Meiosis

- The specialised kind of cell division that reduces the chromosome number by half results in the production of haploid daughter cells called **meiosis**.
- It is responsible for formation of haploid gametes, which during sexual reproduction form diploid zygote by fusion.
- Meiosis involves two sequential cycles of nuclear and cell division called **meiosis I** and **meiosis II** but only a single cycle of DNA replication.
- Interphase of meiosis is similar to interphase of mitosis.

**Meiosis I**

**Prophase I**

- Prophase of the meiosis I division is typically longer and more complex than prophase of mitosis.
- It has been further subdivided into the following five phases based on chromosomal behavior.

- **Leptotene**
  - Chromosomes become gradually visible under the light microscope. (Bouquet phase)

- **Zygotene**
  - Homologous chromosomes start pairing together and form synaptonemal complex or tetrad by synapsis.

- **Pachytene**
  - Appearance of *recombination* nodules.
  - **Crossing over** occurs between non-sister chromatids of the homologous chromosomes.

- **Diplotene**
  - Dissolution of the synaptonemal complex.
  - Recombined chromosomes of the tetrad separate from each other except at the sites of crossovers. These X-shaped structures, are called *chiasmata*.

- **Diakinesis**
  - Terminalisation of chiasmata.
  - Chromosomes are fully condensed.
  - Meiotic spindle is assembled to prepare the homologous chromosomes for separation.
  - By the end of diakinesis, the nucleolus and nuclear envelope disappear.