

## Strawberry DNA

Most strawberries are octoploid, meaning they have 8 copies of their DNA! Having this much genetic material makes it relatively easy to get DNA out of strawberry cells.

In order to extract strawberry DNA, we first rupture the cell walls by freezing the fruit. Crushing the berries further destroys the cells. These processes release coiled DNA material into the solution (juice). To eliminate the structural proteins coiling the DNA inside each chromosome, we use a protein-breaking enzyme called bromelain, which is found in pineapples.

Liquid extraction utilizes the principle of “like dissolves like.” The strawberry DNA is somewhat polar, and is dissolved in polar water. To disrupt the attractions between water and DNA, we need to add alcohol, which is somewhat polar like the strawberry DNA. This causes the DNA to be attracted to and move into the alcohol, away from the water in the fruit mixture. DNA is not soluble in alcohol, so the DNA strands clump together and become visible to the naked eye.

### Materials needed:

- 1/2 cup frozen strawberries
- 2 tablespoons pineapple juice
- Tall, narrow glass
- Spoon
- Rubbing alcohol (70% or greater)
- Ziplock bag
- Skewer or thin straw

### Step-by-step instructions:

1. In a Ziplock bag, crush strawberries and pineapple juice together until you get a thick liquid (do not overmix).
2. Pour mixture into a narrow glass until half full.
3. Slowly pour an equal amount of rubbing alcohol down the back of a spoon into the glass. The alcohol and fruit should not mix, and **because rubbing alcohol is very toxic, you should not drink or taste this liquid.**
4. Wait several minutes until a white, translucent film appears in the alcohol layer.
5. Use the skewer to pick up the white film. This is DNA!



### Additional exploration:

- Repeat this experiment with frozen bananas instead of strawberries. Can you tell which fruit has more DNA?
- Research other fruits you could extract DNA from—the higher the chromosome count, the better!



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### Discussion questions:

- DNA models show a double helix structure. Can you see the double helix structure in your extracted DNA? Why or why not?
- How do strawberries, bananas, and other polyploid species end up with so many copies of their DNA? Is there an evolutionary advantage?
- DNA stands for deoxyribonucleic acid. Is DNA the only nucleic acid being extracted from cells in this experiment?

### Additional resources:

Why do some organisms have more DNA than others?

<https://www.youtube.com/watch?v=5LXEQIyOYto>