

Review Sheet Membrane Structure, Osmosis & Diffusion

Lester BIOL 150

General things to do to prepare for the exam:

- study the PowerPoints
- write out the answers to the learning objectives found with each PowerPoint
- listen to my lecture recordings

Chapter 7

Explain selective permeability, amphipathic molecules, and the fluid mosaic model.

Describe the structure of a lipid membrane. Include a discussion of the describe the structure of a phospholipid and why they form a bilayer.

How do phospholipids move thru the membrane?

Explain how saturated and unsaturated lipids affect the fluidity of the membrane. What is the role of cholesterol in membranes?

Describe how proteins are embedded in the membrane.

What are the six functions or types of proteins associated with the membrane?

What kinds of things can simply diffuse thru the membrane and what kinds of things need help? What is that "help"?

Define diffusion and how it works. What is the source of "energy" for diffusion?

Define concentration gradient, active and passive transport.

What is osmosis? Does water follow its concentration gradient?

Define: tonicity, hypertonic, hypotonic, and isotonic. Where does water move?

What happens to a red blood cell when it is put into the following environments: hypertonic, hypotonic, isotonic

What happens to a plant cell when it is put into the following environments: hypertonic, hypotonic, isotonic?

Define osmoregulation and explain how a paramecium survives in a hypotonic environment.

Explain: facilitated diffusion, active transport, endocytosis, exocytosis, pinocytosis, and phagocytosis.

Sample Test Problems

For a protein to be an integral membrane protein, it would have to be _____.

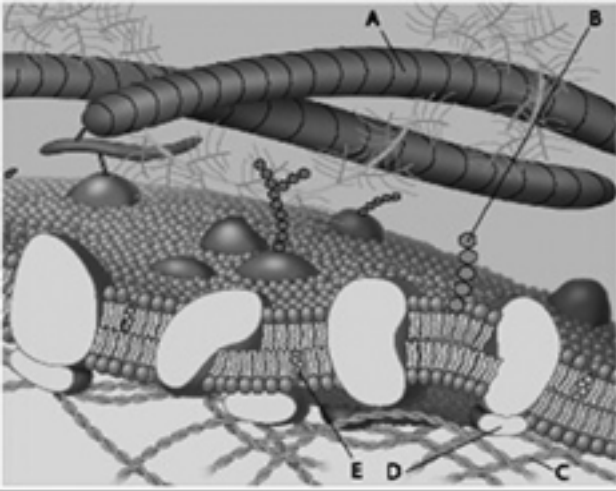
- A) hydrophilic
- B) hydrophobic
- C) amphipathic, with at least one hydrophobic region
- D) exposed on only one surface of the membrane

According to the fluid mosaic model of cell membranes, phospholipids _____.

- A) can move laterally along the plane of the membrane
- B) frequently flip-flop from one side of the membrane to the other
- C) occur in an uninterrupted bilayer, with membrane proteins restricted to the surface of the membrane
- D) have hydrophilic tails in the interior of the membrane

Why are lipids and proteins free to move laterally in membranes?

- A) The interior of the membrane is filled with liquid water.
- B) Lipids and proteins repulse each other in the membrane.
- C) Hydrophilic portions of the lipids are in the interior of the membrane.
- D) There are only weak hydrophobic interactions in the interior of the membrane.



Which component in the accompanying figure plays a critical role in cell-cell recognition?

- A) A
- B) B
- C) C
- D) E

In what way do the membranes of a eukaryotic cell vary?

- A) Phospholipids are found only in certain membranes.
- B) Certain proteins are unique to each membrane.
- C) Only certain membranes of the cell are selectively permeable.
- D) Some membranes have hydrophobic surfaces exposed to the cytoplasm while others have hydrophilic surfaces facing the cytoplasm.

Which of the following statements describes a characteristic feature of a carrier protein in a plasma membrane?

- A) It exhibits specificity for a particular type of molecule.
- B) It requires the expenditure of cellular energy to function.
- C) It works against diffusion.
- D) It has no hydrophobic regions.

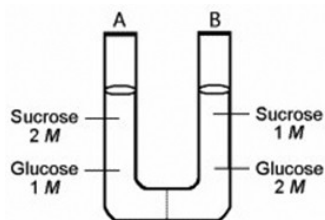
Which of the following statements about diffusion is true?

- A) It is very rapid over long distances.
- B) It requires an expenditure of energy by the cell.
- C) It is an active process in which molecules move from a region of lower concentration to a region of higher concentration.
- D) It is a passive process in which molecules move from a region of higher concentration to a region of lower concentration.

When a plant cell, such as one from a tulip leaf, is submerged in a hypertonic solution, what is likely to occur?

- A) The cell will burst.
- B) Plasmolysis will shrink the interior of the cell.
- C) The cell will become flaccid.
- D) The cell will become turgid.

The solutions in the two arms of this U-tube are separated by a membrane that is permeable to water and glucose but not to sucrose. Side A is half-filled with a solution of 2 M sucrose and 1 M glucose. Side B is half-filled with 1 M sucrose and 2 M glucose. Initially, the liquid levels on both sides are equal.



When the system illustrated above reaches equilibrium, the sugar concentrations on both sides of the U-tube will be _____.

- A) 2 M sucrose, 1 M glucose
- B) 1 M sucrose, 2 M glucose
- C) 1 M sucrose, 1 M glucose
- D) 1.5 M sucrose, 1.5 M glucose

An organism with a cell wall would most likely be unable to take in materials through:

- A) osmosis
- B) active transport
- C) phagocytosis
- D) facilitated diffusion

The difference between pinocytosis and receptor-mediated endocytosis is that:

- A) pinocytosis brings only water molecules into the cell, but receptor-mediated endocytosis brings in other molecules as well
- B) pinocytosis increases the surface area of the plasma membrane, whereas receptor-mediated endocytosis decreases the plasma membrane surface area
- C) pinocytosis is nonselective in the molecules it brings into the cell, whereas receptor-mediated endocytosis offers more selectivity
- D) pinocytosis can concentrate substances from the extracellular fluid, but receptor-mediated endocytosis cannot