

DNA in Living Things (Extracting Strawberry DNA) Experiment



Meet Ann Taylor, MD

Chief Medical Officer, AstraZeneca



Navigate to:

What do you do at AstraZeneca?

I'm the Chief Medical Officer. I make sure the patient perspective is represented in everything we do.

What was your favorite class growing up?

Chemistry – I loved the lab.

Was there a moment in your elementary school years that sparked your passion for science?

My passion was sparked in high school – it was a journey to get here.

Why do you love science?

The opportunities are endless to help people live healthier lives.

What advice would you give your 13-year-old self?

Have confidence in yourself – you can do it!

How did you navigate the challenges of being a woman in STEM?

Having female peers who support you makes a huge difference! Also, always know you can do it, and don't let anyone tell you otherwise.

Why should students consider a career in STEM?

To always do something new and different- build and learn!

What scientist inspires you? Why?

Marie Curie – a great scientist who didn't care what people thought.

Materials



- Safety goggles or clear-lensed glasses
- A lab coat or kitchen apron
- Latex or non-latex gloves
- A resealable plastic bag
- A liquid measuring cup
- A tablespoon
- A teaspoon
- A 1/2 teaspoon
- 2 drinking glasses or plastic cups
- 3 strawberries (fresh or thawed from frozen)
- 1 tablespoon of liquid dish soap
- 1/2 teaspoon of salt
- 1/3 cup of room-temperature water
- 1 metal strainer, a cheesecloth, or a coffee filter
- A spoon or rubber spatula
- 1/2 cup of COLD 70% isopropyl rubbing alcohol (chill in the freezer for around 2 hours)
- A coffee stirrer, chopsticks, or tweezers
- A notebook
- A pen
- A camera or smartphone camera (optional)

Read the Directions

Before starting your experiment, carefully read the protocol. If helpful, record the protocol in your notebook, which will help document your science experiment.

Practice Safety

Before starting, find a clean surface to set-up your experiment. Then, put on your safety goggles, lab coat (or kitchen apron), and gloves. Always to practice safety when exploring science!

Experiment Procedure

- 01. Chill the rubbing alcohol in the freezer** for about 2 hours before starting the experiment.
- 02. Remove the leaves on the three strawberries.** Discard leaves into the compost or trash bin.
- 03. Put the strawberries into the resealable plastic bag.** Push out any extra air, and seal the bag shut. Then, with your fingers, gently press the strawberries for about two minutes. Completely crush the strawberries. This will break open the cells in the strawberry, which will release the DNA.
- 04. In a drinking glass or plastic cup, combine 1 tablespoon of liquid dish soap,** 1/2 teaspoon of salt and 1/3 cup of water. This will be your DNA extraction liquid.
- 05. Add 2 teaspoons of DNA extraction liquid** into the resealable plastic bag with the mashed-up strawberries. This will further break open the cells to release DNA.
- 06. Carefully remove any excess air,** reseal the bag and gently smash for another minute. Be careful to not make too many soap bubbles.



07. Grab your other drinking glass or plastic cup and place a metal strainer, cheesecloth, or coffee filter over the top of the cup.

08. Open the resealable plastic bag and pour the strawberry liquid into the metal strainer, cheesecloth, or coffee filter. You can use a rubber spatula or spoon to gently push down any additional liquid. If using a cheesecloth or coffee filter, you can also twist the filter just above the liquid and gently squeeze the remaining liquid into the cup. Once the liquid is extracted into your cup, you can compost or discard the strawberry pulp left in the metal strainer, cheesecloth, or coffee filter.

09. Next, pour down the side of the drinking glass an equal amount of cold rubbing alcohol as there is strawberry liquid. Do not mix or stir. You have just separated the DNA from the strawberries!

10. Wait a few seconds and watch for the development of a white cloudy substance. This is DNA! This will be in the top layer above the strawberry extract liquid.

11. Tilt the cup and pick up the DNA using a coffee stirrer, chopsticks, or tweezers. What else can you see?

12. Look at the DNA clump. Write down what you see in your notebook. You can even draw or snap a picture of what you see! Do you think the DNA of other fruit or vegetables will look the same? **Experiment to find out!**



POST-EXPERIMENT QUESTIONS*Click to walk through the questions with Ann*

As your experiment comes to an end, take a few minutes to answer the following questions in your notebook.

- 01.** What role does the dish soap play in the extraction liquid?

- 02.** Why do you think we need to use cold rubbing alcohol?

- 03.** Do the experiment again with different food. Which foods give you the most DNA? Which foods give you the least amount of DNA?

- 04.** If you have access to a milligram scale, you can measure how much DNA you extract (called a yield). Just weigh your coffee stirrer, chopsticks, or tweezers when they are clean, before using them for the experiment. Then, weigh them again after you have used them to gather as much of the DNA from your extraction. Subtract the initial weight of the tool from its weight with the DNA to get your final yield of DNA. What was the weight of your DNA yield? If all the petri dishes grew bacteria, including the control, what do you think could be the reason?

- 05.** Change different variables in this activity to see how you can change your DNA yield. For example, you could try starting with different amounts of strawberries or freshness of strawberries, using different soaps or different foods with DNA. Which conditions give you the best DNA yield?