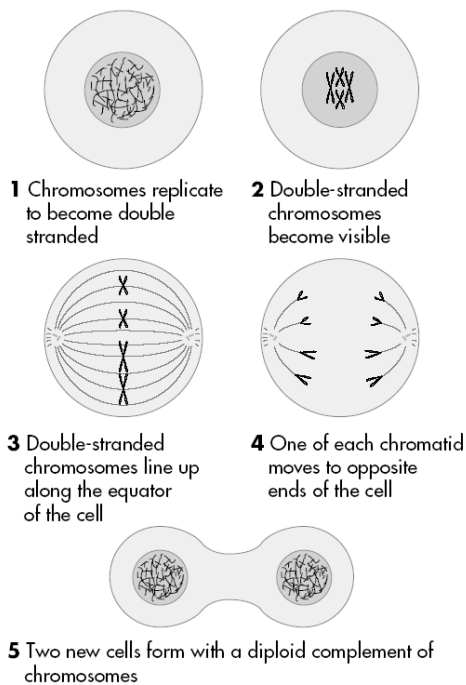


Mitosis

Mitosis is the process that most cells use to divide. It is the process whereby a single cell divides to form two identical daughter cells. These daughter cells carry the same diploid number of chromosomes and exactly the same genetic information as the parent cell. The DNA within the nucleus has already duplicated itself when the cell starts to divide. The chromosomes shorten and thicken, becoming visible under a microscope. Each chromosome can now be seen to consist of two strands attached at only one point, the **centromere**. Each chromosome has made a copy of itself and now consists of two identical strands or **chromatids**.

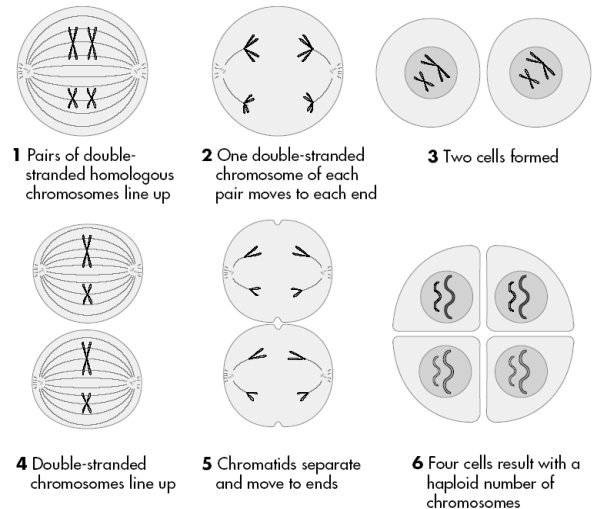
The process is precise. The 'double-stranded' chromosomes line up down the middle of the cell and split into their two chromatids. The chromatids move to opposite ends of the cell and when one of each chromatid reaches its destination, the cell divides into two identical cells, each with the same number of chromosomes as its parent.



Where do Ova and Sperm come from

Meiosis is a special type of cell division used only for the production of **gametes**— sperm or egg cells. When gametes unite at the point of fertilisation their nuclei combine. If two human gametes each had 46 chromosomes and were to combine at fertilisation they would produce a single cell (or **zygote**) with 92 chromosomes. This cell would no longer be the cell of a human. Hence, it is important for the gametes to be produced with only a haploid number of chromosomes so that the zygote that is produced has the correct diploid number of chromosomes.

Meiosis is similar to mitosis except that there are two divisions with four haploid cells being produced. The first division involves the separation of the pairs of chromosomes and the second division the separation of the chromatids.



Questions

Why is it essential for the chromosomes to replicate before cell division occurs?

Why is it important for the 'double-stranded' chromosomes to line up in single file down the centre of the cell prior to its splitting in two during mitosis?

If a cell started off with 28 chromosomes prior to going through mitosis how many chromosomes would it end with?

Why is it important for the cells that are produced to be identical to the parent cell in mitosis but not in meiosis?