Errors in mitosis can lead to abnormal cell division, resulting in conditions such as cancer.

Meiosis

Meiosis is a specialized form of cell division that occurs only in germ cells (cells involved in reproduction). It results in four genetically diverse daughter cells, each with half the number of chromosomes of the original cell. Meiosis consists of two successive divisions: meiosis I and meiosis II.

Meiosis I

1. Prophase I: Homologous chromosomes pair up and undergo crossing over (genetic recombination), which increases genetic diversity.

2. Metaphase I : Paired homologous chromosomes align along the metaphase plate.

3. Anaphase I : Homologous chromosomes are separated and pulled to opposite poles.

4. Telophase I: The cell divides into two haploid cells, each containing one member of each chromosome pair.

Meiosis II

Meiosis II resembles mitosis, where the two haploid cells divide again:

1. Prophase II: Chromosomes condense again, and spindle fibers form.

2. Metaphase II: Chromosomes line up at the metaphase plate.

3. Anaphase II: Sister chromatids are separated and move toward opposite poles.

4. Telophase II: Nuclear envelopes reform, and the cells divide into four haploid daughter cells.

Genetic Diversity Through Meiosis

Crossing Over: During prophase I, homologous chromosomes exchange genetic material, resulting in new combinations of genes.

Independent Assortment: During metaphase I, the orientation of homologous chromosomes is random, leading to a variety of possible genetic combinations in the gametes.

Comparisons Between Mitosis and Meiosis

|------Feature----------|----------mitosis----------|----------meiosis----------