

MODULE: Cells

Activity Sheet 1.4: On the move

You are going to be investigating the conditions yeast requires to grow. It is therefore important that we understand what chemicals cells need to take in for respiration and growth, plus the waste products they need to get rid of, and how the chemicals pass in and out of cells.

Cell membranes

Every cell is surrounded by a cell membrane which separates the inside of the cell from the outside. In an animal cell it is only the cell membrane which separates the contents of the cell from its surroundings. Every plant cell also has a cell wall which is found on the outside of the cell membrane and helps to keep the cell rigid. Animal cells don't have cell walls.

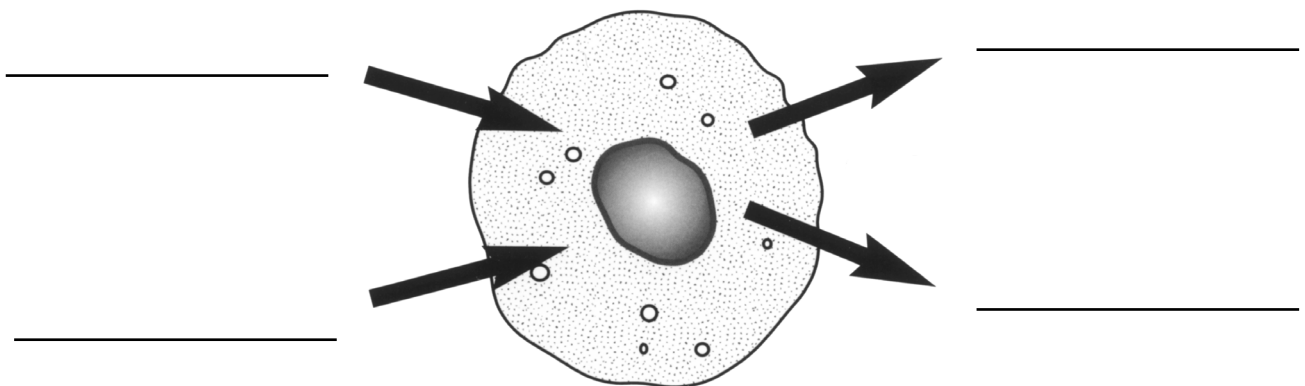
Cell membranes have a number of functions or jobs. Two important functions are

1. forming a barrier between the cell's contents and its surroundings
2. controlling the movement of chemicals in and out of the cell

Label the diagram of a typical animal cell below to show

i) two chemicals which you think may move into animal cells through cell membranes

ii) two chemicals which move out of animal cells through cell membranes



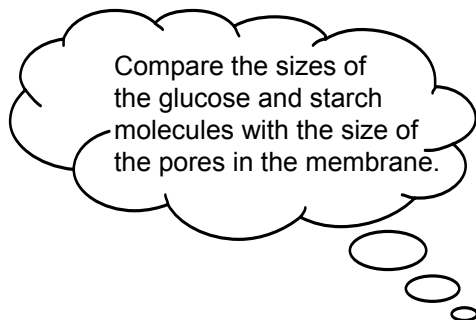
Investigating membranes

When we are studying the chemicals that pass in and out of cells, we can use visking membrane as a model of a cell membrane. Like cell membranes, visking membrane is partially permeable. It has tiny pores or holes which only allow small, soluble molecules to pass through. Larger molecules cannot pass through.

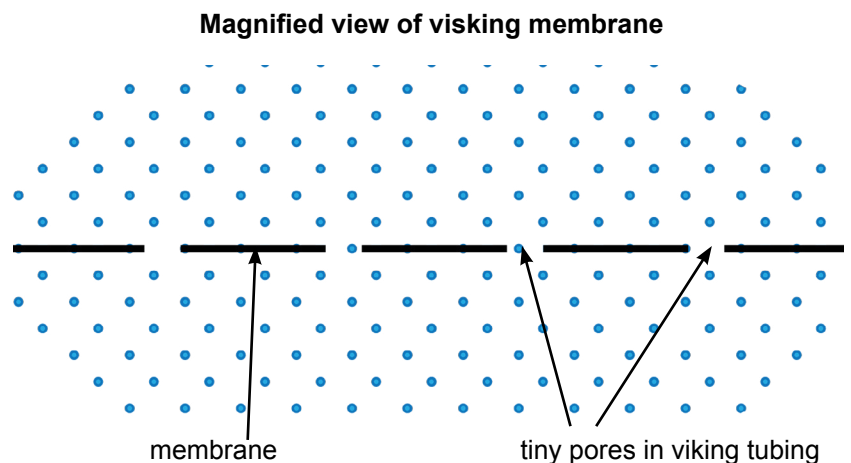
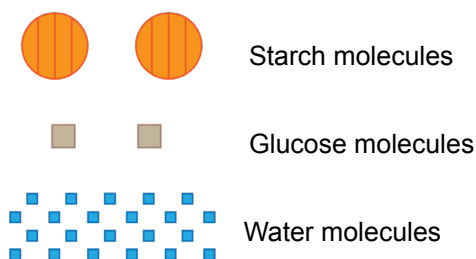
- a. The diagram below shows a magnified view of visking membrane and three types of molecule.

