2.1 The need for excretion

What substances are excreted and why they need to be disposed of

Excretion

The process of **excretion** is the removal of **metabolic waste** from the body. This is the unwanted waste products of metabolic reactions, both anabolic and catabolic. Excretion must not be confused with *egestion*, which is the removal of undigested food and chemicals which have never been inside a cell or part of a cellular reaction (e.g. through faeces).

There are a large number of substances which need to be removed from the body via excretion, but the main two which are produced in significant quantities are **carbon dioxide** and nitrogenous compounds such as **urea**.

Respiratory acidosis

The need to excrete carbon dioxide is shown by looking at a condition associated with high blood CO_2 concentration. There are three methods of transporting carbon dioxide around the body for removal, outlined below:

- as **hydrogen carbonate ions** – a process which also produces hydrogen ions within red blood cells
- carried around directly dissolved in the blood in aqueous form
- combining directly with haemoglobin to form **carbaminohaemoglobin**

Carbaminohaemoglobin reduces the efficiency of oxygen carriage around the blood, as haemoglobin has a higher affinity to carbon dioxide than it does for oxygen, and obviously when one haem group is taken up by a molecule of carbon dioxide it cannot take on a molecule of oxygen. Hydrogen ions, which are produced alongside hydrogen carbonate ions alter the blood pH level too, which means that enzyme action is impaired.

Failure to excrete carbon dioxide from the blood appropriately will result in **respiratory acidosis**. Symptoms of respiratory acidosis include dizziness, feeling faint, feeling weak, vomiting and an increased urge to breathe, or hyperventilation. If this occurs for a prolonged period, there can be permanent damage to organs, in particular the brain.

Deamination

Urea is produced by breaking down excess amino acids in the liver (see 2.2 The liver), in a process called **deamination**. The urea which is produced there is then transported, through the bloodstream, to the kidneys, where it will be excreted through urine. The urine is produced in the kidneys and temporarily stored in the bladder (see 2.3 The kidney) where it eventually leaves the body – this is all a process of excretion.