**Name Period**

**Chapter 7: Membrane Structure and Function**

***Concept 7.1 Cellular membranes are fluid mosaics of lipids and proteins***

1. Phospholipids are *amphipathic.* Explain what this means.

2. In the 1960s, the *Davson-Danielli model* of membrane structure was widely accepted. Describe this model and then cite two lines of evidence that were inconsistent with it.

3. The currently accepted model of the membrane is the *fluid mosaic model.*

Describe this model.

4. What is meant by *membrane fluidity*? Describe the movements seen in the fluid membrane.

5. Describe how each of the following can affect membrane fluidity:

1. decreasing temperature
2. phospholipids with unsaturated hydrocarbon chains:
3. cholesterol:

6. Membrane proteins are the *mosaic* part of the model. Describe each of the two main categories:

**integral proteins**:

**peripheral proteins**:

7. Study Figure 7.10 in your text. Use it to briefly describe the following major functions of membrane proteins.

|  |  |
| --- | --- |
| Function | Description |
| Transport | . |
| Enzymatic activity | . |
| Signal transduction |  |
| Cell-cell recognition |  |
| Intercellular joining | . |
| Attachment to cytoskeleton and ECM |  |

8. Membrane carbohydrates are important in cell-cell recognition. What are two examples of this?

9. Distinguish between *glycolipids* and *glycoproteins*.

**Glycolipids**:

**Glycoproteins**:

***Concept 7.2 Membrane structure results in selective permeability***

11. Distinguish between *channel proteins* and *carrier proteins*.

12. Are transport proteins specific? Cite an example that supports your response.

13. Peter Agre received the Nobel Prize in 2003 for the discovery of *aquaporins*. What are they?

14. Consider the following materials that must cross the membrane. For each, tell how it is moved across.

|  |  |
| --- | --- |
| Material | Method |
| CO2 |  |
| Glucose |  |
| H+ |  |
| O2 |  |
| H2O |  |

***Concept 7.3 Passive transport is diffusion of a substance across a membrane with no energy investment***

15. Define the following terms:

**diffusion**:

**concentration gradient**:

**passive transport**:

**osmosis**:

**isotonic**:

**hypertonic**:

**hypotonic**:

**turgid**:

**flaccid**:

**plasmolysis**:

16. Use as many words from the list above to describe why a carrot left on the counter overnight would become limp. Underline or highlight each word you use.

17. What is *facilitated diffusion*? Is it active or passive? Cite two examples.

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19. Why does the red blood cell burst when placed in a hypotonic solution, but not the plant cell?

***Concept 7.4 Active transport uses energy to move solutes against their gradients***

20. Describe *active transport*. What type of transport proteins are involved, and what is the role of ATP

in the process?

21. The *sodium-potassium pump* is an important system for you to know. Draw a diagram of how the sodium potassium pump works. Refer to p 136 Use these terms to label the figures, and briefly summarize what is occurring in each: *extracellular fluid*, *cytoplasm*, *Na+*, *K+*, *ATP*, *ADP*, *P*, and *transport protein*.

**Summary**

22. Study the diagram on p136, and define these terms: *facilitated diffusion with a carrier protein*, *facilitated diffusion with a channel protein*, *active transport with a carrier protein*, and *simple diffusion*. For each type of transport, give an example of a material that is moved in this manner.

23. What is *membrane potential*? Which side of the membrane is positive?

24. What are the two forces that drive the diffusion of ions across the membrane? What is the combination of these forces called?

25. What is *cotransport*? Explain how understanding it is used in our treatment of diarrhea.

***Concept 7.5 Bulk transport across the plasma membrane occurs by exocytosis and endocytosis***

26. Define each of the following, and give a specific cellular example.

**Exocytosis**:

**Endocytosis**:

**receptor-mediated endocytosis**:

**phagocytosis**:

.

**pinocytosis**:

27. What is a *ligand*? What do ligands have to do with receptor-mediated endocytosis?

28. Are the processes you described in question 23 active or passive transport? Explain your response.