S4 - S6 Senior Phase

"A change is gonna come"

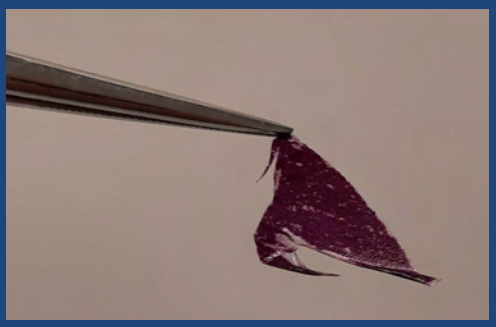
N5 Biology, Unit 1, KA2: Transport across cell membranes.

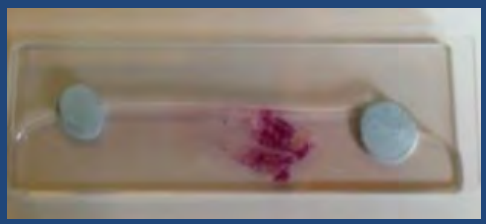
Observing the effects of osmosis in plant cells using the Veho USB microscope.

Materials

- Red onion
- Forceps
- Scalpel
- White tile
- Dropping pipette
- Cocktail stick
- Microscope slide x 2
- Distilled water
- Rock salt crystals
- USB microscope and PC
- Absorbent paper towel
- Blu-tack

1 Use a scalpel to cut a square of red onion about 1cm x 1cm. Use the forceps to tease away the red epidermis from the onion tissue and place this explant onto the microscope slide.





2 Add two small pieces of blu-tack to a second microscope slide and place this over the onion tissue.

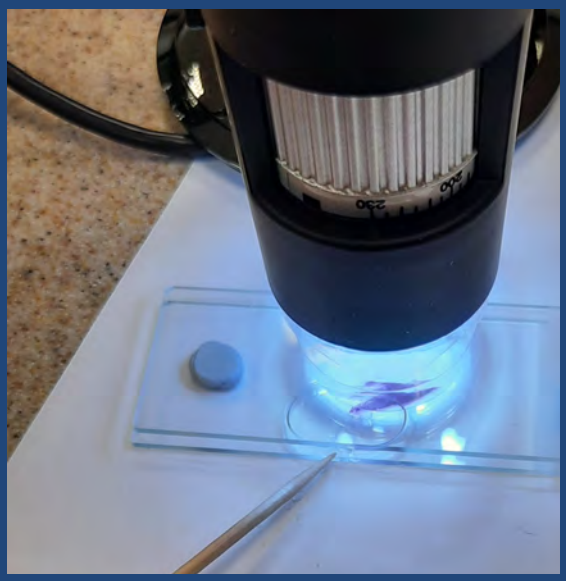
3 Use a pipette to flood the space between the two slides with distilled water. Use the cocktail stick to reposition the onion tissue if it moves.

Observing Plasmolysis

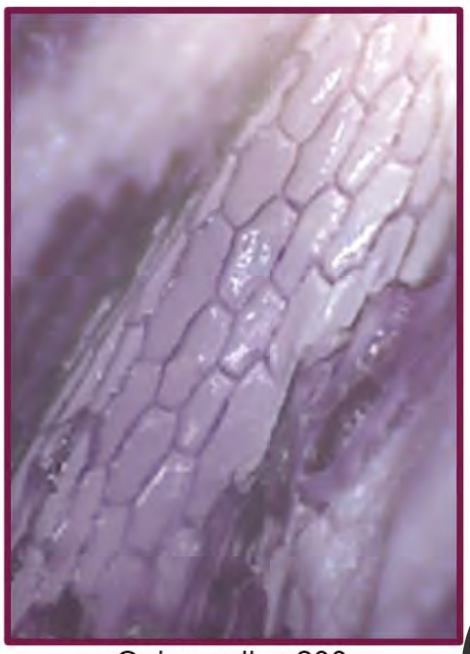
- using the Veho USB microscope

S4 - S6 Senior Phase

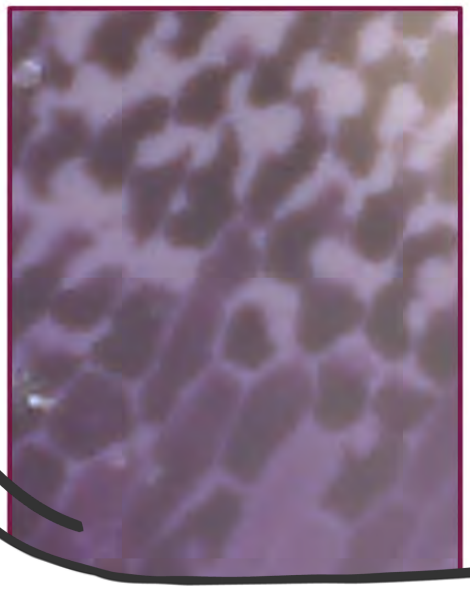
4 Focus the USB microscope on the onion tissue using x200 magnification. Keep 20 cells in the field of view.
Slide 4-6 rock salt crystals into the gap between the two microscope slides.



