

Chap 4 Review Questions

Why do the heads of the phospholipids point out and the tails point to each other?

- a. The tails are nonpolar and form hydrogen bonds with each other.
- b. The tails are repelled by the aqueous environment.
- c. The heads are attracted to the water inside and outside.
- d. a and c.
- e. b and c.

Within the fluid mosaic of a plasma membrane, what is the role of transport and channel proteins?

- a. They prevent passage of amino acids.
- b. They allow movement of salts and sugars through the plasma membrane.
- c. They may set off cellular changes such as cell division or hormone secretion.
- d. They are cell-surface attachment sites.
- e. They identify the cell.

How are plasma membranes best described?

- a. A double layer of phospholipid molecules with hydrophobic tails directed toward cytoplasm of the cell.
- b. A single layer of phospholipid molecules with water molecules attached along one side.
- c. A double layer of phospholipid molecules with hydrophilic heads directed toward each other.
- d. A double layer of phospholipid molecules with hydrophobic tails oriented toward each other.
- e. A single layer of phospholipids with tails pointed to the inside of the cell.

The hydrophobic tails of a phospholipid bilayer are oriented toward the:

- a. Interior of the plasma membrane (i.e. each other)
- b. Extracellular fluid surrounding the cell
- c. Cytoplasm of the cell
- d. Nucleus of the cell
- e. Both b and c

Which of the following accounts for the fluid aspect of the fluid mosaic model of plasma membranes?

- a. The individual phospholipid molecules are not bonded to each other so movement of certain proteins and lipids is possible within the bilayer.
- b. The plasma membrane is "fluid" because of movement of substances across the membrane.
- c. The bilayer permits diffusion of certain lipid-soluble substances.
- d. The membrane is water soluble.
- e. One of the components of the membrane is water.

To say a cell is "differentially permeable" means:

- a. It has different sized perforations in the membrane.
- b. It is permeable to different substances than other cells.
- c. Only certain molecules can pass through.
- d. Sometimes water passes through, and sometimes it can't.
- e. Permeability depends on gradient differences.

According to the fluid mosaic model of cell membranes, which of the following is a true statement about membrane phospholipids?

- a. They move laterally along the plane of the membrane.
- b. They frequently flip-flop from one side of the membrane to the other.
- c. They occur in an uninterrupted bilayer, with membrane proteins restricted to the surface of the membrane.
- d. They are free to depart from the membrane and are dissolved in the surrounding solution.
- e. They have hydrophilic tails in the interior of the membrane.

Recognition proteins are most important for

- a. facilitated diffusion of molecules.
- b. active transport of molecules.
- c. maintaining membrane integrity.
- d. maintaining membrane fluidity.
- e. distinguishing foreign cells from "self" cells.

The net movement of molecules from a high concentration to a low concentration is described by which of the following?

- a. diffusion
- b. active transport
- c. osmosis
- d. facilitated diffusion
- e. exocytosis

The phospholipid contains two different parts, a _____ head and a pair of _____ tails.

The major lipids in biological membranes are called _____.

How does the plasma membrane act as gatekeeper for the cell?

The compounds in biological membranes that form a barrier to the movement of materials across the membrane are

- a. internal proteins.
- b. carbohydrates.
- c. lipids.
- d. nucleic acids.
- e. external proteins

The biological membranes, the phospholipids are arranged in

- a. a bilayer with the fatty acids pointing toward each other.
- b. a bilayer with the fatty acids facing outward.
- c. a single layer with the fatty acids facing the interior of the cell.
- d. a single layer with the phosphorus-containing region facing the interior of the cell.
- e. a bilayer with the phosphorus groups in the interior of the membrane.

When a mouse cell and a human cell are fused, the membrane proteins of the two cells become uniformly distributed over the surface of the hybrid cell. This occurs because

- a. many proteins can move around within the bilayer.
- b. all proteins are anchored within the membrane.
- c. proteins are asymmetrically distributed within the membrane.
- d. all proteins in the plasma membrane are extrinsic.
- e. different membranes contain different proteins.

