

# New ammunition



## Lab activity 2: Extracting fruit DNA



### Extracting fruit DNA [deoxyribonucleic acid]

**Genes** are part of an amazing molecule called DNA. There's some **DNA** in each one of the billions of cells that make up your body. We've known about DNA for over 60 years now, but we're only just beginning to learn how to work with genes to treat genetic diseases.

We know from TV how forensic scientists can use DNA matching to help track down criminals, but understanding how genes work is unlocking a whole new approach to medicine. 'Gene therapy' or 'genetic medicine' could soon bring about treatments and even cures for serious conditions like **cystic fibrosis** that we could only dream of a few years ago.

Most of the DNA in a cell is in the **nucleus**. Around that, there's the cell's jelly-like **cytoplasm**. The whole lot is surrounded by the **cell membrane** and then a tough **cell wall**. DNA molecules are packaged up inside **chromosomes**. Humans have 46 chromosomes in their cells. If you want to study DNA, first you need to get it out from inside the cells without damaging it. This takes some skillful chemistry, and that's what you're going to try to do today.

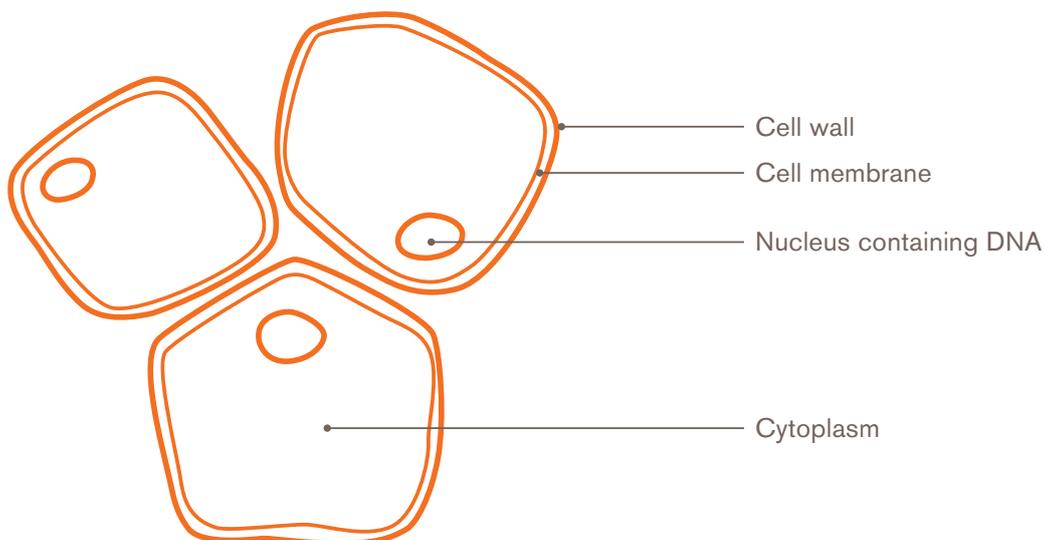


Janette Laroche

Medicines Development Leader

*"My role as a Medicines Development Leader allows me to see and work with all aspects of drug development. At the moment, we are working on the development of a drug for migraine."*

Read Janette's full story [www.gskscienceeducation/careers](http://www.gskscienceeducation/careers)



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Lab activity 2: *Extracting fruit DNA*



## Your group will need:

- One kiwi fruit
- A vegetable peeler or knife
- One 5 ml teaspoon
- A pestle and mortar
- Washing up liquid
- Table salt
- Hot water at about 60–70 °C
- A funnel and two pieces of filter paper
- Two 250 ml glass beakers
- A 30 ml measuring cylinder
- Ice cold surgical spirit (or ethanol), straight from the freezer
- A glass stirring rod
- A paper clip, partly unbent to make a little hook

## SAFETY

- 60–70 °C water is hot enough to scald bare skin.

WARNING



## Try this

1. Peel the kiwi fruit. Throw away the peel and chop the fruit into little pieces.
2. Mash the kiwi fruit up completely with a pestle and mortar.
3. Put 100 ml of hot water into a beaker and stir in one teaspoon of salt and one teaspoon of washing up liquid. Stir gently to dissolve completely, being careful not to make loads of bubbles. This is your 'extraction mixture'.
4. Add some of the extraction mixture to the mashed kiwi fruit and mash it up together really well. This is when the DNA is extracted from the kiwi cells – the better you mash, the more DNA you'll get.
5. Tip the kiwi mash into the beaker with the rest of the extraction mixture and stir to mix. Leave it for 15 minutes to finish the DNA extraction.
6. Carefully filter the mixture into a clean glass beaker. Throw away the filter paper.
7. Measure out 20 ml of the freezing cold surgical spirit into a measuring cylinder. Tilt your beaker of kiwi mixture and gently dribble the surgical spirit down the inside. Take your time. If you are careful you'll get a clear layer of spirit floating on top of the kiwi mixture.
8. The kiwi DNA should make a white, jelly-like layer in between the kiwi mixture and the surgical spirit. Hook it out with your paper clip and put it on a clean piece of filter paper. You're looking at real DNA, extracted from the millions of cells in your kiwi fruit.

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## Looking at your results

1. Kiwi fruit has 174 chromosomes in each cell, compared with 46 chromosomes in each of your cells. Why do you think this makes kiwi fruit good for this experiment?
2. Apart from identical twins, everybody's DNA is different. How can this help police match a suspect with a sample of DNA from a crime scene?
3. Cystic fibrosis is an inherited disease, which means it's caused by DNA passed down from your parents. Find out how it affects people who have it, and how it's treated.
4. Find out the names of two other diseases that are caused by genes.