

# Difference Between Karyokinesis and Cytokinesis

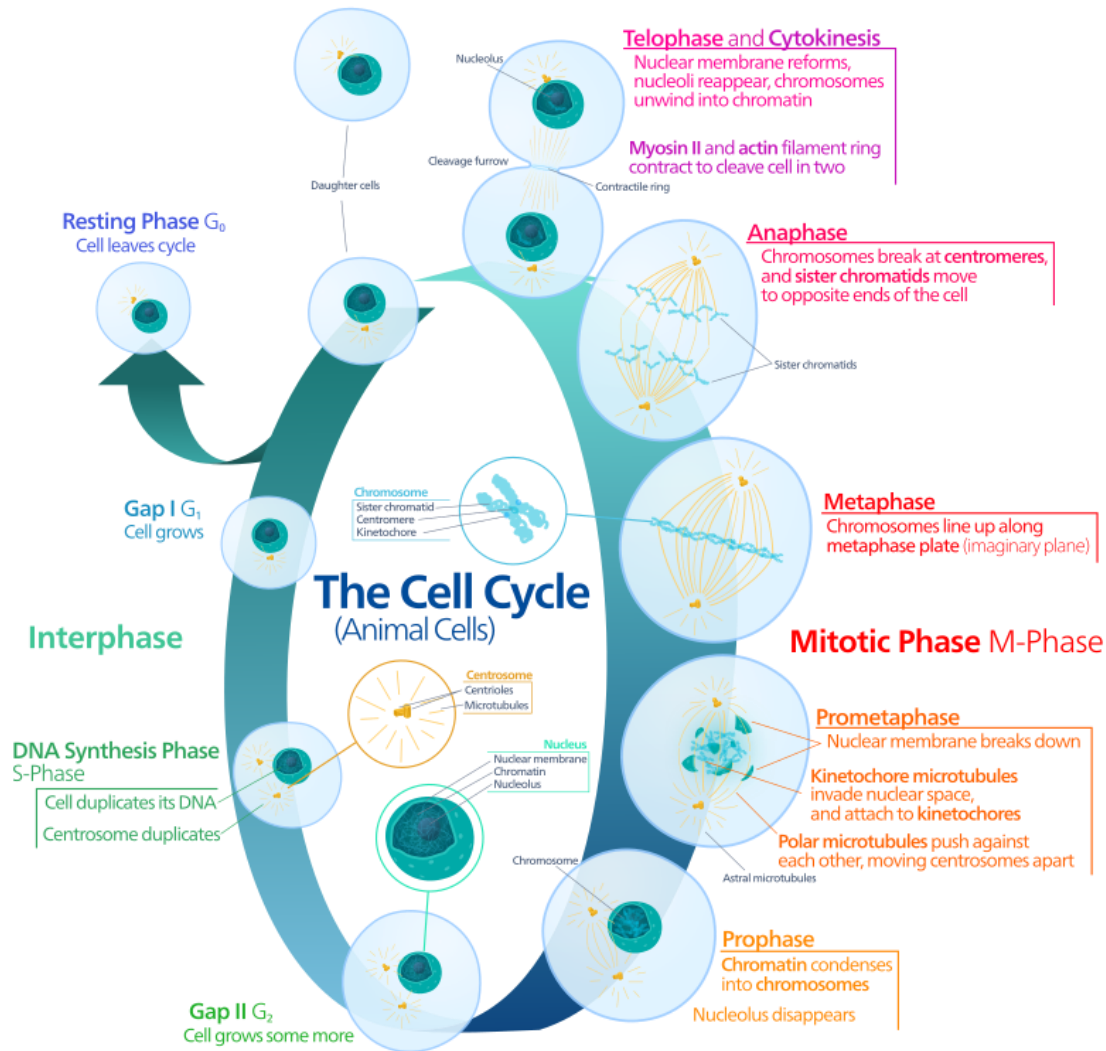
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## Key Difference - Karyokinesis vs Cytokinesis

In the context of a cell cycle there are two main divisions that take place during the [cell division](#) phase. The cell division phase includes both the [mitosis and meiosis](#) phases. The two main divisions include the division of the [nucleus](#) and the division of the [cytoplasm](#). Karyokinesis is referred to as the process in which the nucleus divides to form daughter nuclei either via mitosis or meiosis. Cytokinesis refers to the process of division of the cell cytoplasm in animal cells resulting in daughter cells upon completion of the cell cycle. The **key difference** between the karyokinesis and cytokinesis is the physiology of the process. **During Karyokinesis, the cell nucleus divides whereas during cytokinesis, the cell cytoplasm of animal cells divides to form daughter cells.**

## What is Karyokinesis?

Karyokinesis is the process in which the cell nucleus divides during the cell division phase of the cell cycle. Karyokinesis occurs in both mitosis and meiosis. Mitotic cell division is used, in order to explain the process of Karyokinesis. Karyokinesis or nuclear division takes place in four stages under the mitotic cell division. The stages of karyokinesis are; [Prophase](#), [Metaphase](#), [Anaphase](#) and [Telophase](#). During the Prophase, [chromosome](#) condensation takes place. The replicated chromosomes are untangled during this step. The condensed sister chromatids are bound together at the centromere. The chromosomes move to the two poles of the nucleus. The mitotic spindle also develops during this stage.



**Figure 01: Karyokinesis**

In the Metaphase, the microtubules of the spindle apparatus attached to the chromosomes via the kinetochore proteins at the centromere. The chromosomes then arrange at the equatorial plane of the nucleus. The next stage is the Anaphase stage. During the stage the sister chromatids separate at the centromere. The chromatids arrange in the U shape at the equatorial plane. During the final stage of the mitosis phase or during the Telophase, the nuclear envelope is reformed, and cytokinesis takes place to separate the cells.

