

12. Energy and respiration

Starter Quiz · 课前小测

A-Level Biology

Name: _____ Score: _____

1. Which is a use of energy in a cell?
 - ☐ active transport, movement, and building large molecules
 - ☐ lowering the temperature
 - ☐ removing all water
 - ☐ stopping all reactions
2. The respiratory quotient (RQ) is the ratio of CO₂ produced to:
 - ☐ oxygen used
 - ☐ water made
 - ☐ glucose used
 - ☐ ATP made
3. Glycolysis takes place in the cytoplasm, and needs no oxygen.
 - ☐ True ☐ False
4. During the Krebs cycle, what is removed?
 - ☐ carbon dioxide (decarboxylation) and hydrogen (dehydrogenation, reducing NAD and FAD)
 - ☐ only oxygen
 - ☐ only water
 - ☐ whole glucose molecules
5. Why does fermentation matter when there is no oxygen?
 - ☐ it regenerates NAD so glycolysis can keep producing some ATP
 - ☐ it makes the Krebs cycle run faster
 - ☐ it produces oxygen
 - ☐ it stops glycolysis
6. ATP is re-made from ADP and a _____ group.

7. Which respiratory substrate releases the most energy per gram?
 - ☐ lipids
 - ☐ carbohydrates

- ☐ proteins
- ☐ they all release the same

8. Each turn of the Krebs cycle removes carbon dioxide and hydrogen, reducing NAD and FAD.
 - ☐ True ☐ False
9. An organism produces 4 molecules of CO₂ and takes in 5 molecules of O₂. What is its RQ?

10. In mammals anaerobic respiration produces lactate, while in yeast it produces ethanol and carbon dioxide.
 - ☐ True ☐ False

1. active transport, movement, and building large molecules

Energy from respiration drives active transport, movement (e.g. muscle), and anabolic (building) reactions.

2. oxygen used

$RQ = \text{CO}_2 \text{ produced} \div \text{O}_2 \text{ used}$.

3. True

Glycolysis is in the cytoplasm and is anaerobic; the later stages (Krebs, oxidative phosphorylation) are in the mitochondria.

4. carbon dioxide (decarboxylation) and hydrogen (dehydrogenation, reducing NAD and FAD)

Each turn removes CO_2 (decarboxylation) and hydrogen (dehydrogenation), reducing the coenzymes NAD and FAD.

5. it regenerates NAD so glycolysis can keep producing some ATP

Without oxygen, NAD must be regenerated by fermentation so glycolysis can continue making ATP.

6. phosphate

Respiration provides the energy to re-attach the phosphate to ADP.

7. lipids

Lipids release the most energy per gram (most hydrogen); then proteins, then carbohydrates.

8. True

The reduced NAD and FAD then carry the hydrogen to oxidative phosphorylation, where most ATP is made.

9. 0.8

$RQ = \text{CO}_2 \text{ produced} \div \text{O}_2 \text{ taken in} = 4 \div 5 = 0.8$.

10. True

Same problem (no oxygen), two different products: lactate in mammals, ethanol + CO_2 in yeast.