Nutrient procurement Animals

Bio 11

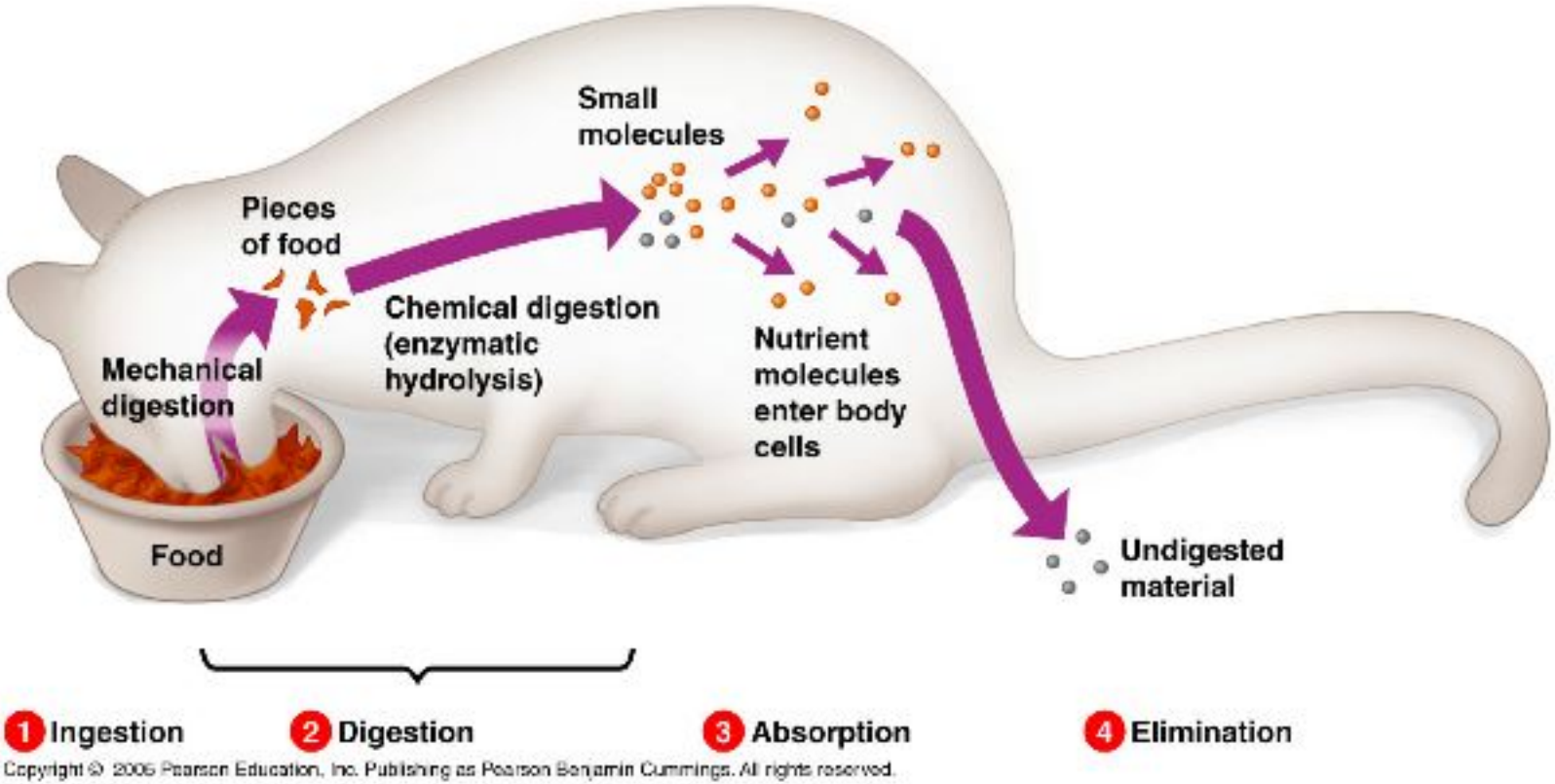
Terms

- Herbivore
- Carnivore
- Omnivore
- Suspension feeders - extract suspended food particles
- Substrate feeders - live on their food source

Terms

- Fluid feeders - sucks nutrient rich fluid from the host
- Bulk feeders - ingests large pieces of food

Movement of food through a digestive tract



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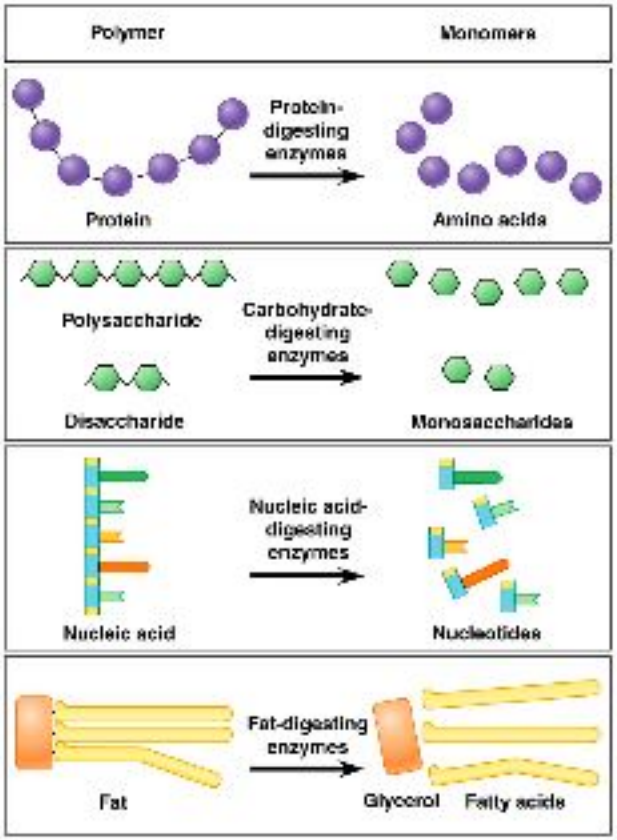
Chemical digestion