The hydrophilic regions of a membrane protein are most likely to be found

- a. only in muscle cell membranes.
- b. associated with the fatty acid region of the lipids.
- c. in the interior of the membrane.
- d. exposed on the surface of the membrane.
- e. either on the surface or inserted into the interior of the membrane.

In general, which of the following is largely responsible for moving substances across the plasma membrane, communicating with other cells and identifying the cell?

- a. Phospholipids
- b. Carbohydrates
- c. Proteins
- d. Nucleic acids
- e. Cytoskeleton

When substances move through a plasma membrane and down gradients of concentration this is called:

- a. Active transport
- b. Passive transport
- c. Pinocytosis
- d. Exocytosis
- e. Entropy

What happens when diffusion moves molecules across the plasma membrane?

- a. The cell gains needed materials and gets rid of excess materials very quickly.
- b. Most molecules are capable of crossing the phospholipid bilayer at any location and at basically the same rate.
- c. Energy input is required to transport molecules.
- d. The rate of diffusion cannot be influenced by the cell.
- e. The process is very slow and is driven by concentration gradients.

For diffusion to occur, there must be:

- a. a membrane
- b. a gradient
- c. water
- d. ATP
- e. all of these

Which of the following may influence the rate of simple diffusion across a differentially permeable membrane?

- a. Size of molecule
- b. Lipid solubility of the molecule
- c. Concentration gradient
- d. a and c are correct
- e. All are correct

Facilitated diffusion is most like:

- a. Coasting across a bridge on your bike.
- b. Being carried across a stream.
- c. Walking across a room.
- d. Riding a ski lift.
- e. Swimming.

Molecules which permeate a plasma membrane by facilitated diffusion:

- a. Require an expenditure of energy
- b. Require the aid of transport proteins
- c. Move from an area of low concentration to an area of high concentration
- d. Do so much more quickly than those crossing by simple diffusion
- e. All of these

A molecule that can diffuse freely through a phospholipid bilayer is probably:

- a. Hydrophilic
- b. Positively charged
- c. Hydrophobic
- d. Negatively charged
- e. A sugar

In reference to diffusion, "passive" really means:

- a. without a membrane
- b. in the air
- c. no gradient
- d. very slowly
- e. no energy required

Molecules assisted by carrier proteins may cross a differentially permeable membrane by:

- a. Facilitated diffusion
- b. Active transport
- c. Osmosis
- d. Endocytosis
- e. Simple diffusion

The diffusion of water molecules across a differentially permeable membrane is termed:

- a. Facilitated diffusion
- b. Hydrolysis
- c. Active transport
- d. Exocytosis
- e. Osmosis

A certain cell, such as a neuron, has a high concentration of K^+ ions. How can K^+ ions continue to enter the cell?

- a. Active transport
- b. Facilitated diffusion
- c. Osmosis
- d. Endocytosis
- e. Infusion

If red blood cells are taken from the body and placed in a hypertonic solution, what happens to the cells?

- a. The cells swell and burst because water moves into the cells.
- b. The cells shrivel up because water leaves the cells.
- c. The cells remain unchanged due to equal solute concentration inside and outside the cells.
- d. The cells remain unchanged due to equal water concentrations inside and outside the cells.
- e. They become white blood cells.

Inside a "cell" you construct, you place a 1 M salt solution. You place the cell in a 1 M sugar solution. What happens?

- a. Water enters the cell because there is more water outside than inside.
- b. Water leaves the cell because sugar is a larger molecule than salt.
- c. Water leaves and enters at the same rate.
- d. Sugar diffuses in and salt diffuses out until equilibrium is reached.
- e. c and d.

Active transport requires:

- a. Transport proteins
- b. ATP
- c. A membrane
- d. A gradient
- e. All of these

What is active transport?

- a. Diffusion of molecules within a cell.
- b. Movement of molecules into or out of a cell against a concentration gradient.
- c. Movement of molecules into or out of a cell down a concentration gradient.
- d. The movement of molecules into or out of a cell using special proteins and not requiring an expenditure of energy.
- e. Rapid movement of molecules in a solution.