## What is Cytokinesis?

Cytokinesis is the final stage of the cell cycle that results in two daughter cells. Cytokinesis is referred to as the division of the cell cytoplasm. Cytokinesis process begins at the end of the Anaphase of the nuclear division. In animal cells, cytokinesis is mediated by a ring of actin and myosin filaments. These filaments form a sheath beneath the plasma

membrane. This ring will eventually determine the cleavage of the cell cytoplasm. The cleavage takes place perpendicular to the spindle. The cleavage results in the contraction of the actin and myosin filaments which results pulling the plasma membrane and the cell are cleaved into two halves.

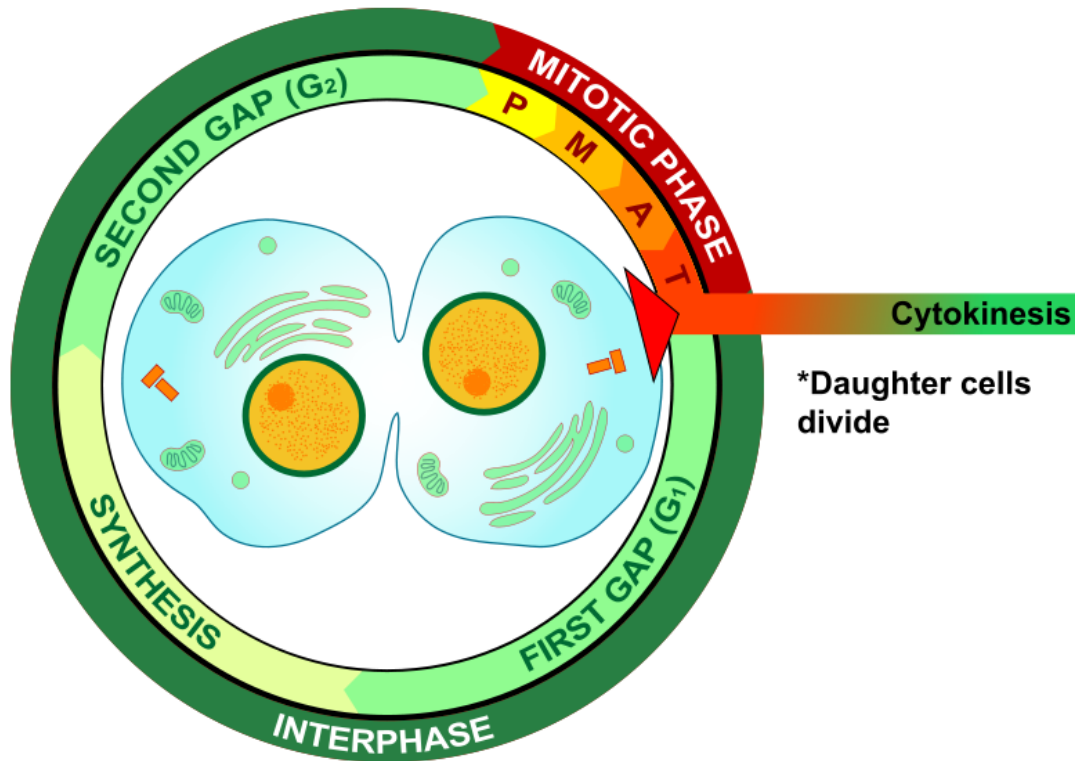


Figure 02: Cytokinesis

In plants, the cytokinesis process is different as it forms a cell plane that eventually gives rise to the cell wall.

## What are the Similarities Between Karyokinesis and Cytokinesis?

- Both processes take place during the cell division phase of the cell cycle.
- Karyokinesis and cytokinesis are two subdivisions of the cell cycle.
- Both processes involved in the production of daughter cells.
- Both processes are important in organism's growth and development.

# What is the Difference Between Karyokinesis and Cytokinesis?

Karyokinesis vs Cytokinesis	
Karyokinesis is referred to the process in which the nucleus divides to form daughter nuclei either via mitosis or meiosis.	Cytokinesis refers to the process of division of the cell cytoplasm in animal cells which results in daughter cells upon completion of the cell cycle.
Time of Occurrence	
The initial stride of the cell division phase karyokinesis occurs.	Cytokinesis takes place towards the end of the cell division phase.
Sequence of Events	
Has a sequence of events from Prophase, Metaphase, Anaphase and Telophase in karyokinesis.	No sequence of events taking place in cytokinesis.
End Product	
Two daughter nuclei result from the karyokinesis.	Two daughter cells result from the cytokinesis.

## Summary - Karyokinesis vs Cytokinesis

Karyokinesis and Cytokinesis are two processes that are important in the process of the cell division of [eukaryotic](#) cells. Karyokinesis refers to the process in which the nucleus divides to form two daughter nuclei. Cytokinesis refers to the process in which the cytoplasm divides into two daughter cells. Karyokinesis takes place in both mitosis and meiosis and begins in the initial stages of cell division. Cytokinesis takes place via the formation of actin and myosin filaments, and through a cleavage furrow, the cytoplasm is cleaved into two halves. karyokinesis is followed by the cytokinesis. This is the difference between karyokinesis and cytokinesis.

### Reference:

- 1.Cooper, Geoffrey M. "The Events of M Phase." The Cell: A Molecular Approach. 2nd edition., U.S. National Library of Medicine, 1 Jan. 1970. [Available here](#)
- 2."Cytokinesis." Wikipedia, Wikimedia Foundation, 4 Feb. 2018. [Available here](#)

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