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Anatomy and Physiology I

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Diffusion and Osmosis Through Nonliving Membranes

Objective

To observe and identify diffusion and osmosis through nonliving membranes. By utilizing an experiment using beakers, sacks, and different sorts of concentrated solutions.

Materials

- Four Dialysis Sacs
- Small Funnel
- 25ml Graduated Cylinder
- Wax Marking Pencil
- Fine twine or Tubing Clamps
- Four Beakers (250ml)
- Test Tubes
- Distilled Water
- Scale
- Silver Nitrate
- Benedict's Solution
- 20% Glucose Solution
- 40% Glucose Solution
- 40% Sucrose Solution

- 10% NaCl

Method

1. Label beakers 1-4. Fill beakers 1, 2, and 3, with distilled water half way. Beaker 2 is to be half filled with 40% glucose solution
2. Label each sac 1-4. Sacs 1 and 2 must be filled with 20ml of 40% glucose solution. Sac 3 must be filled with 10% Nacl solution. Sac 4 to be filled with 40% sucrose solution.
3. Weigh each sac and record initial weight.
4. Place sacs in each beaker corresponding to its same number. Surmerge each sac in its beaker and leave them there for 45 minutes.
5. Once 45 minutes have passed, remove sacs from the beaker and then let each sac dry. Once dried, record the final weight.
6. Label the 4 test tubes as 1A, 1B, 1C, and 1D. Fill each test tube with 10ml of their respective sac solution.
7. Label the 4 test tubes as 2A, 2B, 2C, and 2D. Fill each test tube with 10ml of their respective beaker solution.
8. Use Benedict's solution in test tubes 1A, 1B, 2A, 4A, and 4B.
9. Place said test tubes in boiling water and observe the color change of the content in each test tube.
10. Add Silver Nitrate to test tubes 3A and 3 B and observe change.

Results

Beaker	Content of Sac	Initial weight	Final weight	Weight change	Tests- beaker fluid	Tests- Sac fluid
Beaker 1 filled with 1/2 distilled with water	Sac 1, 20ml of 20% of glucose solution	7.1g	8.0g	0.9g	Benedict's test: light brown (positive)	Benedict's test: light brown (positive)
Beaker 2 1/2 filled with 40% glucose solution	Sac 2, 20ml of 40% glucose solution	6.9g	6.9g	0.0g	Benedict's test: light brown (positive)	Benedict's test: light brown (positive)
Beaker 3 1/2 filled with distilled water	Sac 3 , 20ml of 10% NaCl solution	7.2g	7.8g	0.6g	Silver Nitrate test: white (positive)	Silver Nitrate test: white (positive)
Beaker 4 1/2 filled distilled water	Sac 4 20ml of 40% sucrose solution	7.1g	8.0g	0.9g	Benedict's test: (negative)	Benedict's test: light brown (positive)

Conclusion

Viewing the result we can see that diffusion and osmosis has occurred in our experiment. The experiment does a good job of showing how osmosis can use water molecules to diffuse permeable membranes. By doing so water molecules can move from a low to high concentration area. We can see osmosis occurred in sacs 1, 3, and 4 because their weight increased after they were submerged. The heavier weight indicates that water molecules diffused into the sac. The experiment also showed that sac 2 showed no signs of diffusion or osmosis because there was no weight change, meaning there was no change in either solution. The results also showed that

diffusion of glucose occurred from the sac to the beaker in beakers 1 and 2. Our experiment also presented that beaker 4 was not able to diffuse through the sac into the beaker. This is shown by the color change caused by the sucrose that was greater than the glucose. Meaning sucrose was physically bigger than the pores in the sac and could not diffuse. Lastly our data shows that test tubes 3A and 3B had formed a white milky solution. This represents that sodium chloride diffused out of the sac and into the beaker.