Osmosis lab report assignment

The resulting weights were recorded and the data was graphed. We then could draw conclusions on the lab. Introduction Diffusion and Osmosis are two concepts that go hand in hand with each other. Diffusion is simply described as the movement of a substance from a region of high concentration to a region of low concentration. In another words, the substance will move down its concentration gradient which is " the region along which the density of a chemical substance increases or decreases" (Campbell Biology pig. 132). If you understand the concept of diffusion then osmosis is a very simple process.

It can be defined as the diffusion of water across a permeable membrane. Osmosis can be cellular or artificial, so even though we are creating artificial cells in this lab, it is still considered to be osmosis. During osmosis, a solvent is trying to get through a selectively permeable membrane to make the concentration of that solvent the same on both sides of the membrane. The rate of osmosis depends on the type of environment the cell is in. There are three different environments that a cell can find itself in, a hypersonic environment, a hypotonic environment, or an isotonic environment.

The environment a cell is in will determine its tonic which is " the ability of a surrounding solution to cause a cell to gain or lose weight" (Campbell Biology pig. 133). " In a hypersonic solution, the cell will lose water, shrivel up, and most likely die" (Campbell Biology pig. 133). The reason this happens is because there is a higher concentration of water in the cell then there is in the environment the cell is in. Like I said before, water travels down its concentration gradient from high concentration to low concentration.

So the water inside the cell will cross the membrane and enter into the solution outside the cell and it will continue to do this until the concentration inside the cell membrane and outside the cell membrane are equal. The opposite of this would be if the cell was in a solution that is hypotonic to the cell. In a hypotonic solution, ‘ Water would enter the cell faster than it leaves and the cell will swell up and else (burst)” (Campbell Biology pig. 134). This will also cause the cell to die. Both a hypersonic and hypotonic solution are very harmful to cell and in most cases will cause the death of the cell.

A solution that a cell wants to be in is an isotonic solution. If the concentration of water in the cell and in the surrounding environment is equal, there will be no net movement of water across the membrane and therefore the cell will not shrivel up or swell up.). An experiment has been conducted to find out whether or not osmosis is occurring by using artificial cells made of dialysis tubing. To test this hypothesis the experiment will show the change in weight of each artificial cell across a 90 minute time span.

The experiment will also show which type of environment (as previously stated) each cell is placed in and taken out of to be weighed. Materials and Methods This experiment will look at the effects of various sucrose concentrations on the rate of osmosis in artificial cells made up of dialysis tubing. To begin the experiment one strip of dialysis tubing will be filled with mol of tap water, the second will be filed with mol of 20% sucrose, the third with mol of sucrose, the fourth with mol of 60% sucrose, and the fifth bag will be filled with mol of tap water also.

The dialysis tubing will be clamped at one end in order to fill it and then clamped at the other end to seal the filled bag. If the bag is not soft and floppy, the experiment will not work. Blot a bag with a paper towel to absorb the moisture and weigh it, if this blotting process is not done it could interfere with the weight readings creating inaccurate information. After the bags of the solutions are prepared, they will be placed into five different beakers with different solutions. Beakers 1-4 will be filled with tap water and the fifth beaker is filled with 40% sucrose and water.

Fill each beaker with just enough water or solution so that the bag is covered and place the bags in the beakers simultaneously and record each time. Every 10 min the bags are to be taken out, looted, and weighed again before returning them back into their respective beaker for another 10 min. The process is repeated until you have reached 90 min. The weights should be recorded in grams (g). Results Table 1 shows the contents of the bags and the content of the concentration it was submersed in.

Bags 2-4 each contain a solution of both sucrose and water. These bags were each put into beakers containing hypersonic solution. These bags gained weight over time because the water moved from its high concentration inside the beaker to the low concentration inside the membrane of he artificial cell, the membrane being the bags that consisted of dialysis tubing. The water will continue to move through the pores of the dialysis tubing into the concentration of water is the same in the beaker as well as inside the artificial cell.

Bag 1, consisting of water, was also put into a breaker containing water. The weight of this bag remains the same because it was placed in an isotonic solution, where the concentration of water was the same. Because of this, osmosis does not occur. The last bag (bag 5) contained only water whereas the beaker it was immersed in was a solution of sucrose. The solution is a hypersonic solution because the concentration of water was higher inside the artificial cell then outside the cell membrane, inside the beaker.

Because of this, the weight of bag 5 decreased as time went on because water was constantly leaving the bag through the pores of the dialysis tubing in an attempt to make the concentration of water equal inside and outside of the bag. As you can see from the results plotted in Graph 1, the bags that were put into a hypotonic solution gained weight over time, whereas the bag that was put into a hypersonic solution lost weight over time. Conclusion/ Discussion As you look over the results of this experiment it is clear that indeed osmosis does occur in an artificial cell with a permeable membrane made of dialysis tubing.

As the data shows, the artificial cells that were placed in hypotonic solutions had a gain in weight, the artificial cell that was placed in a hypersonic solution lost weight, and the cell placed in an isotonic solution stayed the same. The amount of weight gained or lost depends on how concentrated the solutions are, and this did not show in our results (Graph 1). “ The rate of diffusion or osmosis is dependent on such factors as temperature, partial size, and the incineration gradient” (General Biology I Laboratory experiments and exercises pig. -1). The cell containing 60% sucrose should have ended up being heavier than the cells containing 20% and 40%

sucrose, but an error must have occurred during our lab that changed the data that was collected. All in all, the results still prove our hypothesis that osmosis does occur in artificial cells. This means that when an artificial cell is placed in a hypotonic solution, it will gain weight. If an artificial cell is placed in a hypersonic solution it will lose weight, and if it is placed in an isotonic solution it will stay the same.