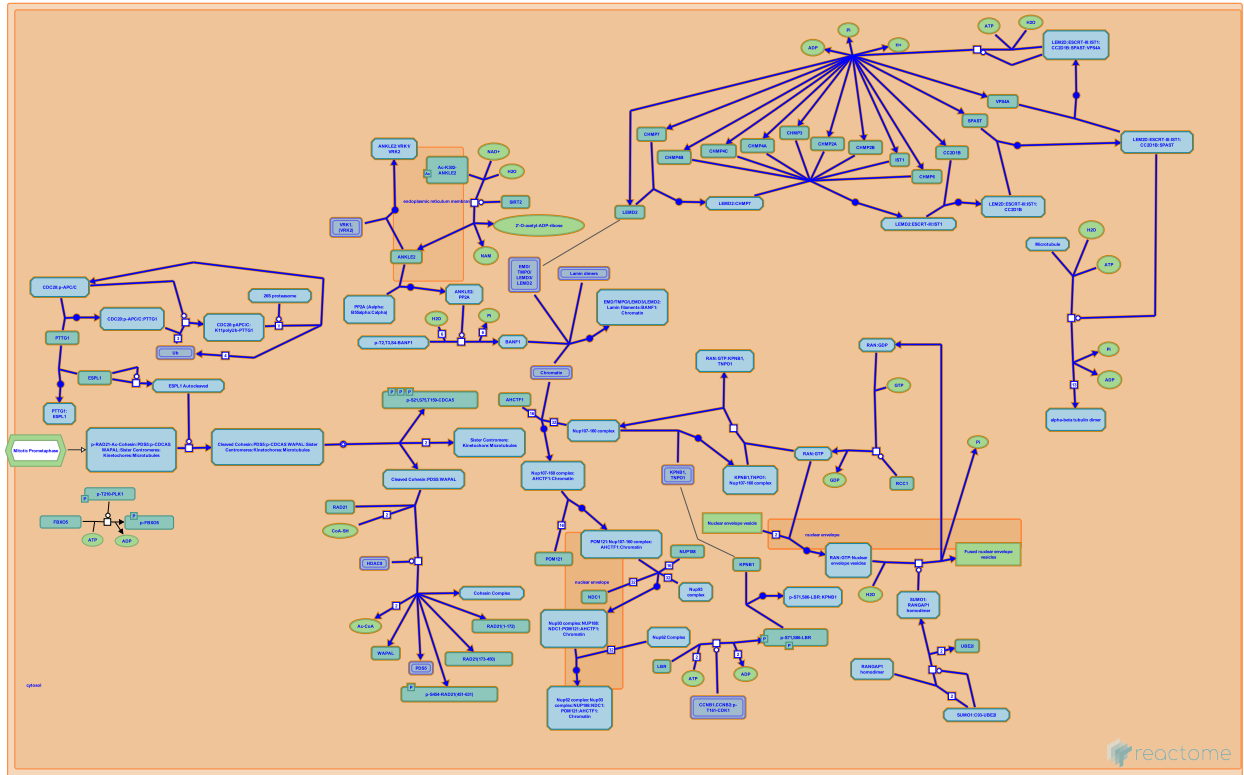


Mitotic Anaphase



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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

