

# Digestive System

How your body processes food to get the necessary molecules for energy!

# Purpose

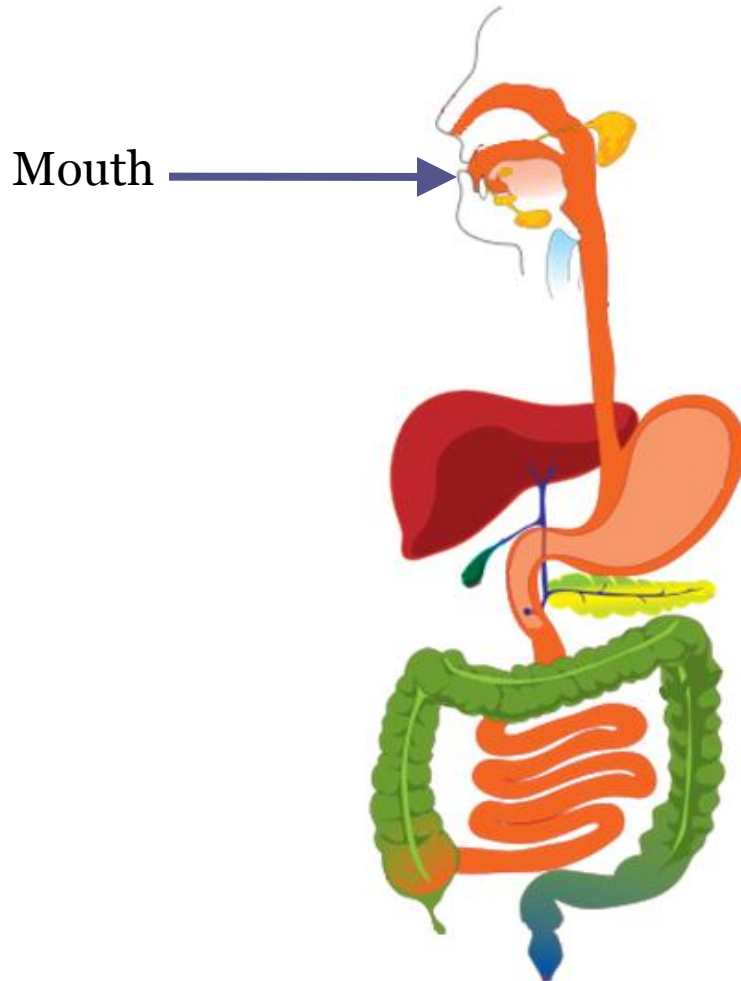
- Ingest
  - Take in food
- Digest
  - Break up the food particles
    - Mechanical: breaks food into tiny pieces
    - Chemical: takes the food pieces and breaks them into the building blocks that can be absorbed by cells
- Absorb
  - Take in food across cell membranes - **DIFUSSION**
- Eliminate
  - Get rid of waste

## 2 Parts

- **Gastrointestinal tract (alimentary canal)**
  - Food passes through this long winding tube that starts at the mouth and ends at the anus
- **Accessory Organs**
  - Food does not pass through but they aid in the digestive process

# Human Digestive System

- As we go through we will label each part – let's start in the mouth where the food begins!



# Mouth

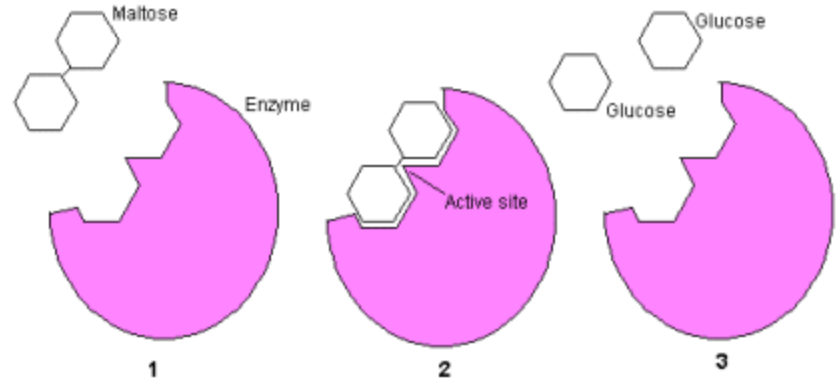
- Mechanical Digestion:

- Teeth break up the food

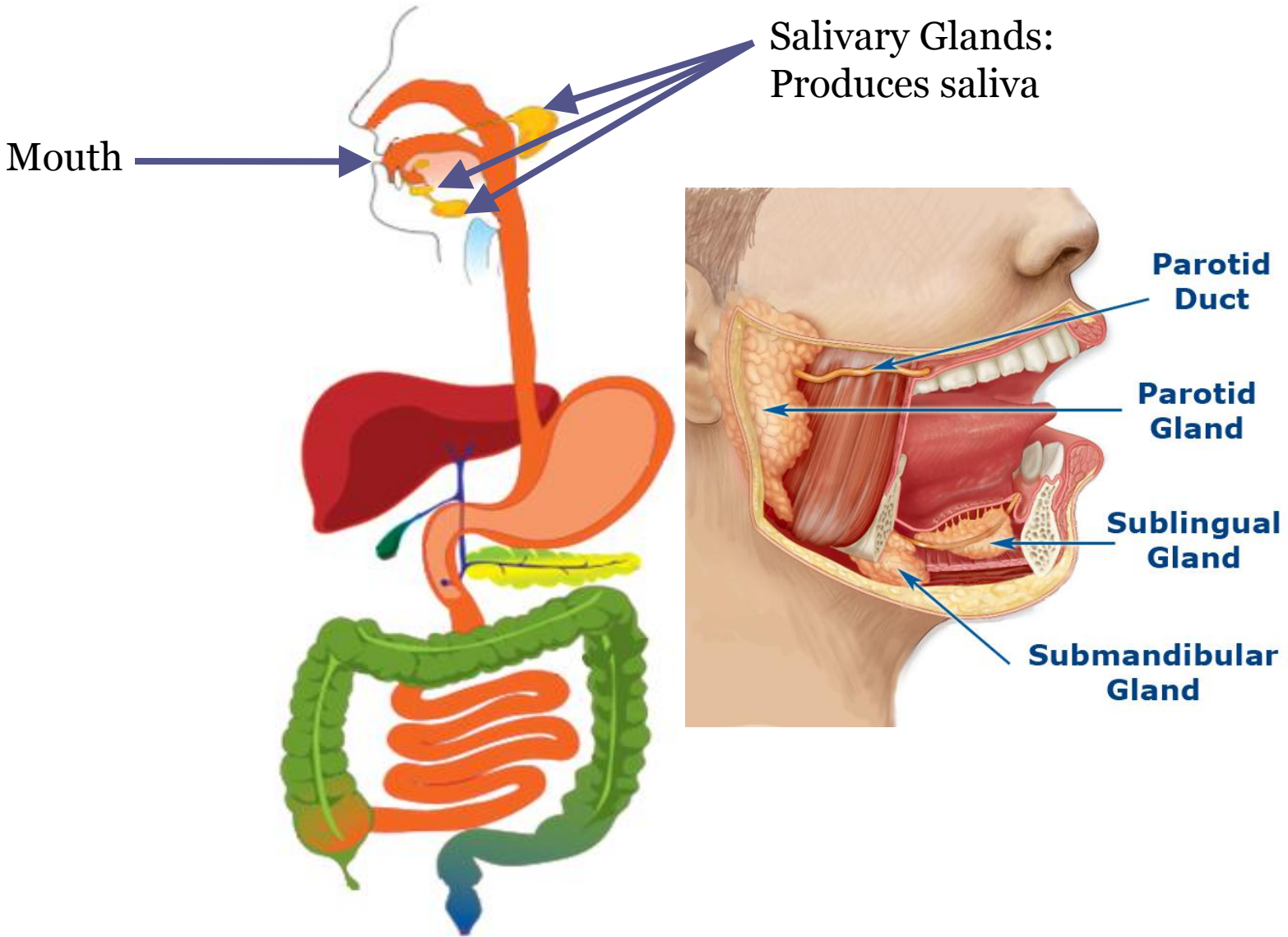
- Chemical Digestion - Saliva:

