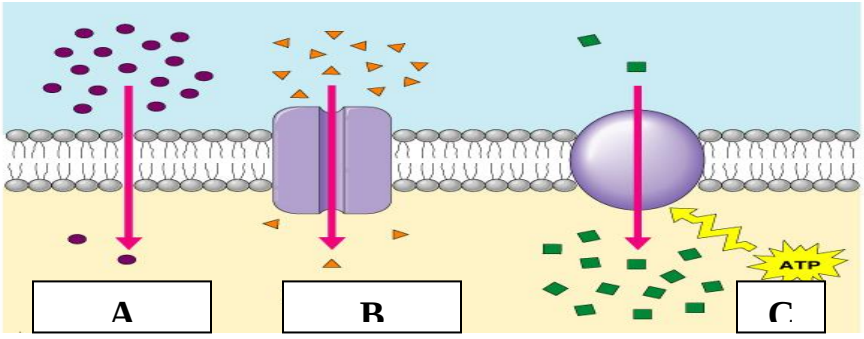
Name _____KEY_____

Cell Membrane Test Study Guide

Study the diagram below illustrating 3 processes that particles can use to cross a cell membrane. Then answer questions 1-5.



1. List which of the processes above show particles using Passive Transport? **A, B**
2. List which of the processes above show particles using Active Transport? **C**
3. List which of the processes above show particles using Simple Diffusion? **A**
4. List which of the processes above show particles using Facilitated Diffusion? **B**
5. CIRCLE which of the following molecules (**H_2O**, hemoglobin protein, **lipid**, **O_2**, **CO_2**, starch, DNA) could use process **A** above to enter a cell?

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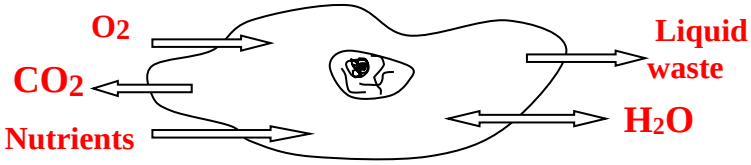
6. Label the cell below with the *materials* that are needed to flow into the cell, out of the cell, and both directions.



7. Draw and label the parts of a phospholipid. In addition, label the hydrophilic and hydrophobic areas of this molecule.

Hydrophilic Polar Head

Hydrophobic nonpolar fatty acid tails

8. Explain why the plasma membrane represents a FLUID MOSAIC model.

FLUID: The membrane molecules move and trade places with fluid-like motion

MOSAIC: The membrane surface has a random and changing pattern of "bumpy" protiens that far away resemble mosaic art

9. When looking at a diagram of a cell membrane, identify several ways to distinguish between the INSIDE and OUTSIDE areas of the cell???

The marker and receptor proteins stick to the OUTSIDE of the cell and the INSIDE of the cell would have various cell organelles

10 Identify **four** membrane proteins and provide their function(s):

Protein name	Function
1 enzyme	speed up chemical reactions needed by the cell
2 transport protein	provides a "tunnel" to help large and/or electrically charged particles across
3 marker protein	each person's uniquely shaped "antler" acts like a cellular ID tag
4 receptor protein	allows the cell to communicate and respond by "catching" signals from other cells

11. What other molecule is present throughout the cell membrane that provides strength and support by anchoring together neighboring phospholipids (like "spiderman") into a "raft"? cholesterol

12. Predict what would happen to a cell if the receptor proteins all faced the inside of the cell instead of the outside?

The cell would NOT be able to communicate with other cells in the body … it would not catch the signal molecules

13. Compare **passive** and **active** transport by checking all that apply in the table below

	Passive Transport	Active Transport
Particles move [L] → [H]		X
Osmosis	X	
ATP energy is used		X
Particles move **with** a concentration gradient	X	
simple diffusion	X	
could use a membrane transport protein	X	X
facilitated diffusion	X	

14. Explain the concept of diffusion using an example from class or everyday life:

Any gas or liquid molecules that spread out in all directions from [H] –>[L] just like perfume dissufes across a room

15. List 2 characteristics of particles that can cross a cell membrane using diffusion without any help:

Small and have NO electrical charges

16. Define **osmosis**: The Diffusion of WATER from [H] –>[L] across a cell membrane

17. Define **facilitated diffusion:**

Using a transport protein to diffuse across a cell membrane from [H] –>[L] with NO energy needed

18. When referring to the movement of molecules across the cell membrane, what is meant by the term **equilibrium**?

The SAME number of molecules moving IN and OUT of the cell

19. What do we mean when we say that "salt sucks"?

Salts and solutes attract water molecules that cause osmosis to happen (water moves across a cell membrane)

