Anaphase 2 definition in meiosis

Attention: This post was written a few years ago and may not reflect the recent changes in ® program. We'll gradually update these posts and remove this disclaimer when this post is updated. Thanks for your patience! Meiosis is how eukaryotic cells (plants, animals and fungi) reproduce sexually. It is a process of chromosomal reduction, which means that a diploid cell (this means that a cell with two complete and identical chromosome sets) is reduced to form haploid cells (these are cells with only one chromosome set). The haploid cells produced by meiosis are germ cells, also known as gametes, sex cells or spores in plants and fungi. These are essential for sexual reproduction: two bacterial cells are combined to form a diploid zygote, which grows to form another functional adult of the same species. The process of chromosomal reduction is important for the preservation of chromosomal numbers of a species. If the chromosome numbers were not reduced, and a diploid germ cell was produced by each parent, the resulting offspring would have a tetraploid chromosome set: that is, it would have four identical sets of chromosomes. This number will continue to increase with each generation. Therefore, chromosome reduction is essential for the continuation of each species. Meiosis occurs in two different phases: meiosis I and meiosis II. There are many similarities and differences between these phases, with each phase producing different products and each phase equally essential for the production of viable bacterial cells. What happens before Meiosis? Before meiosis, the chromosomes in the nucleus of the cell replicate to produce twice as much chromosomal material. After chromosome replication, chromosomes differ in sister chromatomas. This is known as interphase, and can further be broken down into two phases of the mediocre cycle: Growth (G), and Synthesis (S). During the G-phase, proteins and enzymes necessary for growth are synthesized, while chromosomal material in the S phase doubles. Meiosis is then divided into two phases: meiosis I and meiosis II. In each of these phases there is a prophase, a metaphase and anafase and a telophase. In meiosis, these are known as prophase I, metaphase I, anaphase I and telophase I, while in meiosis II they are known as prophase II, metaphase II, anaphase II and telophase II. Different products are formed by these phases, although the basic principles of each are the same. Meiosis I is also initiated in the interphase of both G-phase and S-phase, while meiosis II is only preceded by S-phase: chromosomemal replication is not required again. The phases of Meiosis IAfter Interphase I meiose I occur after Interphase I, where proteins are grown in the G phase and chromosomes are replicated in the S-phase. After this, four phases occur. Meiosis I is known as reductive division, as cells are reduced from being diploid cells to being haploid cells.1. Prophase IProphase I am the longest stage of meiose, with three events that occur. The first is the condensation of chromatin in chromosomes that can be seen through the microscope; the other is synapsis or physical contact between homologous chromosomes; and crossed over by genetic material between these synapsed chromosomes. These events occur in five subphases:Leptonema – The first prophase event occurs: chromatin condenses to form visible chromosomes. Condensation and cadwaying of chromosomes occurs. Zygonema – Chromosomes line up to form homologous pairs, in a process known as homology search. These pairs are also known as bivalents. Synapsis happens when the homologous couples join. Synaptonemic complex forms. Pachynema – The third main event of prophase I encounter: the crossing over. Nonsister chromotidides of homologous chromosome pairs exchange parts or segments. Chiasmata form where these exchanges have occurred. Each chromosome is now different from the mother chromosome, but contains the same amount of genetic material. Diplonema – Synaptonemic complex dissolves and chromosome pairs begin to separate. The chromosomes loosen slightly to allow DNA transcription. Diakinesis – Chromosomal condensation is further developed. Homologous chromosomes differ further, but are still associated with a chiasmata, which moves towards the ends of chromotides in a process referred to as terminalization. The nuclear envelope and nucleoli disintegrate, and the mediocre spindle begins to form. Microtubules are attached to the chromosomes at the kinetochore of each sister chromatoma time.2. Metaphase IHomologous pairs of chromosomes align at the equatorial plane in the center of the cell. Independent assortment determines the direction of each bivalent, but ensures that half of each chromosome pair is oriented towards each rod. This is to ensure that homologous chromosomes do not end up in the same cell. The arms of the sister chromaties are converging.3. Anaphase IMicrotubules begins to shorten, pulling one chromosome of each homologous pair to opposite poles in a process known as disjunction. The sister chromium of each chromosome remains connected. The cell begins to prolong in preparation for cytokinesis.4. Telophase IMeiosis I quit when the chromosomes of each homologous couple come to conflicting poles of the cell. The microtubules disintegrate, and a new nuclear membrane is formed around each haploid set of chromosomes. The chromosomes loosen, forming chromatin again, and cytokinesis occurs, forming two non-identical daughter cells. A resting phase known as interkinesis or interphase II occurs in some organisms. The phases of Meiosis IIMeiosis II may begin with interkinesis or interphase