- Amylase: Breaks down starch into simpler carbs
- Mucus: Coats food to make it easier to swallow
- Buffers: Neutralize acids to protect teeth
- Antibacterial chemicals

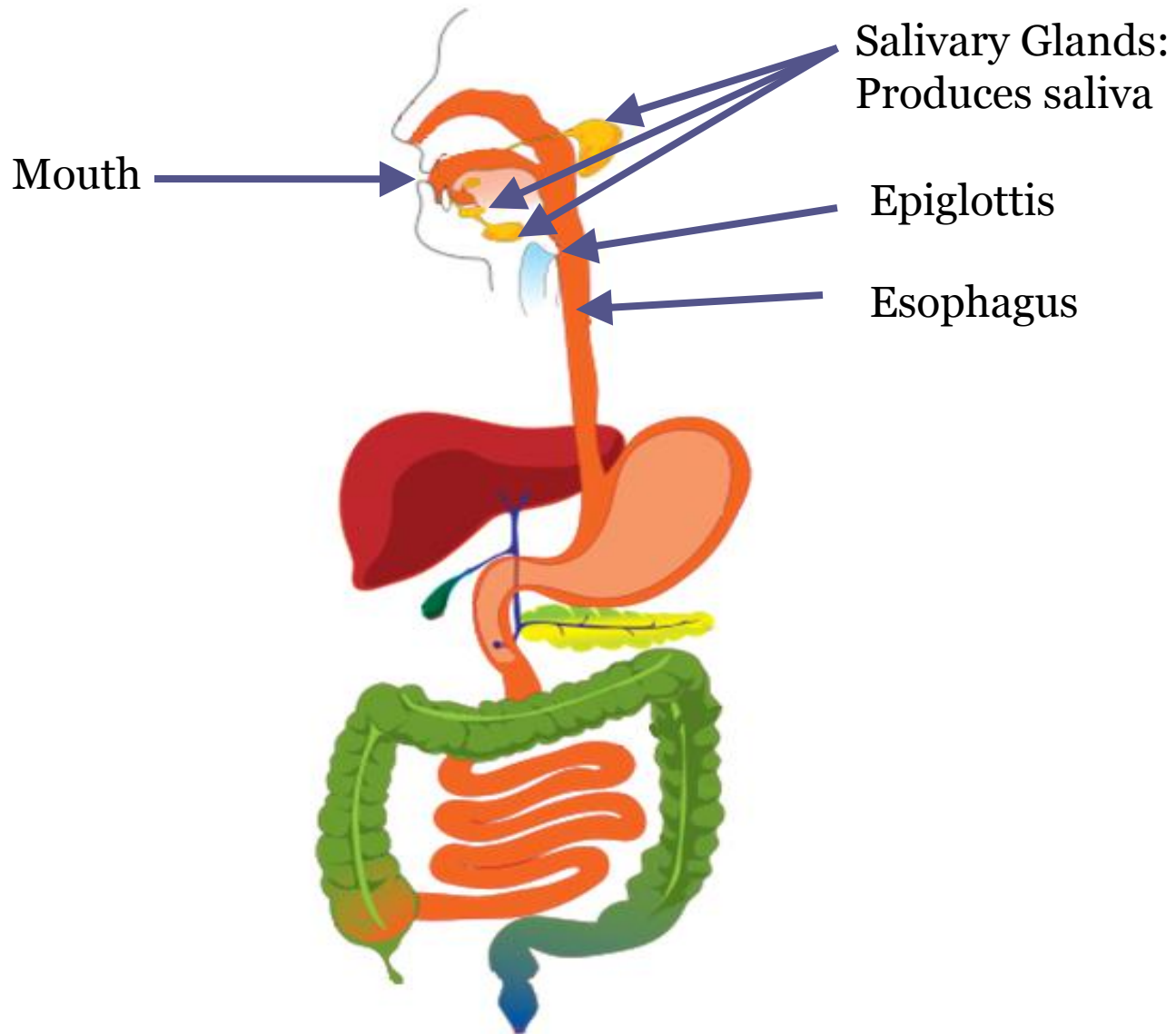
**Enzyme:** A protein that speeds up chemical reactions



# Human Digestive System



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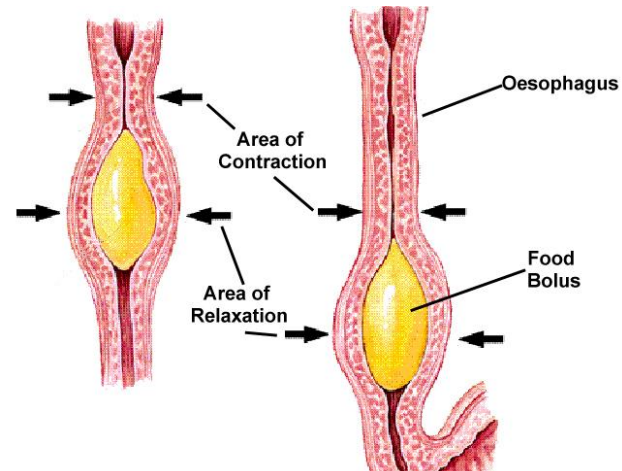
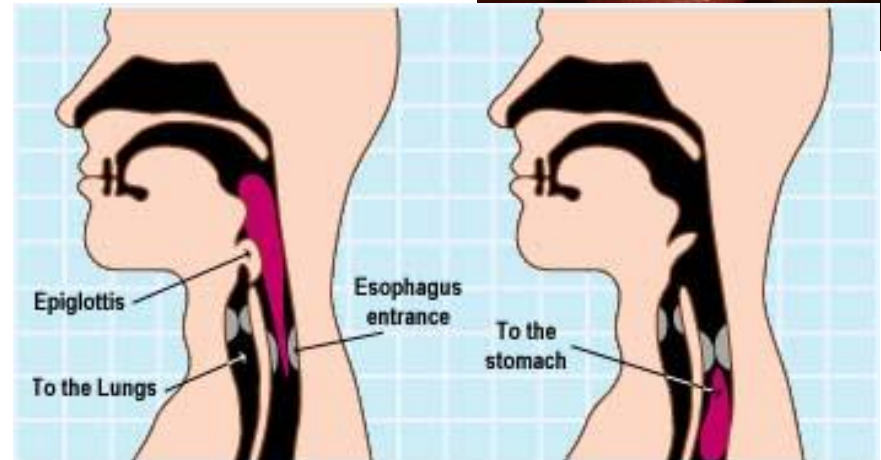
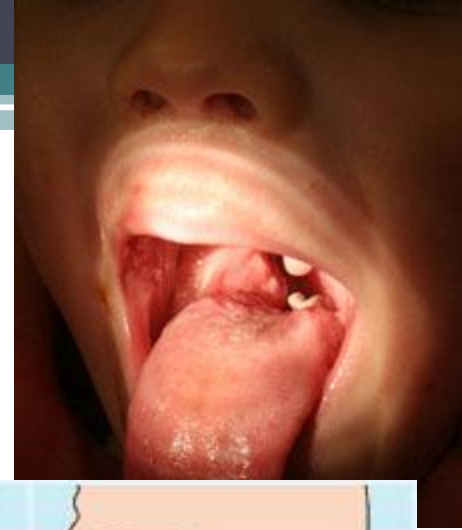
# Mouth → Stomach

- Bolus is moved to Pharynx
  - **Bolus:** Moistened thoroughly chewed food rolled into a ball
  - **Pharynx:** Open area at the back of the mouth
- Enters into the Esophagus