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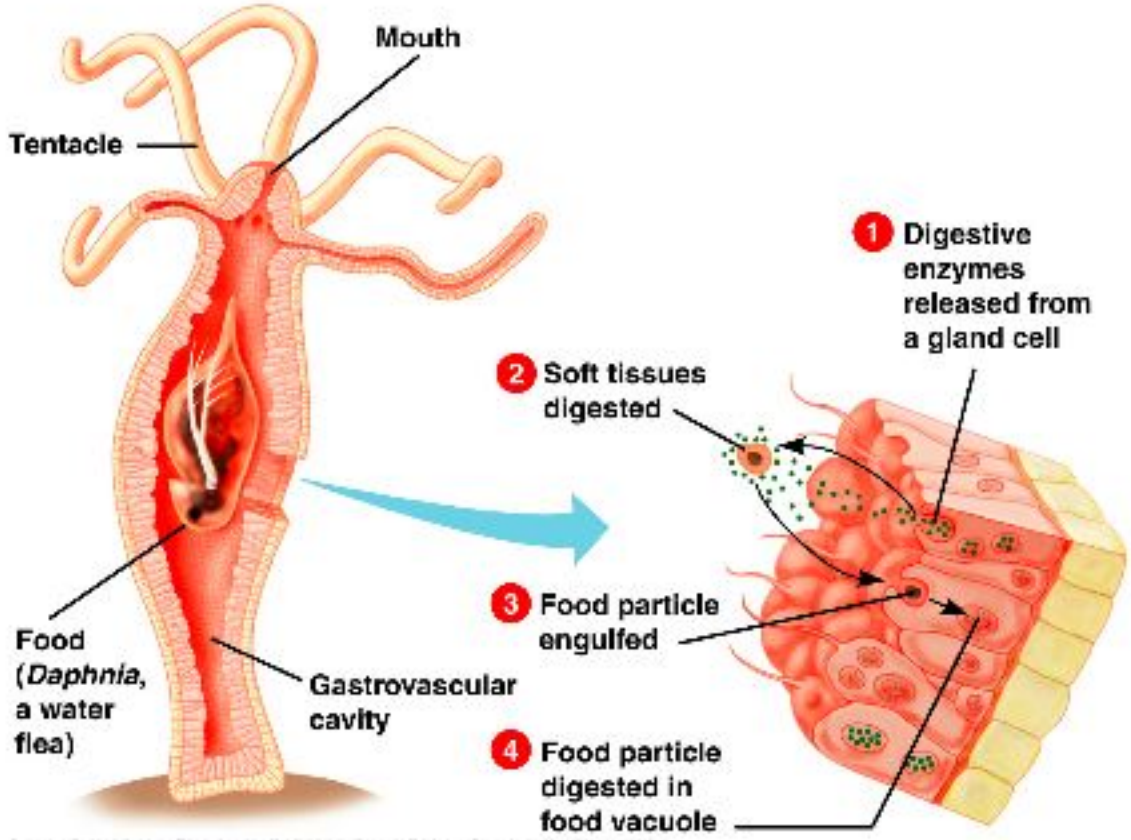
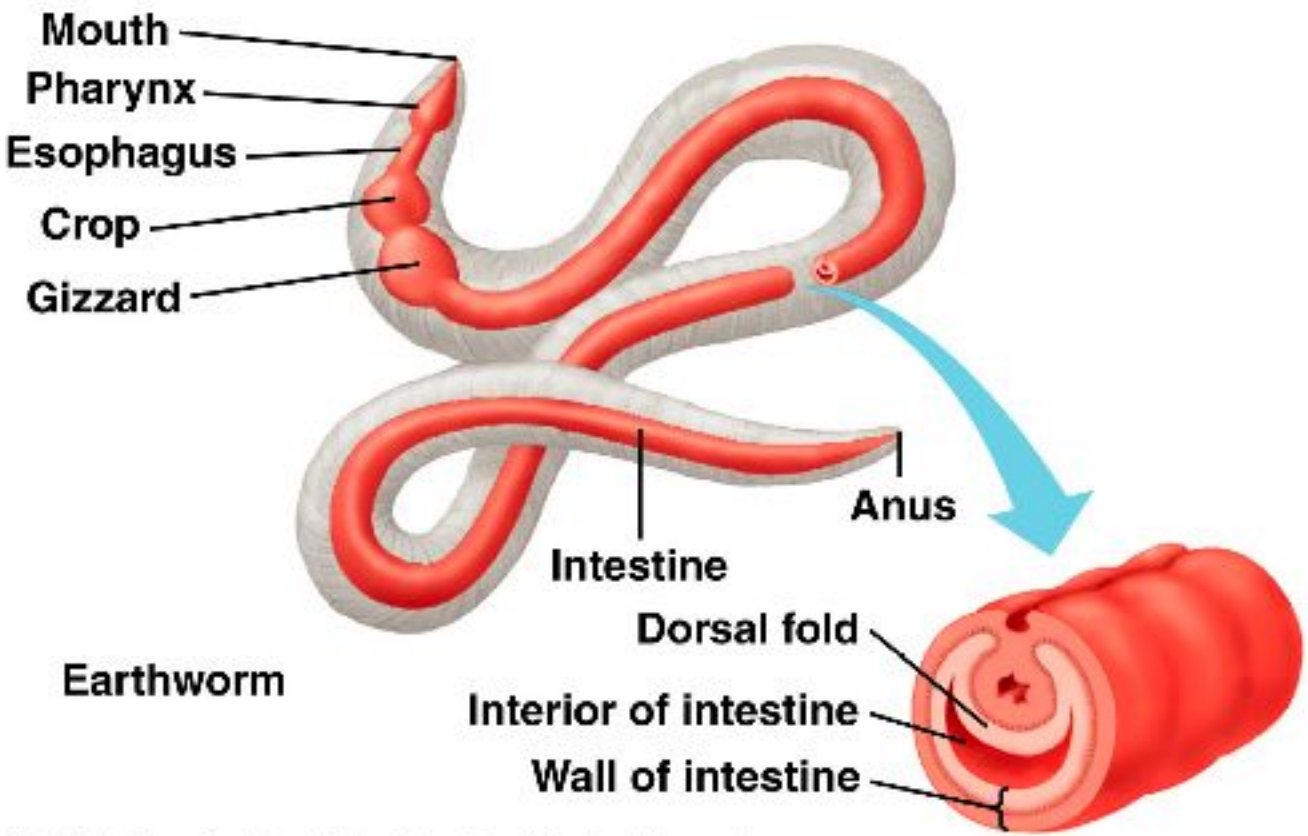
Evolution of digestion

- Simplest form is the food vacuole - sponges
- Next moving to extra-cellular digestion (simplest form of this is the gastrovascular cavity)
- Next moving to a digestive tract with two openings
- Finally the appearance of specialized digestive compartments

