

Cell Division (meiosis)

LAB:11

Meiosis takes place in all organisms that produce sexually, in animal, it occurs during gamete formation (gametogenesis) in special cells of the **gonads**. In plants, it occurs during formation of spore in special cells of the **sporangia**

During meiosis, the genetic material is reduced by half. the resulting daughter nuclei contain **only one_half** the number of chromosomes of parental nucleus.

In the body cells of most eukaryotes, chromosomes exist in pairs called homologous chromosome i.e. there are two chromosome. when both homologous chromosomes (one chromosome comes from each parent) are present in the same nucleus, the nucleus is diploid ($2n$), when only one of the homologous chromosomes is present, the nucleus is haploid ($1n$).

Meiosis consists of two nuclear division, meiosis I and meiosis II with an a typical interphase between the division during which cell do not grow and syntheses of DNA does not take place. Because meiosis has two division four daughter haploid cells result. The haploid cells become sperm in (males), eggs in (females) or spores (in plant).

The end result of one meiosis will be four cells with half the number of chromosomes as the parent cell.

There are two successive division in meiosis, which in plant occur without a pause. mitosis takes roughly 24 hour, while meiosis takes up two weeks. In some organisms, meiosis takes weeks or years depending on the organism.

Maine steps of meiosis:

Interphase I: Meiosis proceeded by an interphase, during which each of chromosomes replicates, this process is similar to the chromosome replication preceding mitosis. for each chromosome, the result is two genetically identical sister chromatids attached at their centromers.

First: Meiosis I

1-**prophase I** : (A: leptotene, B: zygotene, C: pachytene, D: diplotene, E: Diakinesis)

Homologous chromosome pair (tetrads) and exchange segment (crossing over is the interchange of genetic material between homologous chromosome)

2-**metaphase I** : the tetrads line up.

3-**Anaphase I** : pairs of homologous chromosomes split up.

4-**Telophase I** : two new cells (haploid $1n$).

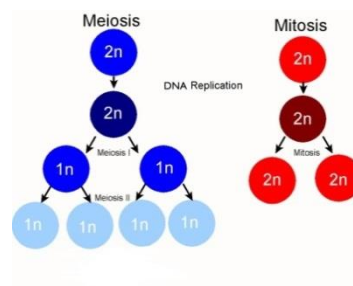
Second: meiosis II

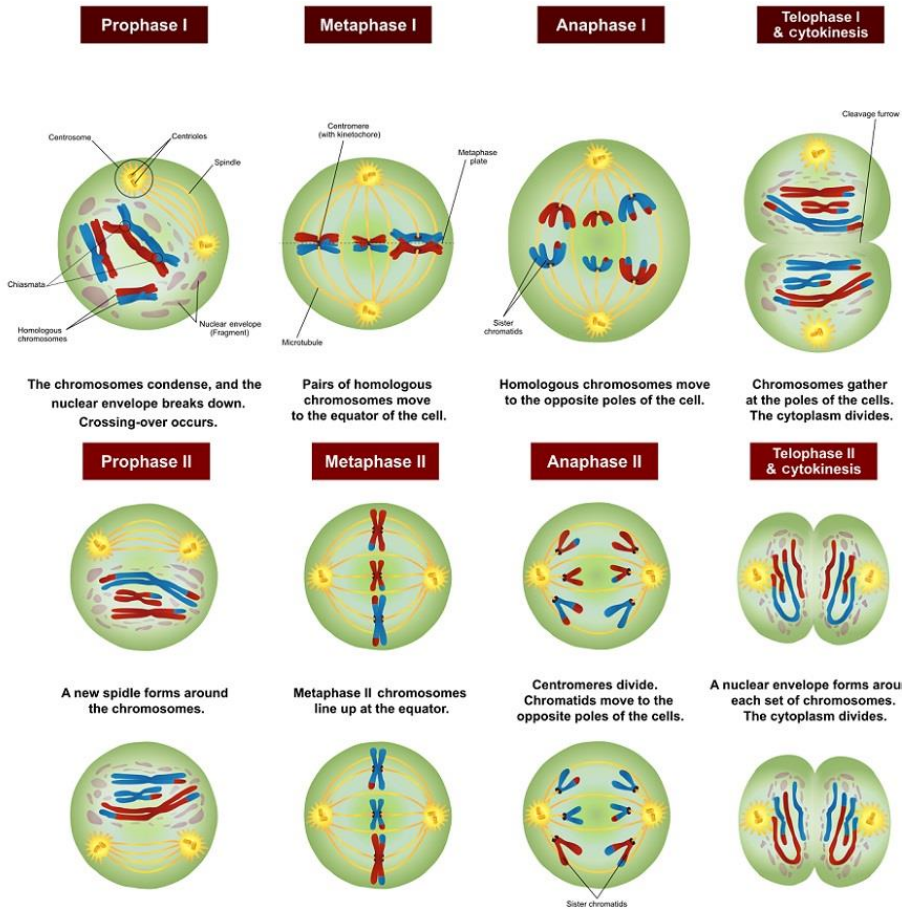
1-**prophase II** : the nuclear membrane disappears , and the mitotic spindles begin to form.

