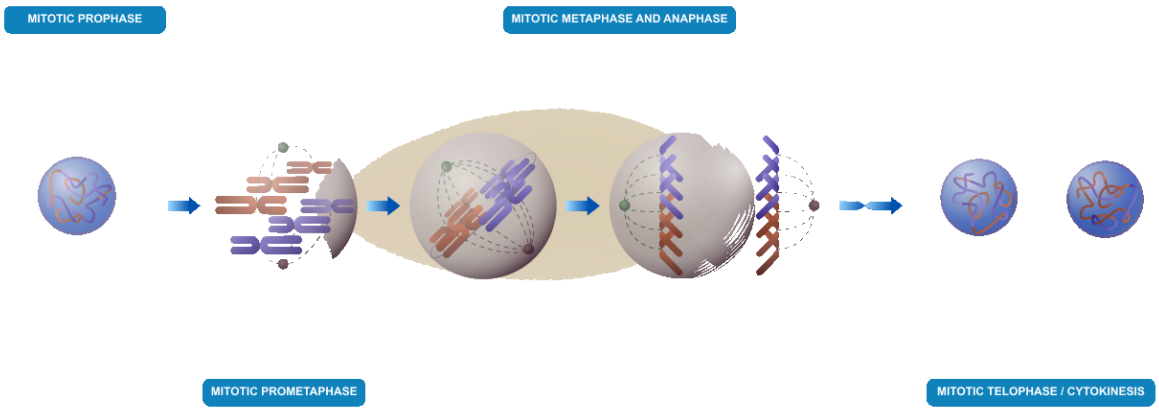
M Phase



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17/09/2021

Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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Literature references

Fabregat, A., Sidiropoulos, K., Viteri, G., Forner, O., Marin-Garcia, P., Arnau, V. et al. (2017). Reactome pathway analysis: a high-performance in-memory approach. *BMC bioinformatics, 18*, 142. ↗

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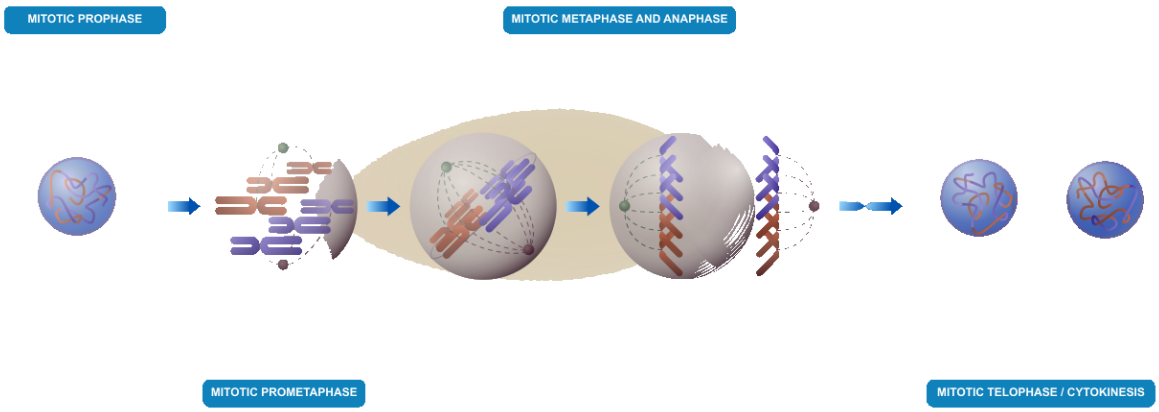
M Phase ↗

Stable identifier: R-HSA-68886



Mitosis, or the M phase, involves nuclear division and cytokinesis, where two identical daughter cells are produced. Mitosis involves prophase, prometaphase, metaphase, anaphase, and telophase. Finally, cytokinesis leads to cell division. The phase between two M phases is called the interphase; it encompasses the G1, S, and G2 phases of the cell cycle.

