

Unit 5: Cell Transport

Review Guide

LEARNING TARGETS

Place a checkmark next to the learning targets you feel confident on. Then go back and focus on the learning targets that are not checked.

- Describe the structure and function of the plasma membrane.

Resources:

Textbook Section 7.2 (pages 203-205)

Student Glossary

Plasma Membrane - Structure Identification WKSH

- Compare and contrast different types of passive transport.

Resources:

Textbook Section 7.3

Student Glossary

Discovering Diffusion Lab

Quiz Review

- Explain how materials diffuse across a semi-permeable membrane.

Resources:

Textbook Section 7.3

Student Glossary

Quiz Review

- Predict the effect of osmotic solutions on plant and animal cells.

Resources:

Textbook Section 7.3

Student Glossary

Passive Transport- Osmosis Practice I-III

Quiz Review

- Identify examples of passive and active transport.

Resources:

Textbook Section 7.3

Student Glossary

Concept Map

Type of Cell Transport - Practice I & II

- Contrast active and passive transport.

Resources:

Textbook Section 7.3

Student Glossary

Concept Map

Plasma Membrane Transport - Active vs. Passive Transport

LT: Describe the structure and function of the plasma membrane.

1. What does it mean that biological membranes are selectively permeable?

Some substances can pass through while others cannot or are unable to.

2. What is the role of protein channels in the cell membrane?

Specific control over molecules entering and leaving the cell.

3. Which part of the membrane's structure gives the cell the greatest and most specific control over molecules entering and leaving the cell?

protein channels (highly specific)

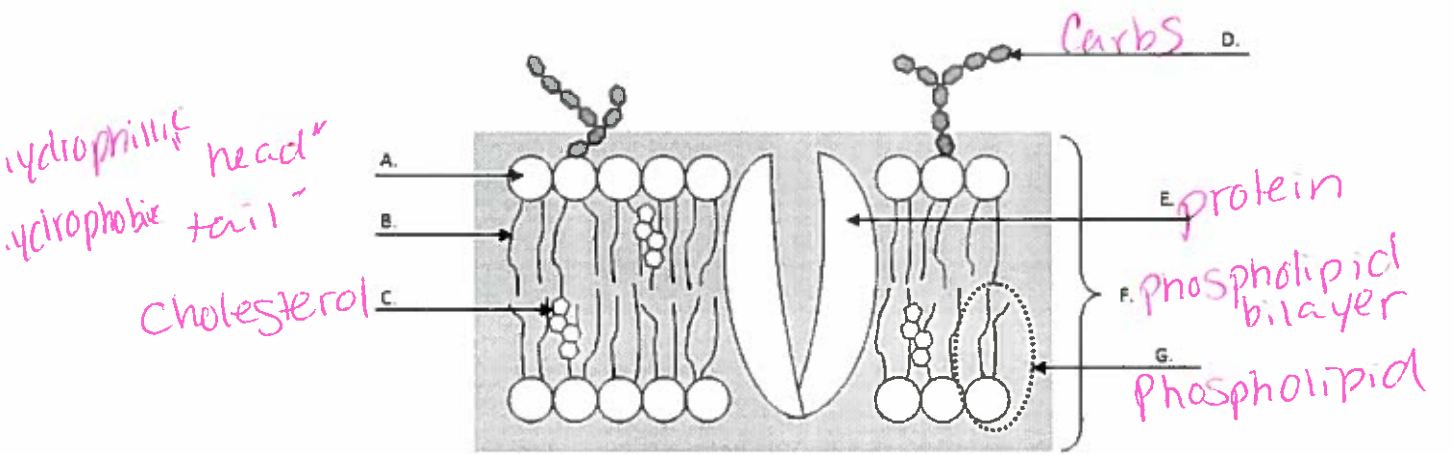
4. What structures are found in the plasma membrane? What are their functions?

Phospholipid - boundary	Cholesterol - reinforcement
proteins - channels	Carbs - cell recognition

5. What does the label "Fluid Mosaic Model" tell you about the plasma membrane?

It is not static and the variety of components can move

6. Label each of the following parts of the plasma (cell) membrane.



LT: Compare and contrast different types of passive transport.