2-**metaphase II**: sister chromatids line up.

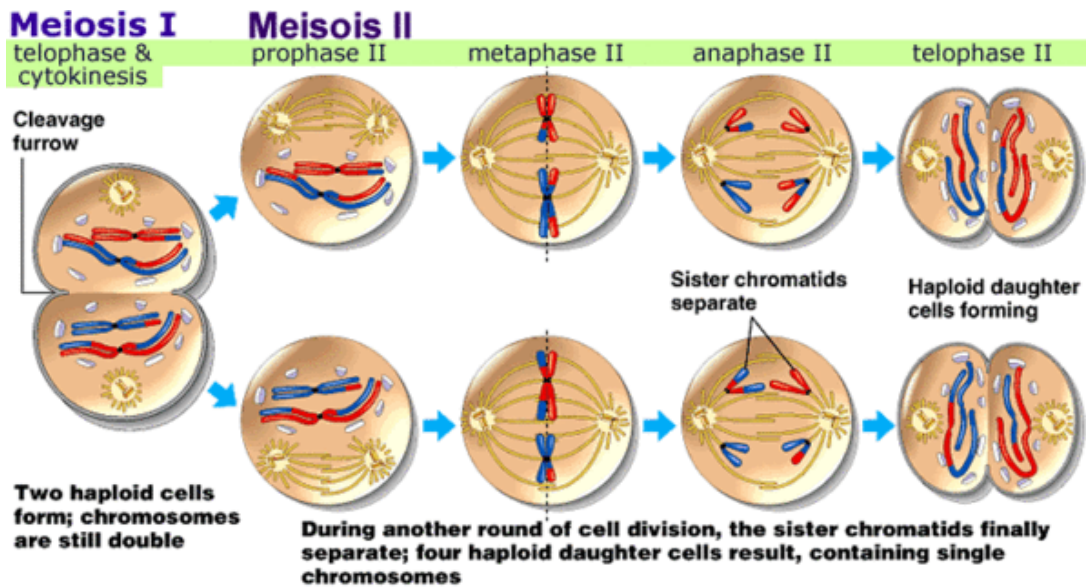
3-**anaphase II** : sister chromatids separate.

4-**telophase II** : four haploid daughter cells are forming.



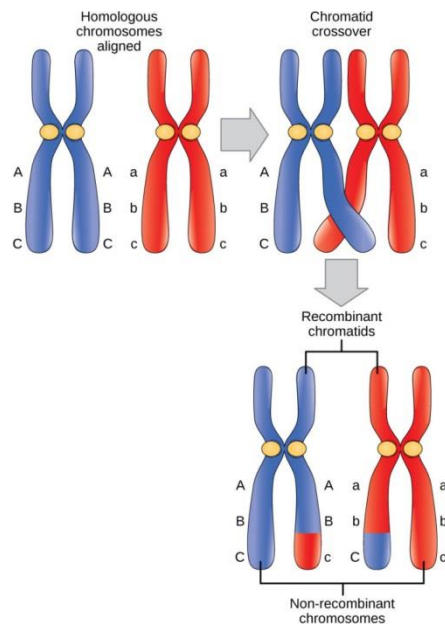


Meiosis I and Meiosis II



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Meiosis II



Crossing over