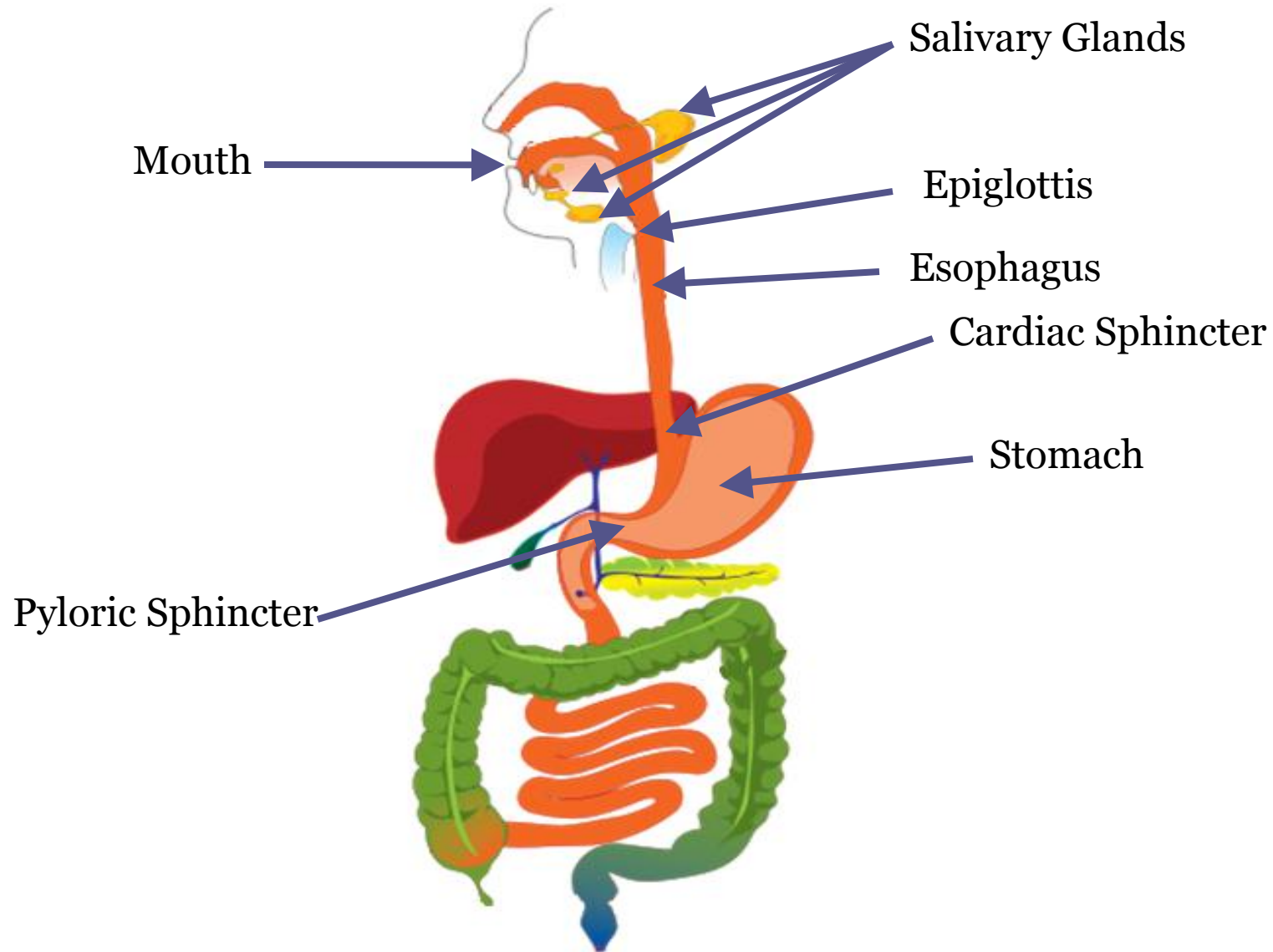


# Swallowing and Not Choking

- Epiglottis
  - Covers the windpipe when you swallow
- Peristalsis
  - Muscle contractions that move food along

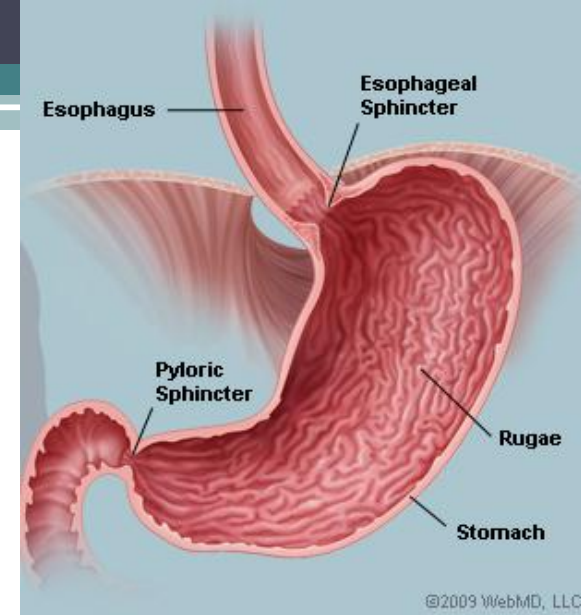


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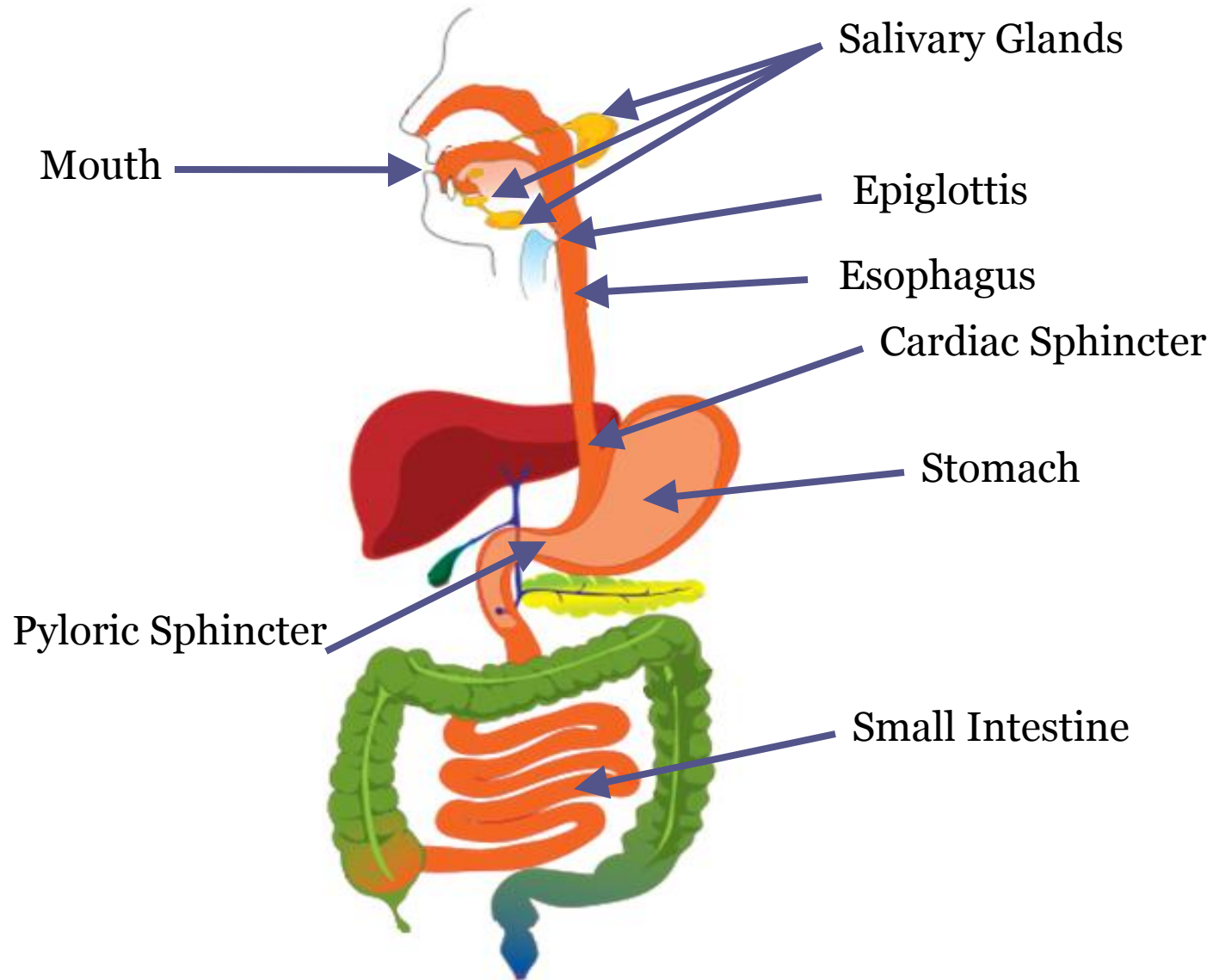


