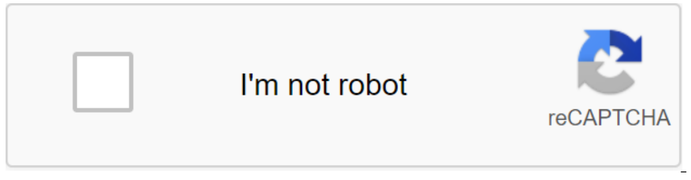

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Virtual osmosis lab activity

Pearson, as an active contributor to the biology teaching community, is pleased to provide free access to the classic edition of Biology Place for all teachers and their students. The purpose of the activities is to help you view material you've already studied in class or read in text. Some materials will expand your knowledge beyond your classroom work or reading textbook. At the end of each action you can assess your progress with the Self-Quiz.To, click on the name of the action. CLICK ON THE SLIDESHOW BELOW TO CONTROL IT! Pause, Play, Forward, Reverse, or SKIP! Enjoy!! Cell membranes are made up of phospholipids. Phospholipids are called amphiphilic because they have hydrophilic (water-loving) heads and hydrophobic (water-water) tails. The head consists of negatively charged phosphate ion (PO4-) and 2 fatty acid tails that are combined using the glycerol molecule. When phospholipids are placed in water, they spontaneously form a lipid bileiser. In this bilayer fatty acids hydrophobic tails will orient themselves face to face together with polar phosphate heads outwards. It is this structure that makes up the membranes of our cells. The function of the membrane is to regulate what enters the cell and what comes out of the cell. It is for this reason that the concept of osmosis is key to understanding how a cell depends on the micro window of the micronionability by which it is surrounded. Cell Membrane Lipid Bilayer DIFFUSION When we talk about osmosis, we must first understand the diffusion. The word diffusion comes from the Latin word spreading. In nature, the molecule will behave in such a way as to spread from a high concentration area to a low concentration area, until the time when these concentrations become equal. In this state, the substance is said to be in balance. it is this phenomenon that causes air currents and ocean currents, as well as the diffusion of the substance in the liquid. Since our cells are in an aquierous environment, we will look at this type of diffusion. EXAMPLE: Let's say it's a hot summer day and some kids enjoy themselves in the local pool. The child at one end of the pool decides to urinate (wee) at one end of the pool. Initially, urine will be concentrated at the end of the pool where the urine has landed. After a while, that urine will be evenly distributed by volume that the pool reaches unsuspecting pool residents at the far end of the pool. OSMOSIS Diffusion behaves as it has just described, because it is able to move freely and freely. In biological systems, molecules are not allowed to move freely. The movement of ions and molecules is tightly regulated by the cell membrane. The cell membrane is selectively permeable. Substances can pass under certain conditions through pores or canals or transporters. The movement of water through the membrane is of particular importance to biological systems. The inability of cells to maintain osmotic balance with the environment can have catastrophic negative consequences. The movement of water molecules through a translucent cell membrane is called osmosis. In osmosis, we only touch the movement of water molecules

