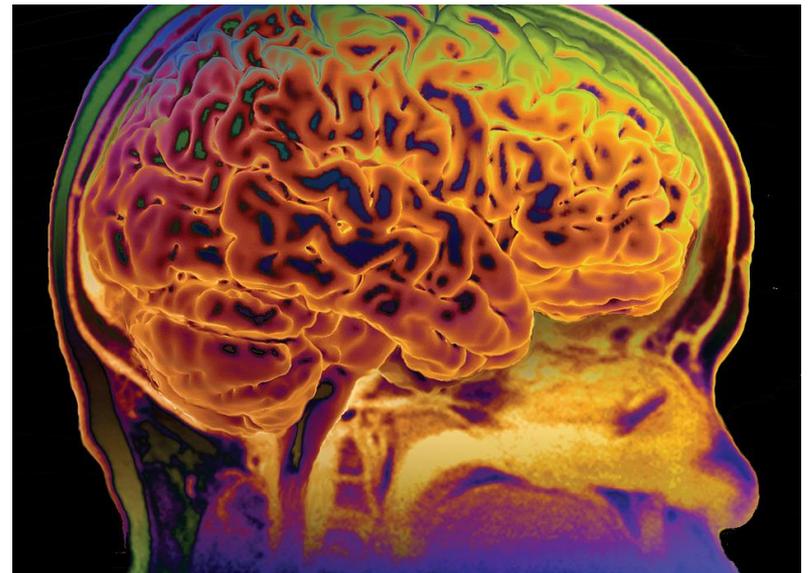


Summary

- Each organism accomplishes the function of digesting food.
- They have different structures to accomplish the food.

Nervous System

- Function:
- **The central nervous system interprets information, and the peripheral nervous system gathers and transmits information.**



Two types:

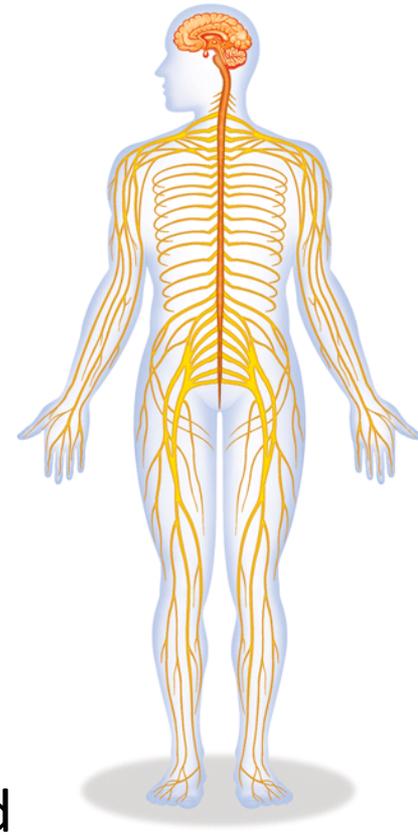
Central Nervous System (CNS)

Structures: Brain; Brain Stem & Spinal Cord

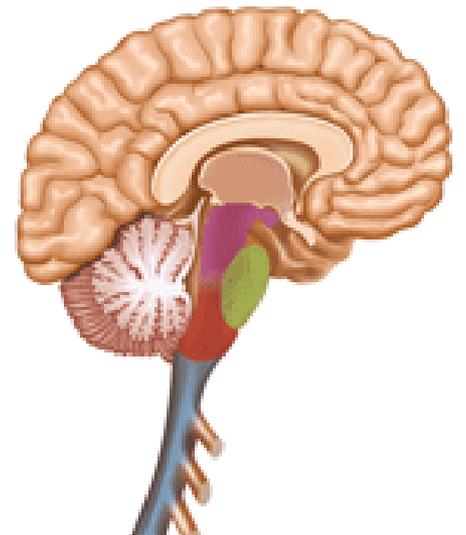
Peripheral Nervous System (PNS)

Structures: nerves (voluntary & involuntary).

Unlike the CNS, PNS is not protected by bone or blood-brain barrier, leaving it exposed to toxins and injuries.