# Stomach Portion

- Cardiac Sphincter – Ring of Muscles
  - Opens the esophagus to the stomach
- Stomach – Can stretch & hold up to 2 L
  - Mechanical Digestion: Churning
  - Highly Acidic: Kills germs and breaks down minerals
  - Chemical Digestion: Pepsin to digest proteins
    - Pepsinogen is turned into pepsin in the presences of HCl
  - Turns the Bolus into Chyme
  - Mucus protects stomach
- Pyloric Sphincter – Ring of Muscles
  - Opens the stomach to the small intestine



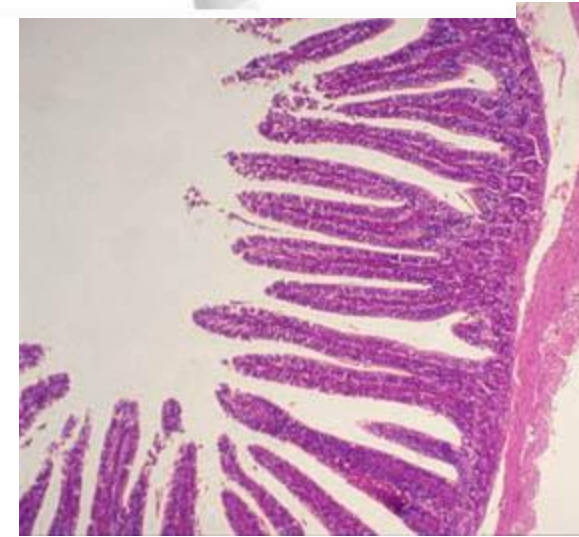
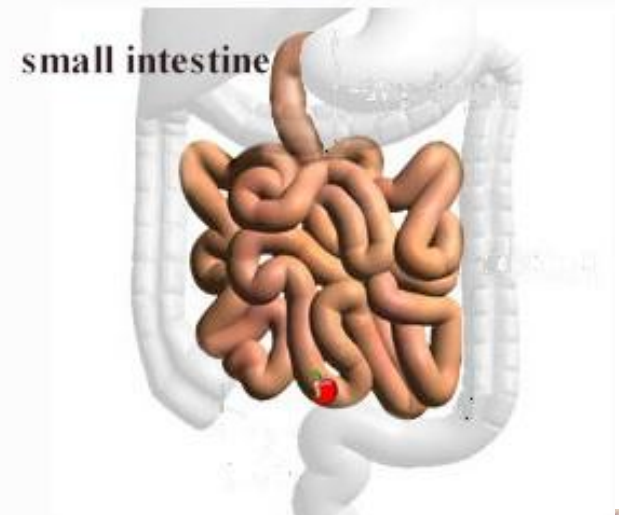
# Human Digestive System



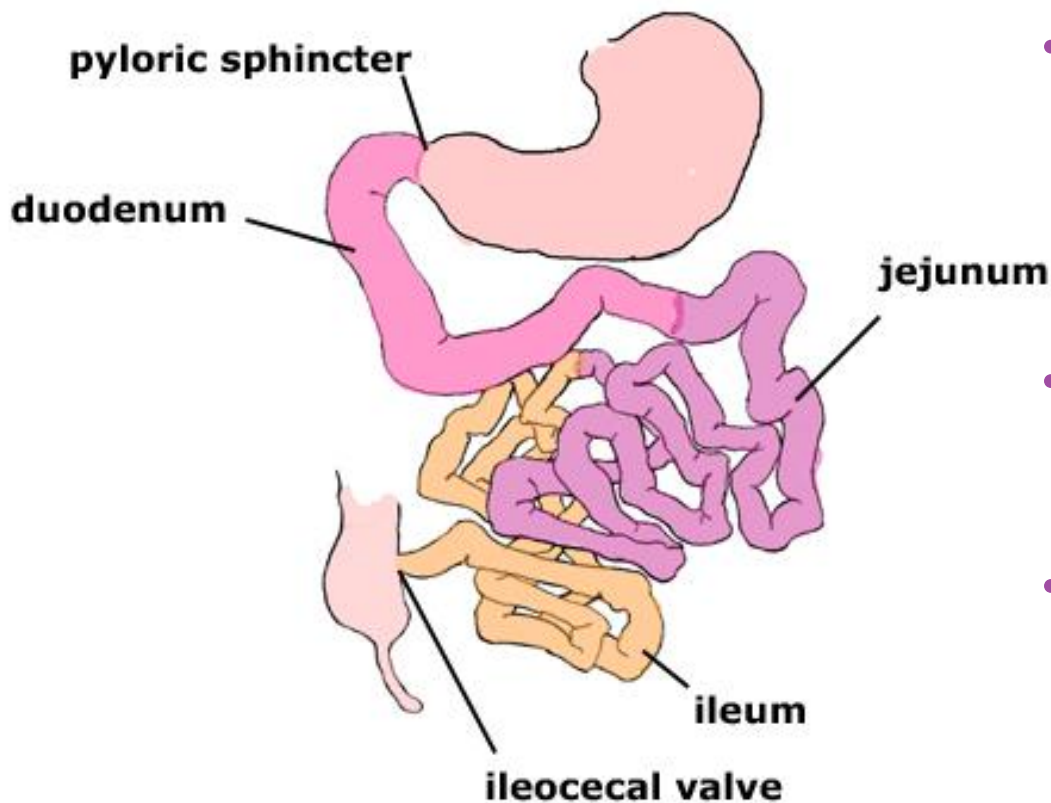
# Small Intestine

## (22 ft long!)

- Chemical Digestion:
  - Digests Carbs:
    - Amylase from pancreas
    - Maltase produced in the small intestine
  - Digests Proteins:
    - Trypsin from pancreas
  - Digests Lipids:
    - Lipase from the pancreas
    - Bile from the liver
- Absorption
  - Villi increase the surface area (approximately the surface area of a tennis court!)



