

Mitosis : Asexual Cell Division

When the cell senses it is becoming too large, it initiates cell division.

The cell will effectively divide in two "daughter" cells.

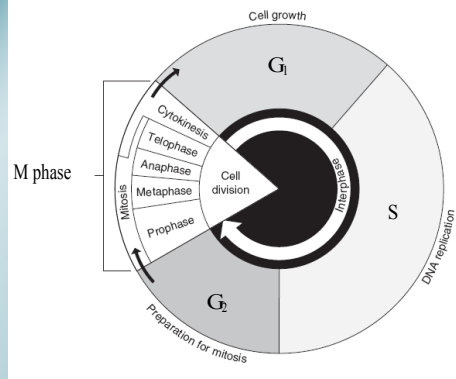
In prokaryotes (unicellular organisms without a nucleus), cell division is as simple as dividing in two.

In eukaryotes (organisms whose cells have a nucleus), the process is more complicated.

Here, it follows a very specific series of steps in order to ensure the safe replication of DNA so that each daughter cell has a complete and accurate genetic library.

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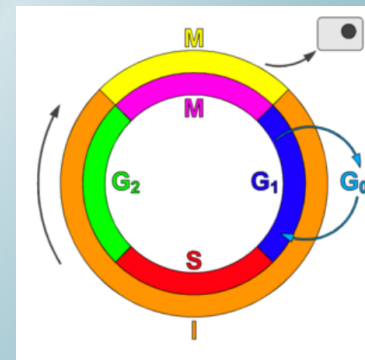
See cell cycle, figure 10-4, p. 245



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- G₁ phase:
 - The "G" stands for Gap
 - In this phase, the cell grows.
 - *What does it mean to grow?*
 - A cell could remain in this stage for life.
- S phase:
 - Synthesis of DNA molecules (DNA replication)
 - Once here, a cell usually finishes the cycle and divides.
- G₂ phase:
 - DNA replication is complete, and organelles necessary for cell division are synthesized.

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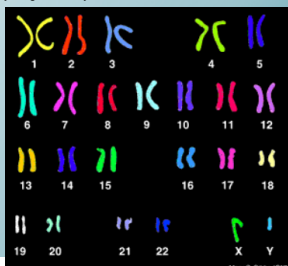


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Taking a break to study Chromosomes

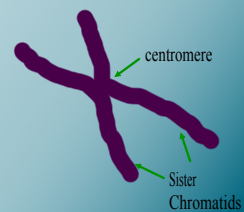
The human cell contains 46 chromosomes.
You got: 23 from your dad
23 from your mom

Each chromosome you got from you mom has a chromosome that you got from your dad. homologous



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During the S Phase of interphase, each chromosome is copied. A chromosome is then made up of 2 identical "sister" chromatids.



Sister chromatids are attached at the centromere.

During cell division, these sister chromosomes will separate and end up in different cells.

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Mitosis, or the M Phase, is the stage during which the cell actually divides and creates 2 daughter cells.

See Figure 10 - 5, p. 246

Assignment: Read through pages 246 - 248 and make up a set of notes summarizing the stages of mitosis.

Make sure you include and understand the following words:

- Prophase, metaphase, anaphase, telophase
- centrioles
- spindle

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Reading the textbook with the intent to summarize / write notes

- In a well-written textbook, the information is divided into sections separated by section titles.
- The first and last paragraphs of each section should summarize the information being provided in the section.
- The first and last line of each paragraph should summarize the information being provided in the paragraph.
- To make your notes:
 - identify key concepts
 - identify and define key terms (use glossary if needed).

****ASK FOR HELP AT ANY TIME****

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Exercise:

Prophase . The first and longest phase of mitosis, prophase, can take as much as 50-60 percent of the total time required to complete mitosis. During prophase, the chromosomes become visible. The centrioles (SEN-tree-ohlz), two tiny structures located in the cytoplasm near the nuclear envelope, separate and take up positions on opposite sides of the nucleus.

The centrioles lie in a region called the centrosome that helps to organize the spindle, a fanlike microtubule structure that helps separate the chromosomes. During prophase, the condensed chromosomes become attached to fibers in the spindle at a point near the centromere of each chromatid. Interestingly, plant cells do not have centrioles, but still organize their mitotic spindles from similar regions.

Near the end of prophase, the chromosomes coil more tightly. In addition, the nucleolus disappears, and the nuclear envelope breaks down.

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Cytokinesis

- Final step of cell division
- Division of the cytoplasm itself.
- In animals, the cell membrane is "pinched" towards the center, resulting in two equal sized cells with the same amount of cytoplasm.
- In plants, a cell plate forms between the 2 nuclei and serves as a division. It will eventually grow into a separating membrane and cell wall.

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Assignment:

Section 10-2 Cell Division

Due: _____

www.phschool.com

Web code cbp-3102
TB, page 247

<http://www.phschool.com/webcodes10/index.cfm?wcprefix=cbp&wcsuffix=3102&fuseaction=home.gotoWebCode&x=0&y=0>

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