

In the centre of every plant cell - from algae to sunflowers - and in the centre of every animal cell - from snails to you and me - there's a copy of the organism's genetic material.

# DNA

The DNA carries a complete blueprint of the organism. It's what transfers characteristics from one generation to the next.

At the chemical level the cells of all plants and all animals contain DNA in the same shape - the famous "double helix" that looks like a twisted ladder. What's

more, all DNA molecules - in both plants and animals

- are made from the same four chemical building blocks - called nucleotides. What is different is how these four nucleotides in DNA are arranged.

## Genetics

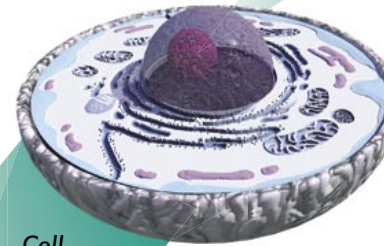
Genetics is about storing and passing on messages.

These genetic messages are stored in your DNA, which is inside almost every cell in your body. DNA tells cells what they're supposed to do, when, where and how - to keep



DNA strands tightly coiled into chromosomes

Cell nucleus



Cell

your body working well.

Our understanding of genetics stems from the discovery of the DNA molecule in every cell, which carries the genetic information.

DNA as you.

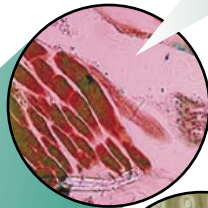
James Watson and Francis Crick found out that DNA looks like two threads twisted around each other, held together by many bridges between the strands. It almost looks like a spiral staircase. This shape is called a double helix. The genetic information is stored on the threads.

## Where can DNA be found?

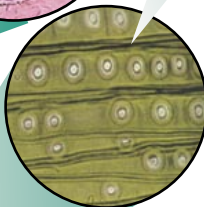
In the nucleus of almost every cell in your body, and that of every other living thing, is the collection of DNA needed to make you. DNA in the nucleus is grouped into 23 sets of chromosomes that are called your "genome". In each chromosome, the DNA is grouped into "genes". Your genome contains about 35,000 genes. Each gene carries information that tells the cell to make a unique protein that will perform a

## What is DNA?

DNA is an acid that carries (as genes) all the information which we inherit from our parents. It controls everything about the way you look, from the colour of your eyes to how tall you are to the width of your feet. Your DNA is like your thumbprint. It is yours and yours alone. Unless you have an identical twin, no one else on the planet has exactly the same



Tissue



special function.

How does something as small as DNA molecules contain all of the instructions to make your whole body and keep it working? Just as a large number of words can be made from only a few letters, so DNA can make lots of different instructions from a few building blocks.



## 1953 - 2003

In 2003, the world celebrated the 50th anniversary of the discovery of the DNA structure. In 1953, Francis Crick and James Watson published the first accurate model of the DNA molecule.

## How knowledge about DNA affects us

Scientists are working to understand the genetic messages that make some people respond to medicines differently than others and make some people more prone to certain diseases than others. They use this knowledge to make new medicines to help people live healthier lives.

DST launched a three-year programme to tell South Africans about Biotechnology (see [www.pub.ac.za](http://www.pub.ac.za)). This is the part of science that uses the DNA building blocks of life to make useful products from living things.

A MONK, GREGOR MENDEL, WONDERED HOW THE OFFSPRING OF TWO RED FLOWERED PEA PLANTS COULD HAVE WHITE FLOWERS.

HE SUGGESTED THAT FEATURES LIKE FLOWER COLOUR WERE PASSED ON IN PACKAGES WHICH DO NOT MIX. WE NOW CALL THESE PACKAGES **GENES**.

CAN YOU ROLL YOUR TONGUE? DO YOU HAVE A WIDOW'S PEAK? WHAT DO YOUR EARLOBES LOOK LIKE? ALL THESE FEATURES ARE PASSED FROM PARENTS TO CHILDREN THROUGH THEIR GENES.

free earlobe  
attached earlobe

widow's peak

The comic strip consists of several panels. The first panel shows a monk, Gregor Mendel, standing in a garden with a church in the background. The second panel shows two pea plants, one with red flowers and one with white flowers, with a plus sign between them and an equals sign followed by a pea plant with red flowers. The third panel shows a man with glasses asking questions about tongue-rolling, widow's peaks, and earlobes. The fourth panel shows two children, one with a tongue-rolling ability and one without. The fifth panel shows two men, one with a widow's peak and one without. The sixth panel shows two women, one with a free earlobe and one with an attached earlobe.