

# Biology Top-Up

## Digestion

### Foods in the body

A balanced diet is one which provides the nutrients needed by the body in the amounts that the body requires. Different nutrients have different functions:

- Carbohydrates - energy source
- Fats (lipids) - energy store, insulation
- Protein - growth & repair
- Vitamins & minerals - various functions e.g. iron is used in haemoglobin
- Water - used in many chemical reactions in the body (e.g. hydrolysis reactions in digestion)
- Fibre - has no nutritional value, but helps the gut to move food through the digestive system

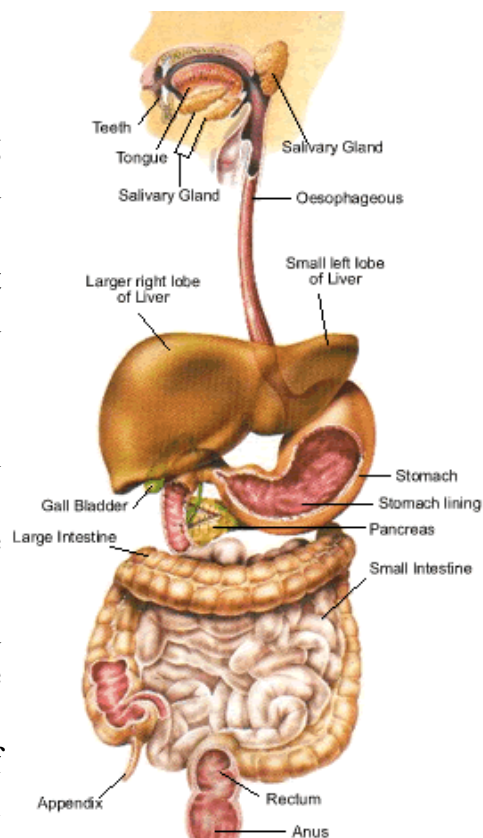
### Digestion

There are 3 main functions of the digestive system: mechanical digestion (physically breaking large chunks of food into smaller ones), chemical digestion (using enzymes to break large molecules into smaller ones) and absorption of the products of digestion into the blood.

The mouth is the start of the digestive system. The act of chewing starts to break food into smaller chunks, and releases saliva from the salivary glands. This contains amylase, an enzyme that starts to break down starch.

The stomach churns the swallowed food with hydrochloric acid and protease enzymes. The acid kills bacteria, and gives the optimum pH for protein to be broken down.

The liver produces bile, which emulsifies fats and neutralises the stomach acid. This is stored in the gallbladder before being secreted into the small intestine. The pancreas produces and secretes a different type of amylase, a different protease and lipase. The small intestine has many villi - projections that increase the surface area available for absorption. The large intestine absorbs any excess water from the faeces, which is stored in the rectum for egestion.



### Enzymes

There are 3 main groups of digestive enzyme:

- Carbohydrases - break down polysaccharides into disaccharides or monosaccharides (e.g. starch into maltose)
- Lipases - break lipids down into fatty acids and glycerol
- Proteases - break long protein chains into smaller ones or into amino acids