

📖 Topic Page: [Chromosome](#)

Definition: **Chromosomes** from *Black's Medical Dictionary, 43rd Edition*

The rod-shaped bodies to be found in the nucleus of every cell in the body. They contain the GENES, or hereditary elements, which establish the characteristics of an individual. Composed of a long double-coiled filament of DNA, they occur in pairs – one maternal, the other paternal – and human beings possess 46, made up of 23 pairs. The number of chromosomes is specific for each species of animal. Each chromosome can duplicate an exact copy of itself between each cell division. (See GENETIC CODE; GENETICS; HEREDITY; MEIOSIS; SEX CHROMOSOMES.)

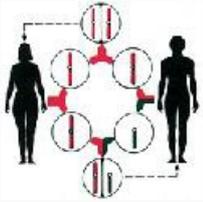


Image from: [The 46 chromosomes in somatic \(non-reproductive\)... in Philip's Encyclopedia](#)

Summary Article: **chromosome**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Structures in a cell nucleus that carry the many thousands of genes, in sequence, that determine the characteristics of an organism. There are 46 chromosomes in a normal human cell. Each chromosome normally consists of one very long double strand (or molecule) of DNA, coiled and folded to produce a compact structure. The exception is just before cell division when each chromosome contains two double strands of DNA, a result of the copying of each molecule of DNA. The point on a chromosome where a particular gene occurs is known as its locus. Most higher organisms have two copies of each chromosome, together known as a **homologous pair** (they are diploid) but some have only one (they are haploid). See also mitosis and meiosis.

In a working cell chromosomes exist in a less dense form called chromatin and cannot be seen using a laboratory light microscope. However, during cell division they get shorter and fatter and so become visible. When pictures are seen of chromosomes, they have usually been taken in this state during mitosis. In such pictures of human chromosomes it can be seen that most chromosomes in a cell have a matching chromosome of exactly the same size. These are known as homologous pairs. However, one pair is not matched. These are the sex chromosomes – a short, male determining one called the Y chromosome and the X chromosome. Males have an X and a Y chromosome and females have two Xs.

In a sex cell (gamete) that has been produced by meiosis, the number of chromosomes is halved. Only one chromosome from each pair of homologous chromosomes is found in a gamete.

In bacteria, the entire genome of the cell is arranged as a circle of double-stranded DNA, which is also referred to as the bacterial chromosome. By contrast, all eukaryotes, including single-celled yeasts, protists, and algae, have linear chromosomes very similar to our own.

Artificial chromosomes The first artificial human chromosome was built by US geneticists in 1997. They constructed telomeres, centromeres, and DNA containing genetic information, which they removed from white blood cells, and inserted into human cancer cells. The cells assembled the material into chromosomes. The artificial chromosome was successfully passed onto all daughter cells.

DNA sequencing The first human chromosome to have its DNA sequenced was chromosome 22. Its 545 genes and 33.5 million bases were sequenced by UK researchers by the end of 1999, leaving only

a few gaps. It is one of the smallest human chromosomes, and has been linked to a number of disorders, including schizophrenia and trisomy 22 (a common cause of miscarriage). The last one to be completely sequenced was the chromosome 1, which was published in spring 2006.

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Chromosomes and genes

Chromosomes and cell division

Structure of DNA and protein synthesis

The Human Genome Project

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