

Strawberry DNA Extraction

Plants, like all living things, have DNA. It's DNA that makes a giant redwood tree different from a blade of grass and different from a human.

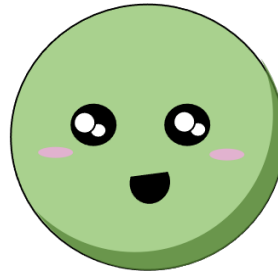
We're going to use strawberries as our model organism to look closer at DNA.

The first important question is: how big is DNA?

The answer? Not big at all! In every human cell has six feet worth of DNA! DNA is super tiny and normally needs a lot of very specialized microscopes to be able to see it. While we aren't going to be able to see the double helix shape, we can still extract and see DNA from cells.

Materials needed:

- Fresh Strawberries
- Ziplock bags
- Dish Soap
- Water
- Salt
- Coffee filters/cheese cloth/strainer
- Gloves
- Small Clear Cup
- Cold Rubbing Alcohol (place in freezer before you get started)
- Toothpicks



Gather all your supplies and let's get started!

Procedure:

1. Place 2-3 strawberries into a Ziplock bag and carefully mash up (don't break the bag!) the fruit. It should like a strawberry smoothie when you're done.

Why are we doing this?

In order to get at the DNA, we have to break apart the cell walls and the nuclear membrane that package the DNA. By breaking the strawberries with our fingers, we're going to give our other ingredients more surface area to get at the cells (and we'll probably break a few in the process as well).

Tip:

Trim the leaves off the strawberries and cut them in half first. It'll make mashing them up easier!



Before



After

2. Add a drop of dish soap and 1 tbsp water to the bag and mix into the strawberries.

Why are we doing this?

Think about the purpose of soap. What does it do? It cleans things. How does it do that? Soaps and detergents work by breaking down dirt and things like bacteria. In this case the soap is helping to open up the cells so we can get the DNA out.

3. Add a small pinch of salt to the bag and mix.

Why are we doing this?

Why are we doing this? DNA is a fragile molecule and needs the right environment to be stable and not just dissolve. The salt is going to help create a happy place for the DNA to be.

4. Place a coffee filter, piece of cheese cloth, or a strainer over a clear cup. Wearing gloves, pour out the strawberry mixture into the filter and gently squeeze all liquid into the cup. If you do get chunks of strawberry into your cup, try straining again so you only have liquid.



In that liquid are all the strands of DNA that we've freed from their cells!

Tip:

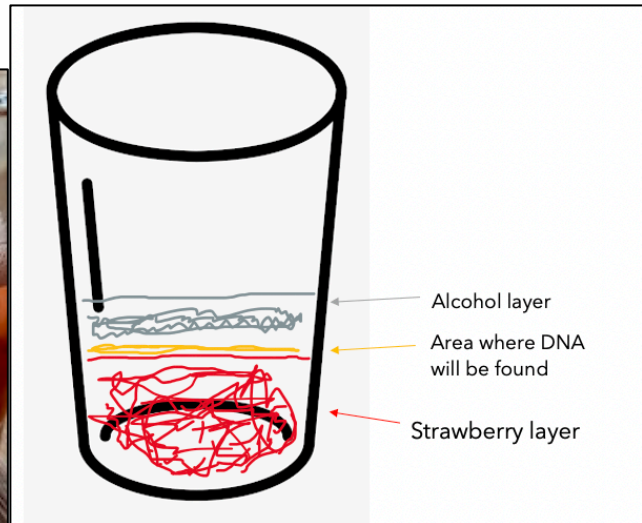
If you have a lot of bubbles on top of your liquid, you may want to let it set for a few minutes before moving onto the next step.

5. Carefully (an adult should do this step), add the cold alcohol to the cup. You should add about the same amount of strawberry liquid you have. **DO NOT MIX THESE LAYERS!** Try to pour the alcohol along the side of the cup so it sits on top the strawberry mixture. You want to see two distinct bands.

What's happening?

You may start to see bubbles and some cloudy stuff start to form right where the two layers come together. What do you think it is? That's the DNA! The alcohol draws the DNA out of the mixture and makes it clump together. The bubbles are a sign of that reaction.

6. You can use a toothpick to gently collect the DNA clumps. Try not to stir too much.



Great work! You have now extracted DNA from strawberries!

Not seeing anything?

It happens. Science is a process and sometimes doesn't go how we expect. Keep trying. You can always alter the process to see what gives you the best result (i.e. more strawberries, less salt, etc.)

Further experiments

Try this with other kinds of fruit. See what works and what doesn't. Keep notes and see if you can determine why some fruit works well and others do not.

Check out our other DNA Day activities that you can do from home!

Share any great photos of your DNA extraction activity and tag us using #MGIDNA21