Observe the result of this salt addition. As the salt dissolves, the onion cells will be surrounded by a strong salt solution. This change in concentration across the membrane will result in osmosis of water molecules from within the onion cells to the surrounding solution. This loss of water molecules will cause cells to appear plasmolysed within a few minutes.



Onion cells x200 magnification; incubated in distilled water.



Remember those 20 cells you were focusing on at the start? When surrounded by water, all should be in a turgid state. What percentage of these cells become plasmolysed following salt addition? Express this as a ratio of turgid:plasmolysed cells.

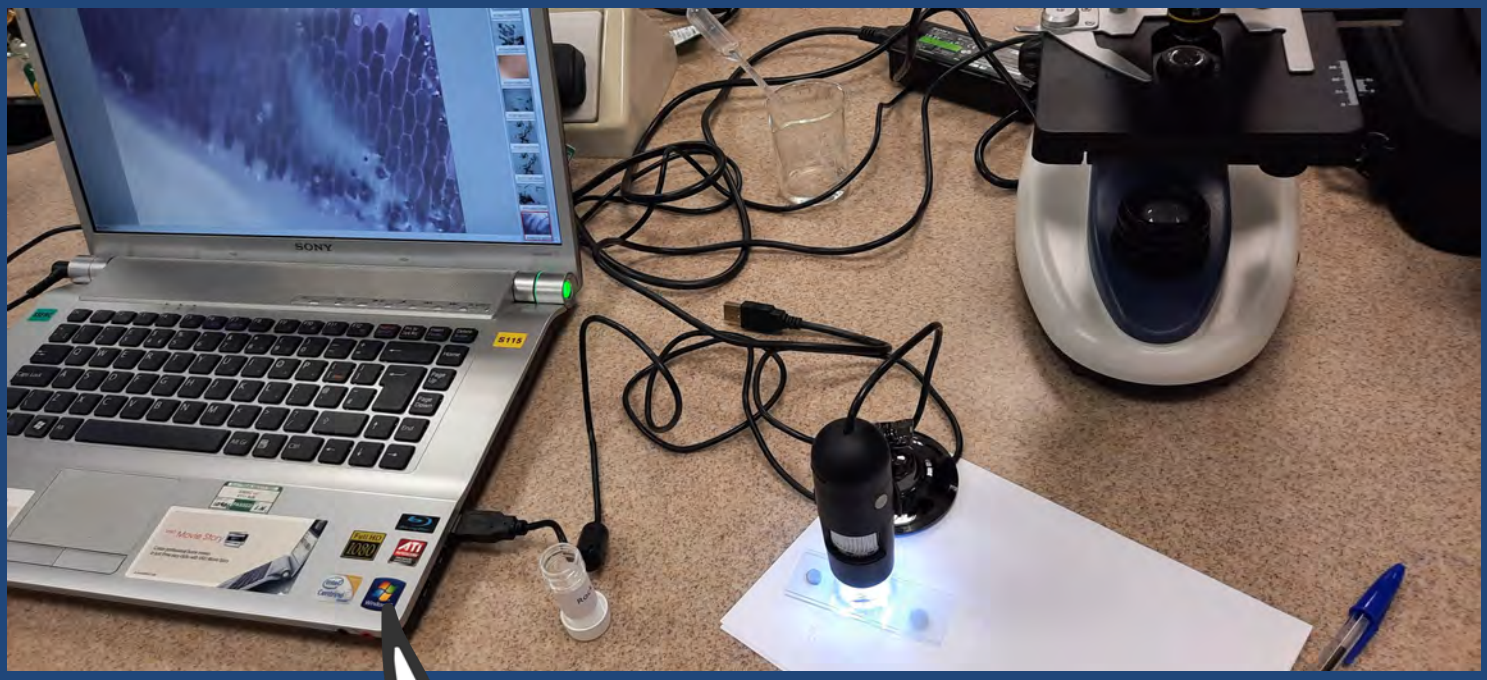
Observing Plasmolysis

- using the Veho USB microscope

S4 - S6 Senior Phase

5 Use absorbent tissue paper to remove the salt solution surrounding the onion tissue. Use a pipette to add distilled water between the two microscope slides.

Step 5 results in a reversal of plasmolysis. Water molecules will return to the cells, resulting in swelling of the cell vacuole and the cell membrane will press against the cell wall once again.



Push Yourself Further: Many people, including athletes, will consume high-glucose energy gels during sport. But what effect does this have on our cells? How would this compare to isotonic drinks? Use this methodology to investigate further.