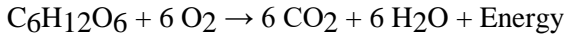


AP Biology Cellular Respiration (Ch. 9) Reading Quiz

1) Which of the following statements describes the results of this reaction?



- A) $\text{C}_6\text{H}_{12}\text{O}_6$ is oxidized and O_2 is reduced.
- B) O_2 is oxidized and H_2O is reduced.
- C) CO_2 is reduced and O_2 is oxidized.
- D) $\text{C}_6\text{H}_{12}\text{O}_6$ is reduced and CO_2 is oxidized.
- E) O_2 is reduced and CO_2 is oxidized.

2) Where does glycolysis take place in eukaryotic cells?

- A) mitochondrial matrix
- B) mitochondrial outer membrane
- C) mitochondrial inner membrane
- D) mitochondrial intermembrane space
- E) cytosol

3) The ATP made during glycolysis is generated by

- A) substrate-level phosphorylation.
- B) electron transport.
- C) photophosphorylation.
- D) chemiosmosis.
- E) oxidation of NADH to NAD^+ .

4) Which process in eukaryotic cells will proceed normally whether oxygen (O_2) is present or absent?

- A) electron transport
- B) glycolysis
- C) the citric acid cycle
- D) oxidative phosphorylation
- E) chemiosmosis

5) During glycolysis, when each molecule of glucose is catabolized to two molecules of pyruvate, most of the potential energy contained in glucose is

- A) transferred to ADP, forming ATP.
- B) transferred directly to ATP.
- C) retained in the two pyruvates.
- D) stored in the NADH produced.
- E) used to phosphorylate fructose to form fructose 6-phosphate.

6) In glycolysis, for each molecule of glucose oxidized to pyruvate

- A) two molecules of ATP are used and two molecules of ATP are produced.
- B) two molecules of ATP are used and four molecules of ATP are produced.
- C) four molecules of ATP are used and two molecules of ATP are produced.
- D) two molecules of ATP are used and six molecules of ATP are produced.
- E) six molecules of ATP are used and six molecules of ATP are produced.

7) In cellular respiration, the energy for most ATP synthesis is supplied by

- A) high energy phosphate bonds in organic molecules.
- B) a proton gradient across a membrane.
- C) converting oxygen to ATP.
- D) transferring electrons from organic molecules to pyruvate.
- E) generating carbon dioxide and oxygen in the electron transport chain.

- 8) Energy released by the electron transport chain is used to pump H^+ into which location in eukaryotic cells?
- A) cytosol
 - B) mitochondrial outer membrane
 - C) mitochondrial inner membrane
 - D) mitochondrial intermembrane space
 - E) mitochondrial matrix
- 9) Chemiosmotic ATP synthesis (oxidative phosphorylation) occurs in
- A) all cells, but only in the presence of oxygen.
 - B) only eukaryotic cells, in the presence of oxygen.
 - C) only in mitochondria, using either oxygen or other electron acceptors.
 - D) all respiring cells, both prokaryotic and eukaryotic, using either oxygen or other electron acceptors.
 - E) all cells, in the absence of respiration.
- 10) In prokaryotes, the respiratory electron transport chain is located
- A) in the mitochondrial inner membrane.
 - B) in the mitochondrial outer membrane.
 - C) in the plasma membrane.
 - D) in the cytoplasm.
 - E) in the bacterial outer membrane.
- 11) In the absence of oxygen, yeast cells can obtain energy by fermentation, resulting in the production of
- A) ATP, CO_2 , and ethanol (ethyl alcohol).
 - B) ATP, CO_2 , and lactate.
 - C) ATP, NADH, and pyruvate.
 - D) ATP, pyruvate, and oxygen.
 - E) ATP, pyruvate, and acetyl CoA.
- 12) Which statement best supports the hypothesis that glycolysis is an ancient metabolic pathway that originated before the last universal common ancestor of life on Earth?
- A) Glycolysis is widespread and is found in the domains Bacteria, Archaea, and Eukarya.
 - B) Glycolysis neither uses nor needs O_2 .
 - C) Glycolysis is found in all eukaryotic cells.
 - D) The enzymes of glycolysis are found in the cytosol rather than in a membrane-enclosed organelle.
 - E) Ancient prokaryotic cells, the most primitive of cells, made extensive use of glycolysis long before oxygen was present in Earth's atmosphere.
- 13) A mutation in yeast makes it unable to convert pyruvate to ethanol. How will this mutation affect these yeast cells?
- A) The mutant yeast will be unable to grow anaerobically.
 - B) The mutant yeast will grow anaerobically only when given glucose.
 - C) The mutant yeast will be unable to metabolize glucose.
 - D) The mutant yeast will die because they cannot regenerate NAD^+ from NAD.
 - E) The mutant yeast will metabolize only fatty acids.
- 14) Phosphofructokinase is an important control enzyme in the regulation of cellular respiration. Which of the following statements correctly describes phosphofructokinase activity?
- A) It is inhibited by AMP.
 - B) It is activated by ATP.
 - C) It is activated by citrate, an intermediate of the citric acid cycle.
 - D) It catalyzes the conversion of fructose 1,6-bisphosphate to fructose 6-phosphate, an early step of glycolysis.
 - E) It is an allosteric enzyme.

