

## Topic 2 – Practical 7

### ***Osmoregulation in ciliates***

#### **Safety**

- There are no specific safety hazards associated with this practical.

#### **Apparatus and materials**

- culture of ciliates (e.g. *Vorticella* or *Stentor*, stalked ciliates are easiest to observe)
- microscope
- cavity slides
- distilled water
- dilutions of salt water at 0.1%, 0.2%, 0.4% and 0.8% (sea water can be used)
- dropping pipette for each dilution of salt water

#### **Introduction**

In this practical, you will observe the effect of salinity on the contractile vacuole of ciliate organisms. Osmoregulation is the control of water and salt balance within an organism. In humans, the kidney is the organ of osmoregulation, removing excess water and salts from the blood to maintain homeostasis. Ciliates, which are small freshwater organisms, collect water in their contractile vacuoles and it is expelled from the body through the outer membrane of the organism.

#### **Procedure**

- 1 Place the ciliates in a cavity slide and cover them with distilled water.
- 2 Observe the formation of a contractile vacuole and count the number of times it contracts in a period of 2 minutes (or other suitable time period, depending on your organisms). Record your results.
- 3 Remove the slide from the microscope stage or turn off the light so that the organisms do not become too hot. Remove as much of the distilled water as possible from the cavity slide using a fine pipette. Replace the water with a 0.1% salt solution. Organisms should be allowed to 'rest' for a period of 2 or 3 minutes to enable them to equilibrate to the new conditions before new readings are taken. Record the number of contractions of the vacuole at this concentration.
- 4 Repeat step 3 for the three other concentrations and then replace the salt solution with distilled water again. Use a fresh dropping pipette for each dilution of salt water.
- 5 Return the organisms to their original culture and make a table of your results.
- 6 Plot a graph of concentration of salt solution against number of contractions per unit time.

#### **Questions and further work**

- 1 What was your initial hypothesis with respect to the likely results of this experiment?
- 2 Explain the reasoning behind your hypothesis.
- 3 How would you expect the results to be different if you carried out the experiment with marine rather than freshwater organisms (protistans)?