7. With regards to diffusion, molecules move from an area of high concentration to an area of low concentration until equilibrium is reached.

8. What is the difference between simple diffusion and facilitated diffusion?
facilitated diffusion uses proteins

9. What is the differences between diffusion and osmosis?
osmosis only pertains to the movement of water and is facilitated (aquaporins)

10. How are diffusion and osmosis similar?
both are types of passive transport

11. Determine the type of passive transport that will occur and what direction the substance will move.

Substance	Inside concentration	Outside Concentration	Direction of Osmosis	Type of Transport
Fluorine gas	5% →	3%	out	Passive
Sugar	8% →	6%	out	Active
Water	5.6% ←	5.7%	in	Passive
Cl ⁻	10% ←	19%	in	Active
Proteins	.05% ←	.10%	in	Active

LT: Explain how materials diffuse across a semi-permeable membrane.

12. Is the following sentence true or false? Water tends to diffuse from a region where it is less concentrated to a region where it is highly concentrated.

False

water goes high \rightarrow low

13. When will water stop moving across a membrane? Explain.

when equilibrium is reached.

no concentration gradient = no need for water to move. (keep in mind H_2O still moves, just at equal rates).

14. How do materials diffuse across the plasma membrane.

Via a concentration gradient.

LT: Predict the effect of osmotic solutions on plant and animal cells.

Respond to the following questions (15-20), referring to Figure 3-2, by inserting your responses in the spaces provided.

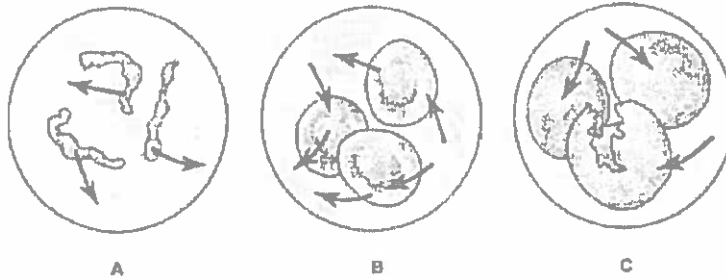


Figure 3-2

15. Which microscopic field contains a *hypertonic* solution?

A

16. The cells in this field are said to be

shriveled

17. Which microscopic field contains an isotonic bathing solution?

B

18. What does *isotonic* mean?

equal movement of H_2O into and out of the cell.

19. Which microscopic field contains a *hypotonic* solution?

C

20. What is happening to the cells in this field and why?

They are bursting, too much H₂O enters the cell.

Use the diagram to the right to answer the next four questions.

21. What is the percent of water inside the cell?

90%

22. What is the percent of water outside the cell?

10%

23. Will osmosis occur?

a. If so, in what direction will osmosis occur?

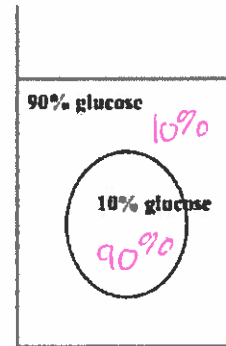
Out

b. Will the cell shrink or swell?

Shrink

24. What type of osmotic solution is the cell in?

hypertonic



Use the diagram to the right to answer the next four questions.

25. What is the percent of water inside the cell?

40%

26. What is the percent of water outside the cell?

80%

27. Will osmosis occur?

a. If so, in what direction will osmosis occur?

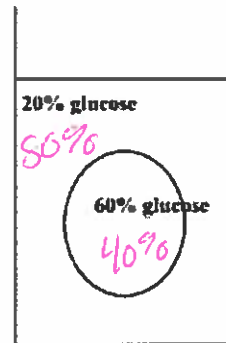
Into

b. Will the cell shrink or swell?

Swell

28. What type of osmotic solution is the cell in?

hypotonic



Use the diagram to the right to answer the next four questions.

29. What is the percent of water inside the cell?

30%

30. What is the percent of water outside the cell?

30%

31. Will osmosis occur?

a. If so, in what direction will osmosis occur?

