تَنوير

BIOLOGY

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Done By : Abdel Rahman Aljariri

BIOLOGY QUIZ
Chapter 9: Cellular respiration and fermentation
Produced by: Abdel Rahman Aljariri

1. A molecule becomes more oxidized when it _____.

Hint: Recall that oxidation is the opposite of reduction.

A. A. gains a hydrogen (H+) ion
B. B. loses a hydrogen (H+) ion
C. C. loses an electron
D. D. gains an electron

2. In the overall process of glycolysis and cellular respiration,_____ is oxidized and _____ is reduced

Hint: Consider what is produced at the end of the electron transport chain.

A. Glucose // ATP
B. Carbon dioxide (CO2) // Water
C. Oxygen // ATP
D. Glucose // Oxygen

3. Most of the ATP produced in cellular respiration comes from which of the following processes?

Hint: Think of the three major groups of reactions in cellular respiration.

A. Substrate-level phosphorylation
B. Oxidative phosphorylation
C. The citric acid cycle (Krebs)
D. Glycolysis

4. The function of cellular respiration is to _____.

Hint: Why do you need to eat?

A. Reduce of CO2

B. Synthesize macromolecules from monemers
C. Produce carbohydrates
D. Extract usable energy from glucose

5. A small amount of ATP is made in glycolysis by which of the following processes?

Hint: Review the events of glycolysis.

A. Transfer of a phosphate group from a fragment of glucose to ADP by subtrate-level phosphorylation
B. Transfer of electrons and hydrogen atoms to NAD+
C. Transport of electrons through a series of carriers

6. Which of the following molecules in the process of glycolysis possesses the most chemical energy?

Hint: Consider the input and output of ATP from the glycolysis pathway.

A. Glucose
B. Pyruvate
C. Fructose-6-phosphate
D. Fructose-1,6-biphosphate

7. Which of the following processes generates most of the NADH that delivers electrons to the electron transport chain?

Hint: This stage produces NADH and FADH2.

A. Oxidative phosphorylation
B. Krebs cycle
C. Subtrate-level phosphorylation
D. Glycolysis
E. Anabolic pathways

8. In preparing pyruvate to enter the citric acid cycle, which of the following steps occurs?

Hint: Think about the reactions that are involved in pyruvate metabolism as it enters the mitochondria.

A) Pyruvate is oxidized and a molecule of carbon dioxide is removed. The electrons removed in this process are donated to NADH to produce NAD+.
B) Pyruvate is reduced and a molecule of carbon dioxide is removed. The electrons removed in this process are used to oxidize NAD+ to NADH.
C) Pyruvate is reduced to acetyl-coA, which involves the reduction of pyruvate, the addition of a carbon dioxide from the environment, and its reduction by NADH.
D) Pyruvate is ionized directly to acetyl-coA.

E) None of the above

9. Why is the citric acid cycle called a "cycle"?

Hint: Consider what aspects of this pathway make it a cycle.

A. The four-carbon acid that accepts the acetyl CoA in the first step of the cycle is regenerated by the last step of the cycle.
B. NADH is cycled down the electron transport chain.
C. NAD+ and FAD are recycled.
D. The acetyl CoA that enters the cycle is regenerated in the last step of the pathway.

10. In the citric acid cycle, for each pyruvate that enters the cycle, one ATP, three NADH, and one FADH2 are produced. For each glucose molecule that enters glycolysis, how many ATP, NADH, and FADH2 are produced in the citric acid cycle? (اسئلة حسام عياش)

Hint: Consider how glycolysis and the citric acid cycle are connected.

A. two ATP, six NADH, two FADH2
B. about 38 ATP
C. about 36 ATP
D. one ATP, three NADH, one FADH2

11. Where do the reactions of the citric acid cycle occur in eukaryotic cells?

Hint: What is the fate of pyruvate produced by glycolysis under aerobic conditions?

A. the intermembrane space of the mitochondrion
B. the cristae of the mitochondrion
C. the matrix of the mitochondrion
D. across the inner membrane of the mitochondrion

12. How many molecules of ATP are gained by substrate-level phosphorylation from the complete breakdown of a single molecule of glucose in the presence of oxygen?

Hint: Substrate-level phosphorylation occurs during both glycolysis and the citric acid cycle.