# Parts of the Small Intestine



- Duodenum: First part –  
Stretches for 25 cm (10 inches)
  - This is where digestive juices enter
  - DIGESTION
- Jejunum: Second part –  
Stretches for 2.5 m (about 8 ft)
  - Absorption
- Ileum: Third Part –  
Stretches for 4 m (13 ft)
  - Absorption

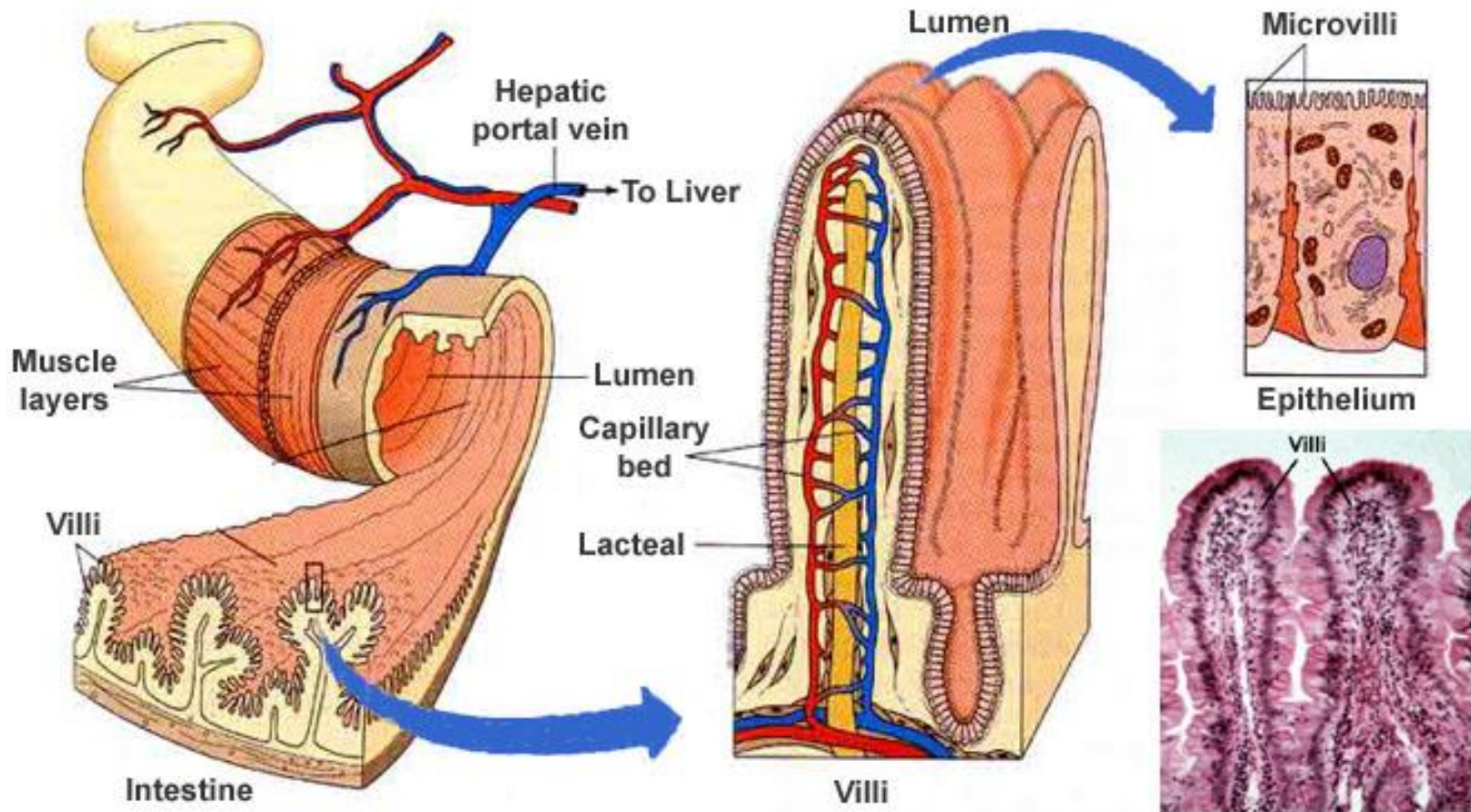
# Villi

- Nutrients are absorbed into bloodstream via diffusion and active transport

## How:

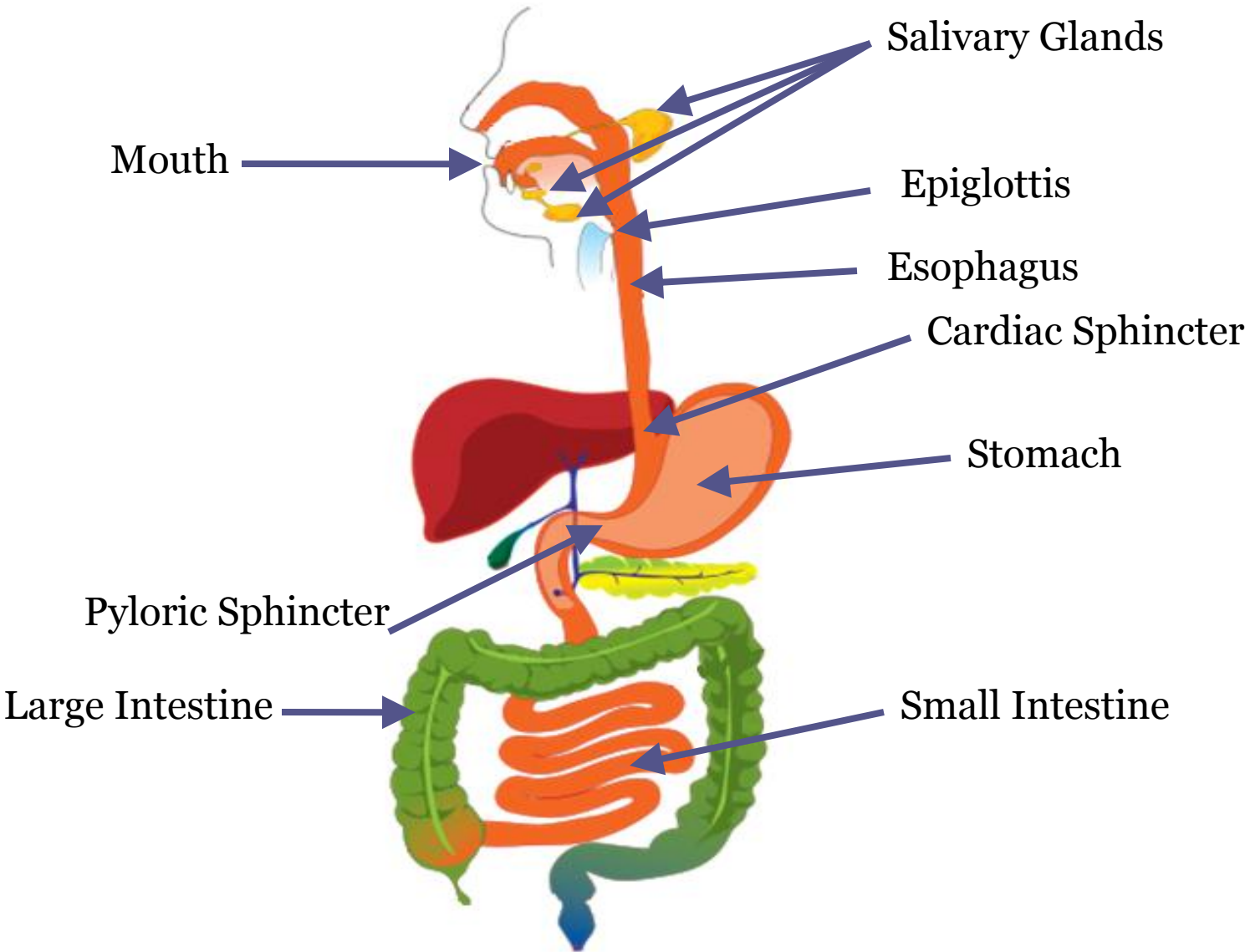
- Lacteals – tiny lymph vessels inside of the villi
  - Fatty Acids enter lacteals and are carried to bloodstream
- Amino Acids & Monosaccharides enter capillaries
  - Capillaries come together in the hepatic portal vein
  - Blood flows to the liver to be filtered