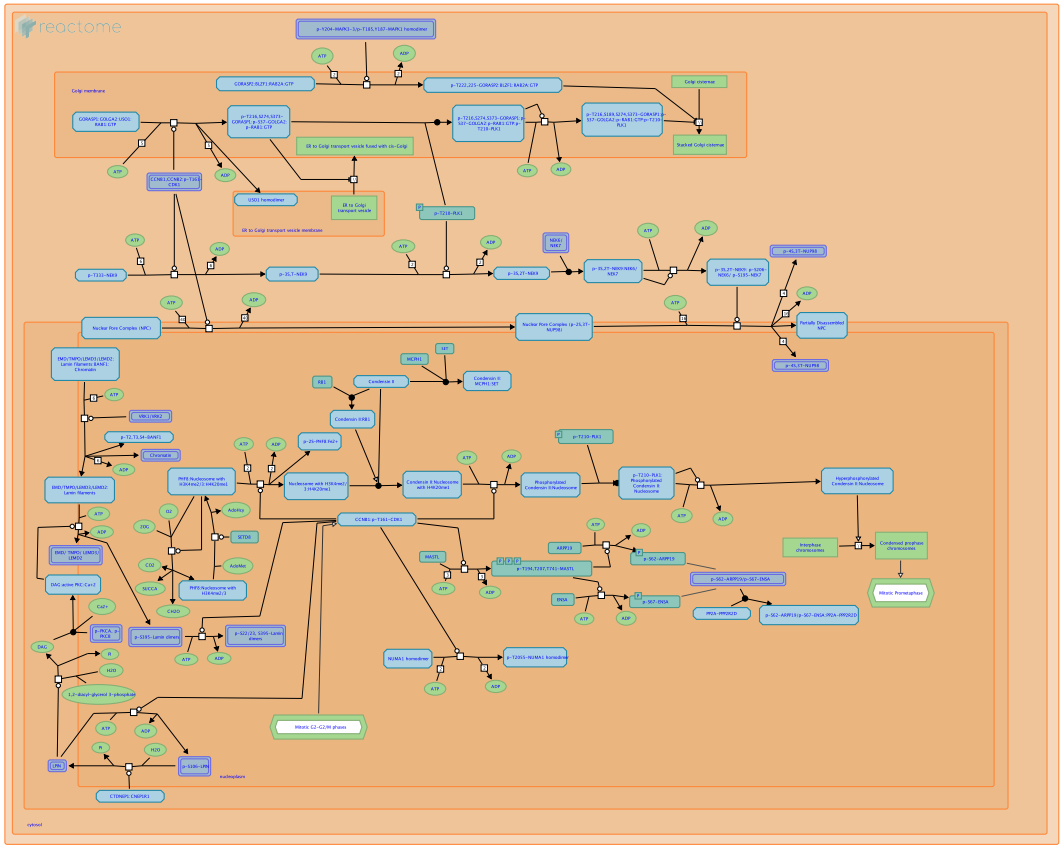
Editions

2018-07-10	Reviewed	Manfredi, JJ.

