

# 1.12 MEIOSIS



## Production of cells which are genetically different

Sexual reproduction involved the fusion of two cell nuclei from two different individuals in order to produce offspring. Each cell contributes half of the total genetic information (**genome**) required by the offspring. This means that special cells containing half the adult number of chromosomes must be produced. Such cells are called **gametes**. The fusion of a male and female gamete produces a **zygote** which can divide via mitosis to grow into a new individual organism.

The process which produces gametes is not mitosis, but a different process called **meiosis** which happens at specific regions of the adult organism – the **gonads** (sex organs). Most adult cells of eukaryotes contain two sets of chromosomes (for example, humans have 46) – they are said to be **diploid**. The chromosomes are **homologous**, this is all contain the same genes but different **alleles** (versions of a gene). During meiosis, only one chromosome from each homologous pair goes into the daughter cell.

The daughter cell will therefore be **haploid** (only contain one set of chromosomes, for example, humans have 23). The haploid cells are not all genetically identical because they contain different alleles of the genes they were allocated from the adult cells.

Meiosis is different to mitosis in two important ways:

-  Meiosis produces cells containing half the number of chromosomes
-  Meiosis produces cells that are genetically different to each other and to the adult cell

These features, together with the fusion of gametes from different individuals, means that the offspring of sexually reproducing organisms are always different from each other (apart from identical twins, which are natural clones).