# Villi - Picture



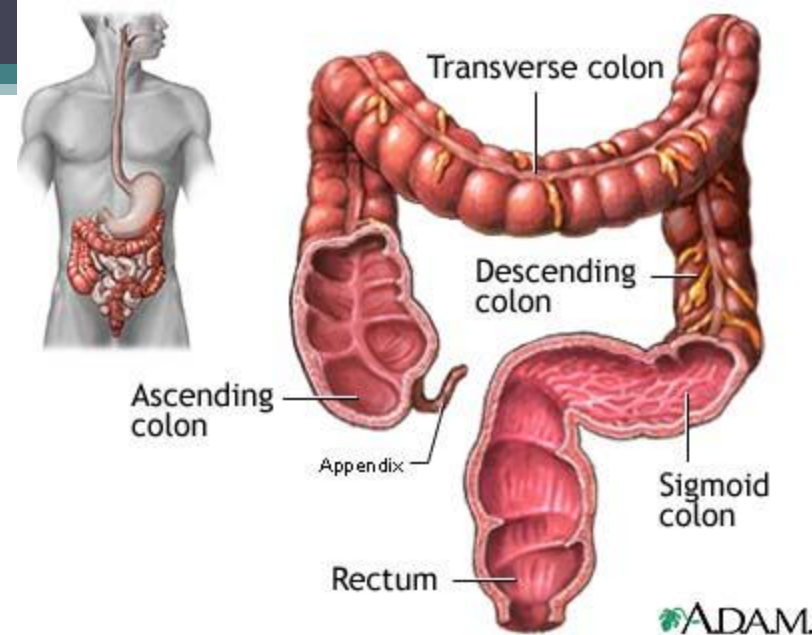


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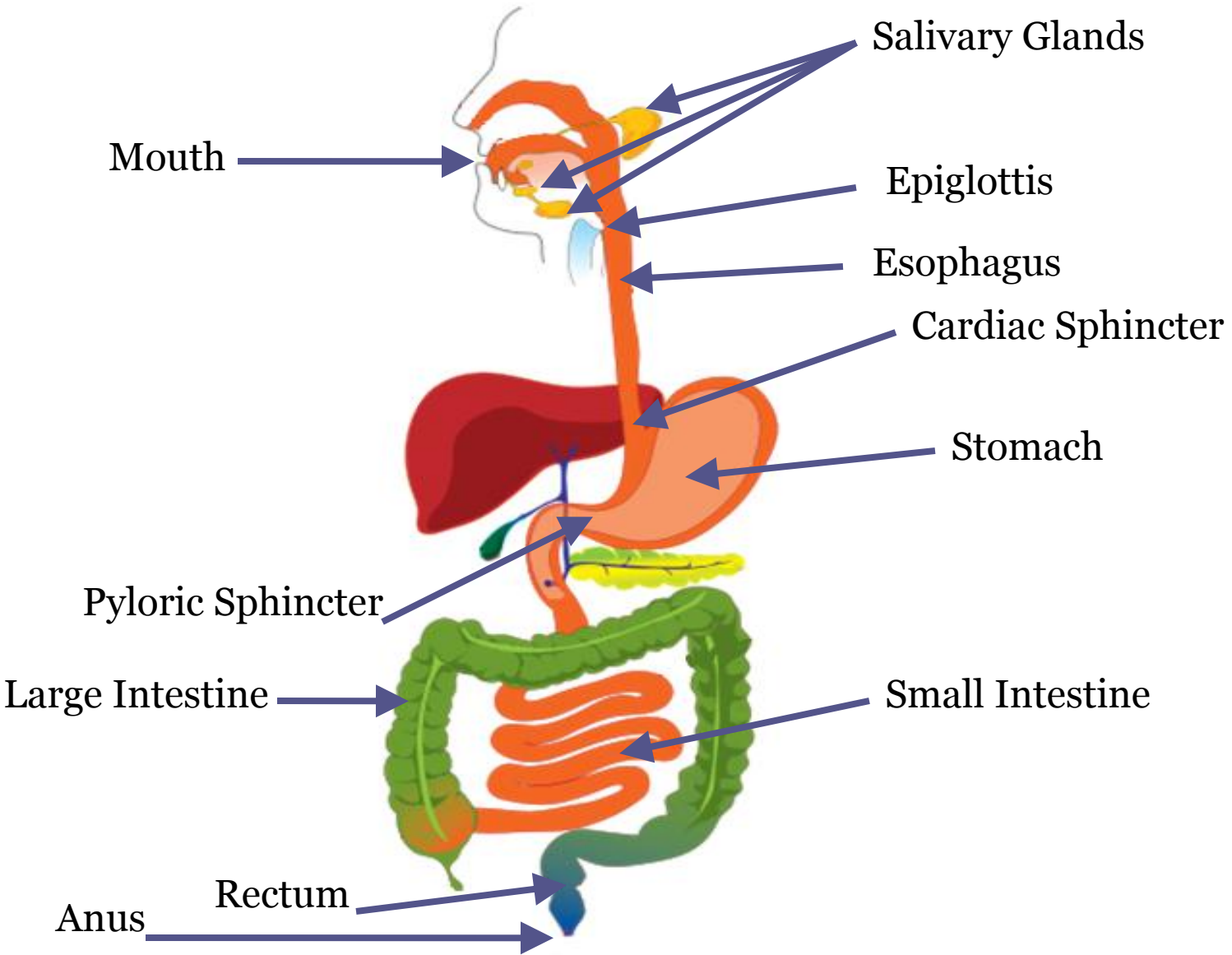


# Large Intestine (Colon)

- Reabsorbs water
  - Must get the right amount...
  - If it absorbs too much water...constipation
  - If it doesn't absorb enough water... diarrhea
- Lots of good bacteria present – E. coli
  - Helps break up cellulose in fruits & veggies
  - Produces vitamins K & B vitamins
  - Creates gases (by product of bacterial metabolism)

