

Experiment 7

A MODEL SMALL INTESTINE

Aim

To use a model to demonstrate how molecules of a certain size pass through the wall of the small intestine.

Starch is a large molecule consisting of between 300 to 500 glucose molecules joined together. (A glucose molecule itself contains 24 atoms.) Cellophane is similar to the membrane that surrounds your small intestine and the membrane around your cells.

Materials

- 3 pieces of cellophane tubing (15 cm long)
- three 250 mL beakers
- starch solution (20 g soluble starch/L)
- glucose solution (10%)
- iodine solution
- Glucose test strips or Benedict's solution

Method

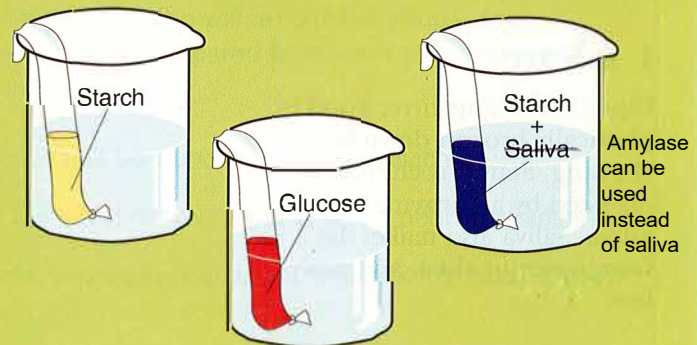
- 1 Hold one end of the cellophane tubing under water until it is soft. Then tie a knot in that end. Make sure this knot is securely tied.



- 2 Hold the other end under water to soften it. Rub your fingers back and forth on the tubing to open it.
- 3 Half fill the tubing with starch solution. Wash the outside of the tube with distilled water and rest it in a beaker as shown. Label this beaker STARCH.
- 4 Half fill another piece of tubing with starch and add about 2 mL of saliva. Hold the end of the tubing and shake it to mix the contents. Rinse with water and place it in a beaker labelled STARCH AND SALIVA.

- 5 Half fill the third piece of tubing with glucose solution. Rinse with water and place it in a beaker labelled GLUCOSE.

- 6 Half fill the beakers with lukewarm water and leave them until the next day.



- 7 **Predict** what you will find when you test for the presence of starch and glucose in the liquids inside and outside the tubing. Explain your predictions.

The next day

Test for the presence of starch and glucose in the tubing and in the water outside the tubing.

- 8 Your teacher will give you instructions to test the solutions and the inside of each tube. Iodine solution (careful, this can stain) and glucose test strips or benedict's solution can test for glucose.

- Record your results.

Questions and conclusions

- 1 How do you explain the presence of glucose in the water outside the tubing in the GLUCOSE beaker?
- 2 Interpret your results for the STARCH AND SALIVA beaker.
- 3 Why did you use lukewarm water and not cold water in the beakers?
- 4 Do your results support the statement in the Aim about the sizes of starch and glucose molecules?
- 5 Suppose the water in the beakers had been automatically kept at 37°C. How would this have affected the results?