

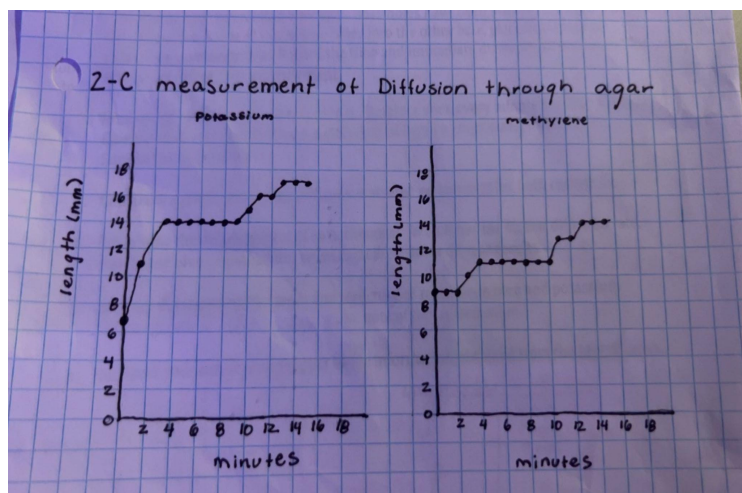
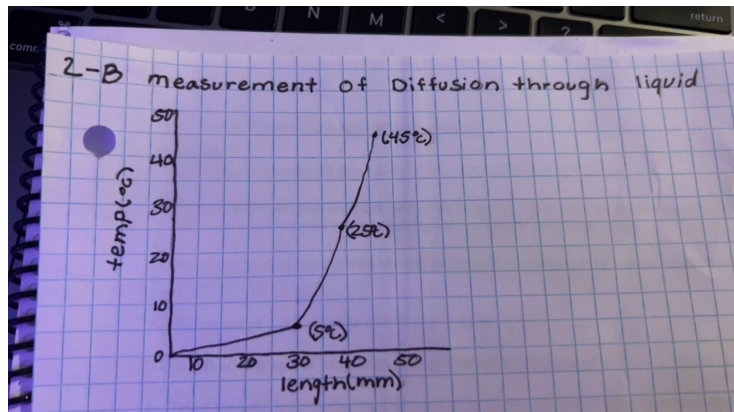
Laboratory 2-Molecular Activity & Membrane Transport

Purpose- Passive transport is the movement of molecules from high concentration to low concentration. Diffusion and osmosis are the two types of passive transport. Diffusion is the actual movement of particles from high to low concentration and osmosis is the movement of water through semi permeable membranes from a high to low concentration. Passive transport expresses the movement of materials along a concentration gradient while in active transport the materials go against the concentration gradient. The molecular activity and membrane transport lab two experiments introduced the basic principles of passive transport and allowed us to gain an understanding on filtration and how tonicity affects the different cells.

Procedures- There were many different procedures in the lab due to the many experiments that were performed to show molecular activity and the membrane transports. In section 2B we were to find the measurement of diffusion through a liquid, which was performed by dropping a crystal of potassium permanganate into three petri dishes filled with 40mL of 25 degree celsius water and then measuring in millimeters the largest color spot that showed up after five minutes. We then repeated those same steps two more times but with the water at 5 degree celsius and 45 degree celsius instead of the 25 degrees. In section 2C there were two petri dishes with holes and we were to place two drops of methylene blue in one petri dish and two drops of potassium permanganate in the other and measure in millimeters how big the spot was in each. Every minute for 15 minutes we then measured the spot again in millimeters and recorded the results. In section 2D we had three beakers filled with 100mL of water and we added charcoal to them to make a charcoal solution, one thin (little charcoal), one medium thick (medium charcoal), and one thick (a lot of charcoal). We were to mix each solution and then drop 50mL of the mixtures through a funnel with filter paper in them and count how many times they dropped in 15 seconds to then calculate how many drops they would drip in a full minute, we then repeated that same procedure with the remaining 50mL we had left of each mixture and calculated the results. In the measurement of the osmosis section we were to fill two dialysis bags, one with 25% sucrose solution and the other with 50% sucrose solution and we tied them at the top to secure the solutions inside. We then got two beakers filled with distilled water and submerged the dialysis bags into them making sure they did not touch the bottom. We then had to weigh the dialysis bags every 10 minutes for 50 minutes and record the results. In the 2G lab experiment we were to fill a dialysis bag with 1% starch and 10% glucose solution and seal it at the top with a string. We then tied the bag to a glass rod suspended in distilled water and tested if it had any starch by adding 10 drops of Lugol's solution to 5mL of water from the beaker and then tested sugar by adding 3mL of

