Chapter 7

class notes

I. Overview- Life at the Edge

- **The plasma membrane separates the living cell from the nonliving surroundings.**
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II. Fluid Mosaic Model

(Singer and Nicolson, 1972)

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III. Cell membranes are fluid mosaics of lipids and proteins

- **Phospholipids in the Bilayer**
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Question 7.1

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III. Cell membranes are fluid mosaics of lipids and proteins

- **Proteins in the bilayer**
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IV. Overview of Six Major Functions of Membrane Proteins

a) **Transport**
b) **Enzymes**
c) **Signal Transduction**
d) **Cell-cell recognition**
e) **Intercellular joining**
f) **Attachment to the cytoskeleton and ECM.**

V. Role of Carbohydrates

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VI. Permeability of the Lipid Bilayer

- A cell must exchange materials with its surroundings, a process controlled by the plasma membrane.

VI. Permeability of the Lipid Bilayer (without transport proteins)

- Nonpolar molecules
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- Polar molecules
  - **Slow transport**
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  - **No transport**
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VI. Permeability of the Lipid Bilayer

- **Transport proteins allow rapid passage of hydrophilic substances across the membrane.**

Question 7.2

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Question 7.3

- Two molecules that can cross the lipid bilayer without the help of a transport protein are O_2 and CO_2. What properties allow this to occur? (Campbell, page 130)

NOTE: You don't need your clicker to answer this question.

VII. Passive Transport is Diffusion

- **Diffusion**
  - **The tendency for molecules of any substance to spread out evenly into the available space**

VII. Passive Transport is Diffusion

- **Substances diffuse <u>down</u> their concentration gradient.**
- **Diffusion across a membrane**
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Questions 7.4

•**The "cell" membrane is permeable to glucose, fructose, and sucrose.**

VIII. Osmosis

- **Osmosis is the *diffusion* of water across a semi-permeable membrane**

VIII. Osmosis

Is affected by the concentration gradient of dissolved substances

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VIII. Osmosis

- **If a solution is hypotonic**
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VIII. Osmosis

- **If a solution is isotonic**
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VIII. Osmosis

- **If a solution is hypertonic**
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VIII. Osmosis

- **Organisms without cell walls.**
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VIII. Osmosis

- **Organisms without cell walls living in isotonic or hypotonic environments**

VIII. Osmosis

- **Organisms with rigid cell walls**
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Question 7.5

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IX. Facilitated Diffusion

- Facilitated diffusion =

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IX. Facilitated Diffusion

- Facilitated diffusion-two types

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X. Active Transport

- Active Transport =
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X. Active Transport

- Active Transport Example
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Question 7.6

XI. Review

- Passive transport
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- Active transport

XII. Endocytosis and Exocytosis

- Movement of macromolecules (DNA, proteins, LDL, etc…)
- Movement of solutes and water in bulk

XII. Endocytosis and Exocytosis

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XIII. Types of Endocytotic Mechanisms

- Phagocytosis = (cellular eating) endocytosis of solid particles.
- Pinocytosis = (cellular drinking) endocytosis of fluid droplets.
- Receptor-mediated endocytosis = The process of importing specific macromolecules into the cell through receptors on the cell's surface.

XIII. Types of Endocytotic Mechanisms

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Question 7.7