

Inquiry Lab-Cell Membranes

SOAP INGREDIENTS:

100 ml glycerin

700 ml distilled water

200 ml dish soap (Joy)

Materials:

String

two straws for bubble holder

Thread, cookie pans/cafeteria trays

string

Small buttons or objects to be used as proteins cell membrane solution

BE CAREFUL! THIS IS MESSY AND SLIPPERY. KEEP ALL SOLUTIONS OVER THE DESK

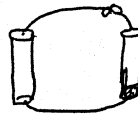
Procedure:

First Discuss the following with your lab partner and the class:

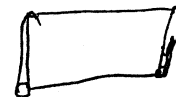
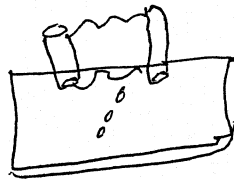
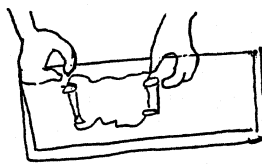
- How can cells keep a stable internal environment if the external environment around them is changing?
- How strong does a cell membrane have to be?
- How flexible does a cell membrane have to be?
- Develop a concept map which explores the properties that a membrane should have!

Second-Construct your membrane. Read and know the instructions before you begin!!!!

1. Make a bubble wand from the string and 2 straws. Put the string through the 2 straws and tie the string. See the diagram to the right.

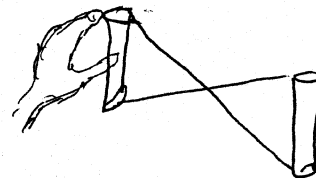


2. Take a tray to hold your soap mixture for the cell membrane.
3. Pour a thin layer into the tray, there should be enough to cover your string and straws. **You must get the soap film on your membrane holder.**
4. It can be messy so hold the wand over the pan. Lift up the holder and open it carefully by holding onto the two straws.



Third- Explore the following:

1. Flexibility-bend the holder with the soap film in all directions and configurations. This soap film is actually less flexible than the cell membrane. How does the structure of the cell membrane enable or allow for this type of movement or flexibility?



2. Create a domed bubble on a cookie sheet by carefully blowing a straw that has been dipped into the bubble mixture just above the surface of the solution. Lift the straw out gently. With this domed bubble you can put soapy materials through the membrane. Soap a few small items such as a button, paper clip, and other items and put them through the membrane. Wet your hands with the soap mixture and put it through the bubble. What happens? How is this possible?

3. Try to cut a bubble in half. What do you get 2 bubbles or 2 half bubbles? Try to join the domed bubbles by letting them touch. Will cells in your body fuse?

4. Experiment with a number of “proteins” (small objects covered with bubble mixture) by sticking them through the bilayer in the holder without popping the bubble. Move them up and down and side to side. Explain what happens. How do proteins that are in the cell membrane behave?

5. Take a small piece of string or thread, place it in the soap mixture and then place the loop gently on the bilayer very carefully. Take a dry piece of paper towel and gently pop the bubble film inside the loop. You’ve created a cell ‘pore’. Stick your finger in the ‘pore’ and carefully move it around the cell. What are the functions of pores in a cell?

Fourth –Evaluate

1. Compare your cell membrane with other groups in your class. Explain why there may be differences.

2. How does this activity demonstrate properties of a cell membrane? Remember hydrophobic and hydrophilic? Relate this to the cells’ membrane properties.