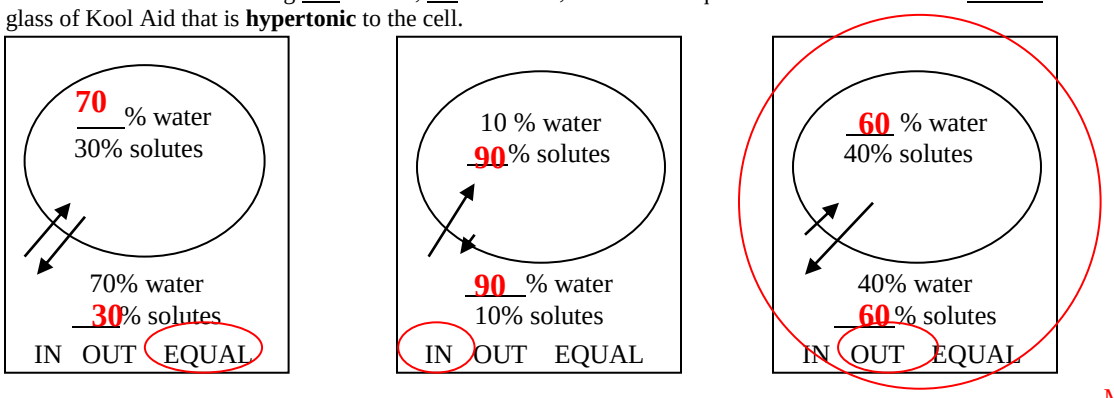
20. Define the three types of –tonic solutions:

HYPERTONIC: A liquid with MORE solutes outside the cell than inside

HYPOTONIC: A liquid with LESS solutes outside the cell than inside

ISOTONIC: A liquid with the SAME [solutes] outside thte cell and inside

21. The pictures below represent a cell inside 3 different solutions of Kool Aid. Based off of the information provided, use an arrow to label the direction of water flow-is water flowing into the cell, out of the cell, or are there equal amounts of water flow into/out of the cell. In addition, circle the glass of Kool Aid that is **hypertonic** to the cell.



Middle cup

22. Which glass of Kool Aid would take the longest amount of time to reach an equilibrium with the cell?

Middle diagram 90% vs 10%

23. Describe **endocytosis**:
Bringing large materials IN to a cell by first surrounding it with the cell membrane to form a pouch which then breaks off to form a vesicle

24. If a cell went through the process of **exocytosis**, would the outer cell membrane get **BIGGER**, SMALLER, or stay the SAME in size? Why?
The vesicle would release its materials OUTSIDE the cell and then the vesicle membrane would fuse to and join the outer membrane

25. A heart cell is soaking in an Isotonic solution. What would happen if solutes were **removed** from the solution?
   a. some water would flow IN to the cell
   b. some water would flow OUT of the cell
   c. the water concentrations would stay the same
   d. some solutes would flow IN to the cell
   e. some solutes would flow OUT of the cell

26. What would make a hypertonic solution become isotonic?
   a. Add more solutes
   b. Add more solutes and water
   c. Add more water
   d. Remove water

27. What would happen if we were to put a red blood cell in a glass of salt water?
   a. It would SHRINK because salts would flow from the cell into the water
   b. It would SHRINK because water would flow from the cell into the water
   c. It would SWELL because salts would flow from the water into the cell
   d. It would SWELL because water would flow by osmosis into the cell
   e. Nothing would happen

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28. A student observing a white blood cell through a microscope notices the cell's perimeter increase slightly. Which membrane process could have recently occurred to explain this change?
   a. endocytosis
   b. exocytosis
   c. facilitated diffusion
   d. osmosis
   e. all are possible
   f. only A & D are correct
   g. only B & D are correct

29. Circle all characteristics that apply to a molecule moving across a cell membrane using **Passive Transport**?
   a. H → L
   b. L → H
   c. uses ATP energy
   d. no ATP needed
   e. always uses a Transport protein
   f. sometimes uses a Transport protein
   g. never uses a Transport protein

30. Circle all characteristics that apply to a molecule moving across a cell membrane using **Active Transport**?
   a. H → L
   b. L → H
   c. uses ATP energy
   d. no ATP needed
   e. always uses a Transport protein
   f. sometimes uses a Transport protein
   g. never uses a Transport protein

31. Circle all characteristics that apply to a molecule moving across a cell membrane using **Facilitated Diffusion**?
   a. H → L
   b. L → H
   c. uses ATP energy
   d. no ATP needed
   e. always uses a Transport protein
   f. sometimes uses a Transport protein
   g. never uses a Transport protein

To study the process of osmosis, a student begins a lab on Day 1 by placing a chicken egg containing 25% solutes and with the shell previously dissolved into a cup containing 200 mL of tea where the % of solutes was unknown. After soaking overnight the student observes on Day 2 that the cup now contains 224 mL of tea.

32. Which term describes the **tea** at the beginning of the lab on Day 1?
    a. hypotonic
    b. hypertonic
    c. isotonic
    d. equilibrium
    e. both c & d are correct

33. Which number below was most likely the % of water for the **tea** solution at the beginning of the lab on Day 1?
    a. 85%
    b. 75%
    c. 55%
    d. none are possible

34. Which number below is most likely the % of water in the **egg** (at equilibrium) at the end of the lab on Day 2 if the tea started with 55% SOLUTES?
    a. 80%
    b. 75%
    c. 60%
    d. none are possible