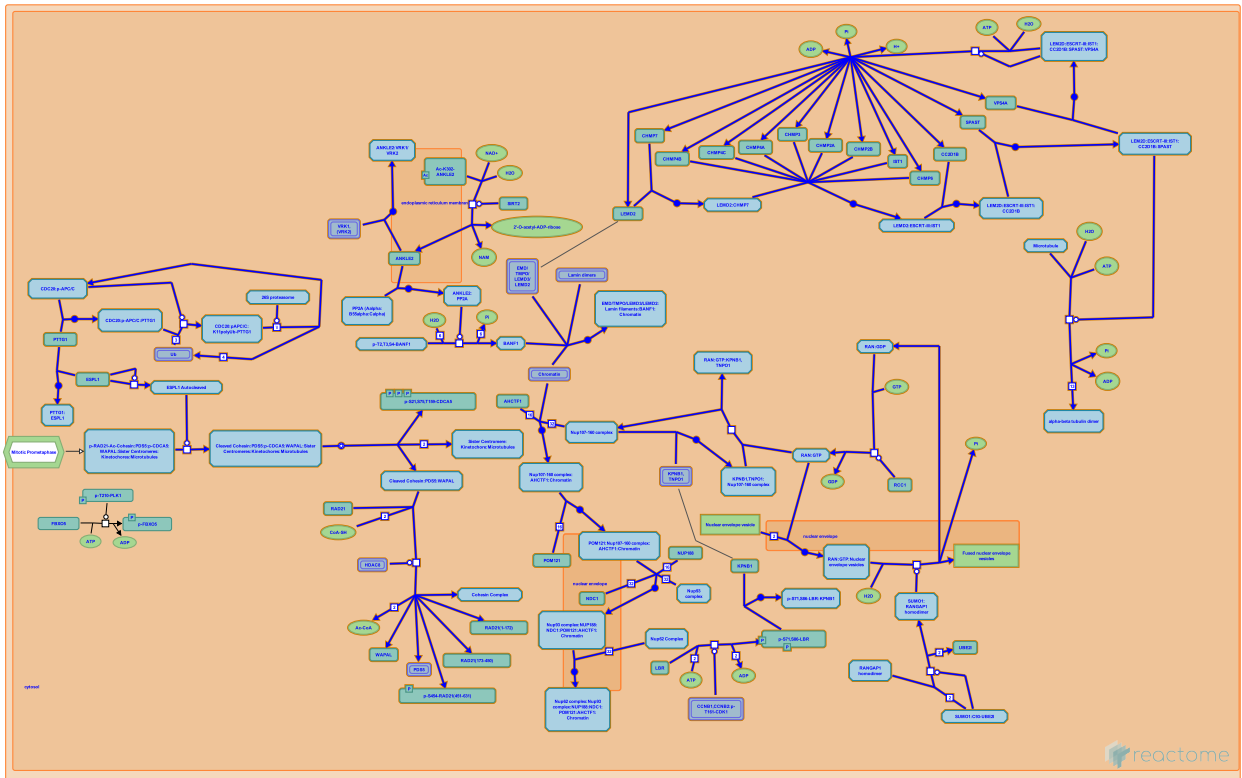
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Reactome database release: 75

This document contains 3 pathways ([see Table of Contents](#))

