

# What is a gene?

Genes hold hereditary information. All the instructions (about 25,000 genes) that make us who we are can be found in every cell of our body.

DNA (deoxyribonucleic acid) is a long strand of many genes and a chromosome is a single strand of DNA.

We have 23 pairs of chromosomes in every cell. This paired arrangement is because we inherit one of each pair of chromosomes from each parent. Babies inherit half their genes from their mother and half from their father.

Twenty-two of these pairs of chromosomes are the same in males and females. One of the pairs, the sex chromosomes, is different in males and females. Females have two X chromosomes while males have an X and a Y chromosome. The Y chromosome carries genes that determine male characteristics.

Some genes control simple characteristics like the colour of our hair and how tall we are, while others influence complex characteristics like intelligence. Some genes control how other genes work, telling them when to switch on and off and how much protein to make.

With 25,000 or so genes, there are bound to be some that are altered. We all carry genetic alterations (mutations). An alteration in an unimportant gene may have little effect on our lives. But an alteration in an important gene, so that it doesn't work properly any more, or if the gene is missing altogether, could have serious consequences. A gene alteration can run in families, but may also occur as a random event, without any previous family history.

Scientists have now discovered what our DNA looks like and they know quite a lot about many genes.

But scientists are still a long way from knowing what all the genes do. There are still conditions which seem to have a genetic basis, but nobody yet knows what genetic alterations are involved. Also, there are still conditions that clearly have a genetic basis, for which no tests are available.

The knowledge available now is incomplete and may not be able to provide all the answers. But existing knowledge can help many people to a better understanding of a genetic disorder in their family.

## Contacts and further information

- Your local genetic service, which you can contact through your nearest community health centre, public hospital or health department.
- Australasian Genetic Alliance at <http://www.australasiangeneticalliance.org.au>
- MyDr at <http://www.mydr.com.au>
- The Centre for Genetics Education at <http://www.genetics.edu.au>
- HealthInsite at <http://www.healthinsite.com>
- MedicineNet at <http://www.medicinenet.com>
- For other related fact sheets, you can contact the Gene Technology Information Service on **free call Australia-wide 1800 631 276** or email [gtis-australia@unimelb.edu.au](mailto:gtis-australia@unimelb.edu.au) or visit Biotechnology Australia's website at <http://www.biotechnology.gov.au>