

Biological membranes

Introduction

Use beetroot to show how membrane integrity is affected by treatments that damage either the protein or the phospholipid component of the membrane.

Background

The cell membrane, (plasma membrane), is composed primarily of a bilayer of phospholipid molecules with a mosaic of protein molecules embedded in and attached to it. Both these components are necessary for the membrane to fulfil its role of maintaining the integrity of the cell contents while allowing selected substances to cross the membrane. The effect of treatments that damage either the phospholipids or the protein components can be investigated using beetroot. The red pigment of beetroot is retained in the cells and only escapes into the surrounding medium if the membrane is damaged.

Method

Use small pieces of beetroot cut using a cork borer. Cylinders about 10mm long with a diameter of about 5mm are ideal. (If you do not have a cork borer just cut pieces about this size with a knife.) The pieces must be thoroughly washed in running water to remove all surface pigment released from damaged cells.

The amount of pigment leaking through the membrane into the surrounding liquid can be observed qualitatively by eye or measured accurately using the colorimeter.

More details, suggestions for investigations and sample results can be viewed on the Mystrica website, www.mystrica.com