A. about 16
B. 3
C. 4
D. about 32

13. After completion of the citric acid cycle, most of the usable energy from the original glucose molecule is in the form of _____.

Hint: Where is most of the energy conserved in the citric acid cycle?

A. FADH2
B. NADH
C. ATP

14. The energy given up by electrons as they move through the electron transport chain is used in which of the following processes?

Hint: How is the energy derived from electron transport coupled to oxidative phosphorylation?

A. the oxidation of water
B. The production of water
C. pumping H+ across a membrane
D. the oxidation of oxygen

15. Energy for synthesizing ATP is obtained by ATP synthase *directly* from which of the following processes?

Hint: Recall the mechanism of chemiosmotic ATP synthesis.

A. the flow of H+ across the inner mitochondrial membrane through the ATP synthase enzyme
B. the movement of electrons through a series of carriers
C. the oxidation of glucose
D. All of the above

16. Most of the electrons removed from glucose by cellular respiration are used for which of the following processes?

Hint: Electrons derived from the oxidation of glucose are involved in many different processes in cellular respiration.

A. reducing NAD+ to NADH in glycolysis and the citric acid cycle
B. producing a proton gradient for ATP synthesis in the mitochondria
C. driving substrate-level phosphorylation in glycolysis
D. The first two choices are correct.
E. The second and third answers are correct.

17. During aerobic respiration, molecular oxygen (O2) is used for which of the following purposes?

Hint: What redox reaction involves O2 during cellular respiration?

A. at the end of the electron transport chain to accept electrons and form H2O
B. as a source of O2 in every reaction that produces CO2
C. at the end of the citric acid cycle to regenerate citric acid
D. at the end of glycolysis to oxidize pyruvate

18. Which of the following substances is/are involved in oxidative phosphorylation?

Hint: Consider what is being oxidized (and reduced) and what is being phosphorylated.

A. oxygen
B. ATP
C. ADP
D. All of the above
E. None

19. Fermentation is essentially glycolysis plus an extra step in which pyruvate is reduced to form lactate or alcohol and carbon dioxide. This last step _____.

Hint: How does the process of fermentation in the absence of oxygen permit glycolysis to continue?

A. enables the cell to make pyruvate into substances it can use
B. extracts a bit more energy from glucose
C. prevents pyruvate from accumulating
D. enables the cell to recycle the reduced NADH to oxidized NAD+

20. In glycolysis in the absence of oxygen, cells need a way to regenerate which compound?

Hint: Consider what is regenerated when the electron transport chain is functioning normally.

A. NAD+
B. ethanol
C. lactate
D. Glucose

21. Muscle tissues make lactate from pyruvate to do which of the following?

Hint: Consider what is regenerated when the electron transport chain is functioning normally.

A. produce additional CO2
B. get rid of pyruvate produced by glycolysis
C. regenerate NAD+
D. utilize the energy in pyruvate

22. In brewing beer, maltose (a disaccharide of glucose) is _____.

Hint: Consider what happens to maltose under the alcoholic fermentation conditions needed to make beer.

A. the substrate for aerobic respiration
B. the substrate for alcoholic fermentation
C. one of the enzymes for alcoholic fermentation
D. a substitute for pyruvate that cannot be made in yeast

23. If muscle cells in the human body consume O2 faster than it can be supplied, which of the following is likely to result?

Hint: Consider the consequences of anaerobic conditions for cells.

A. The muscle cells will have more trouble making enough ATP to meet their energy requirements.
B. The cells will not be able to carry out oxidative phosphorylation.
C. The cells will consume glucose at an increased rate.
D. All of the above

24. A gram of fat oxidized by respiration produces approximately twice as much ATP as a gram of carbohydrate. Which of the following best explains this observation?

Hint: Consider what factor or factors determines the energy content of organic molecules when they are oxidized.

A. Fats are less soluble in water than sugars.
B. Fats do not form true macromolecules as sugars do.
C. Fats are better electron donors to oxygen than are sugars.
D. Fats are produced when cells take in more food than they need.

Answers:

1. C
2. D
3. B
4. D
5. A
6. D
7. B
8. E
9. A
10. A
11. C
12. C
13. B
14. C
15. A
16. D

17. A
18. D
19. D
20. A
21. C
22. B
23. D
24. C