

Anatomy and physiology

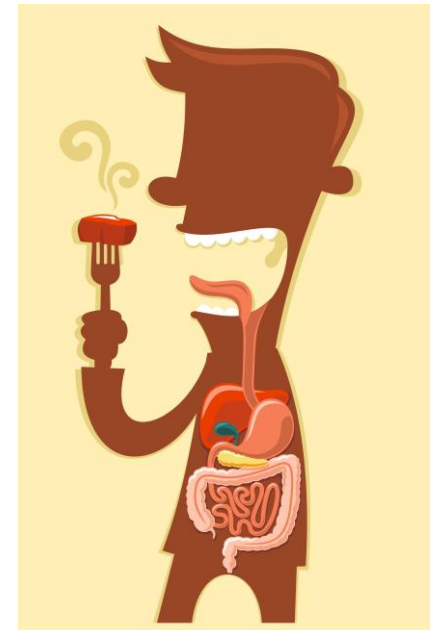
Digestive system

Digestion

Food provides the energy and nutrients that the body needs to stay alive and be healthy.

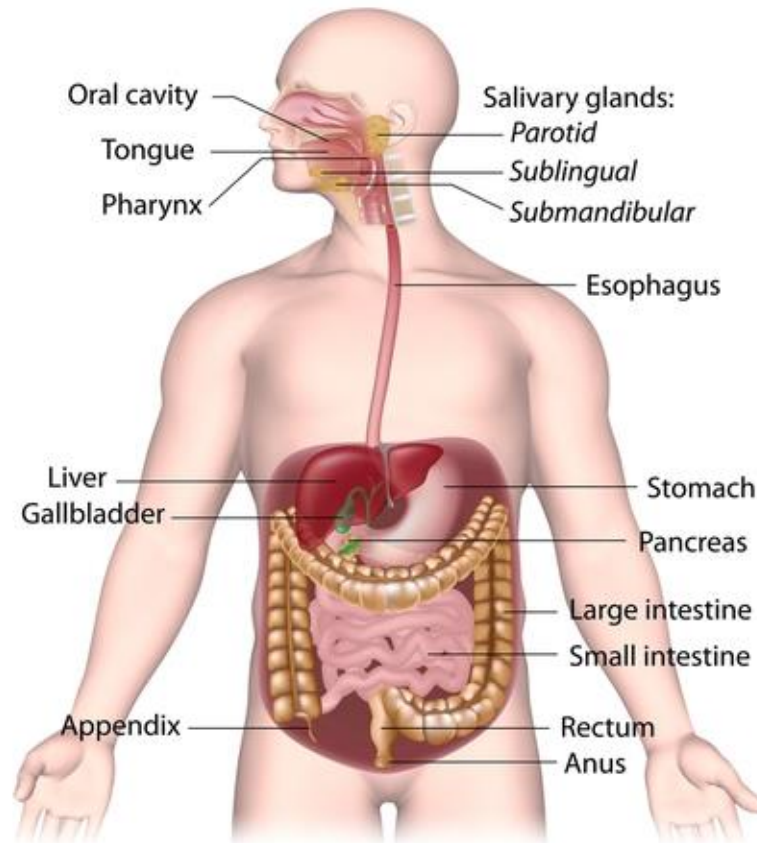
Before the body can make use of it, food has to be digested ie broken down to release the nutrients.

The nutrients are then absorbed into the bloodstream and taken via the circulation to the cells where they can be utilised.



The digestive system

The Digestive System



The mouth

- The teeth and jaws crush and grind food into small particles and mix them with saliva.
- The saliva contains an enzyme called **amylase** which starts to break down the starch into sugars.
- Enzyme action: amylase breaks down starch into sugars.
- The chewed food (**bolus**) is then swallowed.

The oesophagus

- The food passes down the tube which connects the mouth to the stomach.
- This tube is called the oesophagus.
- The food is squeezed along the oesophagus by a process called peristalsis.
- It takes about 3–6 seconds for food to go from the mouth to the stomach.

The stomach

The stomach muscular walls churn the food and mix it into a liquid called **chyme**.

The stomach lining contains cells which produce a liquid called **gastric juice**. The gastric juice contains the enzyme **pepsin** and an acid called **hydrochloric acid** which pepsin needs to work effectively. This acid also kills most of the bacteria which are present in food.

Enzyme action: pepsin breaks down food – protein to peptides and amino acids.

Food usually stays in the stomach for 1–4 hours but liquids may pass through in a few minutes.

Water and alcohol are absorbed from the stomach.

The small intestine

The small intestine is a tube that is about 6m long.

Chyme is squirted into the duodenum from the stomach. As it enters the small intestine, the chyme is mixed with a digestive juice from the pancreas called **pancreatic juice**, along with **bile**, which is made in the liver.

Pancreatic juice is alkaline, which helps to neutralise the acid from the stomach. It also contains several enzymes that help to break up starch, fat and protein.

Bile contains bile salts which break down fat into tiny droplets. This process helps lipase split the fat droplets into fatty acids and glycerol.

Enzyme action: amylase breaks down starch into sugars – lipase breaks down fats to fatty acids and glycerol – proteases breaks down proteins to peptides and amino acids.

Acids

The amino acids and sugars then pass from the villi, which form part of the intestinal wall into the bloodstream and go to the liver.

Most of the fatty acids and glycerol are absorbed through the villi to the lymphatic system from where they enter the bloodstream.

The nutrients are then transported in the blood to all the cells of the body. Some nutrients provide energy and others are used to repair cells or build new cells.

The chyme, which is now less fluid because some water has been removed, passes into the large intestine

The large intestine

The large intestine is a long tube inhabited by bacteria. Some of the bacteria in the large intestine break down the fibre to fatty acids and gas. Other bacteria produce vitamin K.

The remains of chyme contain a mixture of substances which have not been digested. These include fibre, some vitamins and minerals, and water.

Water continues to be absorbed, along with any remaining minerals.

Elimination

- The residue (faeces) consists of remnants of fibre, other undigested material and bacteria.
- The faeces are eliminated from the body through the anus.
- It may take between 12–24 hours for the faeces to pass through the colon.
- This time can be reduced if the diet is high in fibre, as it increases bulk and encourages defecation.