

Excretion and Egestion

Introduction:

Two things may happen to the food we eat. Some is digested, meaning it is converted in its soluble form (amino acids, glucose etc) and some remain undigested (cellulose, fibre). The digested food is transported by the bloodstream to all parts of the body. From the blood, the absorbed food is passed into the cells where it is used to provide energy or as materials for making protoplasm. When the food is absorbed it is broken down to provide energy, certain waste products are given off. If these wastes are allowed to accumulate, they would be detrimental to the body's cells. Waste products made within the cells are known as metabolic wastes. Undigested wastes are removed from the body via the anus.

It is important to distinguish between these two processes. **Egestion** is the removal of undigested waste materials, while **Excretion** is the removal of metabolic waste. Products that have been egested simply travel down the alimentary canal with the useful substances being removed from it as it passes along. These were never a part of the body's cells. Excretory products though have been formed as a result of chemical activities within the cells.

METABOLIC WASTE SUBSTANCES

Metabolic waste substances can occur because of respiration. These are respiration which occurs in all cells as well as the breakdown of protein in the liver cells.

Respiration

is that process in which digested food is oxidized to release stored chemical energy. The energy that is released can be used for other activities in the body.

Chemical equation of respiration:



Word equation:

Glucose + oxygen → water + carbon dioxide + energy

If carbon dioxide accumulates in the cells, it reacts chemically with water to form carbonic acid. Carbonic acid would affect the pH of the body's fluids and therefore affect enzyme activity. Too much water within the body would cause swelling of the tissues (odema). Hence the excess water would need to be removed, either in the form of urine or sweat.

Excess amino acids are deaminated in the liver cells since they cannot be stored in the body.

Deamination involves the removal of the amino group ($-NH_2$) from the amino acids. The carboxylic group ($-COOH$) is converted to carbohydrate which can be used in respiration or it can be stored as glycogen. The amino group removed combines with a hydrogen atom to produce ammonia (NH_3).

The ammonia is converted into the less toxic soluble excretory product urea $CO(NH_2)_2$. As urea is soluble it can affect the osmotic pressure of body fluids if it is allowed to accumulate.