

CHAPTER 12 PRACTICE PROBLEMS

- 1. K⁺ leak channels are found in the plasma membrane, and they gate open and closed in an unregulated, random manner. What do they get from a resting cell?**
They keep the electrochemical gradient for K⁺ at zero
- 2. At the first step in glycolysis, what purpose is served by the phosphorylation of glucose to glucose 6-phosphate by the enzyme hexokinase?**
Helps drive the uptake of glucose from outside the cell
- 3. What essential molecule regenerated by fermentation?**
NAD⁺
- 4. What enzyme performs the first committed step in glycolysis?**
Phosphofructokinase
- 5. If 3 ATPs are hydrolyzed by the Na⁺/K⁺ pump, how many Na⁺ and K⁺ ions move in/out of the cell?**
9 Na⁺ ions move out of the cell and 6 K⁺ ions move into the cell
- 6. Using the molecules deoxyribose, methane, phosphate, and methanol, place these 4 molecules in order of least likely to most likely to diffuse across lipid bilayers.**
Phosphate<Deoxyribose<methanol<methane
- 7. List the transport proteins that actively transport solutes.**
Na⁺/K⁺ ATPase, Antiporter, Symporter, and Light-driven pump
- 8. Using the compounds Pyruvate, NADH, Acetyl-CoA, Glucose, and FADH₂, order the compounds from lowest to highest, based on the total amount of energy a cell can harvest from the molecule during a complete aerobic metabolism.**
FADH₂<NADH<Acetyl CoA<Pyruvate<Glucose
- 9. What is the cellular (and subcellular, if relevant) location of Phosphofructokinase?**
Cytoplasm
- 10. What is the cellular (and subcellular, if relevant) location of ATP synthase?**
Inner membrane of mitochondria
- 11. What is the cellular (and subcellular, if relevant) location of Hexokinase?**
Cytoplasm
- 12. What is the cellular (and subcellular, if relevant) location of Pyruvate dehydrogenase?**
Matrix of mitochondria

13. What is the cellular (and subcellular, if relevant) location of Aldolase?
Cytoplasm
14. What is the cellular (and subcellular, if relevant) location of Citrate synthase?
Matrix of mitochondria
15. What is the cellular (and subcellular, if relevant) location of NADH dehydrogenase complex?
Inner membrane of mitochondria
16. When the cell reaches the threshold potential, what kind of ions help depolarize the membrane?
Sodium
17. When the cell reaches the threshold potential, how do the ions depolarize the membrane?
By moving into the cell
18. What can be done to alter phospholipids to increase membrane fluidity?
Shortening the hydrocarbon tails and increasing the double bonds in hydrocarbon tails
19. What ways can phospholipids move spontaneously within a membrane bilayer?
By flexion of hydrocarbon tails, by rotating along their long axis, and by lateral diffusion within a monolayer.
20. True or false. Cholesterol is an amphipathic molecule
True
21. Detergents can solubilize both membrane phospholipids and membrane proteins. What kind of molecules are they?
Amphipathic
22. Give a description of the primary structure of a protein.
Amino acid sequence
23. Give a description of the secondary structure of a protein.
Stable folding patterns within a polypeptide
24. Give a description of the tertiary structure of a protein.
Full 3D conformation
25. Give a description of the Quaternary structure of a protein.
Complete structure of a complex formed between subunits

26. What kind of bond/interaction is responsible for the formation of alpha-helices and beta-sheets in proteins?

Hydrogen bonds

27. What does protein phosphorylation do to an enzyme to reversibly alter the enzyme activity?

Changes the enzyme's conformation

28. When does feedback inhibition take place?

When an enzyme acting early in a reaction pathway is inhibited by a late product of that pathway.