

Respiration

(IGCSE Biology Syllabus 2016-2018)

- Chemical reactions that break down nutrients molecules in living cells to release energy
- Uses of energy in the body of humans: muscle contraction, protein synthesis, cell division, active transport, growth, the passage of nerve impulses and the maintenance of a constant body temperature
- Respiration involves the action of enzymes in cells

Aerobic Respiration

- Release of a relatively **large amount of energy** in cells by the **breakdown of food substances** in the **presence of oxygen**

Glucose + oxygen → carbon dioxide + water



Anaerobic Respiration

- Release of a relatively **small amount of energy** by the **breakdown of food substances** in the **absence of oxygen**

In muscles	In yeast
<p><i>Glucose → lactic acid</i> $C_6H_{12}O_6 \rightarrow 2 C_3H_6O_3$</p>	<p><i>Glucose → ethanol + carbon dioxide</i> $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + CO_2$</p>
<p>Lactic acid</p> <ul style="list-style-type: none"> - Transported in blood to heart, liver and kidneys which oxidize it - Oxygen debt: extra oxygen is needed to oxidize lactic acid → people continue breathing heavily after exercise 	<p>Ethanol:</p> <ul style="list-style-type: none"> - Manufacture of alcohol beverages <p>Carbon dioxide:</p> <ul style="list-style-type: none"> - Raising of dough

Disadvantages of anaerobic respiration:

- Only produces 1/20 of the energy per glucose molecule that aerobic respiration would
- Produces poisonous lactic acid