

Exercise walk-through

Anaerobic respiration ■ 12.3

eXercise

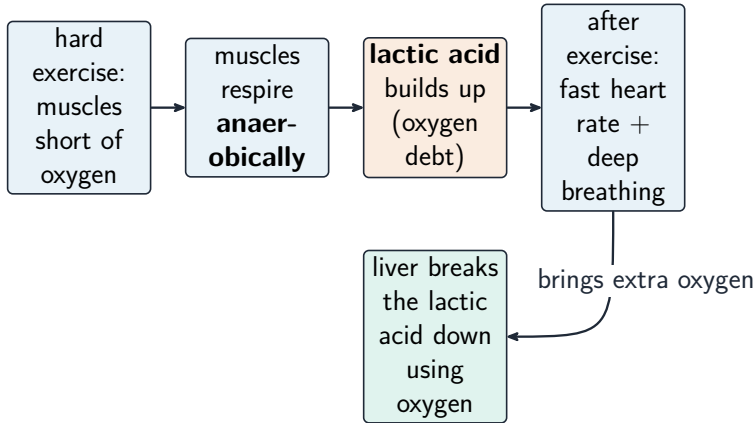
You must be able to

- write the anaerobic equations for yeast and for muscle
- compare the energy released with aerobic respiration
- explain the oxygen debt and how it is repaid

Method — Anaerobic respiration & oxygen debt

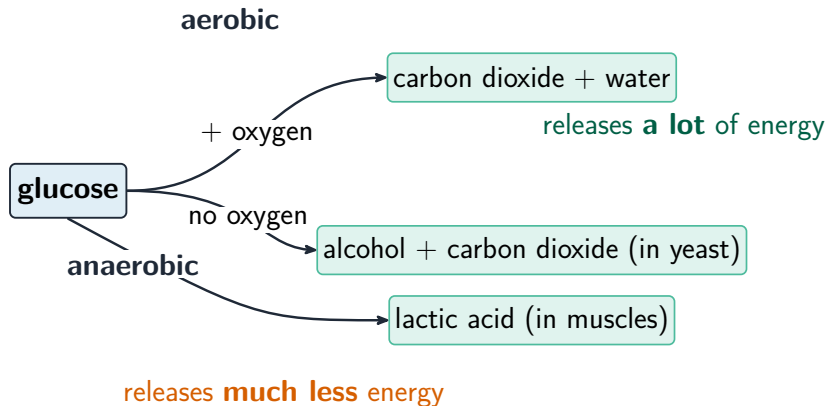
- **yeast:** glucose $\rightarrow$ alcohol + carbon dioxide.
- **muscle:** glucose $\rightarrow$ lactic acid $\rightarrow$ an **oxygen debt** (extra O needed later).

Method — Anaerobic respiration & oxygen debt



Lactic acid builds up (oxygen debt), then is broken down later

Method — Anaerobic respiration & oxygen debt



Anaerobic respiration compared with aerobic

Practice 2.1 ■ 2 marks

Write the word equation for anaerobic respiration in yeast.

Solution 2.1

Method: Anaerobic respiration & oxygen debt

Worked steps

glucose $\rightarrow$ alcohol + carbon dioxide **M1** **A1**.

Practice 2.2 ■ 1 mark

Name the substance that builds up in muscles during hard exercise.

Solution 2.2

Worked steps

lactic acid **B1**.

Exam-style 3.1 ■ 1 mark

Compared with aerobic respiration, anaerobic respiration releases:

- A** more energy
- B** much less energy
- C** the same energy
- D** no energy

Solution 3.1

Method: Anaerobic respiration & oxygen debt

- A more energy
- B much less energy
- C the same energy
- D no energy



Worked steps

B. Anaerobic respiration releases much less energy.

Exam-style 3.2 ■ 1 mark

During a sprint the muscles respire anaerobically.

- (a) Write the equation for anaerobic respiration in muscle.
- (b) Explain what is meant by an oxygen debt.

Solution 3.2

Method: Anaerobic respiration & oxygen debt

Worked steps

- (a) glucose $\rightarrow$ lactic acid **B1**.
- (b) it is the extra oxygen needed after exercise **M1** to break down the lactic acid that built up **A1**.

Exam-style 3.3 ■ 2 marks

Describe how the oxygen debt is repaid after exercise.

Solution 3.3

Method: Anaerobic respiration & oxygen debt

Worked steps

the heart rate stays high and breathing stays deep, bringing extra oxygen **M1**; the liver uses it to break down the lactic acid **A1**.