How is mitosis different from meiosis answers

Organisms grow and reproduce through cell division. In eukaryotic cells, the production of new cells occurs as a result of mitosis and meiosis. These two nuclear division processes are similar, but different. Both processes involve the division of a diploid cell, or a cell containing two sets of chromosomes (one chromosome donated from each parent). In mitosis, the genetic material (DNA) is duplicated in a cell and split equally between two cells. The separator cell goes through an ordered series of events called the cell cycle. The mititotic cell cycle is initiated by the presence of certain growth factors or other signals indicating that the production of new cells is necessary. Somatic cells in the body are replicated by mitosis. Examples of somatic cells include fat cells, blood cells, skin cells, or any body cell that is not a sex cell. Mitosis is necessary to replace dead cells, damaged cells or cells that have a short lifespan. Meiosis is the process by which gametes (sex cells) are generated in organisms that reproduce sexually. Gametes are produced in male and female gonads and contain half the number of chromosomes as the original cell. New gene combinations are introduced into a population through the genetic recombination that occurs during meiosis. Thus, unlike the two genetically identical cells produced in mitosis, the mean cell cycle produces four cells that are genetically different. Mitosis and meiosis are nuclear divisional processes that occur during cell division. Mitosis involves the division of body cells, while meiosis involves the division of sex cells. The division of a cell occurs once in mitosis, but twice in meiosis. Two daughter cells are produced after mitosis and cytoplasmic division, while four daughter cells are produced after meiosis. Daughter cells as a result of mitosis are diploid, while those as a result of meiosis are haploid. Daughter cells that are the product of mitosis are genetically identical. Daughter cells produced after meiosis are genetically different. Tetrad formation occurs in meiosis, but not mitosis. Lily Anther Microsporocyte in Telophase II by Meiosis. Ed Reschke/Photolibrary/Getty Images 1. Cell Division 2. Daughter cell number mitosis: Two daughter cells are produced. Each cell is diploid which contains the same number of chromosomes. Meiosis: Four daughter cells are produced. Each cell is haploid which contains half the number of chromosomes as the original cell. 3. Genetic composition mitosis: The resulting daughter cells in mitosis are genetic clones (they are genetically identical). No recombination or crossing over spoon. Meiosis: The resulting daughter cells contain different combinations of genes. Genetic recombination occurs as a result of random segregation of homologous chromosomes in different cells and by crossing over (transmission of genes between homologous chromosomes). 4. Length of Prophase Mitosis: During the first mitotic stage, known as prophase, chromatin to chromosomes, the atomic envelope break down, and spindle fibers are formed on opposite poles of the cell. A cell spends less time in the prophase of mitosis than a cell in prophase I of meiosis. Meiosis: Prophase I consist of five stages and last longer than prophase of mitosis. The five stages of meiotic prophase I am the leptothes, zygots, pachytene, diplots and diakinesis. These five stages do not occur in mitosis. Genetic recombination and crossing above takes place under prophase I. 5. Tetrad formation mitosis: Tetrad formation does not occur. Meiosis: In prophase I, pairs of homologous chromosomes line up close together forming what is called a tetrad. One tetrad consists of four chromosomes (two sets of sister chromomatides). 6. Chromosome adjustment in metaphasemidosis: Sister chromaoma time (duplicate chromosome consisting of two identical chromosomes connected to the centromere region) is adjusted at the metaphase plate (a plane equally distant from the two cell posts). Meiosis: Tetrads (homologous chromosome pairs) adjusts to the metaphase plate in metaphase I. 7. Chromosome separation mitosis: During anaphase, sister chromates separate and begin to migrate centromere first to opposite poles of the cell. A separated sister chromatoma becomes known as daughter chromosome and is considered a full chromosome. Meiosis: Homologous chromosomes migrate to opposite poles of the cell under anaphase I. Sister chromates do not differ in anaphase I. Plant cell in Interphase. In interphase, the cell does not undergo cell division. The core and chromatin are clear. Ed Reschke/Getty Images While the processes of mitosis and meiosis contain a number of differences, they are also similar in many ways. Both processes have a period of growth called interphase, during which a cell replicates its genetic material and organelles in preparation for division. Both mitosis and meiosis involve phases: Prophase, Metaphase, Anaphase and Telophase. Although in meiosis, a cell goes through these cell cycle phases twice. Both processes also involve setting up individual duplicate chromosomes, known as sister chromosomes, along the metaphase plate. This occurs in the metaphase of mitosis and metaphase II of meiosis. In addition, both mitosis and meiosis involve the separation of sister chromatomes and the formation of daughter chromosomes. This event occurs in the anafase