II. This differs from interphase I in that no S-phase occurs, as DNA is already replicated. Thus, only one G-phase occurs. Meiosis II is known as equation sharing, as cells begin as haploid cells and end as haploid cells. There are again four phases in meiosis II: these differ slightly from those in meiosis I.1. Prophase IIChromatin condenses visible chromosomes again. The nuclear envelope and core disintegrate, and spindle fibers begin to appear. No crossing happens.2. Metaphase IISpindle fibers are connected to the kinetochore of each sister chromatid. The chromosomes are adjusted at the equatorial plane, which rotates 90° compared to the equatorial plane in meiose I. A sister chromatid faces each rod, with the arms divergent.3. The Anaphase IISpindle fibers connected to each sister chromat time are shortened, drawing a sister chromat time to each rod. Sister chromatos are known as sister chromosomes from this point.4. Telophase IIMeiosis II ends when the sister chromosomes have reached conflicting poles. The spindle disintegrates, and the chromosomes recoil, forming chromatin. A nuclear envelope is formed around each haploid chromosome set, before cytokinesis occurs, forming two daughter cells from each parent cell, or four haploid daughter cells in total. Figure 1. The phases of meiosis I and meiosis II, which show the formation of four haploid cells from a single diploid cell. Image source: Wikimedia CommonsHow is Meiosis I Different from Meiosis II? Meiosis is the production of four genetically different haploid daughter cells from a diploid parent cell. Meiosis can occur only in eukaryotic organisms. It is preceded by interphase, especially the G phase of the interphase. Both Meiosis I and II have the same number and arrangement of phases: prophase, metaphase, anaphase, and telophase. Both produce two daughter cells from each parent cell. But Meiosis I begin with a diploid parent cell and end with two haploid daughter cells, halving the number of chromosomes in each cell. Meiosis II starts with two haploid parent cells and ends with four haploid daughter cells, maintaining the number of chromosomes in each cell. Homologous pairs of cells are present in meiosis I and differ in chromosomes before meiosis II. In meiosis II, these chromosomes are further separated into sister chromatomes. Meiose I include crossing over or recombination of genetic material between chromosome pairs, while meiosis II does not. This happens in meiosis I in a long and complicated prophase I, divided into five subphases. The equatorial plane in meiosis II is rotated 90° from the alignment of the equatorial plane in meiosis I.The table below summarizes the similarities and differences between meiosis I and meiosis II. Table 1. The similarities and differences between meiosis I and meiosis II. Meiosis IMeiosis IICan only occur in eukaryotesG phase of interphase usually occurs firstProduction of daughter cells based on the genetic material of the parent cellAgents of sexual reproduction in plants, animals and fungiFire phases occur: prophase, metaphase, anaphase, telophaseStarts as diploid; ends as haploidStarts as haploid; ends as haploidReductive divisionExcitational divisionHomologous chromosome pairs separateSister chromomate separateCrossing over happensCrossing over does not happen Complicated division processSimple processLong durationScord durationForesr of S-phase and G-phasePrescribed only by G-phaseSisterkroomtids in prophase have converging armsSisterekroom times in prophase have divergent arms Equatorial plan is centeredEvatorplanet rotated 90°Prophase divided into 5 subphasesProperness does not have subphasesEnder with 2 daughter cellsEnder with 4 daughter cellsWhy is Meiosis Important? Meiosis is essential for sexual reproduction of eukaryotic organisms, activation of genetic diversity through the recombination and repair of genetic defects. The crossing over or recombination of genes occurring in prophase I of meiosis I am essential for the genetic diversity of a species. This provides a buffer against genetic defects, susceptibility to disease and survival of possible extinction events, as there will always be certain individuals in a population that are better able to survive changes in the environmental state. Recombination allows to mask genetic defects or even be replaced by healthy alleles in the offspring of sick parents. Meiosis I and Meiosis II Biology ReviewWe now know that meiosis is the process of production of haploid daughter cells from diploid parent cells, using chromosomal reduction. These daughter cells are genetically different from their parent cells due to the genetic recombination that occurs in meiosis I. This combination is essential for genetic diversity in the population and correction of genetic defects. Meiosis I and II are similar in some aspects, including the number and arrangement of their phases and the production of two cells from a single cell. But they also differ greatly, with meiose I am reductive division and meiose II as equation sharing. In this way, meiosis II is more similar to mitosis. Both stages of meiosis are important for successful sexual reproduction of eukaryotic organisms. Looking for biology practices? Check out our other articles about Biology.You can also find thousands of practice questions about Albert.io. Albert.io you adapt the learning experience to target practices where you need the most help. We will give you challenging practice questions to help you achieve mastery in biology. Start practicing here. Are you a teacher or administrator interested in increasing biology student outcomes? Learn more about our school licenses here. Here.