

Passive transport through cellulose tubing: starch molecules and chloride ions

Teacher and technician worksheet

This activity is adapted from: <http://www.practicalbiology.org/areas/advanced/exchange-of-materials/digestion-and-absorption/evaluating-visking-tubing-as-a-model-for-a-gut,49,EXP.html>

Equipment and materials

Each student or pair of students will require:

- 15 cm length of cellulose tubing knotted at one end
- Sawn-off plastic syringe barrel to support the cellulose tubing (Figure 1)
- Boiling tube
- 2 x 10 cm³ measuring cylinders
- Elastic band
- 0.01 mol dm⁻³ iodine solution, in a dropper bottle
- 0.01 mol dm⁻³ silver nitrate solution, in a dropper bottle
- 5 cm³ starch suspension
- 5 cm³ sodium chloride solution
- 2 x teat pipettes
- White spotting tile
- 4 x test tubes
- 100 cm³ beaker

Make sure that students wear eye protection. At the concentrations used all solutions are low hazards. However, silver nitrate is corrosive so goggles should be worn for preparation. Students should take care as both iodine solution and silver nitrate solution may stain skin or clothing

Reagents and solution preparations

- Sodium chloride solution
Dissolve 10 g in 100 cm³ of water to make a 10% w/w solution.
- Starch suspension
Make a cream of 5 g soluble starch in cold water, pour into 500 cm³ of boiling water, stir well and boil until the solution is clear.
- Iodine solution
Make a 0.01 mol dm⁻³ by 10-fold dilution of 0.1 mol dm⁻³ solution. Once made, the solution is a low hazard but may stain skin or clothing if spilled.
- Silver nitrate solution
Dissolve 0.17 g silver nitrate in 100 cm³ of water.