Gastrovascular cavity



Earthworm digestion



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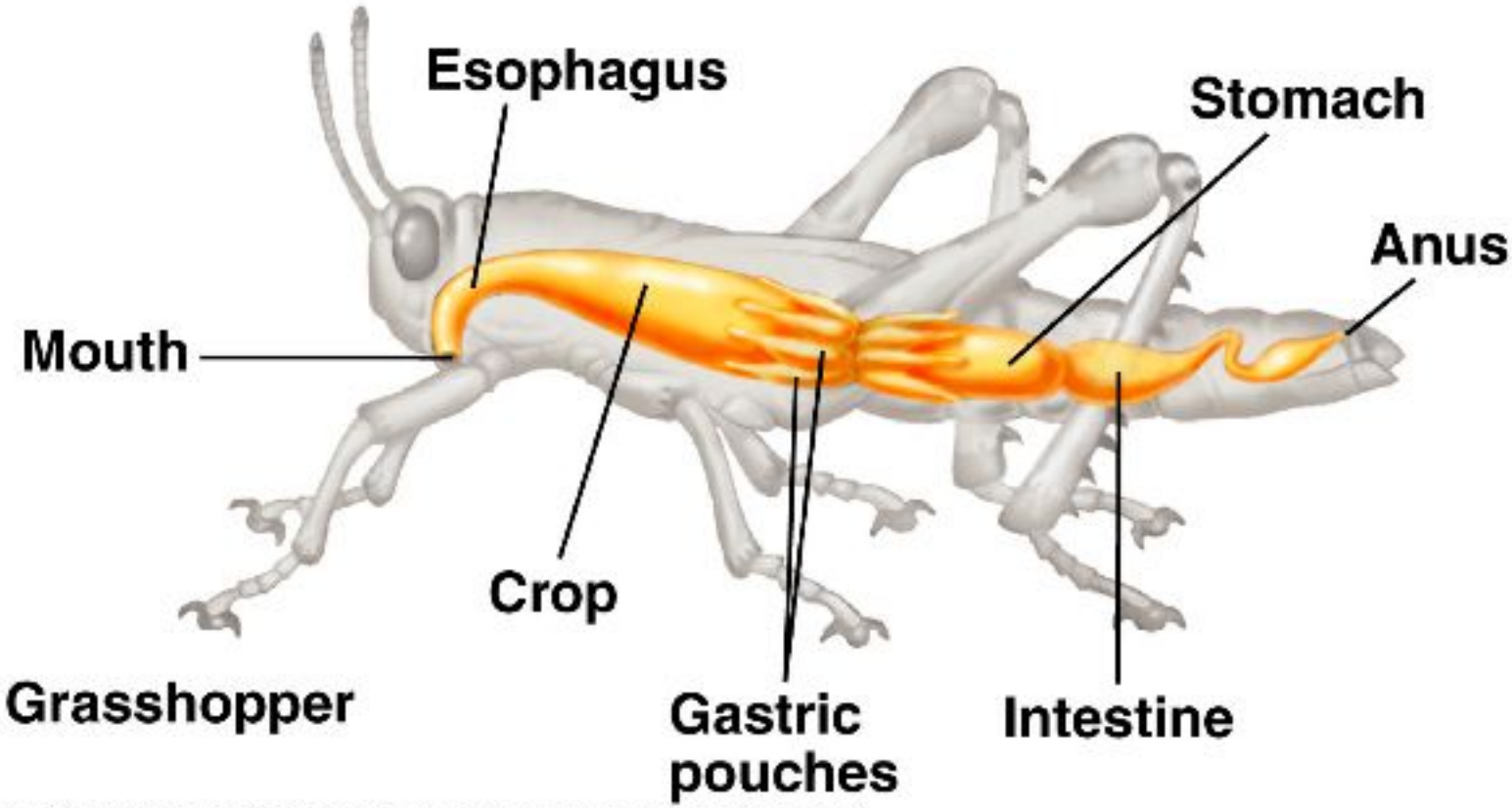
grasshopper



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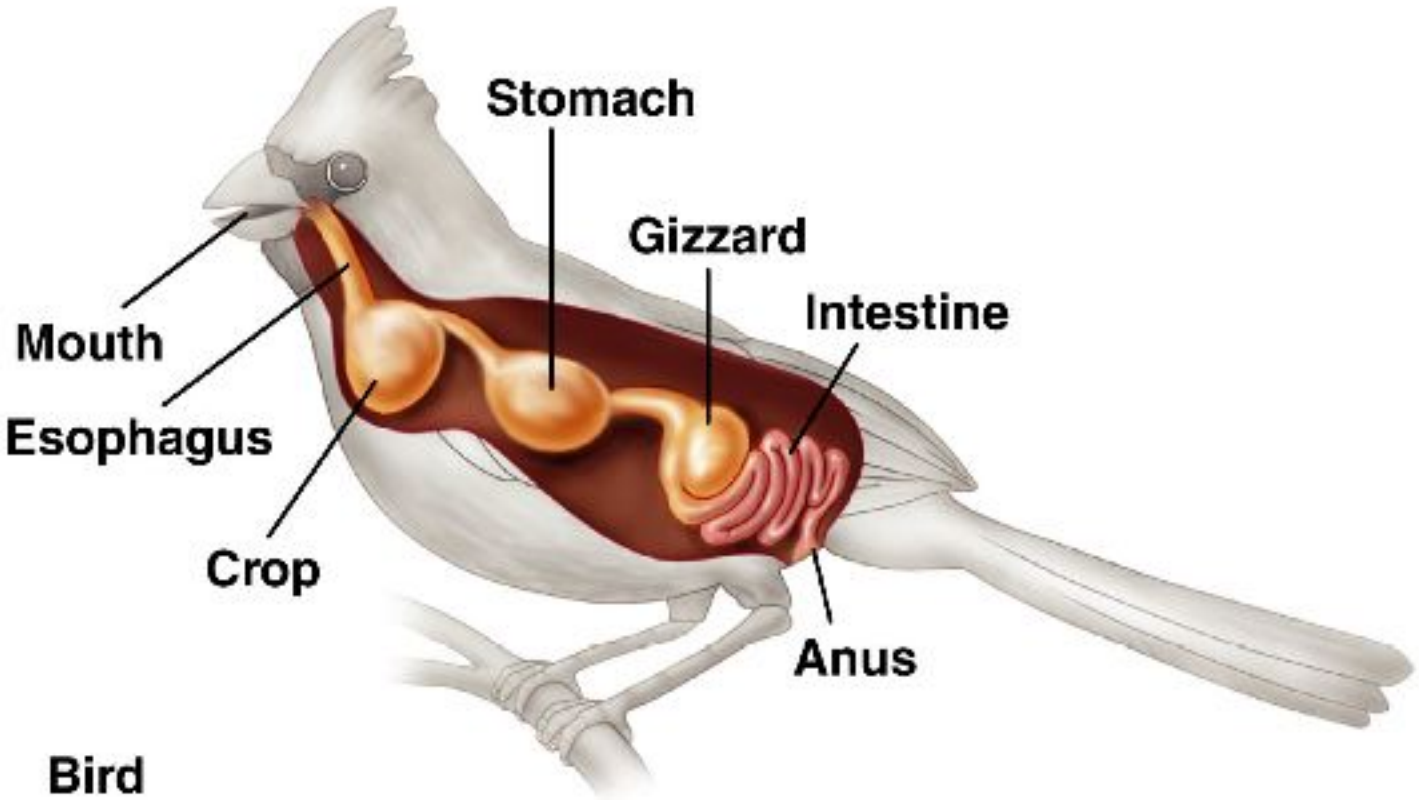
Bird



