

Passive transport through cellulose tubing: starch molecules and glucose molecules

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
- Benedict's reagent
- 5 cm³ starch suspension
- 5 cm³ glucose solution
- 2 x teat pipettes
- White spotting tile
- 4 x test tubes
- 100 cm³ beaker
- Hot water bath (kettle to provide boiling water)

Make sure that students wear eye protection. At the concentrations used all solutions are low hazards. However, students should take care as iodine solution may stain skin or clothing.

Reagents and solution preparations

- Glucose 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.
- Benedict's reagent
No hazard warning is required on the bottle as the concentrations of each of the constituents are low. Take care making up the reagent as sodium carbonate is an irritant to the eyes and copper(II) sulfate is harmful if swallowed.