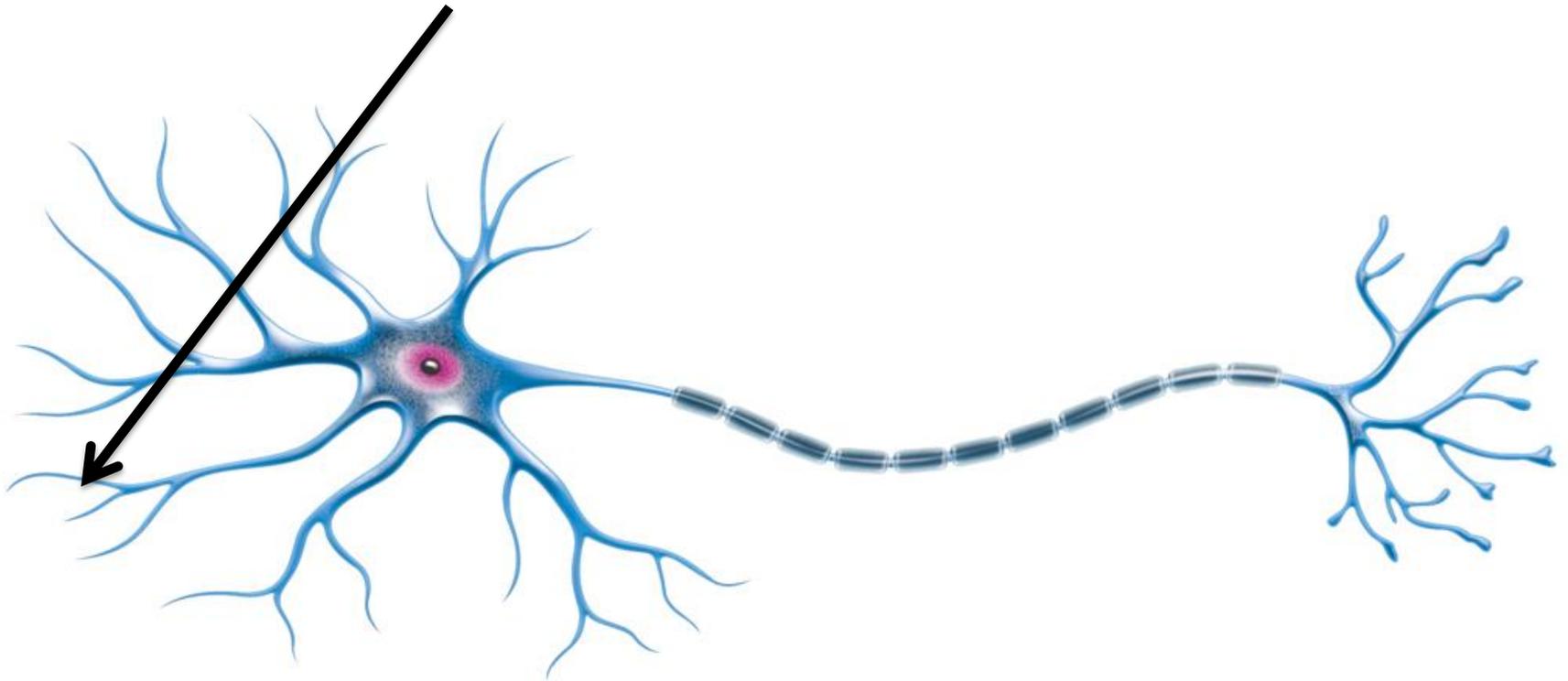


- The brain has three parts.
 - cerebrum controls thought, movement, emotion
 - cerebellum allows for balance
 - brain stem controls basic life functions



