**DNA Extraction Experiment**

**Introduction:** All living things have DNA: the chemical instructions on how to make a living thing. It can easily be seen with the naked eye when collected from thousands of cells.

But have you ever wondered what DNA looks like? We are going to break apart the cell membrane of a strawberry and separate the DNA from the nucleus. Strawberries are a good source of DNA because they have 8 copies of each type of chromosome. This large number of chromosomes will filter out of your solution and you will get to actually see DNA.

*Where in the cell is the DNA found?*

Take a look at the sketch of the plant cell below. The chromosomes (which are made of DNA) are in the nucleus. This is the place where most of the DNA is located.

**What do you think the DNA will look like when you extract it from the strawberry plant cell?**

(Write a brief description and draw a picture)

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**Materials:**

* Strawberry
* Zip-lock Bag
* Gause and elastic band
* Plastic cup or beaker
* Eye Dropper
* Stir Stick
* DNA extraction buffer: Soap, Salt and Water
* Ice cold ethanol

**Procedure and Explanation:**

1. Place a strawberry in a zip-lock bag and remove most of the air before you seal the bag.
2. Mash the strawberry through the bag in your hand. Do not hit against the table.

**WHY:** Crushing the strawberries breaks open many of the strawberry cells, releasing the nuclei where the DNA is

1. Add about 10 ml of the DNA extracting solution

**WHY:** The soap in the detergent or shampoo in the extraction buffer breaks down the fatty membranes of the cells, breaks open the nuclear membrane and releases the DNA into solution. The salt makes the DNA molecules stick together, and separate from the proteins that are also released from the cells

1. Continue mixing and mashing the bag in your hand
2. Drape the gauze over the cup use an elastic band to secure it
3. Pour the mashed strawberries with the extraction buffer onto the gauze and let drip into the bottom of the cup. This will take some time.

**WHY:** The gauze retains the strawberry cell debris. The strawberry DNA is dissolved in the DNA extraction buffer, which will pass through the filter into the cup.

1. Add 5 mL of your chilled isopropyl alcohol to the solution and hold the mixture at eye level

**WHY:** The DNA collects between the layer of alcohol on top and strawberry extract underneath! DNA is insoluble (does not dissolve) in alcohol and therefore clumps together, making it visible

1. Can you see how there is a separation of white "stuff" atop the rest of the solution? That's the DNA of the strawberry.

**Observations an**

1. Watch where the alcohol and extract layers come in contact with each other. Keep the cup at eye level so you can see what is happening. What do you see appearing? (Sketch what you see in the box and add and additional notes you think are needed).

**Notes:**

1. Gently remove the DNA from the solution using the stir stick. The contents you just removed contain the code for all of the proteins required by the strawberry throughout its life

**Post Lab Questions:**

1. **What happened when you added the strawberry solution to the alcohol?**

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1. **What does the DNA look like?**

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1. **Can we extract DNA from other foods or fruits? EXPLAIN YOUR ANSWER!**

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1. **If DNA is so small it fits in one cell, how are we able to see it with our eyes after this extraction?**

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1. **What can we do with the DNA we isolate? Why is it valuable that we are able to isolate DNA? (Think about what unit we are in).**

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