Mitotic Anaphase ↗

Stable identifier: R-HSA-68882



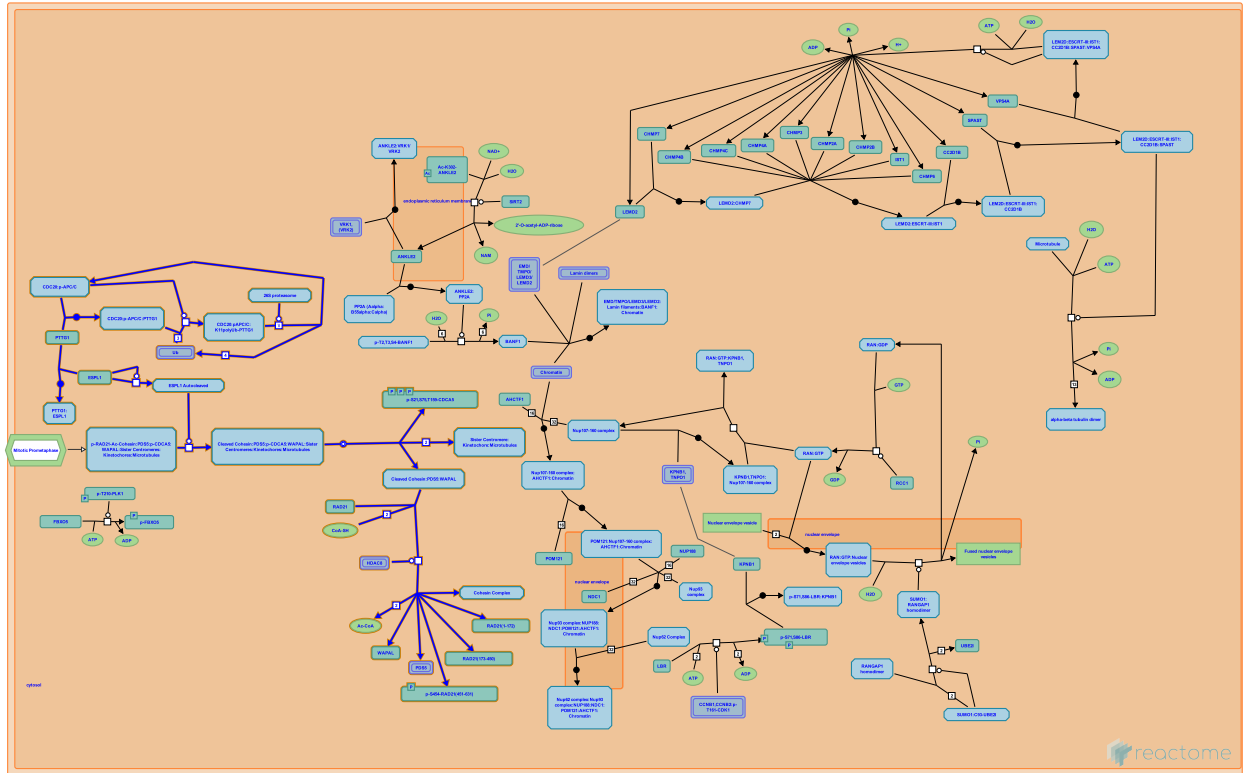
In anaphase, the paired chromosomes separate at the centromeres, and move to the opposite sides of the cell. The movement of the chromosomes is facilitated by a combination of kinetochore movement along the spindle microtubules and through the physical interaction of polar microtubules.

Separation of Sister Chromatids ↗

Location: Mitotic Anaphase

Stable identifier: R-HSA-2467813

Compartments: cytosol



While sister chromatids resolve in prometaphase, separating along chromosomal arms, the cohesion of sister centromeres persists until anaphase. At the anaphase onset, the anaphase promoting complex/cyclosome (APC/C) ubiquitinates PTTG1 (securin), targeting it for degradation (Hagting et al. 2002). PTTG1 acts as an inhibitor of ESPL1 (known as separin i.e. separase). Hence, PTTG1 removal initiated by APC/C, enables ESPL1 to become catalytically active (Zou et al. 1999, Waizenegger et al. 2002). ESPL1 undergoes autoleavage (Waizenegger et al. 2002) and also cleaves RAD21 subunit of centromeric cohesin (Hauf et al. 2001). RAD21 cleavage promotes dissociation of cohesin complexes from sister centromeres, leading to separation of sister chromatids. Subsequent movement of sister chromatids to opposite poles of the mitotic spindle segregates replicated chromosomes to two daughter cells (Waizenegger et al. 2000, Hauf et al. 2001, Waizenegger et al. 2002).

