

Exercise walk-through

12.2

Aerobic respiration

IGCSE Biology

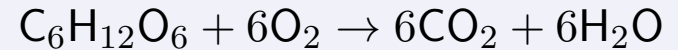
Aerobic respiration



Aerobic respiration releases energy steadily for sustained exercise.

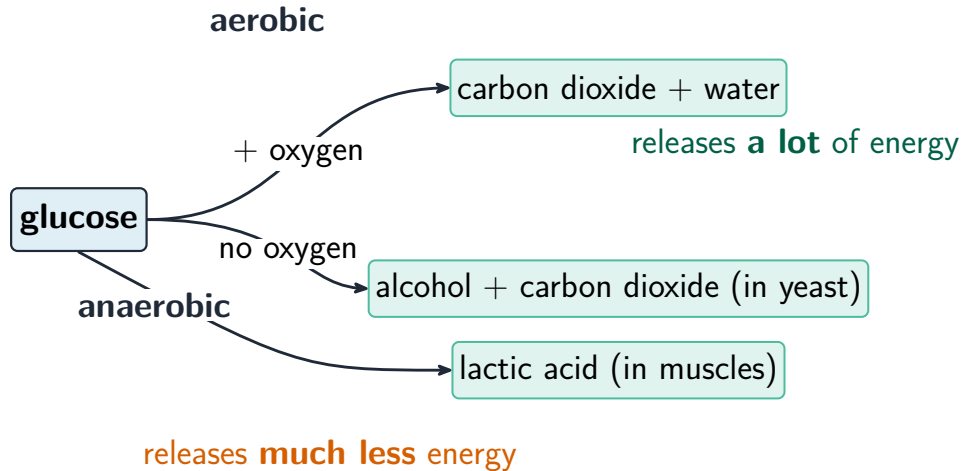
Word equation:

glucose + oxygen → carbon dioxide + water



Aerobic respiration releases far more energy per glucose molecule than anaerobic respiration.

Anaerobic respiration



Anaerobic respiration

works **without** oxygen, giving **much less** energy.

- yeast: glucose $\rightarrow$ **alcohol** + CO₂
- muscle: glucose $\rightarrow$ **lactic acid**

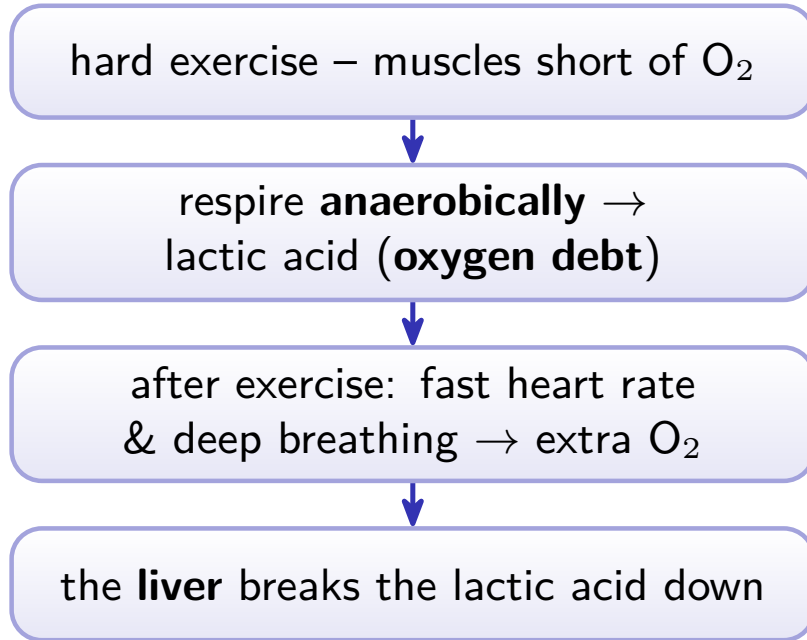
Both yeast products are used: the CO₂ makes **bread** rise, and the alcohol is what **brewing** is for.

