

Membrane Transport Mysteries Practice Problems



Complete each of the following problems.

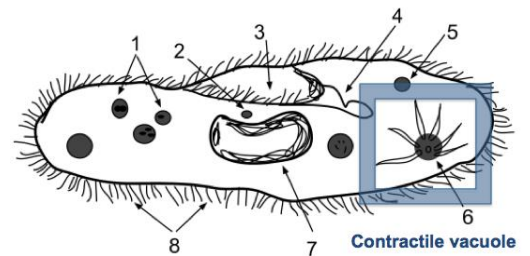
The first five problems are from the learning object in the content where answers were provided for you.

1. One of the ways that food can be preserved is by heavily salting it so that bacteria cannot live upon the food. What causes the bacteria to die in an extremely salty environment?

- a. water moves into bacteria by osmosis
- b. salt moves out of bacteria by osmosis
- c. water moves out of bacteria by osmosis
- d. salt moves into bacteria by osmosis

2. Some protists, like the *Paramecium* pictured, live in freshwater. *Paramecium* have contractile vacuoles, which act to pump water out of the cell. Why?

- a. There is a lower solute concentration inside so water is moving into the cell constantly
- b. There is a higher solute concentration inside so water is moving into the cell constantly
- c. There is a lower solute concentration inside so water is moving out of the cell constantly
- d. There is a higher solute concentration inside so water is moving out of the cell constantly



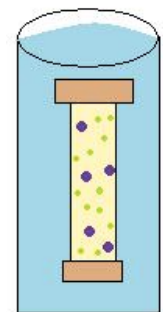
3. The cytoplasm of human cheek cells is 96% water and 4% NaCl (salt.) A scientist removes some of your cheek cells and places them in a solution that is 30% NaCl. Which direction of net water flow would result?

- a. net water flow out of the cell
- b. net water flow into the cell
- c. no net flow; the cell is in equilibrium



4. You watch a scientist dissolve some sugar in a liter of water and then place some of this solution into a dialysis bag, tying both ends shut. The she places the bag into a beaker of distilled water. What word best describes the solution outside of the bag?

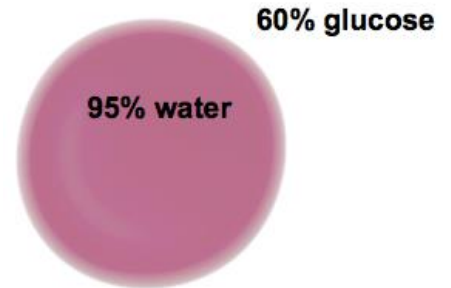
- a. hypertonic
- b. hypotonic
- c. flaccid
- d. isotonic



5. A friend goes to get a blood transfusion. Blood cells are 95% water. You notice the nurse hanging a bag of 60% glucose to inject into your friend instead of blood. You yell "stop!" What did you think would happen to your friend's blood cells if they were

transfused with the sugar water instead of blood?

- a. they would plasmolyze
- b. they would crenate
- c. they would lyse
- d. they would become isotonic



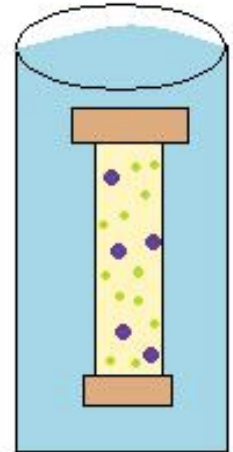
6. Consider an experiment in which starch is dissolved in a liter of water. Some of the solution is placed into a securely tied dialysis bag. The dialysis bag is placed into a beaker containing distilled water and iodine for 30 minutes. What are the correct answers for the questions below? (Note: Iodine reacts with starch to create a black/purple color.)

What would happen to the color of the solution in the bag?

- a. The solution in the bag would turn purple as the iodine reacts with the starch.
- b. The solution in the bag would grow lighter as the starch leaves the bag and enters distilled water and iodine.

Would there be a color change in the water-iodine solution?

- a. The water iodine solution has no color change.
- b. The water iodine solution turns purple.



How do substances enter or leave the dialysis bag?

- a. The dialysis bag is permeable to iodine so it can move into the bag but is not permeable to starch.
- b. There is a leak in the bag allowing starch to flow out.

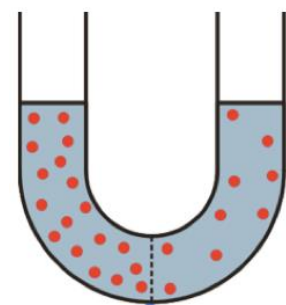
How would the mass of the bag change after a few hours?

- a. The mass of the bag would be lighter as starch leaks out.
- b. After several hours, the mass of the bag should increase as water moves by osmosis from the lower concentration outside the bag to the higher concentration (hypertonic solution).

7. A plant cell is placed in a high solute solution. The cells shrink away from the cell wall. Relative to the cell, the solution surrounding the cell is likely:

- a. hypertonic
- b. osmotic
- c. hypotonic
- d. isotonic

8. Dr. Oops has done it again. His friend told him that to keep celery fresh, it should be placed in some tap water. Dr. Oops puts one stalk of celery in tap water. He places another stalk in his glass of clear, sugary soda by accident. What will happen to each stalk of celery?



9. Look at the tube below. It has a semi-permeable membrane separating the two solutions that only allows water (blue) to pass. What direction will water move - to the right or to the left?

For each of the following cells, determine the direction of osmosis by drawing an arrow that describes water flow. The first problem is done for you. (Hint: Remember that osmosis is the movement of *water*.)