Literature references

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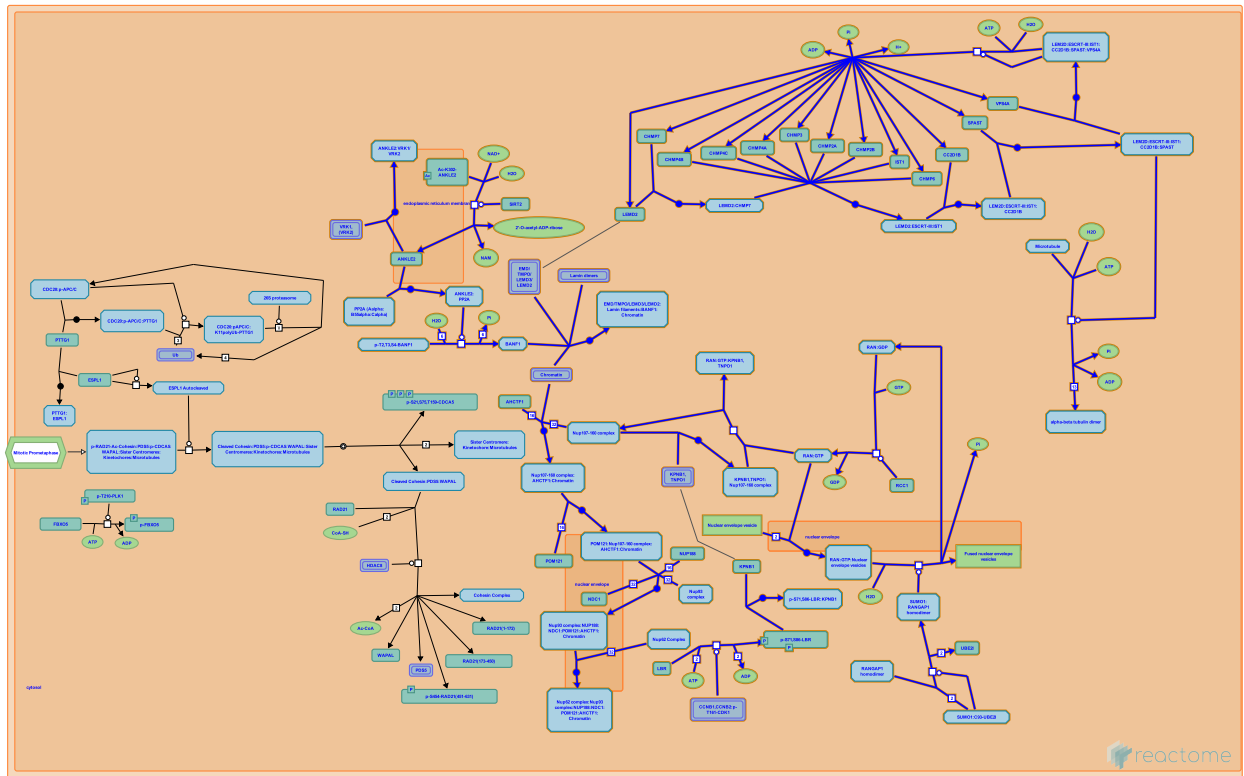
Editions

2012-10-02	Authored	Orlic-Milacic, M.
2012-10-05	Edited	Gillespie, ME., Matthews, L.
2012-10-22	Reviewed	Zhang, N.
2012-11-20	Reviewed	Watanabe, Y., Tanno, Y.

Nuclear Envelope (NE) Reassembly [↗](#)

Location: Mitotic Anaphase

Stable identifier: R-HSA-2995410



Reassembly of the nuclear envelope (NE) around separated sister chromatids begins in late anaphase and is completed in telophase (reviewed by Wandke and Kutay 2013). Characteristic proteins of the inner nuclear membrane and nuclear lamina accumulate at the reforming NE (reviewed by Wandke and Kutay 2013). Concurrently, nuclear pore complexes (NPCs) assemble and insert into the reforming NE, and the NE becomes sealed to reestablish the nucleocytoplasmic diffusion barrier (reviewed by Otsuka and Ellenberg 2018).

Literature references

- Otsuka, S., Ellenberg, J. (2018). Mechanisms of nuclear pore complex assembly - two different ways of building one molecular machine. *FEBS Lett.*, 592, 475-488. [↗](#)
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Editions

2013-01-23	Edited	Gillespie, ME.
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2019-11-07	Authored	Gerace, L.
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