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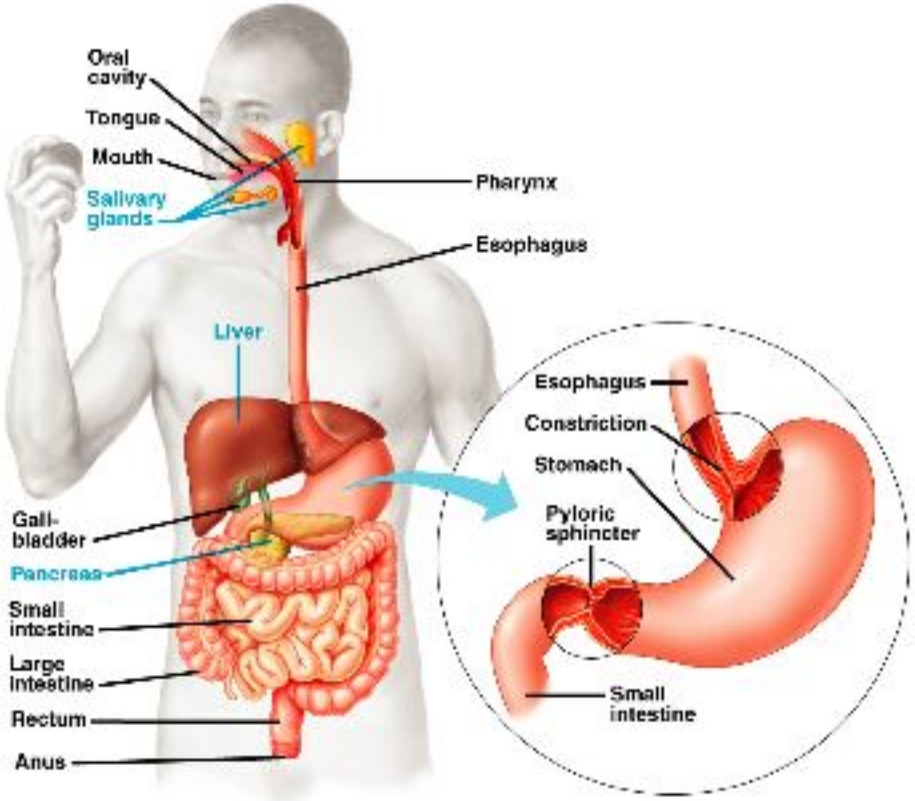
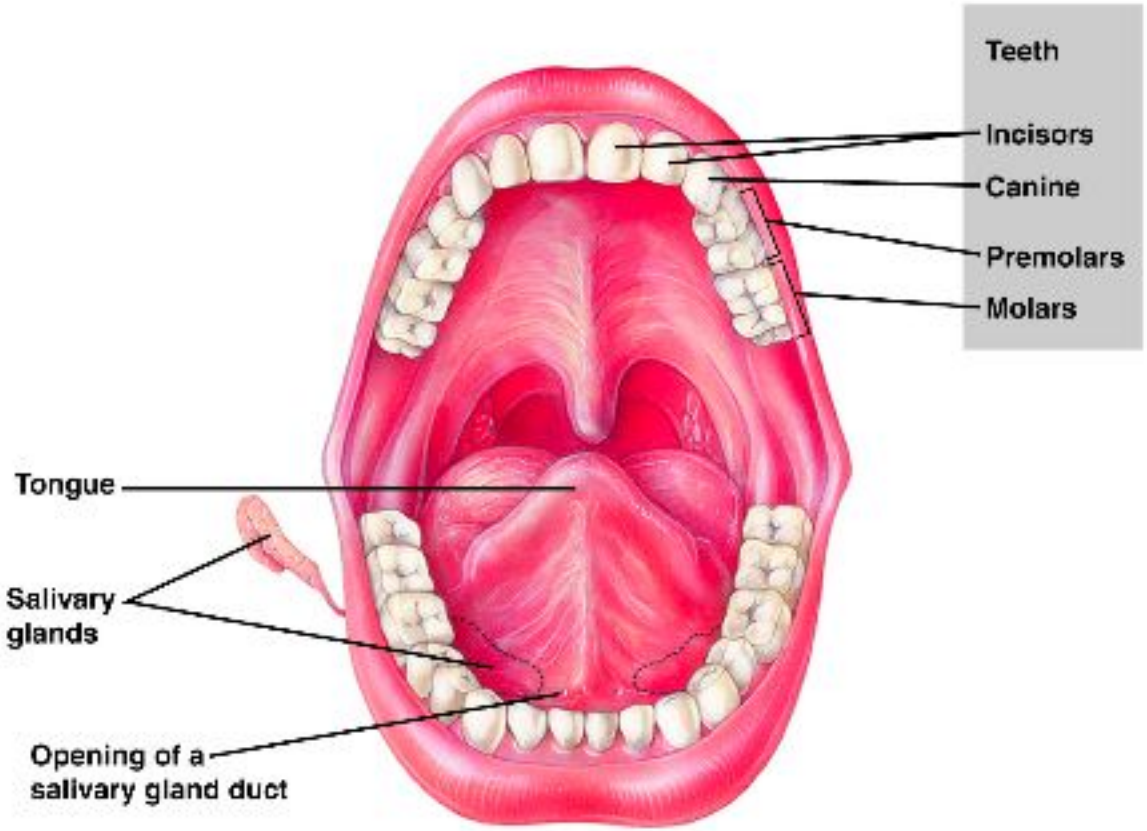
Human


Oral cavity
Tongue
Mouth
Salivary glands
Pharynx
Esophagus
Liver
Gall-bladder
Pancreas
Small intestine
Large intestine
Rectum
Anus
Esophagus
Constriction
Stomach
Pyloric sphincter
Small intestine

First part of the digestive tract



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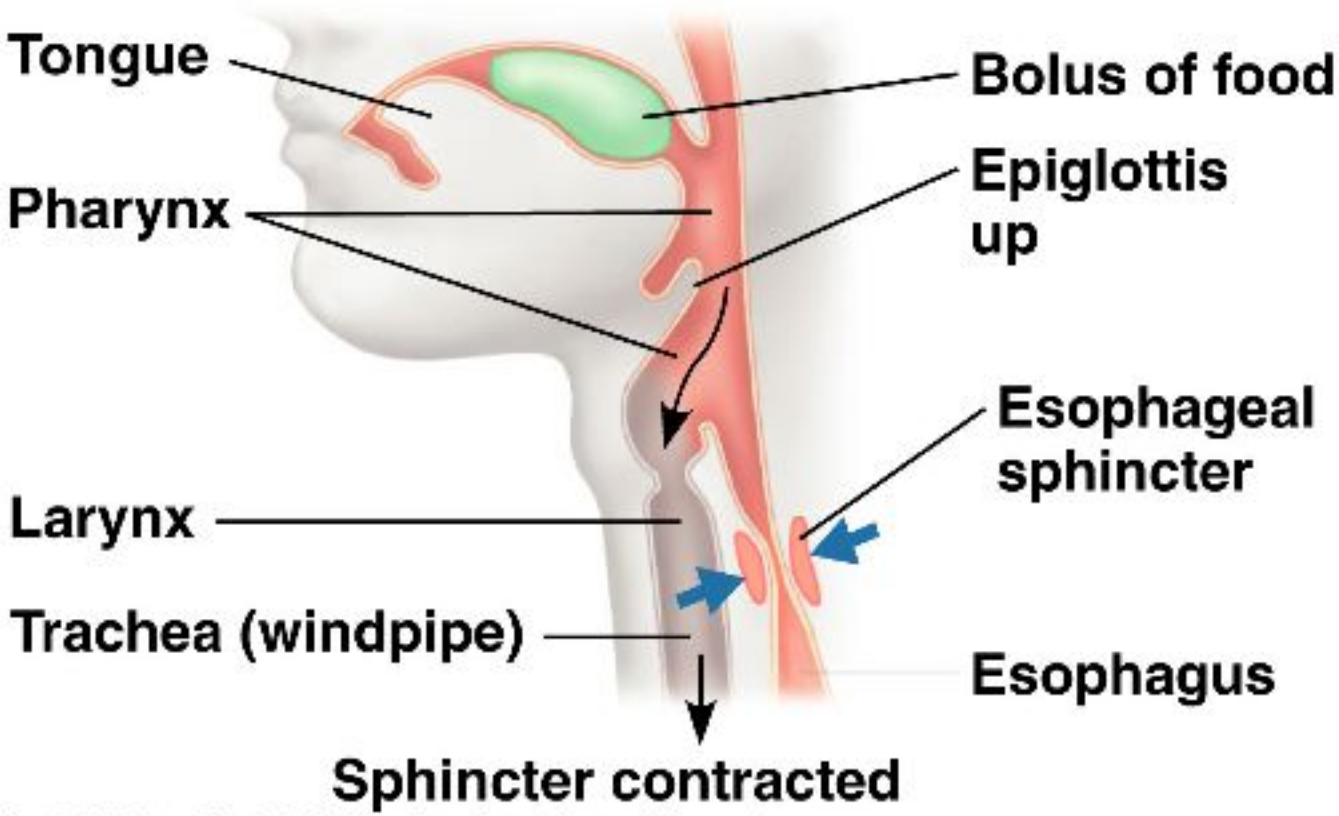
Teeth

