Membrane Transport

Use the following graph to answer questions 1 and 2.

![Graph showing the rate of diffusion of X into the cell against extracellular concentration of X.]

1. Which of the following processes is represented by the above graph?
   a. Simple diffusion
   b. Facilitated diffusion
   c. Active transport

2. Molecule X is most likely:
   a. Lipid soluble and hydrophobic
   b. Lipid soluble and hydrophilic
   c. Lipid insoluble and hydrophobic
   d. Lipid insoluble and hydrophilic

3. A cell was placed in solution and the cell shrank. Therefore, the solution was _____________ to the cell and the cell was _____________ to the solution.
   a. Hypotonic – hypertonic
   b. Hypertonic – hypotonic
   c. Isotonic – isotonic
   d. Hypertonic – isotonic
   e. Hypotonic – isotonic

Use the following information for questions 4-6:

ATP was broken down in order to move molecule Z out of the cell. Molecule Z then diffused back into the cell. The energy from the movement of Z back into the cell was used to move molecule Q into the cell.

4. The movement of molecule Z out of the cell is an example of?
   a. Simple diffusion
   b. Facilitated diffusion
   c. Primary active transport
   d. Secondary active transport

5. The movement of molecule Q into the cell is an example of?
   a. Simple diffusion
   b. Facilitated diffusion
   c. Primary active transport
   d. Secondary active transport
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6. The concentration of molecule Q inside the cell must be ____________________ the concentration of molecule Q outside the cell.
   a. Greater than  
   b. Less than  
   c. The same as  

7. If a cell is placed in an isotonic solution, the size of the cell will:
   a. Increase  
   b. Decrease  
   c. Not change  

8. An increase in temperature causes the rate of diffusion to:
   a. Increase  
   b. Decrease  
   c. Not change  

9. Molecules C and D have different masses but they are at the same temperature. Thus, the kinetic energy of molecule C is ____________________ the kinetic energy of molecule D.
   a. Greater than  
   b. Less than  
   c. The same as  

10. Molecules E and F have the same kinetic energy. Molecule E is diffusing faster than molecule F. Thus, the mass of molecule E is ____________________ the mass of molecule F.
     a. Greater than  
     b. Less than  
     c. The same as  

Use the following diagram for questions 11 and 12. It represents a container with 2 sides (A and B) separated by a membrane (dashed line). Both sides contain water and particles (black circles).

11. Suppose the membrane separating side A from B is permeable to both water and to the particles. Which of the following is TRUE?
    a. No osmosis will occur.  
    b. Osmosis will occur and water will move from side A to side B.  
    c. Osmosis will occur and water will move from side B to side A.
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12. Suppose the membrane separating side A from B is permeable to water and impermeable to the particles. Which of the following is TRUE?
   a. No osmosis will occur.
   b. Osmosis will occur and water will move from side A to side B.
   c. Osmosis will occur and water will move from side B to side A.

13. Vesicular transport of materials from the inside of the cell to the outside of the cell is known as:
   a. Endocytosis
   b. Receptor-mediated endocytosis
   c. Phagocytosis
   d. **Exocytosis**
   e. Active proteinaceous transport

14. Which of the following cells commonly performs phagocytosis?
   a. Fibroblast
   b. Macrophage
   c. Simple squamous epithelial cell
   d. Chondrocytes
   e. Goblet cell

15. Passive transport does not require any energy expenditure by the cell.
   a. True
   b. False

16. Facilitated diffusion may occur via integral proteins acting as channels or integral proteins acting as carriers.
   a. True
   b. False

17. The diffusion of ____________ through the plasma membrane often occurs via channels called aquaporins.
   a. Water
   b. Oxygen
   c. Glucose
   d. Sodium
   e. Proteins

18. The uptake of LDL cholesterol molecules by cells is done via:
   a. Exocytosis
   b. Simple diffusion
   c. **Receptor-mediated endocytosis**
   d. Phagocytosis
   e. All of the above

19. Exocytosis causes the number of phospholipid molecules in the plasma membrane to:
   a. Increase
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b. Decrease  
c. Not change

20. The blood in the children in the above picture must have a ________ particle concentration.  
   a. Low  
   b. Normal  
   c. High

21. What process is depicted in the above picture?  
   a. Phagocytosis  
   b. Receptor-mediated endocytosis  
   c. Exocytosis  
   d. Primary active transport  
   e. Secondary active transport

22. The diffusion of hydrophilic molecules through the plasma membrane via a protein channel is known as simple diffusion.  
   a. True
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b. False

23. If a cell is placed in a hypertonic solution it will increase in size.
   a. True
   b. False

24. Diffusion only occurs if the cell breaks down ATP.
   a. True
   b. False

25. Carrier proteins are almost always peripheral proteins.
   a. True
   b. False

26. Which of the following graphs would most likely represent the rate of facilitated diffusion of molecule Q (y-axis) into a cell versus the extracellular concentration of molecule Q (x-axis)?

   ![Graphs A, B, C]

27. You placed a cell in solution. The osmolarity of the cell was greater than the osmolarity of the solution. The solution was ______________ to the cell and cell size _______________.
   a. Hypotonic – increased
   b. Hypotonic – decreased
   c. Hypotonic – stayed the same
   d. Hypertonic – increased
   e. Hypertonic – decreased
   f. Hypertonic – stayed the same

28. An decrease in temperature will cause the rate of diffusion to:
   a. Increase
   b. Decrease
   c. Stay the same

29. An increase in the size of the concentration gradient will cause the rate of diffusion to:
   a. Increase
   b. Decrease
   c. Stay the same
30. Name all of the labeled structures that would be considered hydrophilic? (Just write the letters please!)

31. Name the labeled structure that has both hydrophilic and hydrophobic portions. (Just write 1 letter please!)

_____________________________________________________________________________________

32. 4-androstenedione is a lipid-soluble steroid. Does it need a transport protein in order to enter the cell?
   a. Yes – because lipid-soluble molecules are considered hydrophilic
   b. Yes – because lipid-soluble molecules are considered hydrophobic
   c. No – because lipid-soluble molecules are considered hydrophilic
   d. No – because lipid-soluble molecules are considered hydrophobic

33. Oligomycin is a chemical that inhibits ATP production. Which of the following processes would it have the greatest effect on?
   a. Simple diffusion
   b. Facilitated diffusion
   c. Active transport.