

Chapter 3: Metabolism

Study questions from material for metabolism.

1. How does a molecule of glucose or fat represent stored energy, that is, where within the molecule is energy stored and how is it released during catabolism?
2. What are the basic definitions of metabolism, catabolism, and anabolism?
3. What is the one and only direct means of storing energy in the cell that can be used to perform those functions (such as muscle contraction) that require energy?
4. How much ATP is there in a muscle cell, i.e., how long could the cell continue contraction without other means of producing energy?
5. What is meant by a “high energy bond” in molecules like ATP and CrP?
6. How much CrP is there in a muscle cell?
7. What are the ways that ATP can be resynthesized?
8. What is the carbohydrate molecule that all carbohydrate molecules are converted to before being utilized in metabolism by the body?
9. How important is protein in the energy production process during typical exercise?
10. CHO has several advantages over fat for producing energy during exercise. Give the two major ones. HINT: Anaerobic and oxygen efficiency!
11. What does “anaerobic glycolysis” literally mean (break the term down into its component parts!)
12. What is glycogen?
13. What two types of cells possess glycogen that is important during exercise?
14. How long can the body rely heavily upon anaerobic glycolysis for exercise such as sprinting?
15. What is the end product of anaerobic glycolysis when oxygen is not available?
16. What is the difference between lactic acid and lactate? Between pyruvic acid and pyruvate?
17. What makes things acidic? What is the pH scale?
18. What is the function of NAD in metabolism? How does it get rid of the H⁺ it picks up? (Two ways, depending upon availability of oxygen!)
19. What is the Cori cycle? Basically how does it work?
20. What is “gluconeogenesis”?
21. What is the function of oxygen in metabolism?
22. What are the two commonly used names for the aerobic cycle of metabolism?
23. What is the ETC?
24. Where in the cell do the anaerobic metabolic processes occur? Where do the aerobic processes occur? (Answer—in the mitochondria, the “powerhouses” of the cell!)
25. How much energy (in ATPs) is produced anaerobically from one glucose molecule?
26. What is acetyl-coA (what is it made from)?
27. How much energy is produced aerobically from one glucose molecule?
28. What is the criterion (best) measure of cardiovascular fitness? What are typically values for trained and untrained athletes?
29. What is the name of the process used to prepare fatty acids (fat molecules) for entry into the TCA cycle?
30. Compare the amount of oxygen required to produce energy from fats versus carbohydrates.