- Incisors - used for sniping off pieces of food
- Canines - used for tearing
- Molars and premolars - used for grinding
- Diet of the animal will determine the shape of the teeth

Digestion begins

- Start to break down carbohydrates - amylase.
- Mechanically break down the other food groups

Movement to the esophagus



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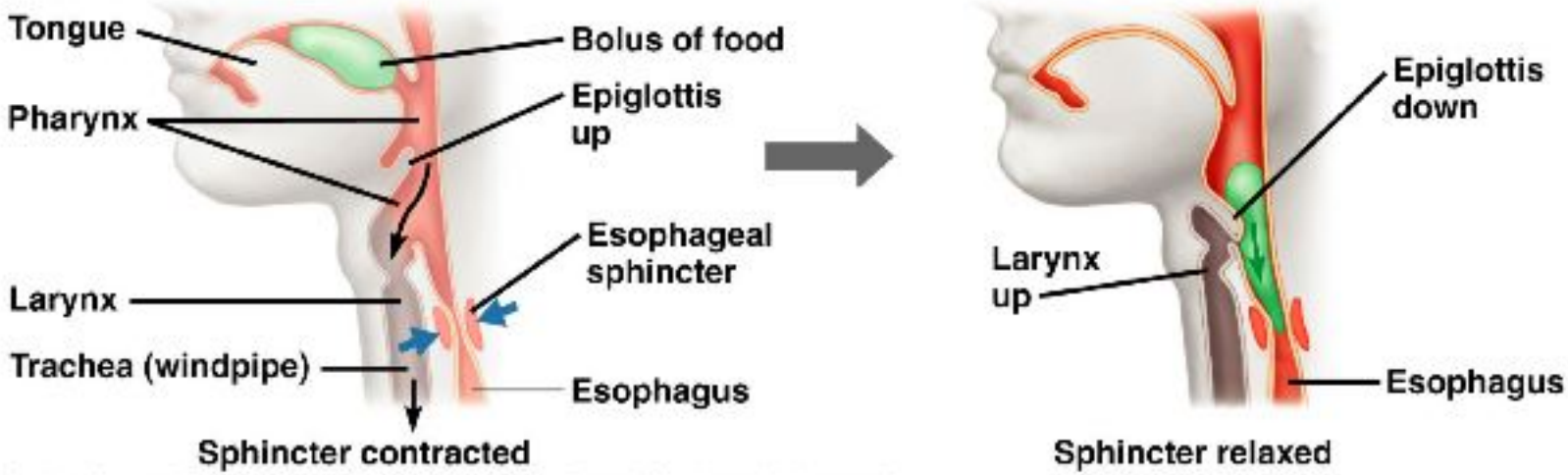
Movement to the esophagus



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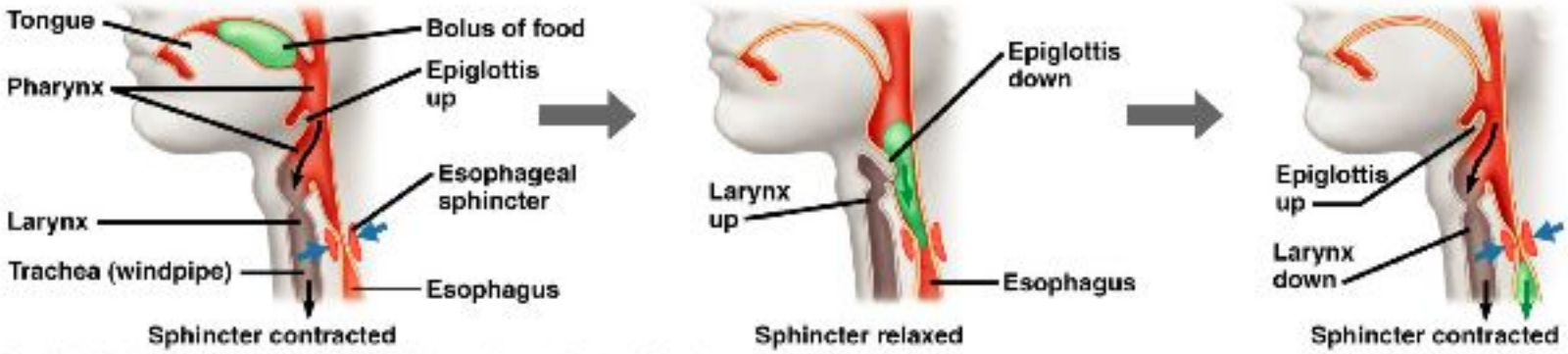
Movement to the esophagus



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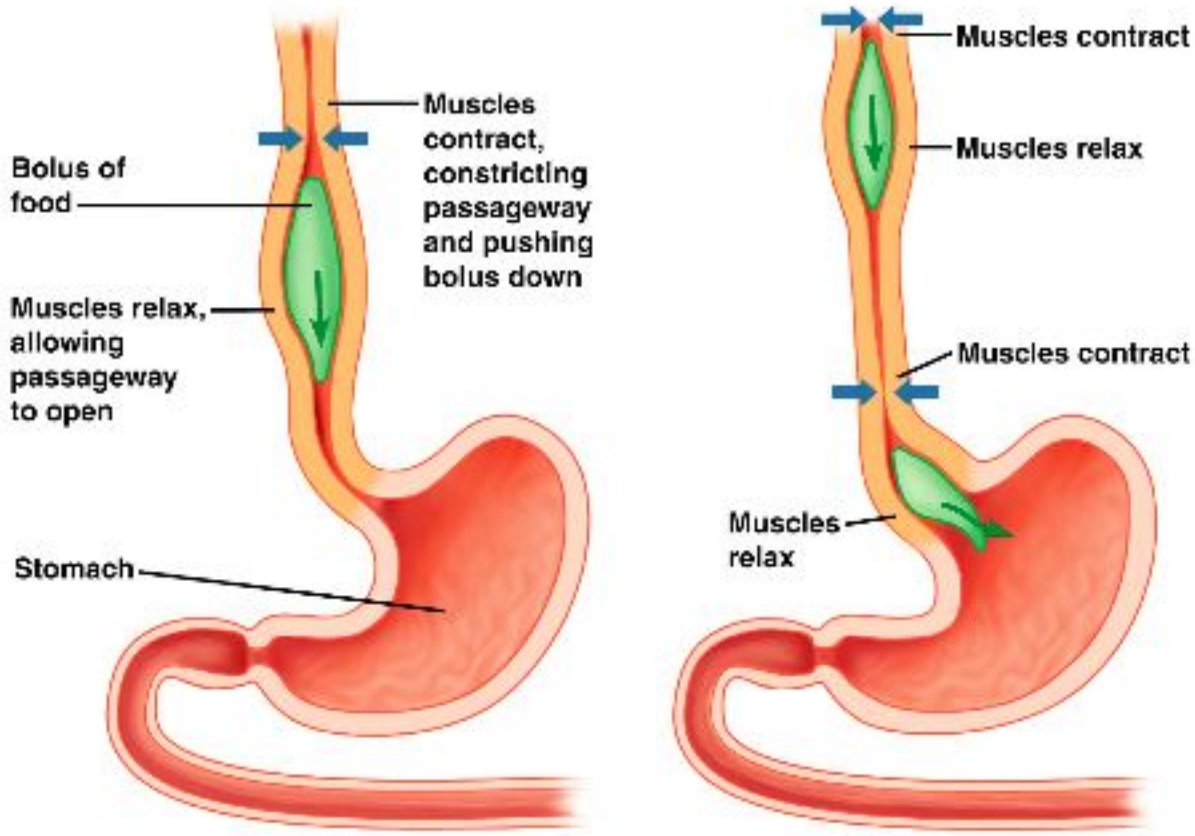
Movement to the stomach



