

Cell Cycle

The **cell cycle** is the life cycle of a cell. It is the series of growth and development steps a cell undergoes between its “birth”—formation by the division of a mother cell—and reproduction—division to make two new daughter cells.

Stages of Cell Cycle

The stages of the cell cycle are divided into two major phases: **interphase** and the **mitotic (M) phase**.

During *interphase*, the cell grows and makes a copy of its DNA.

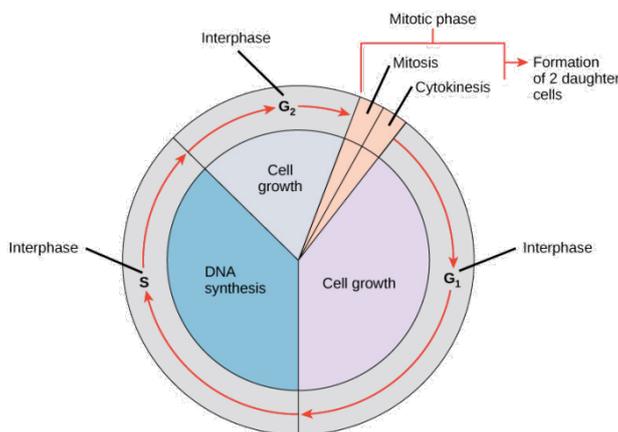
During the *mitotic (M) phase*, the cell separates its DNA into two sets and divides its cytoplasm, forming two new cells.

Interphase

Let's enter the cell cycle just as a cell forms, by division of its mother cell. What must this newborn cell do next if it wants to go on and divide itself? Preparation for division happens in three steps:

- **G₁ phase.** During G₁ phase, also called the first gap phase, the cell grows physically larger, copies organelles, and makes the molecular building blocks it will need in later steps.
- **S phase.** In S phase, the cell synthesizes a complete copy of the DNA in its nucleus. It also duplicates a microtubule-organizing structure called the centrosome. The centrosomes help separate DNA during M phase.
- **G₂ phase.** During the second gap phase, or G₂ phase, the cell grows more, makes proteins and organelles, and begins to reorganize its contents in preparation for mitosis. G₂ phase ends when mitosis begins.

The G₁ phase, S, and G₂ phases together are known as **interphase**.



Cyclins

Cyclins are among the most important core cell cycle regulators. Cyclins are a group of related proteins, and there are four basic types found in humans and most other eukaryotes: G₁/S cyclins, G₁/S cyclins, S cyclins, and M cyclins.

Each cyclin is associated with a particular phase, transition, or set of phases in the cell cycle and helps drive the events of that phase or period. For instance, M cyclin promotes the events of M phase, such as nuclear envelope breakdown and chromosome condensation.

