

Bioenergetics: Fueling the Body

Biology · Answer Key · 15 Questions

1. What is the sum total of all chemical reactions involved in maintaining the dynamic state of a cell?

- A) Catabolism
- B) Anabolism
- C) Metabolism**
- D) Homeostasis

2. Which process involves breaking down molecules to supply energy?

- A) Anabolism
- B) Catabolism**
- C) Photosynthesis
- D) Glycolysis

3. Which process involves synthesizing (building up) molecules?

- A) Catabolism
- B) Anabolism**
- C) Respiration
- D) Fermentation

4. In what cell organelle does the common catabolic pathway take place in higher organisms?

- A) Nucleus
- B) Lysosome
- C) Mitochondria**
- D) Golgi Body

5. Which of the following is NOT part of the common catabolic pathway?

- A) Citric Acid Cycle
- B) Oxidative Phosphorylation
- C) Photosynthesis**
- D) Electron Transport Chain

6. Which molecule is the most important agent for storing energy and transferring phosphate groups?

- A) ADP
- B) AMP
- C) ATP**
- D) CoA

7. Which coenzyme is responsible for transferring electrons in biological oxidation-reduction reactions and contains an ADP core?

- A) Coenzyme A
- B) Acetyl-CoA
- C) NAD⁺**
- D) Pyruvate

8. What molecule transports acetyl groups in the common catabolic pathway?

- A) ATP
- B) CoA**
- C) FAD
- D) NADH

9. What two-carbon fragment enters the citric acid cycle to be further fragmented?

- A) Glucose
- B) Fatty Acids
- C) Acetyl-CoA**
- D) Amino Acids

10. What is the final complex in the electron transport chain that passes electrons to oxygen molecules to produce water?

- A) Complex I
- B) Complex II
- C) Complex III
- D) Complex IV**

11. For each NADH molecule, how many ATP molecules are produced in oxidative phosphorylation? (simplified)

- A) One
- B) Two
- C) Three**
- D) Four

12. For each FADH₂ molecule, how many ATP molecules are produced in oxidative phosphorylation? (simplified)

- A) One
- B) Two**
- C) Three
- D) Four

13. What type of energy is generated by maintaining unequal charges inside and outside the cell through ion pumping?

- A) Mechanical Energy
- B) Heat Energy
- C) Electrical Energy**
- D) Chemical Energy

14. In muscle contraction, which protein acts as an ATPase enzyme that hydrolyzes ATP?

- A) Actin
- B) Myosin**
- C) Collagen
- D) Elastin

15. What is the main advantage of the cyclic nature of acetate degradation?

- A) Maximizing ATP production
- B) Providing raw materials for amino acid synthesis
- C) Regulating the speed of catabolic reactions
- D) All of the above**