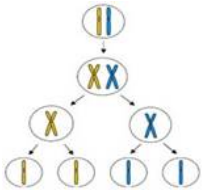
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What is Meiosis?

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Introduction to Meiosis



The production of offspring by sexual reproduction includes the fusion of two gametes, each with a complete haploid set of chromosomes. Gametes are formed from specialized diploid cells. This specialized kind of cell division that reduces the chromosome number by half, results in the production of haploid daughter cells. This kind of division is called meiosis. Meiosis ensures the production of haploid phase in the life cycle of sexually reproducing organisms whereas fertilization restores the diploid phase. We come across meiosis during gametogenesis in plants and animals. This leads to the formation of haploid gametes.

Sequential cycles of Meiosis

Meiosis involves two sequential cycles of nuclear and cell division called meiosis I and meiosis II but only a single cycle of DNA replication. Meiosis I is initiated after the parental chromosomes have replicated to produce identical sister chromatids at the S phase. Meiosis involves pairing of homologous chromosomes and recombination between them. Four haploid cells are formed at the end of meiosis. Meiosis undergoes different phases in Meiosis 1 and Meiosis 2

Meiosis I:

In meiosis I, diploid cell resegregate, producing four haploid daughter cells. It helps in generatinggenetic diversity.

The phases of meiosis I & II

In meiosis I chromosomes are in diploid state and re segregate producing haploid cells. It leads to genetic diversity

Prophase 1:

Replication of DNA starts with meiosis 1. The homologues pair from synapses they are bivalent (two chromosomes and four chromatids, with one chromosome coming from each parent) forming chiasmata caused bygenetic recombination.

Prometapahse 1:

The nuclear membrane vanishes and the chromosomes attached to the spindle fibres begin to move.

Metaphase I:

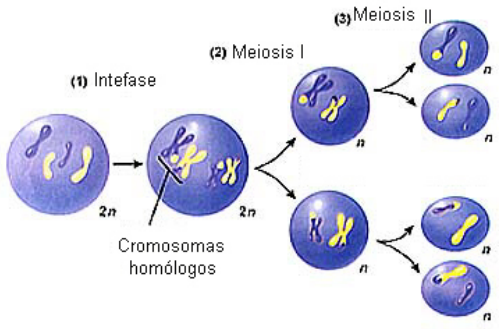
Bivalent chromosome aligns in the plate as four chromatids. They have got 50% chances of getting mother's or father's homologue chromosome.

Anaphase1:

Chromosomes, each with two chromatids, move to separate poles and the Chaismata separates each having 23 pairs of two chromatids

Telophase 1:

The nuclear envelope reforms and may start the process of meiosis 2.



Cytokinesis :

After cytoplasmic division, two complete daughter cells form.

Meiosis 2:

Prophase II:

Meiosis II begins immediately after cytokinesis, and the chromosomes have fully elongated. It is just like mitosis on the contrary. The nuclear membrane vanishes by the end of prophase II the chromosomes again become compact.

Metaphase II:

At this stage the chromosomes align at the equator and the microtubules from opposite poles of the spindle get attached to the kinetochores of sister chromatids.

Anaphase II:

It begins with the simultaneous splitting of the centromere of each chromosome (which was holding the sister chromatids together, allowing them to move toward opposite poles of the cell.

Telophase II:

Meiosis ends with telophase II, in which the two groups of chromosomes once again get enclosed by a nuclear envelope; cytokinesis follows resulting in the formation of tetrad of cells i.e., four haploid daughter cells

What is the difference between a Mitosis and Meiosis?

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Reference Links:

- http://en.wikipedia.org/wiki/Meiosis
- http://en.wikipedia.org/wiki/Mitosis
- http://en.wikipedia.org/wiki/Binary_fission
- http://en.wikipedia.org/wiki/Chromosomes
- http://en.wikipedia.org/wiki/Cell_division
- http://en.wikipedia.org/wiki/Homologous_recombination
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