

## Regulation and Synthesis in Cell Cycle

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### DESCRIPTION

A cell cycle is a series of events that takes place in a cell as it grows and divides. A cell spends much of its time in interphase, where it develops, multiplies its chromosomes, and gets ready to divide. The cell then exits interphase, goes through mitosis, and finishes dividing. Each of the produced cells, referred to as daughter cells, enters its own interphase to start a new cycle of the cell. We refer to this process through which cells multiply and divide into two new cells as cell cycle. G1, S, G2, and M are the phases of the cell cycle, respectively. Cells starts at the G1 stage. It enters the S phase, where the cell copies the entire DNA. S stands for DNA synthesis. The cell enters the G2 stage, where it organizes and starts to condense the genetic material, and gets ready to divide, after the DNA has been replicated and there is a complete extra set of all the genetic material. Stage M is the next stage. M is an acronym for mitosis. The cell divides the two copies of the genetic material into the two daughter cells at this point. When the M phase is over, cell division takes place, leaving two cells, after which the cell cycle can resume. Interphase and the mitotic (M) phase are the two main phases of the cell cycle in eukaryotic (animal, plant, fungal, and protist cells) cells containing nuclei (including mitosis and cytokinesis). The cell divides, expands, and replicates its DNA as well as some of its organelles during interphase. It also gathers nutrients necessary for mitosis. The replicating organelles, cytoplasm, and

chromosomes divide into two new daughter cells during the mitotic phase. After each of the crucial parts of the cycle, there are control mechanisms known as cell cycle checkpoints that determine whether the cell may move on to the next phase, ensuring the correct replication of cellular components and division. The B, C, and D periods make up the cell cycle in cells without nuclei (prokaryotes, such as bacteria and archaea). From the conclusion of cell division until the start of DNA replication is known as the B phase. During the C phase, DNA replication takes place. Between the conclusion of DNA replication and the division of the bacterial cell into two daughter cells is referred to as the "D phase."

Single-celled organisms replicate themselves by a single cycle of cell division. Cell division cycles are the process by which multicellular organisms, such as plants and animals, develop from a single-celled fertilized ovum into a mature organism. Cell division cycles are also the process by which hair, skin, blood cells, and various internal organs are regenerated and healed (with possible exception of nerves; see nerve damage). Each daughter cell starts the interphase of a new cell cycle after cell division. Every step of the cell cycle contains a unique set of specialized biochemical activities that prepare the cell for the start of the cell division, even though the different stages of interphase are typically not physically recognizable.

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