

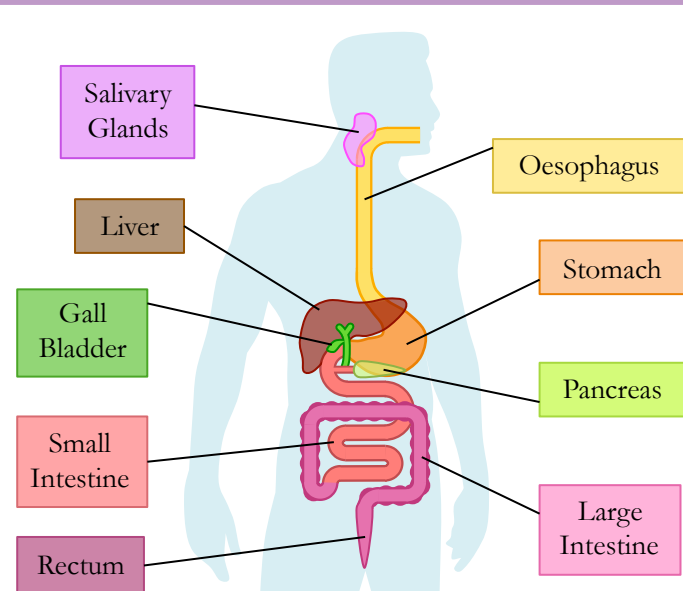
TOPIC 6.1: DIGESTION

Purpose of Digestion

The main purpose of the digestive system is to break large molecules down into smaller subunits due to the fact that:

- Large molecules are typically **chemically inert** and need to be broken down and reassembled into usable products
- Large molecules are typically **insoluble** and cannot be easily absorbed into cells, whereas smaller subunits are soluble

Digestive System Structure



Digestive System Components

The digestive system is composed of the alimentary canal and a variety of supporting accessory organs

Alimentary Canal (*directly transfers food*)

- Oesophagus – Food tract from mouth to stomach
- Stomach – Storage tank with low pH (protein digestion)
- Small intestine – Site of nutrient absorption
- Large intestine – Absorbs water and dissolved minerals

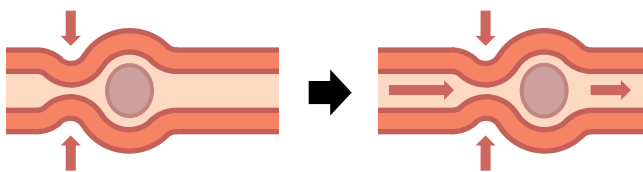
Accessory Organs (*supports digestive processes*)

- Salivary glands – Moistens food bolus (starch digestion)
- Pancreas – Secretes key enzymes into small intestine
- Liver – Metabolises absorbed nutrients (produces bile)
- Gall bladder – Stores and secretes bile (emulsifies fats)

Digestive Movement

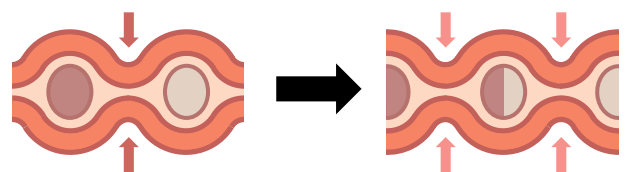
Peristalsis

- Unidirectional movement of food along alimentary canal
- Caused by contraction of sequential longitudinal muscles



Segmentation

- Bidirectional mixing of food within the small intestine
- Caused by contraction of non-sequential circular muscles



Types of Digestion

Food can be digested by one of two ways:

Mechanical Digestion

The breakdown of food via physical actions

- Chewing (grinding food using teeth)
- Churning (squeezing stomach contents)
- Segmentation (intestinal contractions)

Chemical Digestion

The breakdown of food via chemical agents

- Stomach acids (low pH environment)
- Bile (emulsification of fats into droplets)
- Enzymes (catalyse hydrolysis reactions)

Starch Hydrolysis

Starch is composed of glucose monomers

- Is linear (*amylose*) or branched (*amylopectin*)

Amylase (salivary or pancreatic) digests starch

- It digests amylose into maltose disaccharides
- It digests amylopectin into dextrin chains

The **pancreas** regulates the uptake of glucose

- Insulin increases glucose uptake by cells
- Glucagon decreases glucose uptake by cells

The **liver** is responsible for glucose storage

- Glucose is stored as glycogen (*polysaccharide*)

