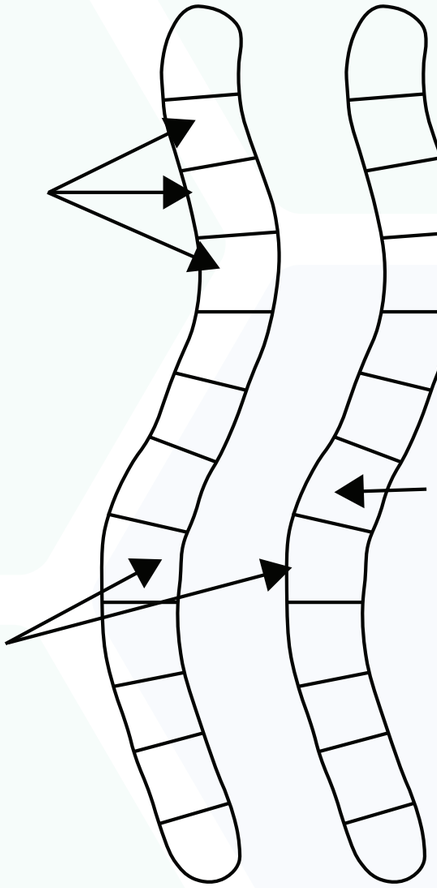
Cell division and stem cells

Inside the cell nucleus:

Chromosomes are linear arrangements of genes.

Chromosomes come in pairs, one from each parent. So, genes come in pairs. An allele is a different version of the same gene. For example:
Gene = eye colour
Allele = brown, blue, green or hazel



Genes code for characteristics.

Stem cells

Stem cells are undifferentiated cells that can differentiate into any other type of cell.

Sources of stem cells are:

- embryonic tissue
- adult stem cells that occur in some tissue.

Stem cells can be used to replace damaged or diseased tissue and so have many medical applications.

If possible, it is better to use your own stem cells for the following reasons:

- no rejection
- no need to find a donor
- no need for tissue typing
- avoids the use of embryonic stem cells which raises particular ethical issues.

Cell division – Mitosis

Mitosis is a type of cell division which organisms use for:

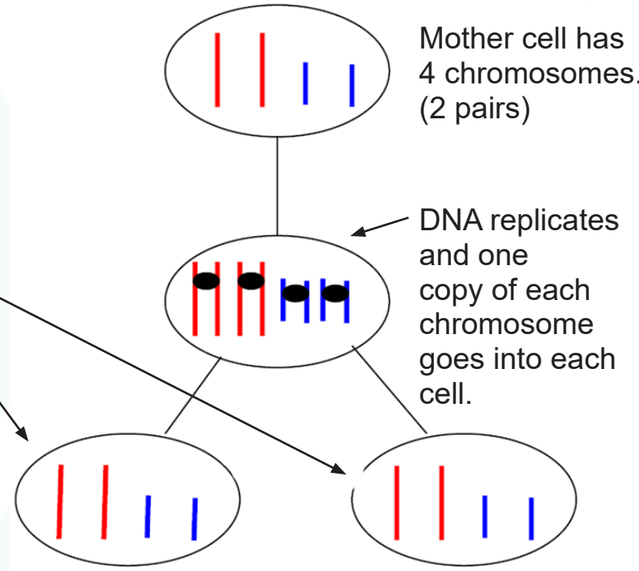
- growth
- repair of damaged cells
- replacement of old cells.

Mitosis produces 2 daughter cells.

Each daughter cell is:

- genetically identical
- has the same number of chromosomes as the mother cell.

Cancer is the result of uncontrolled mitosis.



Meiosis

Meiosis is the type of cell division which only occurs for:

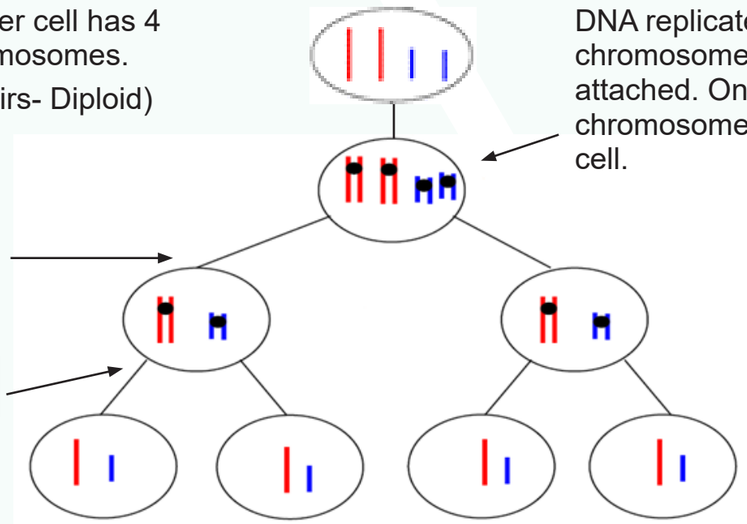
- formation of sex cells(**gametes**) like eggs and sperm for **sexual reproduction**.

Mother cell has 4 chromosomes.
(2 pairs- Diploid)

DNA replicates but the chromosome and its copy remain attached. One of each pair of chromosomes goes into a new cell.

Division 1

Division 2



- 4 new cells are formed.
- Each cell has half the chromosomes the mother cell has - they are haploid.
- Cells are not genetically identical to the mother cell.