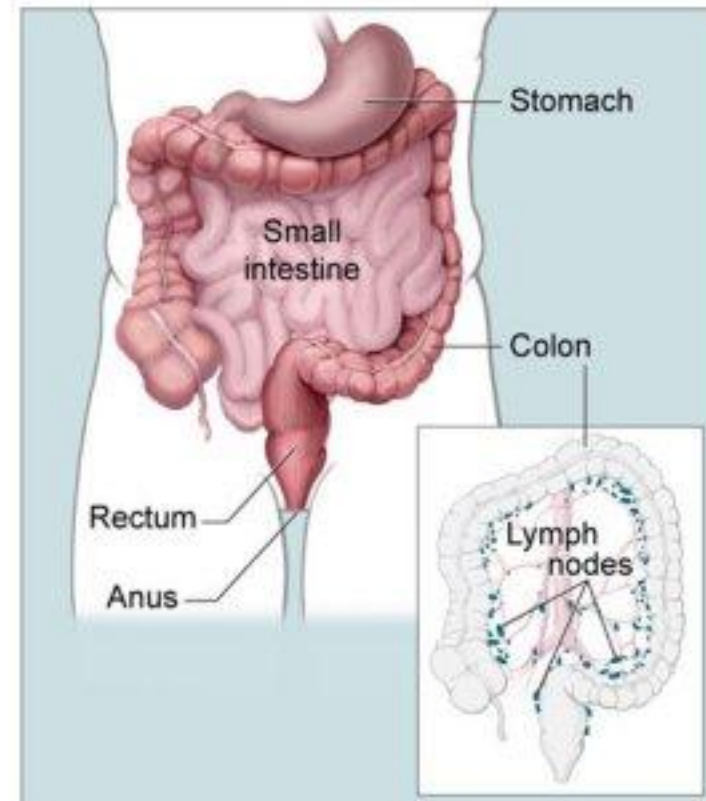


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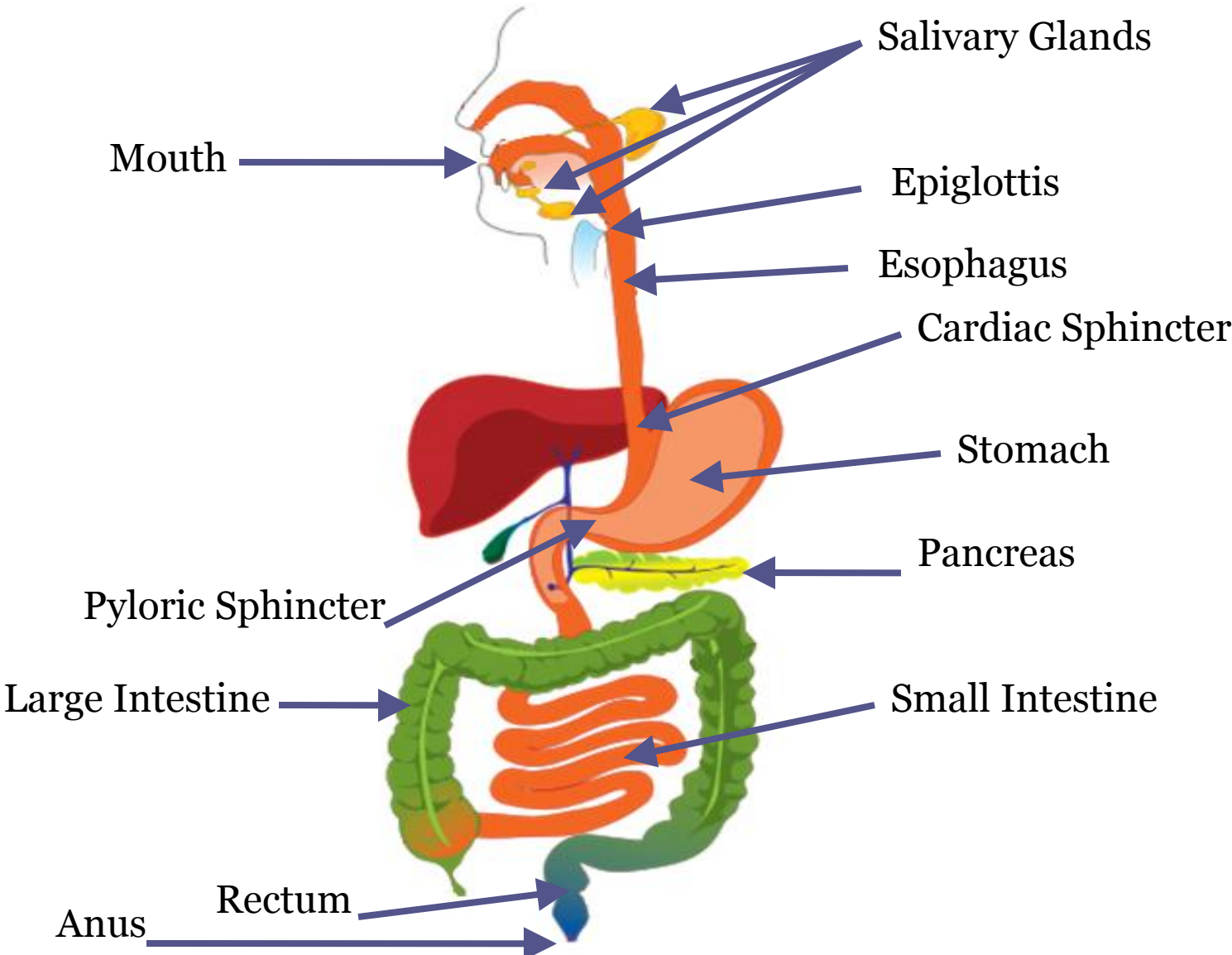


# End of the Line

- Rectum
  - Holds waste ready for disposal
- Anus
  - Sphincter

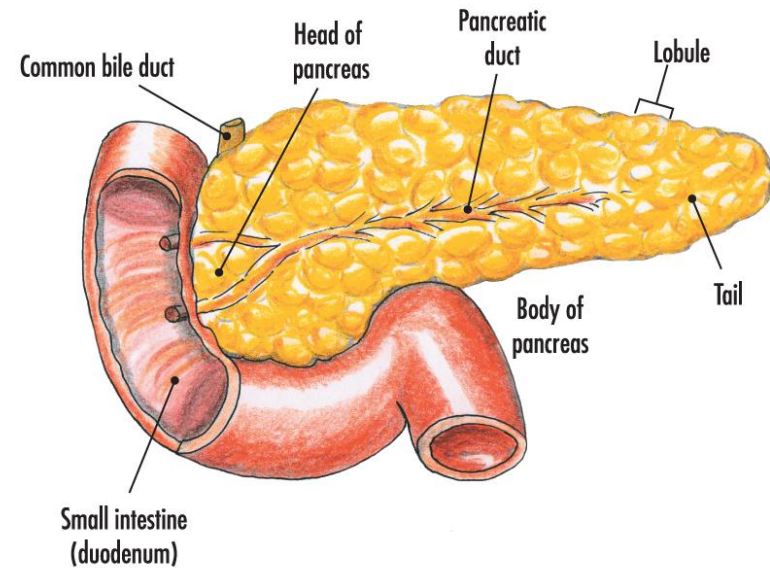


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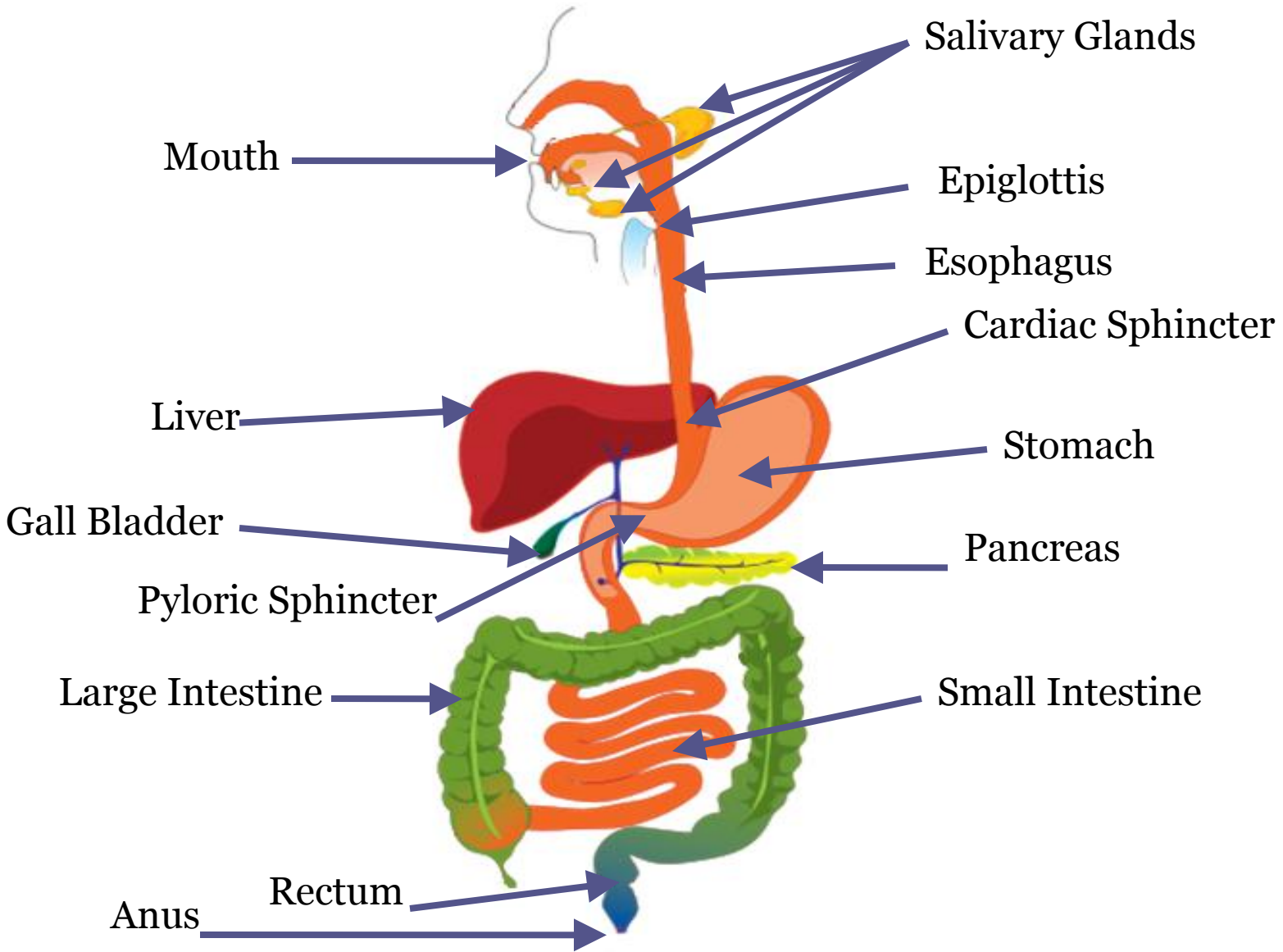


