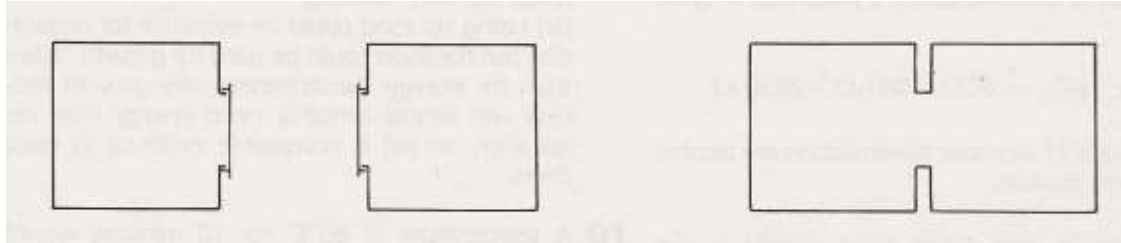


4 How substances get in and out of cells

1 Containers X and Y each hold one litre of air. X also contains 0.4g of a gas and Y contains 0.6 g of the same gas. The two containers are connected together as shown in the diagram.

- Which way will the gas diffuse?
- After a long period of time, what will be the concentration of the gas (in grams per litre) in each container?



2 The diagram represents (not to scale) molecules of a salt dissolved in the bottom layer of water in a beaker. Make two similar diagrams to show the distribution of salt molecules (a) after a few minutes, (b) after several hours.



3 When a cell is respiring aerobically, which two gases are likely to be diffusing in and out of the cell, and in which direction will they be diffusing?

4 The graph shows the concentration of a substance inside and outside a cell.

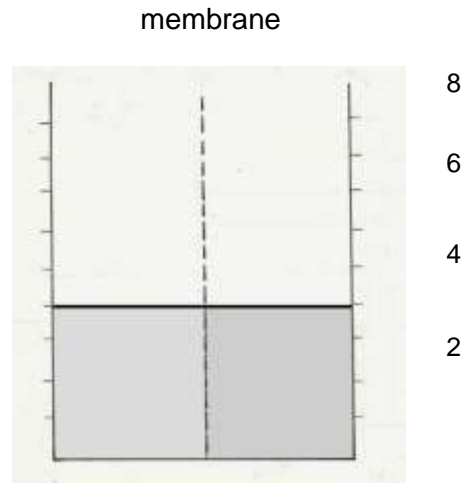
- If the substance is free to move by diffusion, which way will it move
 - inside the cell
 - between the cell and the medium outside the cell?
- If, after some hours, the concentration has not changed, what assumption would you make about the movement of the substance across the cell membrane?

5 (a) Which one of the following is the best definition of osmosis?

- The movement of water from a concentrated solution to a dilute solution across a partially permeable membrane. .
 - The movement of a dissolved substance from a concentrated solution to a dilute solution across a partially permeable membrane.
 - The movement of water from a dilute solution to a concentrated solution across a partially permeable membrane.
 - The uptake of water by a living cell.
- (b) Which of the statements is an acceptable description of diffusion?

How substances get in and out of cells (continued)

6 The diagram shows a vessel which contains a concentrated and a dilute solution separated by a partially permeable membrane. Draw a similar diagram to show the liquid levels after an hour or two.

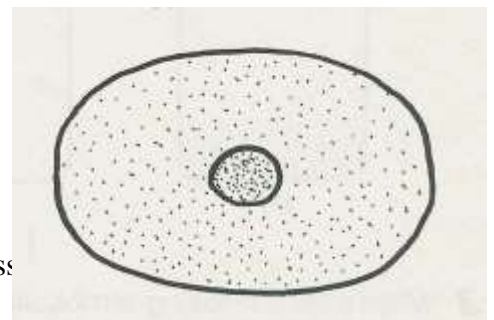


- 7** Which statement is correct?
- (a) A concentrated solution has a high osmotic potential (water potential).
 - (b) A concentrated solution has a low osmotic potential (water potential).

8 The drawing shows the outline of a human cell. Copy the drawing and make two further drawings to show how the cell would appear if it were to be immersed for a few minutes in a solution with

- (a) a lower osmotic potential (water potential) than its own cytoplasm
- (b) a higher osmotic potential (water potential) than its own cytoplasm.

concentrated solution
dilute solution



9 Why is it important that a cell membrane does not allow all dissolved substances to pass freely through it?

10 The concentration of the tissue fluid, which bathes all cells in the body, is kept more or less constant. Why is this important?

11 When meat is salted, bacteria cannot grow on it. Suggest a reason for this.