of mitosis and anafase II of meiosis. Finally, both processes end with the division of cytoplasm that produces individual cells. Mitosis and meiosis are both processes that describe the production of new cells. Mitosis produces 2 daughter cells that are genetically identical to the parent cell. Each daughter's cell is diploid (contains the normal number of chromosomes). This is the result of DNA replication and 1 cell division. Mitosis is used in growth and asexual reproduction. Meiosis produces 4 daughter cells, each of which is inidentical to the parent cell and to each other. Every daughter cell haploid (contains half the number of normal chromosomes). This is the result of DNA replication, followed by the crossing of homologous chromosomes and the separation of chromosomes. There are two cell divisions: the parent cell divides once and then each cell produced by this first division divides once. Meiosis is used to produce gametes (sperm and egg cells), the cells of sexual reproduction. Two gametes merge to form a zygote, a diploid cell with the full number of chromosomes. Mitosis is a process of asexual reproduction in which the cell divides in two that produces a copy, with equal number of chromosomes in each resulting diploid cell. Meiosis is a type of cellular reproduction in which the number of chromosomes is reduced by half through the separation of homologous chromosomes, producing two haploid cells. The following are the differences between mitosis and Meiosis:1Type of ReproductionAsexualSexual2GeneticallySimilarDifferent3Crossing OverNo, the crossing above cannot occur. Yes, mixing of chromosomes may occur.4Number of divisionsOneTwo5Pairing of HomologsNoYes6Mother CellsCan either haploid or diploidAlways diploid7Number of Daughter produced Cells2 diploid cells4 haploid cells8Chromosome NumberRemains the same. Reduced by half.9Chromosomes Mating Does not occurTake place under the zygots of prophase I and continue up to metaphase I. 10CreatingDoes do anything but sex cells. Sex cells only: female egg cells or male sperm.11Takes Place inSomatic cellsGerm Cells12ChiasmataAbsentObserved under prophase I and metaphase I.13Spindle FibresDisappear completely in telophase. Do not disappear completely in telophase I.14NucleoliReappear by telophase Not reappeared at telophase I.15StepsProphase, Metaphase, Anaphase, Telophase. (Meiosis 1) Prophase I, Metaphase I, Anaphase I, Telophase I; (Meiosis 2) Prophase II, Metaphase II, Anaphase II and Telophase II.16KaryokinesisOccurs in Interphase.Occurs in Interphase I.17CytokinesisOccurs in Telophase.Occurs in Telophase I and in Telophase II.18Centromeres Split Centromeres split during anafase. Centromeres do not distinguish under anaphase I, but under anaphase II.19ProphaseSimpleComplicated20ProphaseDuration of prophase is short, usually by few hours. Prophase is relatively longer and can take days.21SynapsisNo SynapsisSynapsis of homologous chromosomes takes place during prophase.22Exchanging segmentsTwo chromosome time of a chromosome does not exchange segments under prophase. Chromomatides of two homologous chromosome exchange segments during crossing above.23Discovered by Walther FlemmingOscar Hertwig24FunctionCellular reproduction and general growth and repair of the body. Genetic diversity through sexual reproduction.25FunctionTar a part in healing and repair. Takes part in the formation of gametes and maintenance of chromosome number. Cells divide and reproduce in two ways, mitosis and meiosis. Mitosis results in two identical daughter cells, while meiosis results in four sex cells. Below we see keys differences and similarities between the two types of cell division. Mitosis Implies a cell division Results in two daughter cells Results in diploid daughter cells (chromosome number remains the same as parent cell) Daughter cells are genetically identical Occurring in all organisms except viruses Creating all body cells (somatic) except bacterial cells (eggs and sperm) Prophase is much shorter No recombination/ crossing over occurs in prophase. In metaphase individual chromosomes (pairs of chromosomes) line up along the equator. During anafase, the sister chromaties are separated to opposite poles. Meiosis Involves two consecutive cell divisions Results in four daughter cells Results in haploid daughter cells (chromosome number is halved from the parent cell) Daughter cells are genetically different Occurring only in animals, plants and fungi Creates bacterial cells (eggs and sperm) only Prophase I take much longer Involves recombination / crossing over chromosomes in prophase I metaphase I pair chromosomes line up along the equator. During anafase, the sister chromaties move together to the same pole. During anafase II, the sister chromaties are separated to opposite poles. Mitosis Diploid parent cell Consists of interphase, prophase, metaphase, anafase and telophase In metaphase individual chromosomes (pair of chromosomes) line up along the equator. During anafase, the sister chromaties are separated to opposite poles. Ends with cytokinesis. Meiosis Diploid parent cell Consists of interphase, prophase, metaphase, anafase and telophase (but twice!) In metaphase II, individual chromosomes (pairs of chromosomes) line up along the equator. During anafase II, the sister chromaties are separated to opposite poles. Ends with cytokinesis. This page was last updated on 2017-05-17 2017-05-17