Mitotic Prophase ↗

Location: M Phase

Stable identifier: R-HSA-68875

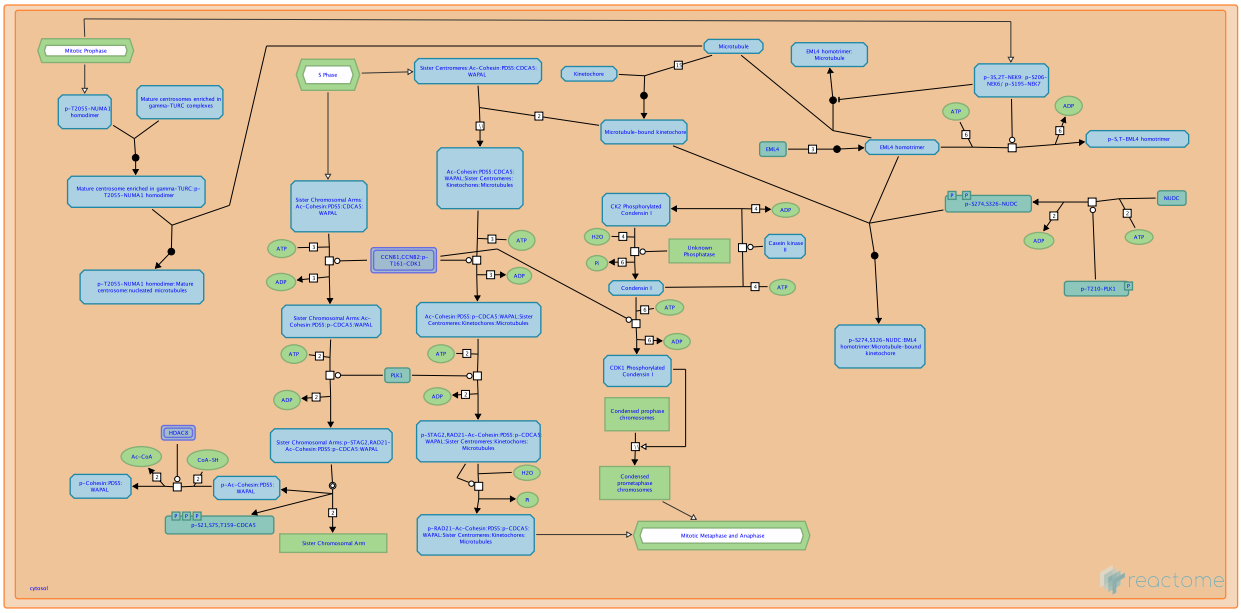


During prophase, the chromatin in the nucleus condenses, and the nucleolus disappears. Centrioles begin moving to the opposite poles or sides of the cell. Some of the fibers that extend from the centromeres cross the cell to form the mitotic spindle.

Mitotic Prometaphase ↗

Location: M Phase

Stable identifier: R-HSA-68877



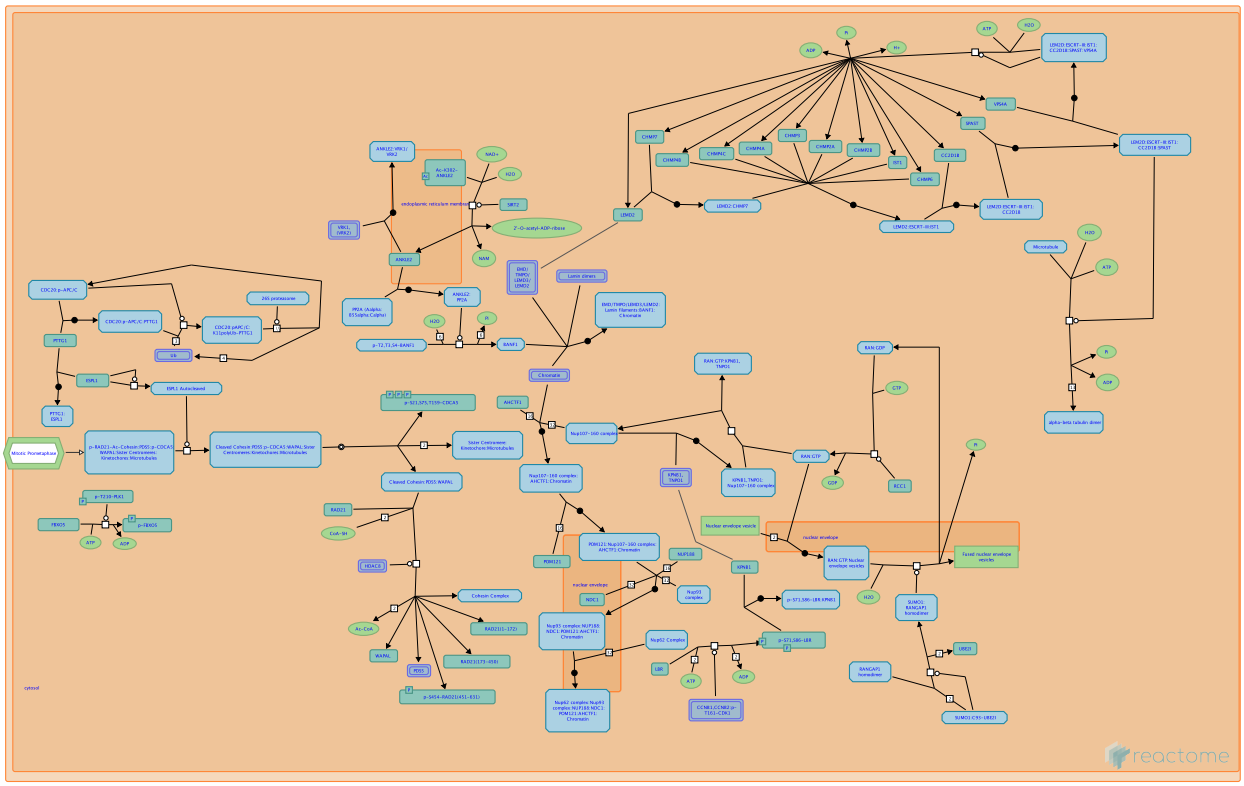
The dissolution of the nuclear membrane marks the beginning of the prometaphase. Kinetochores are created when proteins attach to the centromeres. Microtubules then attach at the kinetochores, and the chromosomes begin to move to the metaphase plate.

