



## **Strawberry DNA Extraction**

**(adapted from the National Human Genome Research Institute, National Institutes of Health)**

Deoxyribonucleic acid (DNA) is the material that all life on Earth is made from. When you examine DNA under a very powerful microscope, you will see two parallel strands that twist around each other to form the shape of a double helix. These strands carry genetic instructions for the growth, functioning and reproduction of a life form. The genome of a strawberry (the complete set of its DNA) is very large and can be easily extracted, which means more DNA can be extracted from the strawberry than from any other fruit.

### Materials

1. Large, sealable freezer bags
2. Strawberries
3. Table salt
4. Dish detergent
5. Water
6. Isopropyl alcohol (chilled)
7. Coffee filters
8. Plastic cups
9. Coffee stirrers

### Directions

1. Take two strawberries and remove the stems. Place strawberries inside a plastic bag, seal the bag and mash the strawberries into a pulp. This will start to break down the cell walls and release the cytoplasm which contains the DNA.
2. In a plastic cup, mix 2 tsp of detergent, 1 tsp of salt and  $\frac{1}{2}$  cup of water to make DNA extraction formula. The salt breaks up the protein chains that bind the DNA together. The detergent breaks down fats in the cell membrane, which enables the DNA to escape from the nucleus of the cell.

3. Add 2 tsp of DNA extraction formula to the bag of strawberry pulp. Reseal bag and continue to mash for another minute. Don't make too many soap bubbles.
4. Place coffee filter inside the top of another plastic cup. Open bag and pour strawberry mixture into filter. You can gently squeeze the pulp through the filter until all the pulp is in the cup. The filter will trap larger cellular material, while the small and tightly wound DNA strands slip through.
5. Tilt the cup and pour an amount of isopropyl alcohol that is equal to the amount of pulp in the cup. Do not shake or stir. The alcohol will help to separate the DNA from the rest of the material because DNA is not soluble in alcohol.
6. You should see some white strands forming at the top of the strawberry mixture. This is the DNA. You should be able to pick up a clump of DNA using the tip of a coffee stirrer.

### Discussion

Why would it be useful for scientists to extract and study DNA from different forms of life?

Every life form has its own unique DNA. So when you eat a strawberry, you are ingesting its DNA, which is different from your own. Is it safe? Does it get mixed up with your DNA?

*Answer: Yes, it is safe. Enzymes from our pancreas break down the DNA into little bits that enter our bloodstream and can be reassembled into new forms.*