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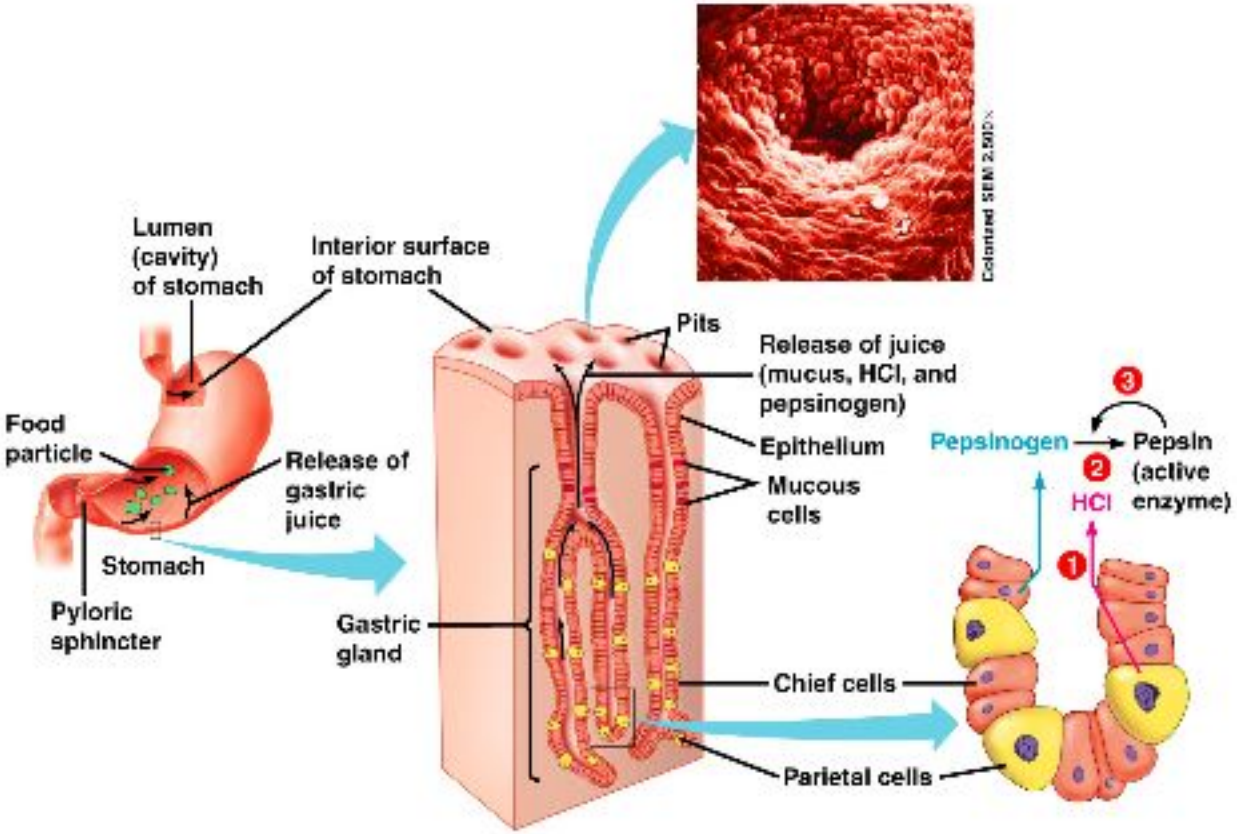
Digestion in the stomach



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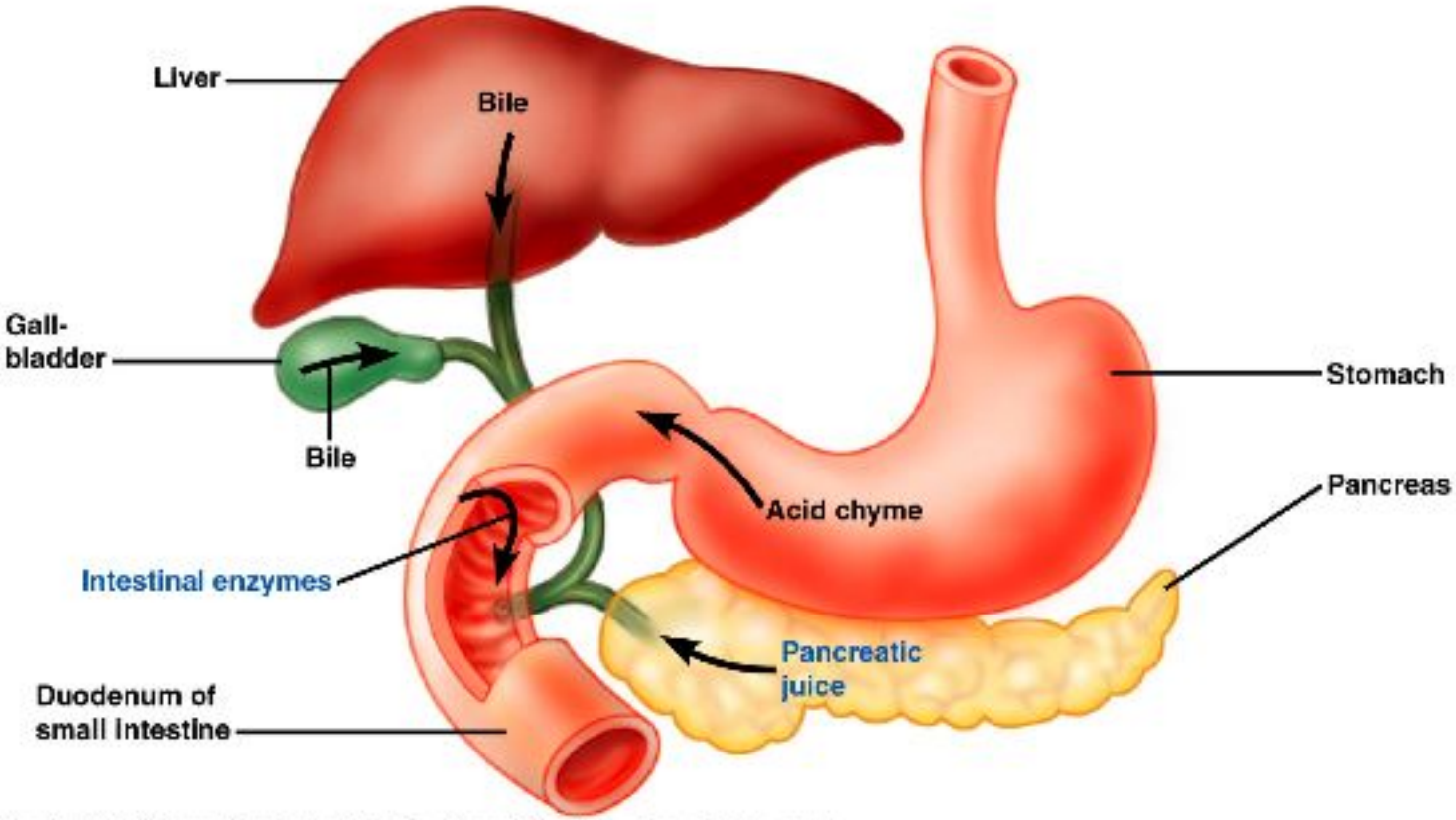
Digestion in the stomach

