

Mitosis and Meiosis

- If the checkpoints do not work...
 - Cancer caused by unrestrained cell division
 - Loses contact inhibition, which is the ability to stop dividing after coming into contact with normal cells
 - Loss of balance between cell division and cell death
- Meiosis
 - A somatic cell is a diploid with 46 chromosomes
 - Gametes are haploid cells with 23 chromosomes, and fertilization restores the diploid #
 - Meiosis halves the number of chromosomes in daughter cells and creates gametes
 - Homologous chromosomes have the same genes, but are not genetically identical
 - Each chromosome is replicated to form a sister chromatid
 - Due to genetic variation, species are more likely to prevail during ecological disasters
 - Overview
 - Takes place in two rounds of division
 - Meiosis I halves the number of chromosomes and shuffles genetic info (diploid cell to two haploid cells)
 - Replicated chromosomes condense
 - Homologous chromosomes line up
 - Crossing over occurs
 - A segment from the maternal chromosome swaps with a segment from the paternal chromosome
 - One of the ways that meiosis produces a lot of genetic variation
 - Homologous chromosomes separate
 - Independent assortment occurs
 - The chromosomes at each pole are a random assortment of paternal and maternal chromosomes
 - Cytoplasm divides and results in two haploid cells
 - Meiosis II produces 4 non-identical haploid daughter cells (gametes)
 - In each new haploid daughter cell, the chromosomes will line up in the middle of the cell and the sister chromatids will be pulled apart
 - Results in 4 haploid, non-identical daughter cells
- DNA Biotechnology
 - DNA Sequencing is used to find out the sequence of DNA bases
 - Uses include
 - Studying disease and disorders caused by mutations
 - Understanding organismal physiology
 - Studying evolutionary patterns among different species
 - Next Gen sequencing
 - Began around ten years ago and can now sequence millions of bp/run
 - Specialized instrument simultaneously targets many areas of DNA