Water molecules are small enough to pass through the pores of the membrane.

- Which other molecules shown below are small enough to pass through?
- Draw some of these molecules on both sides of the membrane in the diagram.
- Which molecules are too big to pass through the membrane?
- Draw some of these molecules only on one side of the membrane in the diagram.



Key



- b. Write in the missing words to complete the following paragraph.

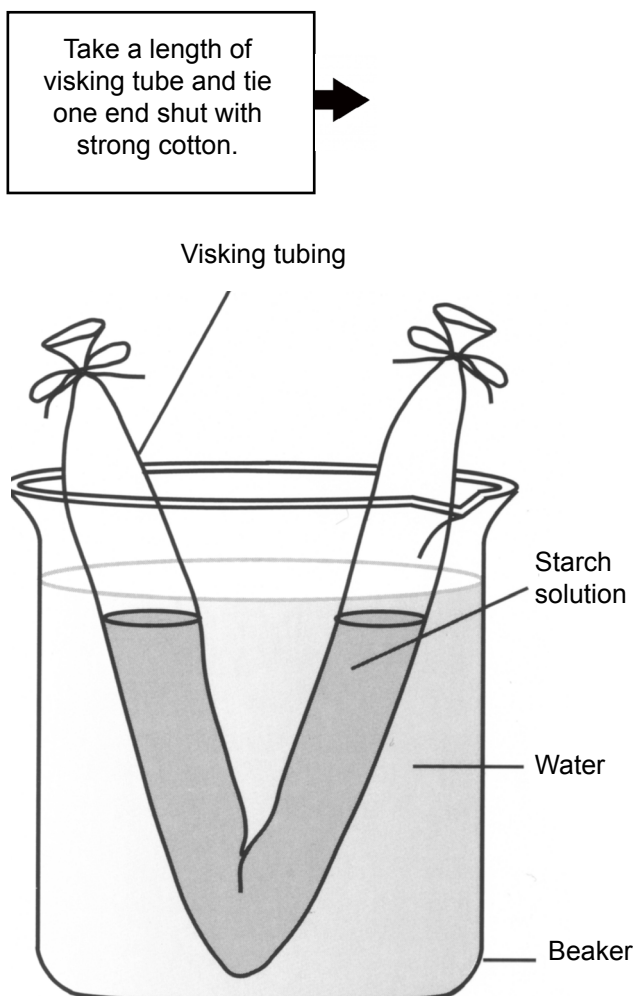
Visking membrane has many tiny Molecules of and are small enough to pass through the pores in the membrane but molecules cannot pass through because they are too

In an investigation, as part of her work on cells, a researcher called Shyrin carried out an experiment using visking membrane as a model of the cell membrane. Like visking membrane, the cell membrane is partially permeable.

During her investigation Shyrin used strong cotton to tie one end of the tube of visking membrane so it was sealed shut at that end. She filled the tube with glucose solution then sealed the other end of the tube with another cotton tie. Shyrin carefully washed the outside of the tube with cold water and lowered it into a beaker of pure water.

After 15 minutes Shyrin tested the water surrounding the visking tube for glucose. She obtained a positive result which showed her that there was now glucose in the water surrounding the tube.

- c. Read the last two paragraphs again and, in your write out a detailed flow chart to explain exactly how Shyrin carried out this experiment.



When you have finished your flowchart and your teacher has checked it, test how easy it is to follow by using it to help you and a partner carry out Sharyn's experiment. Your teacher will show you how to test for glucose.

- d. Answer the following questions in your research log.
- Why is the outside of the tube washed with water after it is filled with glucose?
 - Did you detect glucose in the water surrounding the beaker after 15 minutes?
 - How did glucose pass from inside the visking tube into the surrounding water?
Explain this process scientifically.
 - When Shyrin repeated this experiment using starch solution instead of glucose solution inside the visking membrane tube, she found that no starch passed into the surrounding water. Explain this difference.