A freshwater protozoan, such as Paramecium, tends to _____ because it lives in a _____ environment.

- a. gain water; hypotonic
- b. lose water; hypertonic
- c. gain water; hypertonic
- d. lose water; hypotonic
- e. gain water; isotonic

Osmosis depends on:

- a. Random movement of water molecules until equilibrium is reached.
- b. Random movement of solute molecules until equilibrium is reached.
- c. Differences in water concentration between solutions.
- d. The amount of water inside and outside the cell.
- e. All of these.

Solutions that cause water to enter cells by osmosis are termed:

- a. Hypertonic
- b. Isotonic
- c. Hypotonic
- d. Permeable
- e. Hydrophilic

The blood plasma of a human becomes _____ to their red blood cells if they drink saltwater.

- a. hyposmotic
- b. isotonic
- c. hypotonic
- d. hypertonic
- e. hydroponic

The process whereby white blood cells engulf bacteria is termed:

- a. Adhesion
- b. Exocytosis
- c. Pinocytosis
- d. Phagocytosis
- e. Ingestion

40. What prevents your immune system from attacking your own cells?

- a. inadequate enzymes
- b. fever
- c. cholesterol
- d. recognition proteins
- e. receptor proteins

Transport processes (for example, diffusion and active transport) occur across which membranes?

- a. Plasma membranes
- b. Chloroplast membranes
- c. Mitochondrial membranes
- d. ER membranes
- e. All of these

The slowest rate of diffusion of dye particles in water will occur in which situation?

- a. Dye particles in water at 10 degrees C
- b. Dye particles in water at 20 degrees C
- c. Dye particles in water at 30 degrees C
- d. Dye particles in water at 40 degrees C
- e. Dye particles in water at 80 degrees C

You fill a shallow tray with water and place a drop of red ink in one end of the tray and a drop of green ink in the other end. Which of the following is true at equilibrium?

- a. The red ink is uniformly distributed in one half of the tray and the green ink is uniformly distributed in the other half of the tray.
- b. The red and green inks are both uniformly distributed throughout the tray.
- c. Each ink is moving down its concentration gradient.
- d. The concentration of each ink is higher at one end of the tray than at the other end.
- e. No predictions can be made without knowing the size of the ink molecules.

Carbon dioxide crosses the plasma membrane by simple diffusion. What determines the rate at which carbon dioxide enters the cell?

- a. The concentration of carbon dioxide on each side of the membrane.
- b. The amount of energy being produced by the cell.
- c. The amount of transport protein in the membrane.
- d. The concentration of carbon dioxide outside of the cell.
- e. The amount of oxygen being exported from the cell.

Plant cells transport sucrose across the vacuole membrane against its concentration gradient by a process known as

- a. simple diffusion.
- b. active transport.
- c. passive transport.
- d. facilitated diffusion.
- e. osmosis.

When a red blood cell is placed in an isotonic solution, which of the following will occur?

- a. The cell will shrivel.
- b. The cell will swell and burst.
- c. The cell will shrivel, and then return to normal.
- d. The cell will swell and then return to normal.
- e. Nothing.

The rate of facilitated diffusion of a molecule across a membrane does not continue to increase as the concentration difference of the molecule across the membrane increases because

- a. facilitated diffusion requires ATP energy.
- b. as the concentration difference increases, molecules interfere with one another.
- c. there are a limited number of carrier proteins in the membrane.
- d. increased concentration difference causes a situation far from equilibrium.
- e. the diffusion constant depends on the concentration difference.

Osmosis moves water from a region of

- a. high concentration of dissolved material to a region of low concentration.
- b. low concentration of dissolved material to a region of high concentration.
- c. hypertonic solution to a region of hypotonic solution.
- d. negative osmotic potential to a region of positive osmotic potential.
- e. low concentration of water to a region of high concentration of water.

A concentration gradient of glucose across a membrane means

- a. there are more moles of glucose on one side of the membrane than the other.
- b. glucose molecules are more crowded on one side of the membrane than the other.
- c. there is less water on one side of the membrane than the other.
- d. the glucose molecules are chemically more tightly bonded together on one side than the other.
- e. there are more glucose molecules within the membrane than outside of the membrane.