- Stomach is an area for storage
- The start of protein digestion occurs here.
- Also mechanical break down of the food - acid
- Role of pepsinogen and HCl
- Mucus helps protect the stomach
- Secretion of HCl regulated by hormone gastrin

Digestion in the stomach

- Stomach creates acid chyme
- Slowly released to the small intestine by the Pyloric spincter
- Stomach takes 2-6 hours to fully empty.
- Only water, alcohol and a few drugs can be absorbed by the stomach

Majority of digestion takes place in small intestine



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Majority of digestion takes place in small intestine

- All four types of nutrients--carbs, proteins, nucleic acids and fats are digested and absorbed here.
- Pancreas produces fluids that neutralize chyme and also digestive enzymes.
- Duodenum also produces digestive enzymes
- Liver produces bile that is stored in the gallbladder. Bile emulsifies fats -- allows for the digestion.

Majority of digestion takes place in small intestine

TABLE 21.11 ENZYMATIC DIGESTION IN THE SMALL INTESTINE

Carbohydrates				
Starch	Pancreatic amylase →	Maltose (and other disaccharides)	Maltase, sucrase, lactase, etc. →	Monosaccharides
Proteins				
Polypeptides	Trypsin, chymotrypsin →	Smaller polypeptides	Aminopeptidase, carboxypeptidase, dipeptidase →	Amino acids
Nucleic acids				
DNA and RNA	Nucleases →	Nucleotides	Other enzymes →	Nitrogenous bases, sugars, and phosphates
Fats				
Fat globules	Bile salts →	Fat droplets (emulsified)	Lipase →	Fatty acids and glycerol

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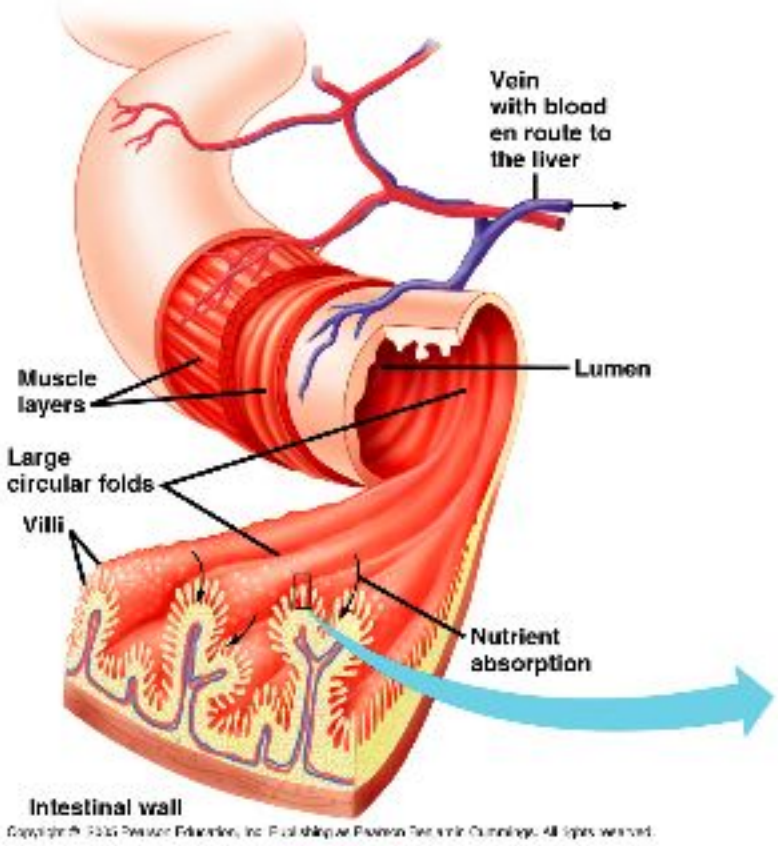
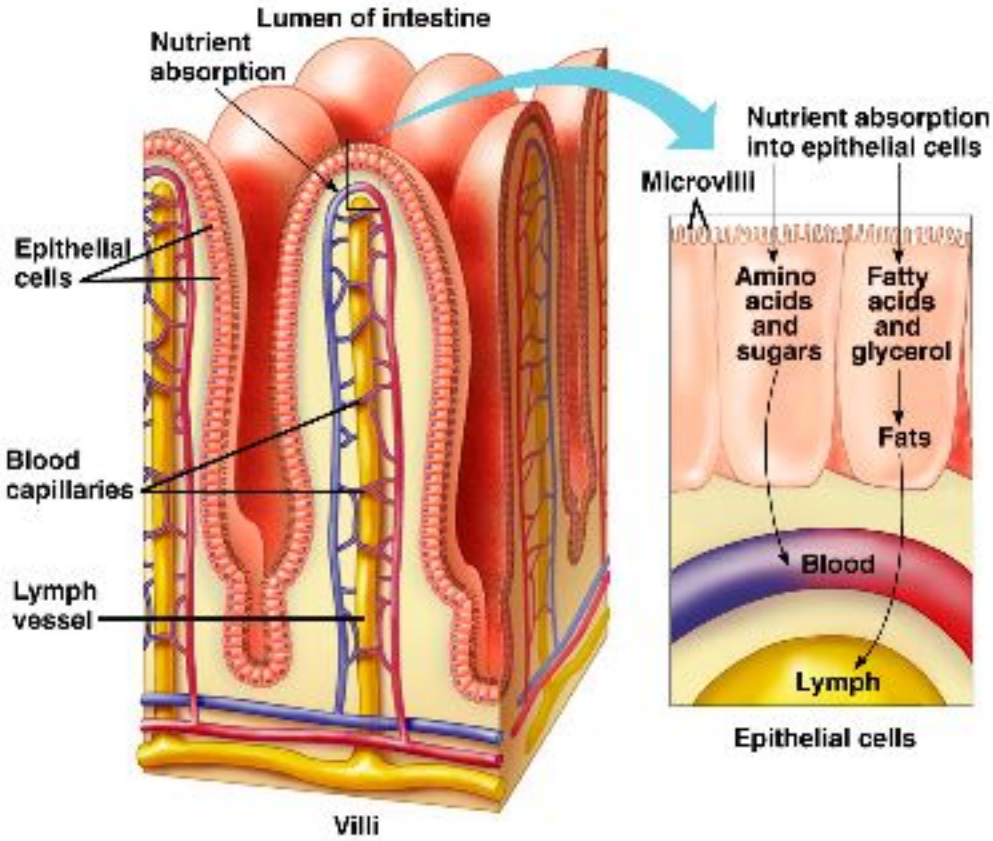
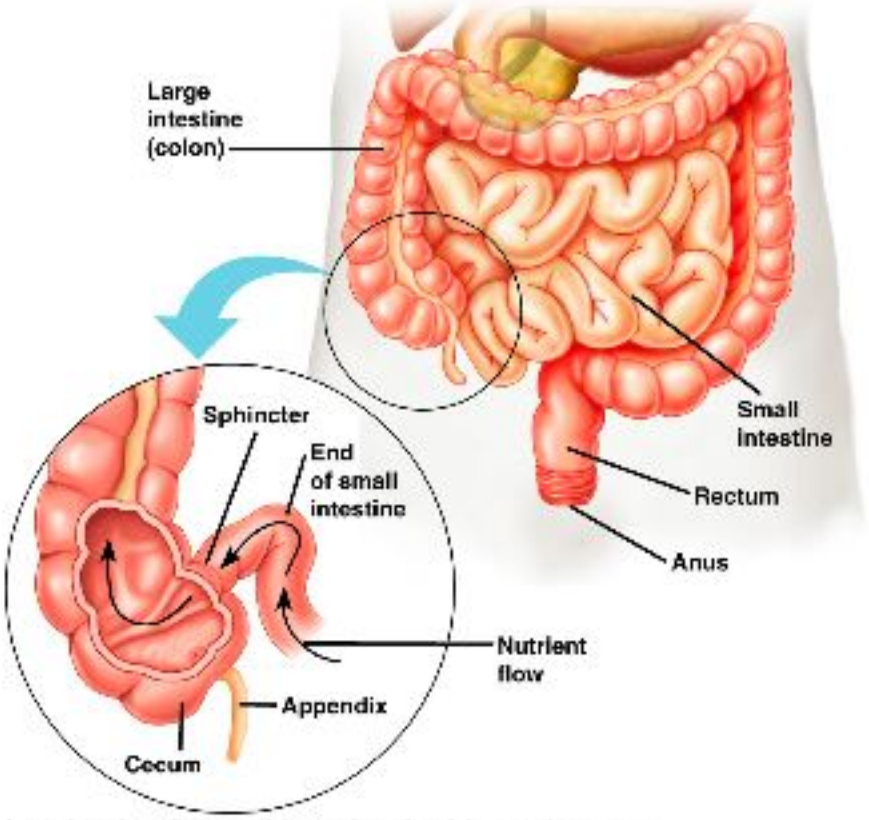
Majority of absorption takes place in small intestine



