EASY DNA EXTRACTION

DNA can be found almost everywhere, but we rarely see it in its pure form. Isolating DNA is actually quite easy, here you can see how to isolate your own DNA from saliva, or from for instance strawberries or bananas.

Materials

- Test tube and cap + saliva (± 1 mL) or
  Ziplock bag + 5 strawberries / 1 banana / other fruit
- Several drops of dish soap
- Pinch of table salt
- Isopropyl alcohol or any strong alcohol (± 5 - 6 mL)
- Wooden stick

Methods

Step 1: Sample collection

Add about 1 mL of saliva to your test tube. This works best if you think about your favourite food while working your tongue against your cheeks and teeth, to get as many DNA-containing cheek cells in there.
OR
Put about 5 strawberries or any fruit in a ziplock bag, close it and smash! Keep squishing the bag until the fruit is completely mushy and mixed.

Step 2: break open the cells

Add 1-2 drops of soap to your tube of saliva or ziplock bag.

The soap will cause the cells to break open in your sample. The detergents in the dish soap destabilize the membranes of the cells, making them spill their contents into the solution. There are a lot of things in a cell apart from DNA, so in the next steps we will make the DNA clump together.

Step 3: salt

Add a pinch of table salt to your sample. Mix the solution in the tube or ziplock bag for a minute by gently flicking or inverting the tube, or by squishing the closed bag.

We have previously freed the DNA from the cells, but it is still dissolved in the solution. When we dissolve salt in the solution, some of the positively-charged sodium ions interact with the negatively-charged regions of the DNA molecules. This will help them clump together in the next step.

Normally, individual DNA molecules resist each other like the south poles of two magnets when you try to push them together. If you insert the north pole of a third magnet between the south poles of the first two, the resistance is reduced. This is similar to what the sodium ions do in our solution.

Step 4: DNA clumping

Add 5 - 6 mL alcohol and gently invert the tube with the cap on to mix, or gently squeeze the closed ziplock bag.

DNA is hydrophilic ('water loving'), so it will dissolve well in water. DNA is not soluble in alcohol, so adding this causes the DNA to come out of the water. When gently mixing, you should see cloudy, snot-like white stuff appear. This is the DNA coming out of the solution!

Step 5: spool your DNA

Use a wooden stick to spool your DNA and lift it out of the tube. Insert the stick into the DNA precipitate and gently swirl it around, rotating the stick at the same time. When you then slowly lift the stick out of the solution, you can see snotty white strands that are DNA!

CONGRATULATIONS, YOU SUCCESSFULLY EXTRACTED DNA!

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