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Anatomy and Physiology I

Professor Haque

Osmosis and Diffusion Lab Report

Title: The Cell-Transport Mechanisms and Cell Permeability

Objective: The objective of this experiment was to observe the diffusion of water through a selectively permeable membrane which defines osmosis. By using four different beakers and sacks, each of which contained different concentrations of solutions, we were able to identify which beakers and sacks allowed for osmosis and diffusion to occur.

Materials:

- 4 beakers and 4 sacks
- 20% glucose solution
- 40% glucose solution
- 40% sucrose solution
- 10% NaCl solution
- Distilled water
- Test tubes
- Timer
- Scale
- Benedict's solution
- Silver nitrate solution

Methods: Each sack was labeled one through four and filled with 20ml of solutions. Sack 1 was filled with 20ml of 20% glucose solution, sack 2 was filled with 20ml of 40% glucose solution, sack 3 was filled with 20ml of 10% NaCl solution and sack 4 was filled with 20ml of 40% sucrose solution. After filling the sack with its respective solutions, it was tied, wiped down, and the initial weight was recorded. The sacks were then placed in four separate beakers that also contained different solutions. Beaker 1, 3, and 4 were filled with distilled water while beaker 2 was filled with 40% glucose solution. After leaving the sacks in the beakers for 45 minutes, they were then taken out, wiped clean and the weight was recorded once again. After recording our observations, we proceeded to test the sacks and beakers for the presence of glucose and sodium chloride. By taking samples from the four sacks and four beakers, we placed each sample into separate test tubes labeling the sample from the sacks 1A through 4A and the sample from the beakers 1B through 4B. For each test tube, we added Benedict's

solution and placed the test tubes in boiling water to observe its color change. Test tubes 3A and 3B were taken to observe the diffusion of sodium chloride through the dialysis tubing. Silver nitrate solution (brown color) was added to both tubes. If milky white precipitate was formed, that means sodium chloride was present.

Data:

Activity 3: Experimental Data on Diffusion and Osmosis Through Nonliving Membranes						
Beaker	Contents of sac	Initial weight	Final weight	Weight change	Tests— beaker fluid	Tests— sac fluid
Beaker 1 ½ filled with distilled water	Sac 1, 20 ml of 40% glucose solution	7.1 grams	8.0 grams	0.9 grams	Benedict's test: Positive	Benedict's test: Positive
Beaker 2 ½ filled with 40% glucose solution	Sac 2, 20 ml of 40% glucose solution	6.9 grams	6.9 grams	0 grams	Positive	Positive
Beaker 3 ½ filled with distilled water	Sac 3, 20 ml of 10% NaCl solution	7.2 grams	7.8 grams	0.6 grams	AgNO ₃ test: Positive (milky white)	Positive (milky white)
Beaker 4 ½ filled with distilled water	Sac 4, 20 ml of 40% sucrose solution	7.1 grams	8.0 grams	0.9 grams	Benedict's test: Negative	Positive

Conclusion: According to our data, we can confirm that the process of osmosis and diffusion had occurred. Through this experiment, we were able to learn that osmosis allows water molecules to diffuse across a selectively permeable membrane in which water molecules move from an area of high concentration to low concentration. It is evident that osmosis had occurred in sacks 1, 3 and 4 because there was an increase in weight. This shows that the water molecules in the beakers had diffused into the sack, to an area of higher concentration of solutes. It was also observed that in sack 2, osmosis and diffusion had not occurred because there was no weight increase since both the sack and beaker contained the same concentration and type of solution. Our data also showed that glucose was present in beakers 1 and 2 which demonstrates that the diffusion of glucose from the sack to the beaker had occurred. In beaker 4, the color had changed however, because sucrose is larger than glucose it was not able to diffuse through the sack into the beaker. It is also noted in our data that test tubes 3A and 3B had milky white precipitate formed which indicates that sodium chloride had indeed diffused out from the sack into the beaker. By conducting this experiment, we were able to get a better understanding of how the process of osmosis and diffusion works in relation to a selectively permeable membrane.