Majority of absorption takes place in small intestine



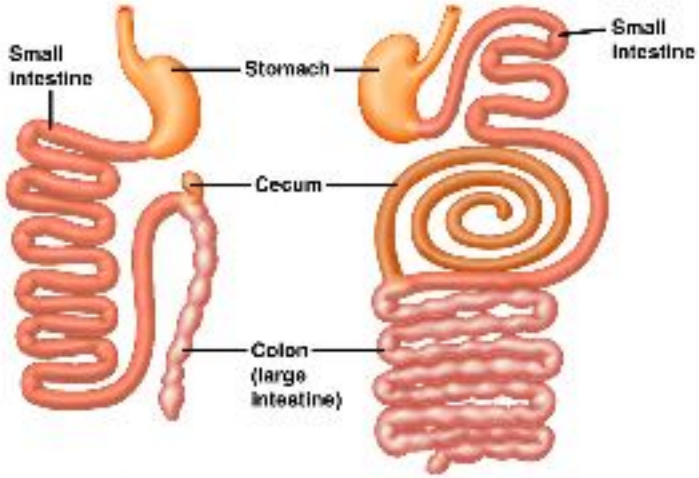
Large Intestine



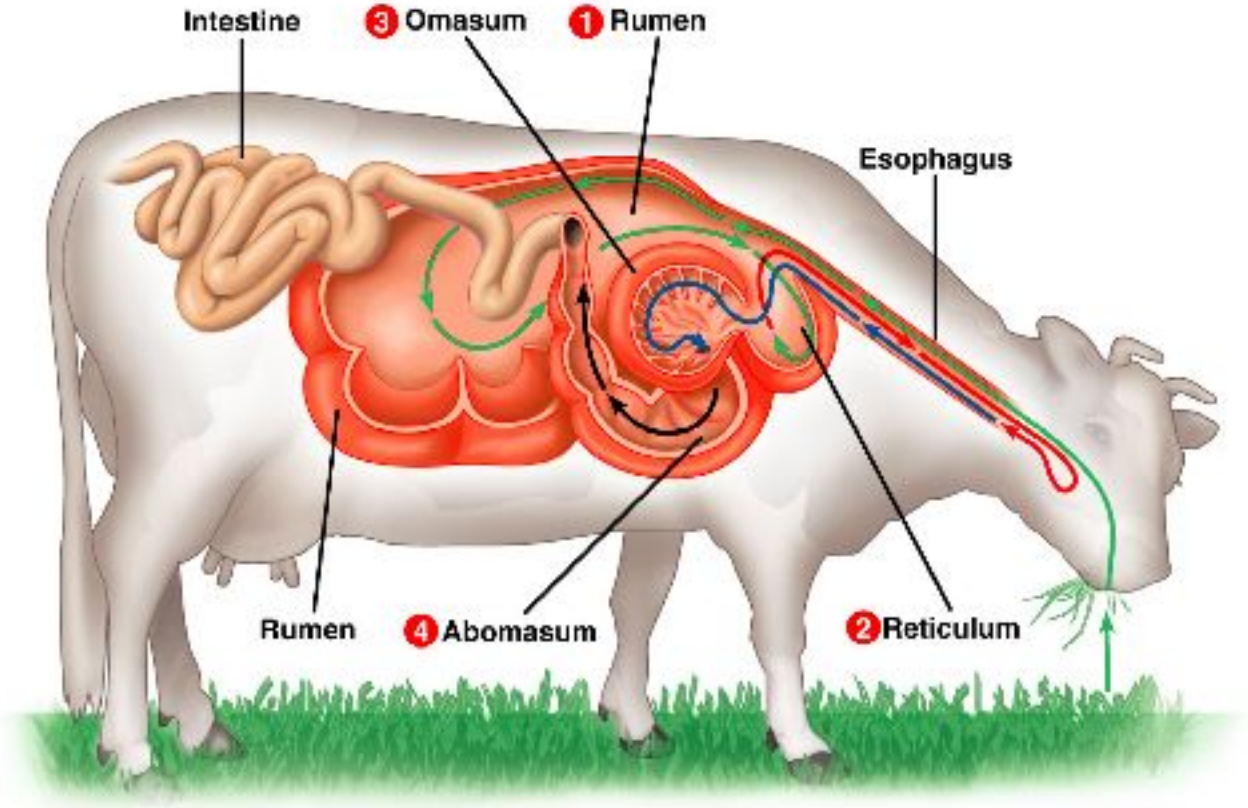
Large Intestine

- Reabsorbs water
- Feeds bacteria that give us biotin, folic acid, several B vitamens, and vitamen K.

Digestive tracts differ with diet



Digestive tracts differ with diet



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