# Exercise I

## **1. Research Question:** Can the principles of osmosis be used to predict the condition of diabetics?

## **2. Conduct background research.** Included in pre-lab and lab protocol.

## **3. Construct a hypothesis.** What is your hypothesis? Yes or no? Why might this work?

## Why do think this may be the case? What is the rationale for this hypothesis? In other words, what do you expect to see if the patient is hyper- or hypoglycemic? What do you expect to happen to the “cell” if the patient is hyper- or hypoglycemic?

## **4. Design & implement your experiment** Design was included in the lab protocol.

**Results:** Use this results table for your individual results and class results.

You may need put your results and classes mean results in each cell.

|  |  |  |
| --- | --- | --- |
|  | Cell in  Solution 1 | Cell in  Solution 2 |
| Original Mass (g)  -Before Osmosis- |  |  |
| Final Mass (g)  -After Osmosis- |  |  |
| Difference? (+ if the cell gained water, - if it lost water) |  |  |

## **5. Analyze Data and Draw Conclusions.**

|  |  |
| --- | --- |
| Patient | Predicted Condition Based on Osmosis (change in cell mass):  Hyper, Iso, or Hypoglycemic |
| 1 |  |
| 2 |  |

# Exercise II (*Stop, you need approval before moving on)*

## **5. Analyze Data and Draw Conclusions (continued)**

**Results:** Use this results table for your individual results and class results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Patient | Predicted Condition  (from Exercise I) | Benedict’s Results | Glucose Reading  (Test Strips) | Actual Condition (From Instructor) |
| 1 |  |  |  |  |
| 2 |  |  |  |  |

## **Conclusions & Discussion:** Were you right/wrong in your predictions? Why?

**List any potential sources of error or things you would correct next time.** What could we have done better/different?

**Below is a list of common symptoms of diabetes. Relate each condition to osmoregulation, where possible.**

* Frequent urination-
* Increased thirst-
* Always feeling hungry-
* Feeling very tired-
* Blurry vision-
* Slow healing of cuts and wounds-
* Tingling, numbness, or pain in the hands or feet-

## **For each patient, brainstorm a scenario that may have led to their condition.**

Patient 1)

Patient 2)

**6. Communicate Results.** This document will be uploaded into LABridge

# Exercise III

**After viewing the video, place each step below in the correct order in the concept map/flow chart**

* insulin binds to a receptor in the membrane of a muscle, fat or brain cell
* insulin signaling pathway carried out by kinases and phosphorylation
* GLUT 4 is released and binds to the cell membrane
* insulin released by beta cells
* insulin signaling pathway activated
* GLUT 4 takes in large quantities of glucose
* phosphate groups are added to intracellular portion of the receptor
* insulin circulates in the bloodstream