Mitotic Metaphase and Anaphase ↗

Location: M Phase

Stable identifier: R-HSA-2555396

Compartments: cytosol



Metaphase is marked by the formation of the metaphase plate. The metaphase plate is formed when the spindle fibers align the chromosomes along the middle of the cell. Such an organization helps to ensure that later, when the chromosomes are separated, each new nucleus that is formed receives one copy of each chromosome. This pathway has not yet been annotated in Reactome.

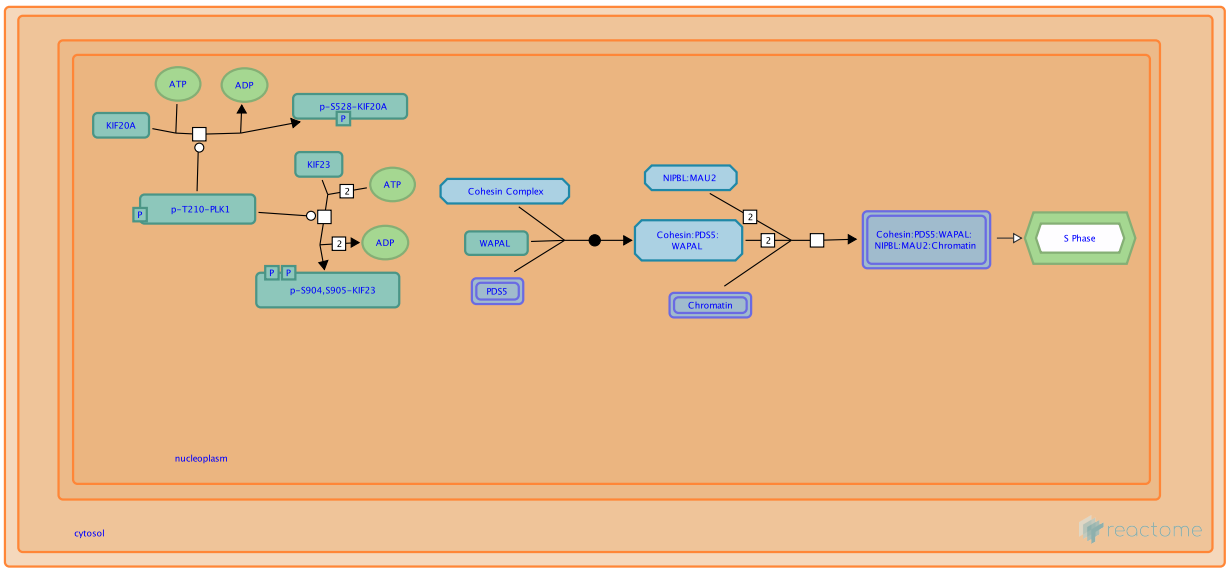
The metaphase to anaphase transition during mitosis is triggered by the destruction of mitotic cyclins.

In anaphase, the paired chromosomes separate at the centromeres, and move to the opposite sides of the cell. The movement of the chromosomes is facilitated by a combination of kinetochore movement along the spindle microtubules and through the physical interaction of polar microtubules.

Mitotic Telophase/Cytokinesis ↗

Location: M Phase

Stable identifier: R-HSA-68884



In this final phase of mitosis, new membranes are formed around two sets of chromatids and two daughter cells are formed. The chromosomes and the spindle fibers disperse, and the fiber ring around the center of the cell, composed of actin, contracts, pinching the cell into two daughter cells.

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