

I didn't know that

What is DNA?

In the nucleus of every cell in your body, there are chromosomes. These chromosomes are made up of a chemical called DNA. Sections of DNA are called genes and genes control all processes inside your cells and how your body works, as well as your appearance.

It is thought that humans have about 30,000 genes. They are always arranged on the chromosomes in the same order.

DNA profiling or fingerprinting is a way of identifying an individual organism from its genetic material.

DNA fingerprinting

Proving that a suspect's DNA matches a sample left at the scene of a crime requires two things:

- Creating a DNA profile
- Comparing DNA profiles to find a match

We are all 'unique' and not like anyone else in the world. Unless you are an identical twin your DNA is unique to you!

Humans have 23 pairs of chromosomes containing the DNA blueprint that codes for all the materials needed to make up your body as well as the instructions for how to run it.

One member of each chromosomal pair comes from your mother, and the other is from your father. Your DNA is similar to your parents so profiling can be used for paternity testing.

Every cell in your body that has a nucleus contains a copy of your DNA.

While the majority of DNA doesn't differ from human to human, there are some parts that vary from person to person. The key to DNA evidence lies in comparing the DNA left at the scene of a crime with a suspect's DNA in these chromosomal regions that do differ.

General procedure for DNA analysis:

1. Collect the DNA.
2. Cut the DNA up into fragments
3. Sort the DNA fragments by size using **gel electrophoresis**
4. Compare the DNA fragments in different samples with crime scene DNA

DNA can be collected from a sample such as blood, saliva, semen, tissue, hair, dandruff, earwax and even fingerprints. DNA has to be cleaned up because samples from a crime scene are often contaminated with dirt and other debris. Red blood cells do not have a nucleus but white blood cells are found in your blood and these do have nuclei.

In **gel electrophoresis** DNA is loaded into jelly-like agar and placed in an electric field.

The DNA is separated by size because:

- DNA, being negatively charged, is pulled through the gel toward the positively charged electrode.
- Larger fragments move more slowly than smaller ones through the porous agar.

Once you have separated the DNA, you can determine the relative size of each fragment based on how far it has moved through the agar. Bands show in the gel where fragments of DNA of the same size have collected and these bands are similar to a bar code on items you buy at the supermarket. Some bands are unique to an individual so DNA can be used to identify an individual in the same way your shopping is identified at the checkout of the supermarket.

DNA from suspects can be compared to DNA extracted from evidence found at the crime scene.