

## Membrane Diffusion Lab

In this investigation, you will explore the process of diffusion across a semi-permeable cell membrane.

### Part 1:

1. Go to the following website: <http://phet.colorado.edu/en/simulation/membrane-channels>
2. Download the executable jar file. Run the file. If you are having trouble getting the file to run, check here for suggestions: <https://phet.colorado.edu/en/help-center/running-sims>
3. Add 5 blue and 5 green "Gated Channels" – space them out evenly
  - a. Make sure the channels are closed
4. Let the green dots represent solute (like salt) and the blue diamonds represent water molecules
5. Add 20 green dots and 20 blue diamonds into the top section of the cell (let this be the inside of the cell)
6. Add 40 blue diamonds to the bottom section of the cell (let this be the outside of the cell)
7. Is the cell "hypotonic", "hypertonic" or "isotonic" to the surrounding fluid? Explain. *I believe the cell is hyper tonic because there is a lot of water molecules and salt molecules bouncing around at once.*
8. You are about to open both of the channels at the same time, what do you expect to happen? *I think that all of them will go together and just go crazy but i don't know, we will see what happens.*
9. Open both types of channels at the same time and begin a timer for 15 seconds.
10. After 15 seconds, pause the simulation and count how many green dots and blue diamonds are on each side of the cell membrane.

	Inside of Cell (top of simulation)		Outside of cell (bottom of simulation)	
	Solute (green dots)	Water molecules (blue diamonds)	Solute (green dots)	Water molecules (blue diamonds)
0 seconds	20	20	0	40
15 Seconds	15	25	4	34
30 Seconds	12	22	8	38
45 Seconds	12	27	9	31
60 Seconds	12	28	8	32

11. If you could see this cell and could watch this happen, what would you see the cell do? *I think the cell would be doing its best to keep control of the movement of water molecules and salt molecules. Like for example people with Cystic Fibrosis don't have that control so their salt goes out of control.*

### Part 2:

12. Click the "Clear Particles" icon
13. Add 20 green dots and 40 blue diamonds into the top section of the cell (let this be the inside of the cell)
14. Add 20 blue diamonds to the bottom section of the cell (let this be the outside of the cell)
15. Is the cell "hypotonic", "hypertonic" or "isotonic" to the surrounding fluid? Explain. *I think it is hypertonic, it has a lot more water molecules than salt molecules so it kind of balances it out.*
16. You are about to open both of the channels at the same time, what do you expect to happen? *Last time I expected them to go crazy, but they kind of just calmly bounced into the others space. So, I expect that exact same thing to happen again, so of the green from the top will go to the bottom and some of the blue will go to the inside of the cell.*
17. Open both types of channels at the same time and begin a timer for 15 seconds.

# Diffusion Through Membrane Lab Answers

**K Morrison**



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