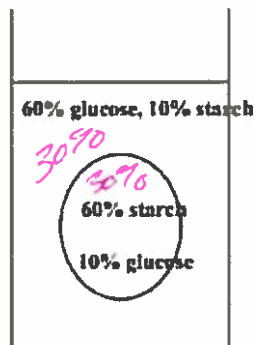
In + out at equal rates

b. Will the cell shrink or swell?

Size stays the same

32. What type of osmotic solution is the cell in?

Isotonic



Match the situation to the description.

Situation

Description

33. Two solutions are isotonic. **B**

34. A solution is hypertonic. **A**

35. A solution is hypotonic. **C**

A. The solution is above strength in solute.

B. The solutions are the same strength.

C. The solution is below strength in solute

36. Determine the concentration of water for the inside and outside of the cell, the direction of osmosis, and the type of solution.

low H₂O outside cell
high H₂O outside cell.

Outside Cell	Inside Cell	Concentration of Water Outside Cell	Concentration of Water Inside Cell	Direction of Osmosis	Type of Solution
43%	28%	57%	72%	out	hyper-
4%	67%	96%	33%	in	hypo-
99%	1%	1%	99%	out	hyper-
3%	3%	97%	97%	Both	ISO-
87%	52%	13%	48%	out	hyper
16%	6%	84%	94%	out	hyper

37. Complete the missing boxes below.

Outside Cell	Inside Cell	Concentration of Water Outside Cell	Concentration of Water Inside Cell	Direction of Osmosis	Type of Solution
43%	9.2%	57%	8%		
88%	67%	12%	33%		
99%	2%				
97%	3%	14%			
87%	21%				

SKIP

LT: Identify examples of passive and active transport.

Select the term from the list below that characterize the statements 26-33.

- Diffusion* *Osmosis* *Endocytosis* *Exocytosis* *Facilitated Diffusion*

38. Requires ATP (cellular energy)

Endocytosis & Exocytosis (Active Transport)

39. Driven by hydrostatic (fluid) pressure (i.e. fluid version of a concentration gradient)

Passive (Diffusion, Facilitated diffusion, osmosis)

40. Follows a concentration gradient

Same as 39

41. Moves water through a semipermeable membrane

Osmosis

42. Provides for cellular uptake of solid or large particles from the cell exterior

Endocytosis

43. Proceeds against a concentration gradient

Active Transport

44. Removes material from inside a cell

Exocytosis

45. Requires transport proteins embedded in the plasma membrane

Facilitated Diffusion

46. Label each image with the type of transport being shown.

The diagrams are labeled as follows:

- Facilitated Diffusion:** Shows a transport protein channel in a cell membrane with particles moving through it from high to low concentration.
- Simple Diffusion:** Shows particles moving directly through the lipid bilayer of a cell membrane from high to low concentration.
- Active Transport:** Shows a transport protein moving particles from low to high concentration, with an ATP molecule being hydrolyzed to provide energy.
- Osmosis:** Shows water molecules (represented by small circles) moving through a semipermeable membrane from an area of high water concentration to an area of low water concentration. A handwritten note says "These are water molecules".
- Exocytosis:** Shows a vesicle fusing with the cell membrane to release its contents into the extracellular space.

LT: Contrast active and passive transport.

47. How are active transport and facilitated diffusion similar? How are they different?

Both involve the use of proteins.
Active requires energy, facilitated diffusion does not.

48. Circle the processes that require energy to occur.

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

49. State whether the solution would be hypertonic, hypotonic, or isotonic:

- a. concentration of water is the same inside of cell as outside

Isotonic

- b. net movement of water out of the cell

Hypertonic

- c. no net movement of water

Isotonic

- d. concentration of water is greater inside of cell

Hypertonic

- e. concentration of water is lower outside of cell

Hypertonic

- f. plasmolysis may occur

hypertonic

- g. cytolysis may occur

hypertonic

- h. ideal solution type for animal cells

Isotonic

- i. the cell swells and may burst

hypotonic

- j. beneficial for plant cells but not animal cells

hypotonic

- k. distilled water

hypertonic

Shrinking