Figure 9.1 illustrates some of the steps (reactions) of glycolysis in their proper sequence. Each step is lettered. Use these letters to answer the questions.

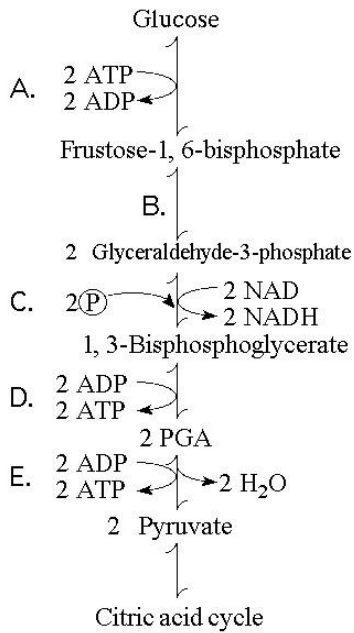


Figure 9.1

15) Which step in Figure 9.1 shows a split of one molecule into two smaller molecules?

- A) A
- B) B
- C) C
- D) D
- E) E

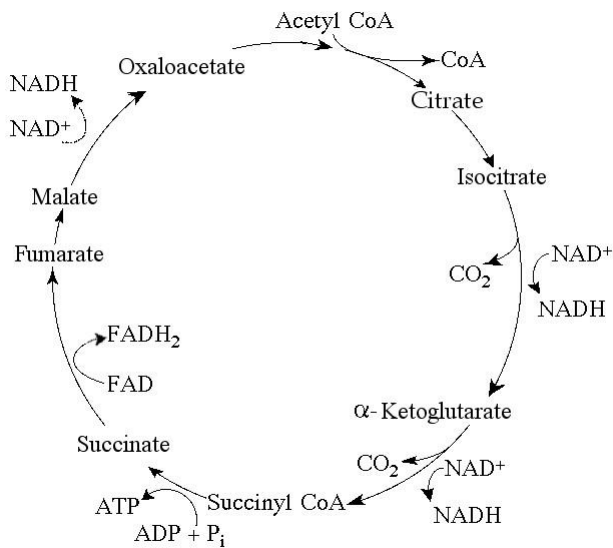


Figure 9.2 The citric acid cycle.

16) Starting with one molecule of isocitrate and ending with fumarate, how many ATP molecules can be made through substrate-level phosphorylation (see Figure 9.2)?

- A) 1
- B) 2
- C) 11
- D) 12
- E) 24

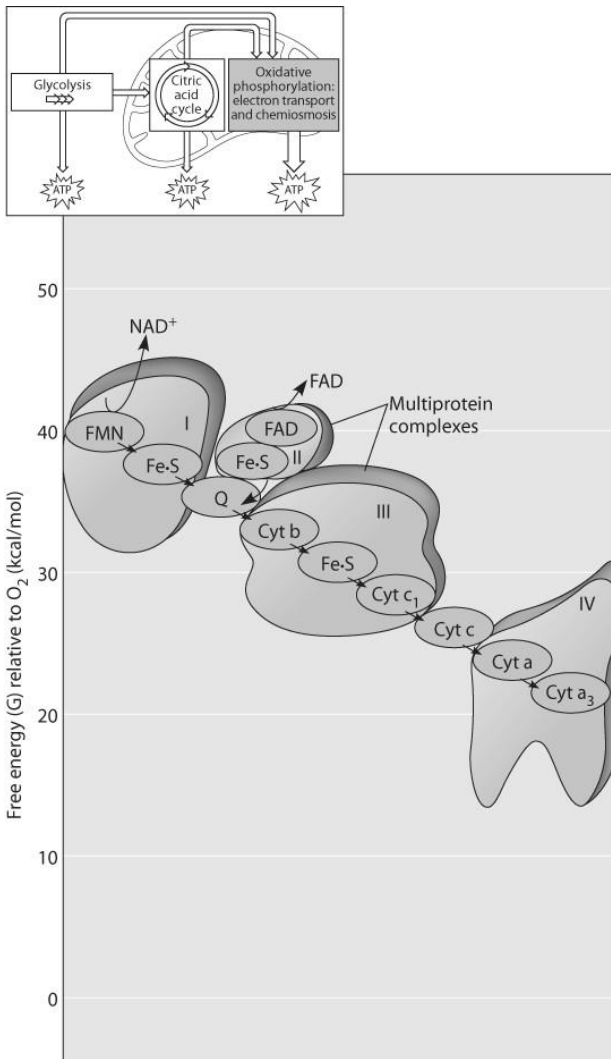


Figure 9.3

17) Figure 9.3 shows the electron transport chain. Which of the following is the combination of substances that is initially added to the chain?

- A) oxygen, carbon dioxide, and water
- B) NAD⁺, FAD, and electrons
- C) NADH, FADH₂, and protons
- D) NADH, FADH₂, and O₂
- E) oxygen and protons

18) Which of the protein complexes labeled with Roman numerals in Figure 9.3 will transfer electrons to O₂?

- A) complex I
- B) complex II
- C) complex III
- D) complex IV
- E) All of the complexes can transfer electrons to O₂.