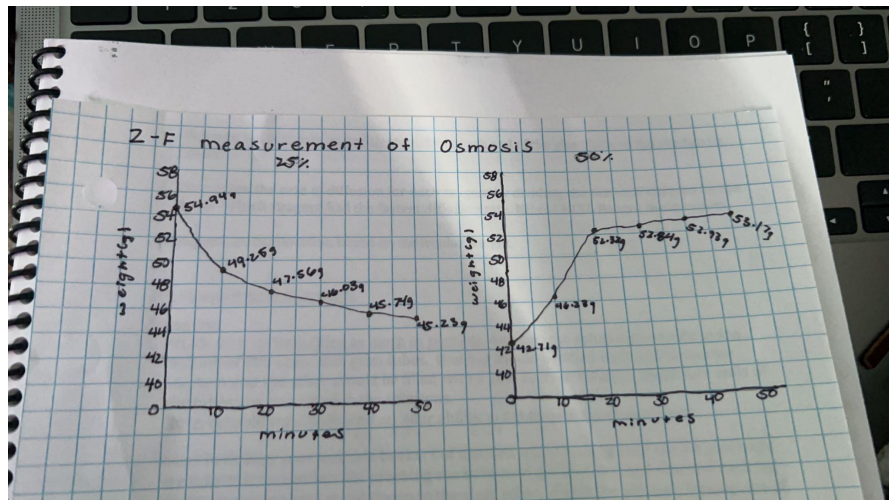
Benedict's solution to 5mL of water from the beaker. We were to then test the water again for starch and sugar for 30, 45, and 60 minutes and record the results. In section 2H there were three slides set up under microscopes, one containing a blood/DI water solution, one containing blood/0.85 NaCl solution, and one containing blood/2.0% NaCl solution. We were to look through the microscope at these slides and observe what they looked like and record the results.

Results-



2-D Demonstration of filtration

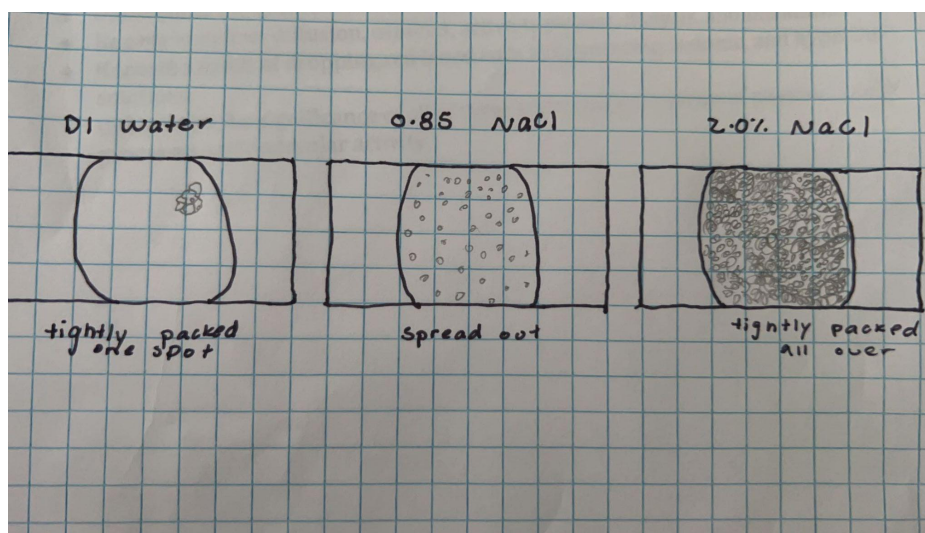
Thin (Drops per Min.)	Medium (Drops per Min)	Thick (Drops per Min.)
132 drops (50mL)	48 drops (50mL)	72 drops (50mL)
104 drops(50mL)(2nd half)	24 drops (50mL)(2nd half)	64 drops (50mL)(2nd half)