(H2O) on the cell membrane. As we have seen in diffusion, molecules will travel from a high concentration area to an area of low concentration. To understand this concept, it is important to think about the solution in terms of its components. The substance is a liquid substance that acts to dissolve particles, called solvent. Particles that dissolve are called dissolved. In biological systems, the solution is not able to spread freely through the cell membrane, so it creates a gradient of concentration. This means that there is a higher concentration of the solution on one side of the membrane that is on the other. Water molecules, on the other hand, can move freely through the cell membrane and will move from a high concentration to low concentration. This journey from high concentration to low concentration can be seen as a journey down its concentration gradient. An isotonic solution is a solution that has the same solvent concentration as intracellular fluid (liquid inside the cell). When a cell is placed in an isotonic solution, there is no NET movement of water in or out of the cell. The cage is happy. The hypotonic solution has a lower concentration of solvent than intracellular fluid (liquid inside the cell). When the cell is placed in a hypotonic solution, the water is thrown into the cell and causes it to SWELL or BURST. The hypertensive solution contains a higher concentration of solvent than the liquid inside the cell. When the cell is placed in a hypertensive solution, the water will rush out of the cell, causing it to contract. The dialysis tube is a translucent membrane tube used in methods of separation and demonstration of diffusion, osmosis and the movement of molecules through the restrictive membrane. It separates dissolved substances of various molecular sizes in the solution, and some substances can easily pass through the pores of the membrane, while others are excluded. The dialysis tube consists of cellulose fibers. This is formed in a flat tube. This experiment will test the selective permeability of dialysis tubes with glucose, starch and iodine (potassium iodide). This experiment consists of two tests; starch test and sugar reduction test. When iodine (potassium iodide) is added to the solution in which the starch the solution becomes blue-black or purple, otherwise it remains yellow-amber. When The Benedict reagent is added to a solution in which there is a reduction in sugar and it is heated in a water bath, the solution becomes green, yellow, orange, red, and then brick red or brown (with a high concentration of sugar present). Otherwise, the solution remains blue. A: Will glucose, starch and iodine (potassium iodide) easily pass through the pores of dialysis tubes? HYPOTHESIS: Glucose, starch and iodine (potassium iodide) easily pass through the dialysis tube membrane. WARNING: The solution in the bag and glass will turn blue-black due to the presence of iodine and starch; the presence of glucose in the bag and glass will be investigated with the benedict test. MATERIALS:BeakersDialysis TubingTest TubesTest TubesTest rackClipsWater BathWater SOLUTIONS: Reagent BenedictglucoseStarchIodine (Potassium iodide)DIRECTIONS1) Add 250 ml or water to the glass and add iodine (potassium iodide) solution in water until it is noticeably yellow. Come the color of the solution. 2) Next, soak the dialysis tube in water until it starts to open. Fold and trim one end of the tube so that no solution can pass.3) Leave the other end of the tube open so that it forms a bag. Add 4 ml of glucose and 3 ml of starch. Close the bag and mix the contents. Come the color of the solution. 4) Rinse the bag with tap water and place the bag in the glass. Hang the other end of the bag on the edge of the glass.5) Wait 30 minutes. Gently remove the bag and place in a dry glass. To enter the final color of the solution. 6) Benedict test will be done to check for the presence of sugar in the solution in the bag, glass and tap water (serves as a control)..a) 3 test tubes were labeled control, bag and glass.b) 2 ml of water was added to the test tube. A 2 ml solution bag was added to the tube bag and a 2ml cup solution was added to the tube glass.c) 2 ml of Benedict's reagent was added to each test tube and was suspended in a boiling water bath for 10 minutes. The color change was recorded. osmotic_response_of_cells.pdfFile Size: 1471 kbFile Type: pdfDownload File Diffusia Virtual Lab (look back at instructions for Gummy Bear Lab for Laptop Requirements) Background information: cell membrane allows some materials to pass while saving other materials. This membrane is called selectively permeable. Under normal conditions, water is constantly passing in and out of this membrane. This diffusion of water through a selectively permeable membrane is called osmosis. Like other substances, water dissipates from a higher concentration area to a lower concentration area. the movement of water molecules in and out of the cell reaches the same speed, achieving a state of equilibrium. If the concentration of water molecules is greater outside the cell, the solution is hypotonic for the cell. The water will move into the cage with osmosis. The pressure on the inner cell membrane will increase steadily. If the pressure becomes large enough, the cell membrane will burst. The solution isotonic for the inside of the cell when there is the same concentration of water molecules on the inside and outer side of the cell membrane. To maintain balance, water molecules move into and out of the cell at the same speed. Suppose a living cell is placed in a solution that has a higher concentration of salt than a cell. This solution is hypertensive for the cell because there are more salt ions and fewer water molecules per unit of volume outside the cell than inside. Water will move from the area of higher concentration of water (inside the cell) to the area of lower water concentration (outside the cell). Selectively permeable membrane does not allow salt ions to pass into the cell. The cell shrinks as the cell loses water. Goals: Describe the osmosis process - Observe the movement of water through cell membranes in the osmosis process - Compare and compare three osmotic states: hypotonic, isotonic and hypertensivevocabulary: Identify the next vocabulary in the notebook using your own words. Concentration Of VapsionOsmmosisMembraneSelectively permeableEcivably permeable membrane TransportIve TransportProcreation: Choose one of the three cells depicted at the top of the screen and drag it into one of the glasses. Watch the osmosis process. Determine whether the water represented by animated blue arrows is moving into it, whether it remains in balance or out of the cage. Watch what happens to the shape and size of the cell. Keep your observations in the table. Move the cell to another glass or select another cell. Watch the osmosis process again and record your observations in the table. Repeat with all three cells and all three solutions. Compare your observations. Data: Molecules NameRed Blood Pure Water Movement in / outRed blood cells Appearance cellElodea Pure water movement in / outElodea Appearance cellParamecium Pure water movement in / outParamecium the appearance of cellular hypotonic solutionItonic solutionHipertonic SolutionAnalysis / Conclusion: Under what conditions cells get or lose waterDid to move water into the cell or from the cell when the cell was surrounded by a hypertensive solution? Compare and compare what happens to an animal plant and a paramecolic cell in a hypotonic, isotonic and hypertensive solution. Maybe Elode or paramecia Freshwater lake is expected to survive if transplanted into the ocean? Explain.If you had to grill the steak, it would be best to put salt on it before or after you cooked it. Explain why from the point of view of osmosis. Why does the salad become raw and wilted when the dressing has been on it for a while? Explain why from the point of view of osmosis. An effective way to kill this is to pour salt water on the ground around the plants. Explain why the U.S. is dying using the principles found in this virtual lab. Lab.