

Question 1

Which of the following cells rely exclusively on glycolysis to supply them with ATP?

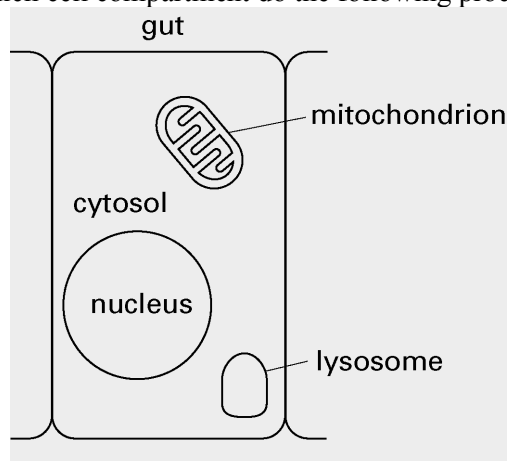
- (a) Anaerobically growing yeast.
- (b) Aerobic bacteria.
- (c) Skeletal muscle cells.
- (d) Plant cells.

Question 2

In the absence of oxygen, cells consume glucose at a high, steady rate. When oxygen is added, glucose consumption drops suddenly and is then maintained at the lower rate. Why is glucose consumed at a high rate in the absence of oxygen and at a low rate in its presence?

Question 3

Shown is a cell lining the gut. In which cell compartment do the following processes occur?



1. Glycolysis
2. Citric acid cycle (Kreb's cycle)
3. Conversion of pyruvate to activated acetyl groups (acetyl CoA)
4. Oxidative phosphorylation that produces ATP

Question 4

Where end up the oxygen atoms that we breathe in as O_2 ?

What is the source of the carbon atoms that we breathe out as CO_2 ?

What will then happen to these carbon atoms in the expired CO_2 ?

Question 5

What is the major role of the stomach in the digestion of food?

In which segment of the digestive tract most of the absorption takes place?

What is the main function of the large intestine?

Question 6

A farmer is going to ferment apple juice to make cider. The fermentation has two stages: an aerobic one and an anaerobic one.

What might happen during these two stages?

How should the barrel be handled during the two stages?

Question 7

Which type of fermentation is associated with CO₂ production?

- a. only the lactic fermentation
- b. only the alcohol fermentation
- c. both types of fermentation

Question 8

At the end of a marathon, a runner is not feeling good.

What substance has probably accumulated in his body and makes him feel bad ?



Question 9

A person is sleeping in an environment at 37 °C. Obviously this person need energy to stay alive because the heart is beating (60 times / minute) and the respiratory muscles ensure 12 inspirations / expirations per minute. Beside this mechanical (muscles) work, does this sleeping person need energy for other kinds of work?

YES

NO

If yes, which work is preformed while a person is sleeping?

Question 10

Which of these molecules is not produced by the Kreb's cycle ?

- a. FADH₂
- b. NADH
- c. carbone dioxyde (CO₂)
- d. GTP
- e. water

Question 11

What is the correct path followed by electrons delivered by the co-enzyme NADH ?

- a. complex I → complex II → complex III → complex IV
- b. complex II → complex III → complex IV → ATPsynthase
- c. complex I → complex III → complex IV
- d. complex I → complex II → complex III → ATPsynthase
- e. complex I → complex II → complex III

Question 12

Co-enzyme Q10 is added to some popular skin cream.

What is the connection between co-enzyme Q10 and the electron transport chain (ETC)?

- a. Q10 has nothing to do with ATP synthesis
- b. Q10 is the first shuttle, it delivers electrons to complex III
- c. Q10 is the second shuttle; it delivers electron to complex IV
- d. Q10 transport some electrons from the Kreb's cycle to the ETC.
- e. Q10 transport protons (H^+) from the mitochondrial matrix to the intermembrane space



Question 13

The ATP synthase shown of n the figure is made of 12 c subunits.

For this ATPsynthase, how many protons must move from the inter-membrane space to the mitochondrial matrix to allow the synthesis of one ATP molecule.