2-G Measurement of differential permeability of sugar and starch

15 Minutes	30 Minutes	45 Minutes	60 Minutes
Starch N/A	Starch N/A	Starch N/A	Starch N/A
Sugar N/A	Sugar N/A	Slight Sugar (Green/Blue)	Little Sugar (Green)

2-H The effects of tonicity on red blood cells



Discussion- Doing the different experiments that were in laboratory two allowed me to gain a better understanding on the different topics introduced in the lab which were passive transport, osmosis, diffusion, active transport, filtration, tonicity, and permeability. I remember some of the topics introduced in the laboratory from anatomy class lectures last semester. All of the data collected in the experiments was very important in showing the concepts of the entire laboratory topics. Experiment 2B was about diffusion, in the experiment we were to measure the largest colored spot in the petri dish when the water was at 5, 25, and 45 degrees celsius. The data had shown that the higher the temperature was, the bigger the colored spot was in diameter. In section 2C we dropped potassium and methylene blue into petri dishes filled with agar and recorded its diameter every minute for 15 minutes. The data had shown that the potassium drops had increased at a much higher rate than the methylene blue drops, it also shows that from about 3 minutes to 10 minutes they stay the same size in diameter and then increase some more. In experiment 2D we had counted the drops of a thin, medium, and thick solution going through filter paper. The results showed that the thin solution had the most drops due to it going through the easiest, because of it having a little amount of charcoal. The thick solution had the 2nd most drops and the medium solution had the slowest drop rate, which I thought would be the opposite. In our experiment I believe we had maybe put more charcoal into the medium solution than the thicker solution and that is why our results showed the medium solution having the least amount of drops. In section 2F we had dropped dialysis bags filled with sucrose into distilled water for 50 minutes and recorded the weight of the bags every 10 minutes. The results of this experiment showed that the 25% sucrose solution bag had lost its

weight throughout the 50 minutes and the 50% sucrose solution bag had gained weight in the 50 minutes. These results show how osmosis occurs and how water moves from higher water concentration to lower concentration. In experiment 2G we were to calculate and test how much starch and sugar were in a beaker with dialysis bags of 1% starch and 10% glucose solution submerged inside. This experiment's results showed how permeability works in the membrane and cells. We were to test how much starch and sugar were in the beaker at 15, 30, 45, and 60 minutes. In the beginning there was no starch or sugar in the beaker, but after 45 minutes we then started to see color changes and tested that there was sugar forming into the beaker. In section 2H we were to look at three different blood sample slides, one with dI water, one with 0.85 NaCl and one with 2.0% NaCl. From observing the three slides I noticed that the one with dI water had only one little section that showed little particles really bunched up and close together. The slide with the 0.85 NaCl had particles surrounding everywhere throughout the slide and they were not touching, but they were close together and spread out equally. The slide with the 2.0 NaCl had particles everywhere throughout the slide but they were tightly packed and close together which was different from the 0.85 NaCl slide.

Conclusions- The different experiments done in laboratory two showed many different passive transport types and ways we can figure out how exactly the different types of passive transports work and occur. Experiments 2B and 2C were done to show results of how diffusion works, they did have there differences such as 2B used potassium permanganate and different temperatures of water while 2C used methylene blue and agar. Even though they were both separate experiments using different materials they still gave us the knowledge of diffusion rate. The data collected in section 2D showed how different solutions can all filter differently based on thickness of the mixtures. Experiment 2F had two different results based on how much percent of sucrose solution was in the dialysis bags. The results of this experiment showed exactly how osmosis

occurs in passive transport. Section 2G showed the results of how permeability works and why the dialysis bags test positive or negative for starch and sugar. The last experiment's data showed how tonicity on red blood cells affects them differently, from the experiment the results showed pretty distinct differences in the different slides. In conclusion it is very important to do different experiments to get a better understanding of how different things work such as the diffusion and osmosis experiments. It is also important to have the right knowledge about passive transports because they allow movement of materials such as oxygen, water and nutrients to go in and out of our cells keeping them in normal ranges.