

DNA Extraction Lab

Cells are the functional units of living things. They reproduce, in part, by making and passing deoxyribonucleic acid (DNA) from the parent cell to the offspring cell. All DNA is made up of the same chemical bases, adenine, thymine, guanine, and cytosine. The order of the bases determines the proteins the cell makes and the functions the cell performs.

In this activity, students extract DNA (and also some RNA) from bananas. They see that:

- DNA is a component of living and once-living things.
- DNA can be extracted and observed.

Materials

- 20 mL DNA extraction buffer (15 g NaCl/ 1 L water)
- 1 mL liquid dishwashing detergent
- Ice-cold 95% ethanol or 95% isopropyl alcohol
- 1/3 banana
- Ziplock plastic bag
- 50 mL beaker
- Large Test tube
- Cheese cloth
- Pipettes
- 200 ml beaker
- Glass stirring rod

Procedure

1. Put 1/3 of a banana into the ziplock bag, squeezing out all air. Gently mash the banana to a pulp for 2 minutes.
2. Open the bag and add 20 mL extraction buffer into ziplock bag. The extraction buffer causes DNA to stick together and removes any associated protein.
3. Filter the mixture through cheese cloth set up on top of a 50 mL beaker and save the filtrate (liquid coming through).
4. Pour 10 mL of the filtrate into a test tube.
5. Add 1 mL of detergent (this breaks apart the cell membrane and nuclear membrane). Gently mix with a glass stirring rod without causing foam.
6. Immediately add 20 mL of ICE COLD ethanol to the test tube by slowly pouring it down the side of the test tube to create a layer on top of the filtrate. (DNA is not soluble in ice cold ethanol. When it is added to the mixture, all the components of the mixture except DNA, stay in solution, while the DNA precipitates out.)
7. Let the ethanol sit of 2-3 minutes without disturbing it. Bubbles will form and DNA will precipitate out of the solution at the interface.
8. DNA will look like whitish mucous.
9. The DNA may be lifted out carefully using a pipette and dried on an absorbent towel.

Introduction Hints:

- What other methods of DNA extraction can you use?
- What additional information can other forms of DNA extraction provide?

Discussion Hints

- What limited information can this form of DNA extraction provide.
- What are some advantages to this form of DNA extraction.