

Microbiology / Active Lecture Questions  
Chapter 5 – Microbial Metabolism

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2 Which substance in the following reaction is being reduced?

- a. acetaldehyde
- b. NADH

3 Which of the following reactions produces the most molecules of ATP during aerobic metabolism?

- a. glucose → glucose 6-phosphate
- b. phosphoenolpyruvic acid → pyruvic acid
- c. glucose → pyruvic acid
- d. acetyl CoA → CO<sub>2</sub> + H<sub>2</sub>O
- e. succinic acid → fumaric acid

4 Which of the following processes does NOT generate ATP?

- a. photophosphorylation
- b. the Calvin-Benson cycle
- c. oxidative phosphorylation
- d. substrate-level phosphorylation
- e. All of the above generate ATP.

5 Which of the following compounds has the greatest amount of energy for a cell?

- a. CO<sub>2</sub>
- b. O<sub>2</sub>
- c. ATP
- d. glucose
- e. lactic acid

6 Which of the following is the best definition of the Krebs cycle?

- a. the oxidation of pyruvic acid
- b. the way cells produce CO<sub>2</sub>
- c. a series of chemical reactions in which NADH is produced from the oxidation of pyruvic acid
- d. a method of producing ATP by phosphorylating ADP
- e. a series of chemical reactions in which ATP is produced from the oxidation of pyruvic acid

7 Which of the following is the best definition of respiration?

- a. a sequence of carrier molecules with O<sub>2</sub> as the final electron acceptor
- b. a sequence of carrier molecules with an inorganic molecule as the final electron acceptor
- c. a method of generating ATP
- d. the complete oxidation of glucose to CO<sub>2</sub> and H<sub>2</sub>O
- e. a series of reactions in which pyruvic acid is oxidized to CO<sub>2</sub> and H<sub>2</sub>O

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8 Which culture produces the most lactic acid?

- a. E. coli growing in glucose broth at 35°C with O<sub>2</sub> for 5 days
- b. E. coli growing in glucose broth at 35°C without O<sub>2</sub> for 5 days
- c. both a and b
- d. neither a nor b

9 Which culture produces the most ATP?

- a. E. coli growing in glucose broth at 35°C with O<sub>2</sub> for 5 days
- b. E. coli growing in glucose broth at 35°C without O<sub>2</sub> for 5 days
- c. both a and b
- d. neither a nor b

10 Which culture uses NAD<sup>+</sup>?

- a. E. coli growing in glucose broth at 35°C with O<sub>2</sub> for 5 days
- b. E. coli growing in glucose broth at 35°C without O<sub>2</sub> for 5 days
- c. both a and b
- d. neither a nor b

11 Which culture uses the most glucose?

- a. E. coli growing in glucose broth at 35°C with O<sub>2</sub> for 5 days
- b. E. coli growing in glucose broth at 35°C without O<sub>2</sub> for 5 days
- c. both a and b
- d. neither a nor b

12 The enzyme-regulated energy-requiring reactions are involved mostly in

- a. catabolism.
- b. anabolism.
- c. photosynthesis.
- d. oxidation.

13 What is the essential nutrient used by many bacteria in the synthesis of the coenzyme folic acid?

14 Apoenzymes are inactive by themselves and must be activated by

- a. cofactors.
- b. ATP.
- c. holoenzymes.
- d. substrates.

15 How many molecules of ATP can be generated from the three phases in the respiration of glucose?

- a. 2
- b. 4
- c. 34
- d. 38

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16 Energy is released during a cell's

- a. reduction of glucose.
- b. decarboxylation of glucose.
- c. oxidation of glucose.
- d. phosphorylation of glucose.

17 In which of the following is chemical energy used for carbon fixation?

- a. photosynthesis
- b. Krebs cycle
- c. fermentation
- d. glycolysis

18 The energy from catabolic reactions is used to produce

- a. ADP.
- b. ATP.
- c. AMP.
- d. phosphate.

19 The pentose phosphate pathway provides a means to break down glucose and

- a. five carbon sugars.
- b. six carbon sugars.
- c. lipids.
- d. galactose.

20 In aerobic respiration, what is the fate of the pyruvic acid produced in glycolysis?

- a. It is catabolized in glycolysis.
- b. It is reduced to lactic acid.
- c. It is oxidized in the Krebs cycle.
- d. It is oxidized in the electron transport chain.

21 Where does photosynthesis take place in eukaryotic cells?

- a. mitochondria
- b. ribosomes
- c. chloroplasts
- d. lysosomes

22 In the Calvin-Benson cycle,

- a. oxygen is used to synthesize sugars.
- b. carbon dioxide is used to synthesize sugars.
- c. ADP is formed.
- d. light is required.

23 In cyclic photophosphorylation, the electrons

- a. return to chlorophyll.
- b. are incorporated in NADPH.

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- c. are converted to ATP.
- d. are converted to glucose.

24 Fatty acids are catabolized in

- a. glycolysis.
- b. the electron transport chain.
- c. the Krebs cycle.
- d. the pentose phosphate pathway.

25 The light-independent (dark) reactions of photosynthesis include:

- a. fermentation
- b. beta oxidation
- c. Calvin-Benson cycle
- d. carbon fixation

26 In lipid catabolism, glycerol is converted into dihydroxyacetone phosphate and catabolized via

- a. beta oxidation.
- b. the pentose phosphate pathway.
- c. lactic acid fermentation.
- d. glycolysis.

27 What is the difference between substrate level phosphorylation and oxidative?

28 How do inhibitors interfere with chemical reactions?

- a. Block the active site
- b. Block allosteric site
- c. Open/ activate active site
- d. Open/ activate allosteric site
- e. None of these

29 Know your graphs illustrating factors that influence enzyme reaction rates.