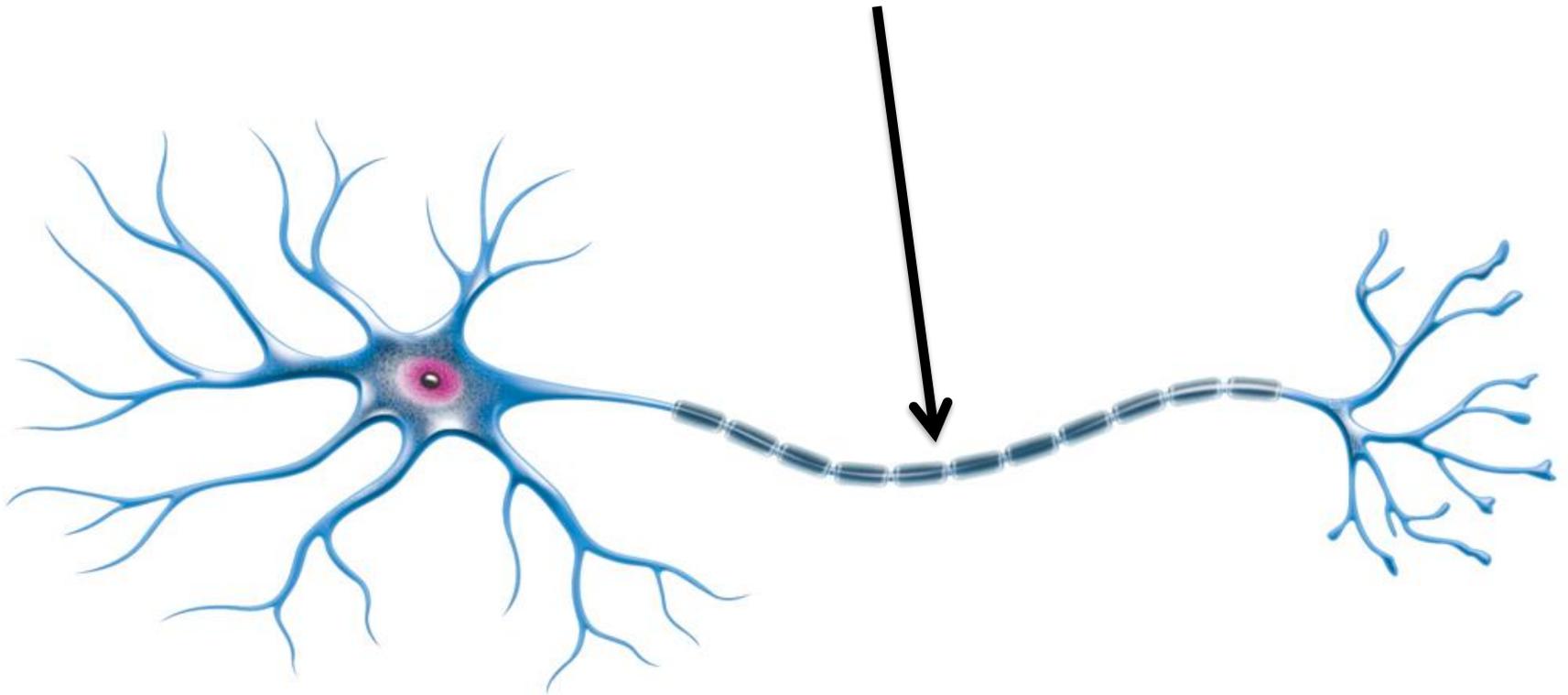
Neurons

- Dendrites receive impulses

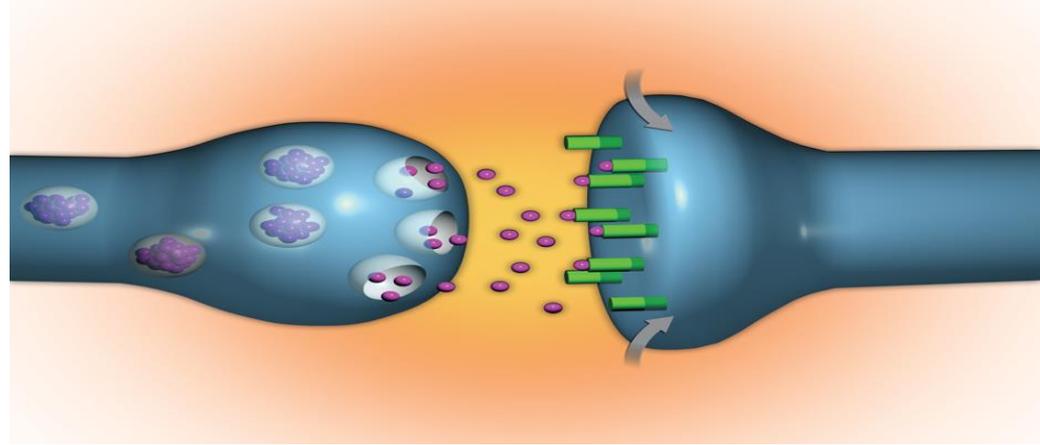


Neurons

- Axon carries impulses



Neurons



- A chemical signal passes between neurons.
- Neurotransmitters released into synapse.
- Neurotransmitters stimulate next cell.

Video Clip:

- Neurons how they work