



Colegio de
San Francisco de Paula
NATURAL SCIENCES
DEPARTMENT

Laboratory Handbook

Year 10 Natural Science

Practical Session 5



Assessed criteria**Criteria E: AIE**

In all lab sessions you will be assessed for AIE: You will gain or lose points on this criteria based on your attitude in the laboratory, things like forgetting equipment, not listening to instructions will result in losing points: helping other students, cleaning up without being asked to, for example, will gain you points.

Research Question

“How can you isolate DNA from your own cells?”

Background Information

All living organisms contain DNA. Individual strands of DNA are too small to be visible to the eye. One million threads of DNA fit onto the period at the end of a sentence using Times New Roman, font 12 in WORD. The reason why we are able to see DNA in this activity is that there are so many of them, clumped together.

DNA extraction is a fairly simple procedure that requires only a few steps: 1. The detergent breaks open the cells by destroying the fatty membranes that enclose the cells as well as the nuclei membranes within the cells. DNA is released into the solution. Detergent and the salt also helps strip away proteins that are associated with the DNA molecules. 2. DNA is NOT soluble in alcohol, whereas other cell parts are. By adding alcohol, DNA precipitates out of the solution and collects at the interface of the alcohol and soap layer. The colder the alcohol, the less soluble the DNA will be in it.

Objective

To obtain an Eppendorf tube containing your own DNA.

Materials**Observation cheek cells**

- Methylene blue - Microscopic slides - Cover slides - Plastic stirring sticks

Extraction DNA

- 0.9 percent salt solution - 25 % detergent solution - Test tube - Cooled alcohol - Glass rod - Small funnel – 25mL measuring cylinder – a plastic cup - Small paperclip hook

Method

1. This procedure will collect some of the buccal cells that line the inside of your mouth. These cells are continuously being sloughed off by your cheeks. Swill 2 teaspoons (10 ml) 0.9 percent salt water in your mouth for 30 seconds. This amount of swishing will actually become quite laborious—hang in there!

2. Add 5mL of the 25 % detergent solution to your test tube and then spit the water into your cup.
3. Gently swirl the tube for 2–3 minutes. The detergent will break open the cell membrane to release the DNA into the soap solution. Do not be too vigorous while mixing! DNA is a very long molecule. Physical abuse can break it into smaller fragments, a process known as shearing.
4. Slightly tilt the tube and pour 5 ml fluid of the chilled 95 % ethanol **down the side** of the tube so that it forms a layer on the top of your soapy solution. Do this carefully by using the small measuring cylinder.
5. Allow the tube to stand for 1 minute.
6. Place a thin acrylic or glass rod into the tube.
7. Stir or twirl the rod in one direction to wind the DNA strands onto the rod. **Be careful to minimize mixing of the ethanol and soapy layers.** If too much shearing has occurred, the DNA fragments may be too short to wind up, and they may form clumps instead. You can try to scrape these out with the small paperclip bend like a hook.
8. Add some alcohol to the Eppendorf and place the DNA carefully from the hook into it. Fill the tube with alcohol. Your DNA should stay solid in this solution.

Results

Write a short revision of the method here below when you finish.

References

Seplelessons.ucsf.edu, (2015). Extract your own DNA from cheek cells | SEP LESSONS. [online] Available at: <http://seplelessons.ucsf.edu/node/222> [Accessed 12 Jan. 2015].