

CBSE Class-11 Biology

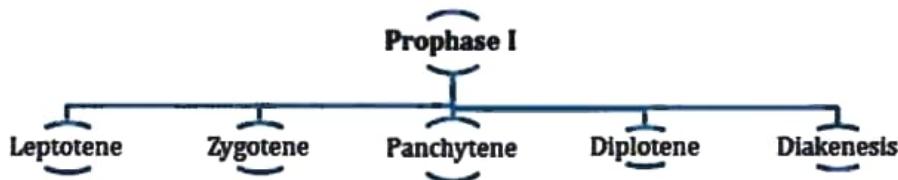
CHAPTER-10

CELL CYCLE AND CELL DIVISION

Meiosis- The cell division that reduces the number of chromosome into half and results in the production of haploid daughter cells is called meiosis. It helps in production of haploid phase in the life cycle of sexually reproducing organism. It involves following events.

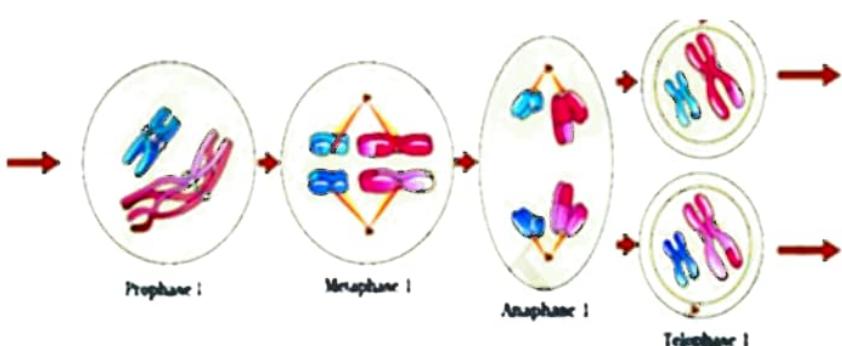
1. Two sequential cycles of nuclear and cell division called meiosis I and meiosis II but single cycle of DNA replication.
2. It involves pairing of homologous chromosome and recombination of them.
3. Four haploid cells are formed at the end of meiosis II.

| Meiosis I | Meiosis II |
|------------------|-------------------|
| Prophase I | Prophase II |
| Metaphase I | Metaphase II |
| Anaphase I | Anaphase II |
| Telophase I | Telophase II |



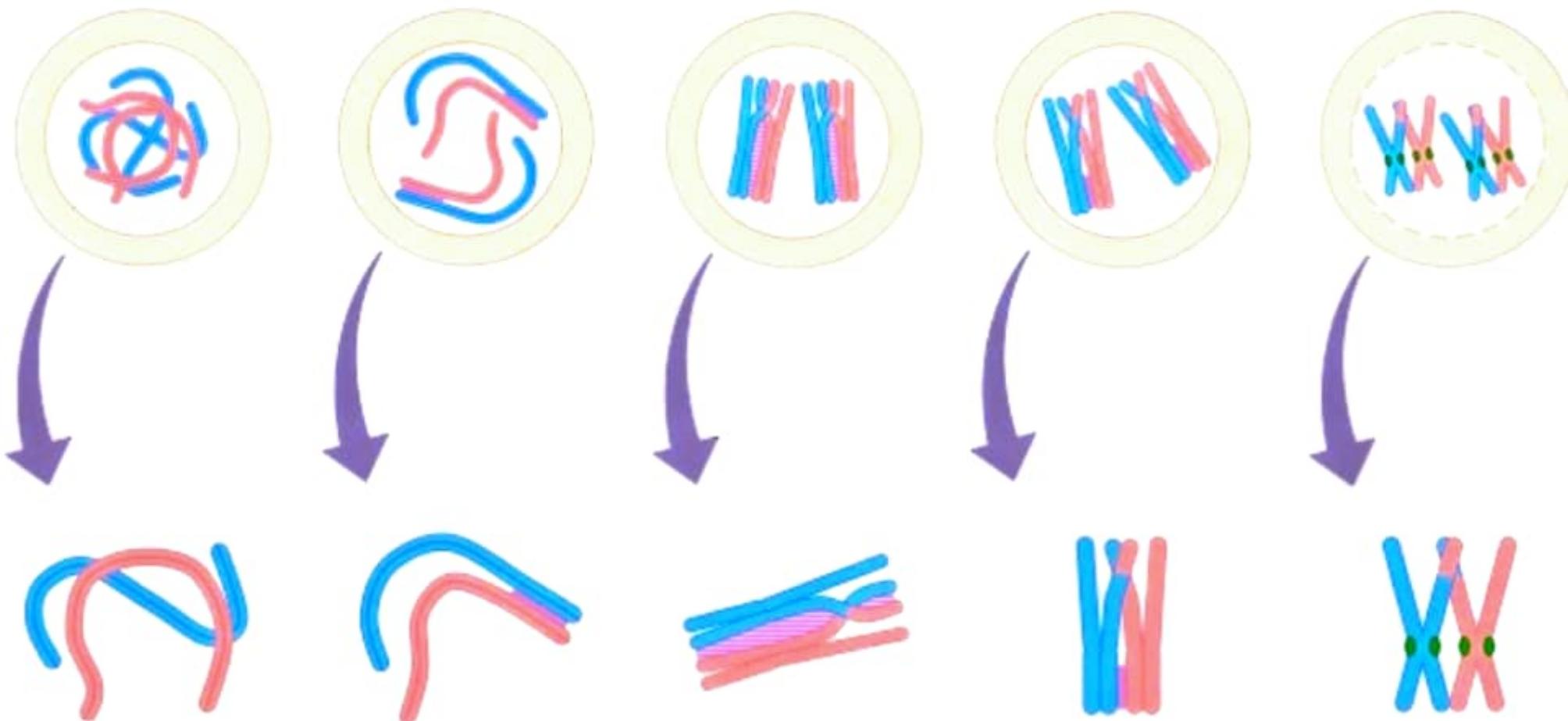
- During **Leptonene**, the chromosome becomes distinct and visible under microscope. Compaction of chromosome continues throughout the leptotene phase.

- During **Zygotene** stage, chromosomes start pairing together (**synapsis**). The paired chromosomes are called **homologous chromosome**. Synaptonemal complex formed by a pair of homologous chromosome is called bivalent or a tetrad.
- During **Pachytene** stage, crossing over between non-sister chromatids of homologous chromosome occurs for exchange of genetic materials. The crossing over is enzyme –mediated process which involves enzyme recombinase.
- **Diplotene** is recognized by dissolution of synaptonemal complex and tendency to separation of bivalent except at the site of crossing over. This forms an X like structure called **chiasmata**.
- **Diakinesis** is marked by terminalisation of chiasmata. The nuclear membrane breaks and nucleolus disappear.
- In **metaphase I** the bivalent chromosome align at equatorial plate and microtubules from the opposite poles of the spindle get attached to the pair of homologous chromosomes.
- **Anaphase I** – homologous chromosome separate but sister chromatids remain attached at centromere.



- During Telophase I, nuclear membrane and nucleolus reappears and cytokinesis follows. This is called as diad of the cells.
- The stage between two meiotic divisions is called **interkinesis** and it is short lived that follows Prophase II.

LEPTOTENE → ZYGOTENE → PACHYTENE → DIPILOTENE → DIAKINESIS



Prophase begins
Chromosomes
start to condense

Synapsis begins
Synaptonemal
complex forms

Crossing over
DNA exchanged by
non-sister chromatids

Synapsis ends
Chiasma visible
within bivalent

Prophase ends
Nuclear membrane
disintegrates