In muscles (Supplement)

During hard exercise your muscles cannot get enough oxygen, so they respire anaerobically:

- your **heart rate** stays high, carrying the lactic acid in the blood from the muscles to the **liver** .
- you keep breathing deeply and quickly, taking in extra oxygen.
- the liver uses this oxygen to break the lactic acid down by aerobic respiration.

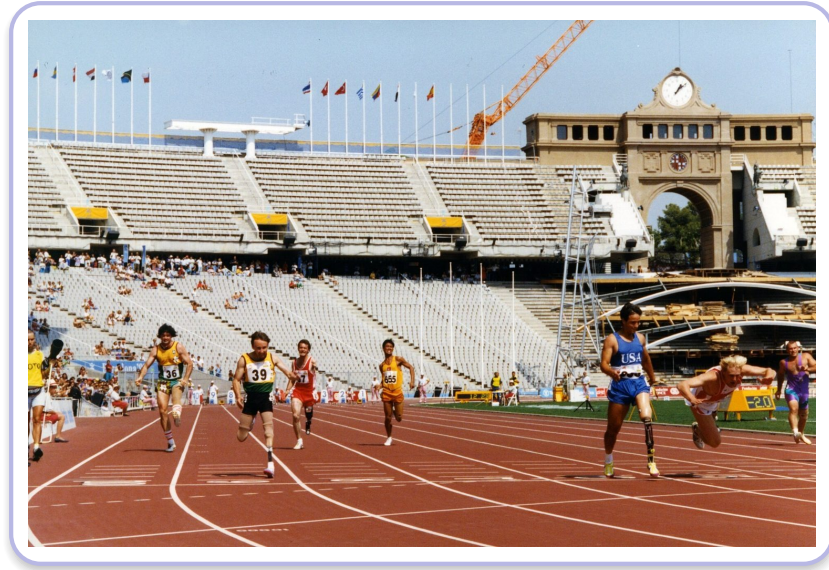
Oxygen debt



Lactic acid builds up – the **oxygen debt**

After exercise: a fast heart rate & deep breathing bring extra O₂, so the **liver** breaks the lactic acid down.

Anaerobic respiration, continued



A hard sprint relies on anaerobic respiration, building up lactic acid.

Exercises 2.1-2.2

2.1 Write the word equation for aerobic respiration.

[2]

2.2 State the gas needed for aerobic respiration.

[1]

Exercises 2.1·2.2

2.1 Write the word equation for aerobic respiration.

[2]

2.1

- **glucose + oxygen → carbon dioxide + water**
-

2.2 State the gas needed for aerobic respiration.

[1]

2.2

- aerobic respiration needs **oxygen**

Exercise 3.1

3.1 The products of aerobic respiration are:

[1]

☐

A alcohol and carbon dioxide

B lactic acid only

C carbon dioxide and water

D glucose and oxygen

Exercise 3.1

3.1 The products of aerobic respiration are:

[1]

☐

A alcohol and carbon dioxide

B lactic acid only

C carbon dioxide and water

D glucose and oxygen

3.1 C

- aerobic products are **carbon dioxide and water**
- A and B are anaerobic; D are reactants

Exercise 3.2 (a)

3.2 Aerobic respiration releases energy from glucose.

(a) Write the balanced chemical equation.

[2]

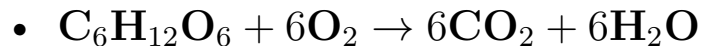
Exercise 3.2 (a)

3.2 Aerobic respiration releases energy from glucose.

(a) Write the balanced chemical equation.

[2]

(a)



Exercise 3.2 (b)

3.2 Aerobic respiration releases energy from glucose.

(b) State how the energy released compares with anaerobic respiration.

[1]

Exercise 3.2 (b)

3.2 Aerobic respiration releases energy from glucose.

(b) State how the energy released compares with anaerobic respiration.

[1]

(b)

- aerobic respiration releases **much more energy** than anaerobic