# Pancreas

- Produces important digestive juices for the small intestine
  - Amylase - carbs
  - Chemotrypsin - proteins
  - Trypsin - proteins
  - Lipase – lipids
- Produces hormones to help body
  - Glucagon – stimulates the liver to break down glycogen to raise blood sugar
  - Insulin – stimulates the liver to store more glucose as glycogen to lower blood sugar
- Produces sodium bicarbonate
  - Neutralizes stomach acid in the small intestine

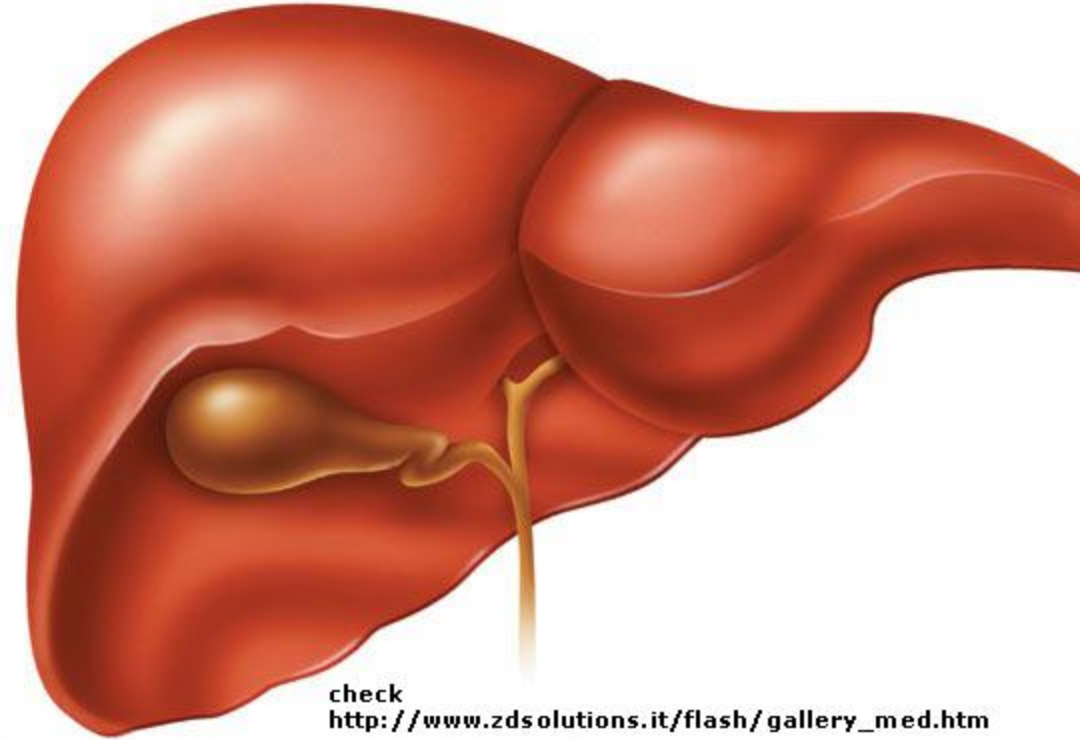


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# Bile

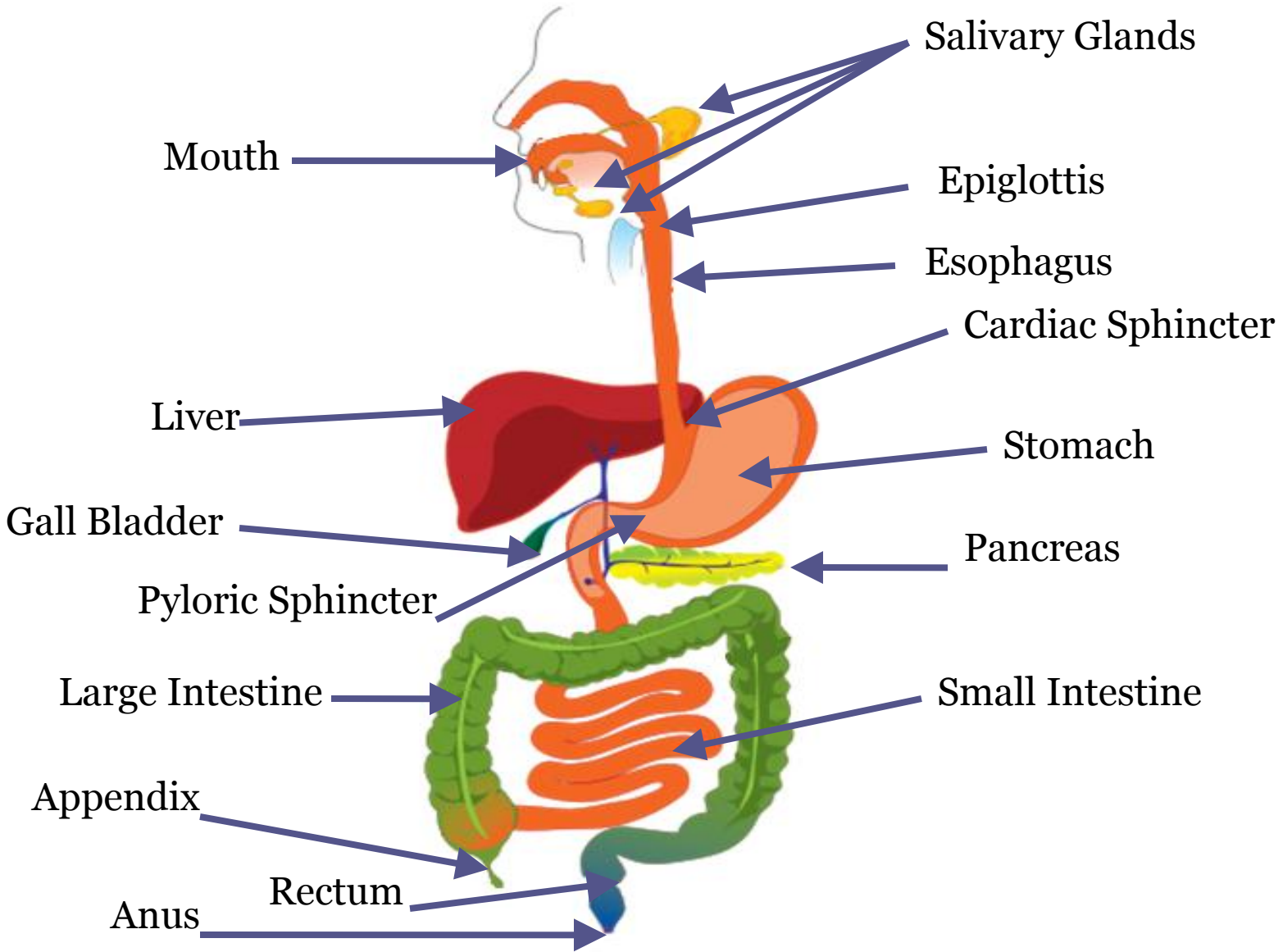
- Liver
  - Produces Bile
    - Breaks down fats
  - Detoxifies
    - Example Alcohol – 1 oz per hour
  - Stores extra glucose as glycogen
  - Makes proteins
- Gall Bladder
  - Stores bile until it is needed



check  
[http://www.zdsolutions.it/flash/gallery\\_med.htm](http://www.zdsolutions.it/flash/gallery_med.htm)



# Human Digestive System



# Appendix

- It is a vestigial organ
- May be involved in storing good bacteria