Why is the biological membrane referred to as being differentially permeable?

Compare and contrast the terms diffusion and osmosis.

Why does the cell perform endocytosis in addition to active and passive transport mechanisms?

Suppose a bag made of a differentially permeable membrane was filled with a 5% solution of glucose and sealed. What would happen if the bag was placed in 1) pure water or 2) 10% glucose solution?

Distinguish between the three types of endocytosis?

Which types of molecules move most easily through the plasma membrane and which types of molecules cannot pass easily through the membrane?

Glucose is a six-carbon sugar that diffuses slowly through artificial phospholipid bilayers. The cells lining the small intestine, however, rapidly move large quantities of glucose from the glucose-rich food into their glucose-poor cytoplasm. Using this information, which transport mechanism is most probably functioning in the intestinal cells?

- a. Simple diffusion
- b. Exocytosis
- c. Active Transport
- d. Facilitated diffusion
- e. Endergonic reactions

Two similar-sized animal cells are placed in a 0.5% sucrose solution. Cell A enlarges in size for a while, then stops; cell B continues to enlarge and finally ruptures. Which of the following was true at the beginning of the experiment?

- a. Cell A was hypotonic to the solution and cell B was hypertonic.
- b. Cell A was hypertonic to the solution and cell B was hypotonic.
- c. Cell A was hypertonic to cell B.
- d. Cell B was hypertonic to cell A.
- e. Cells A and B were isotonic to each other.

Which process accounts for the movement of solids into some animal cells?

- a. Active transport
- b. Facilitated diffusion
- c. Diffusion
- d. Osmosis
- e. Phagocytosis

What does a cell use exocytosis for?

- a. To move away from danger.
- b. To release substances from the cell.
- c. To incorporate nutrients.
- d. To pump hydrogen molecules across the membrane.
- e. To create new cells.

The movement of molecules across a cell membrane in which no energy is required (i.e. diffusion) is called _____ transport and the movement of molecules across the membrane in which energy (i.e. ATP) is required is called _____ transport.

Facilitated diffusion and active transport both require _____ for the movement of molecules across the membrane.

Plant cell walls are primarily composed of _____.

Which statement is true of cell walls?

- a. Cell walls are nonliving.
- b. Cell walls are secreted by the cells they surround.
- c. Bacteria, fungi, and some protists possess cell walls.
- d. a and c are correct.
- e. All of these are true.

Specialized cell junctions include

- a. gap junctions.
- b. tight junctions.
- c. desmosomes.
- d. a, b, and c.
- e. a and b.

The electric signal for a muscle to contract passes rapidly from one muscle cell to the next by way of

- a. tight junctions.
- b. desmosomes.
- c. gap junctions.
- d. internal proteins.
- e. external proteins

What is a major component of primary cell walls of plants?

- a. Chitin
- b. Cellulose
- c. Pectin
- d. Lignin
- e. Protein

Adhesion of animal tissues is accomplished by cell-to-cell junctions called:

- a. Desmosomes
- b. Tight junctions
- c. Gap junctions
- d. Plasmodesmata
- e. Cell plates

The urinary bladder is protected from leaking due to cell-to-cell junctions called:

- a. Desmosomes
- b. Tight junctions
- c. Gap junctions
- d. Plasmodesmata
- e. Stretch receptors

Protein channels that provide passage for hormones and nutrients between animal cells are termed:

- a. Desmosomes
- b. Tight junctions
- c. Gap junctions
- d. Plasmodesmata
- e. Capillaries

When very small viruses infect a plant cell by crossing its membrane, the viruses often spread rapidly throughout the entire plant without crossing additional membranes. Explain how this occurs?

Compare and contrast the intercellular junctions that allow communication between plant and animal cells.

In plant cells, _____ allow for communication between cells and in animal cells the _____ serve the same purpose.

The cells of the intestinal epithelium (lining) are joined to one another by _____ that prevent substances from passing between the cells of this tissue.

_____ is used by cells to pick up large particles like bacteria.

_____ hold cells together much like glue.