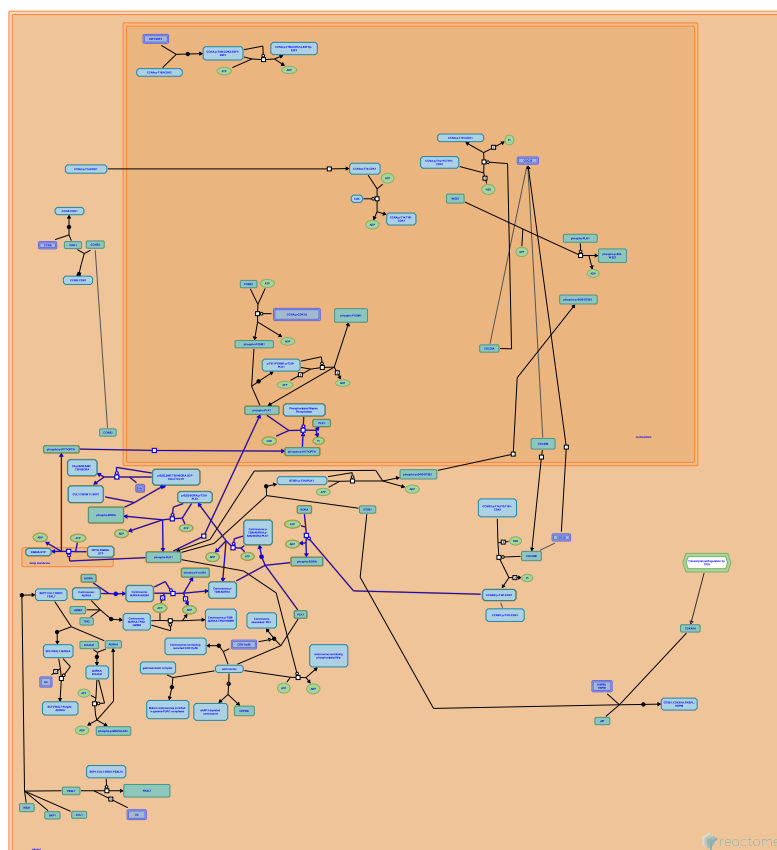


# Regulation of PLK1 Activity at G2/M Transition



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This is just an excerpt of a full-length report for this pathway. To access the complete report, please download it at the [Reactome Textbook](https://reactome.org/textbook).

19/05/2024

## 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.

The development of Reactome is supported by grants from the US National Institutes of Health (P41 HG003751), University of Toronto (CFREF Medicine by Design), European Union (EU STRP, EMI-CD), and the European Molecular Biology Laboratory (EBI Industry program).

## 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. [↗](#)
- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
- Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res*, 46, D649-D655. [↗](#)
- Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

Reactome database release: 88

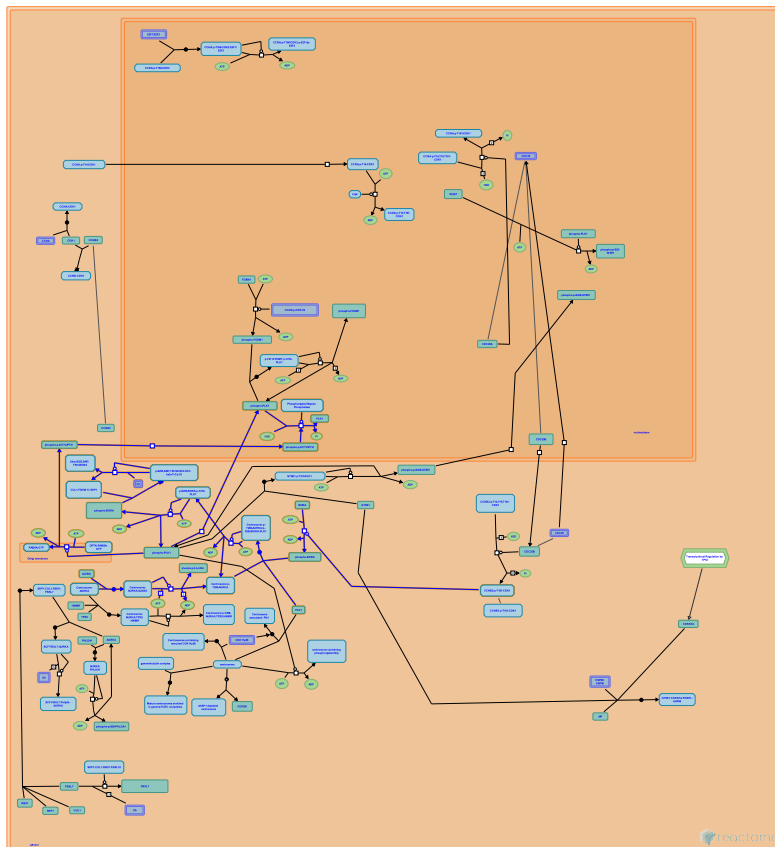
This document contains 1 pathway and 12 reactions ([see Table of Contents](#))

## Regulation of PLK1 Activity at G2/M Transition ↗

**Stable identifier:** R-GGA-2565942

**Compartments:** cytosol

**Inferred from:** [Regulation of PLK1 Activity at G2/M Transition \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## AJUBA binds centrosome-associated AURKA ↗

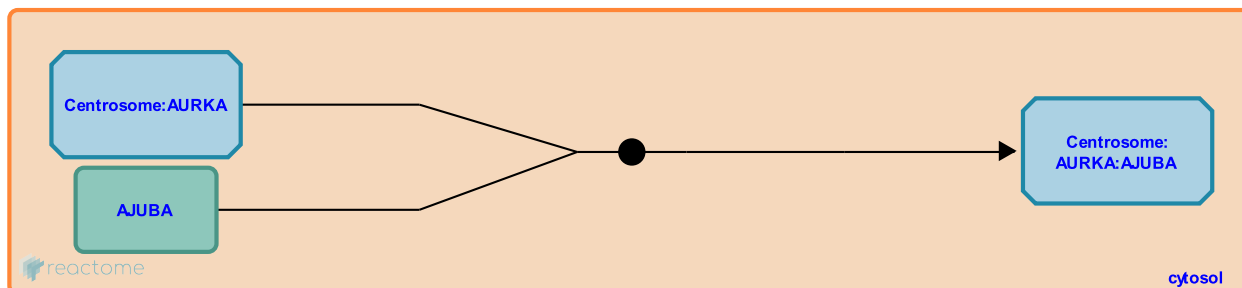
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-2574845

**Type:** binding

**Compartments:** cytosol

**Inferred from:** [AJUBA binds centrosome-associated AURKA \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

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**Followed by:** [AJUBA facilitates AURKA autophosphorylation](#)

## AJUBA facilitates AURKA autophosphorylation ↗

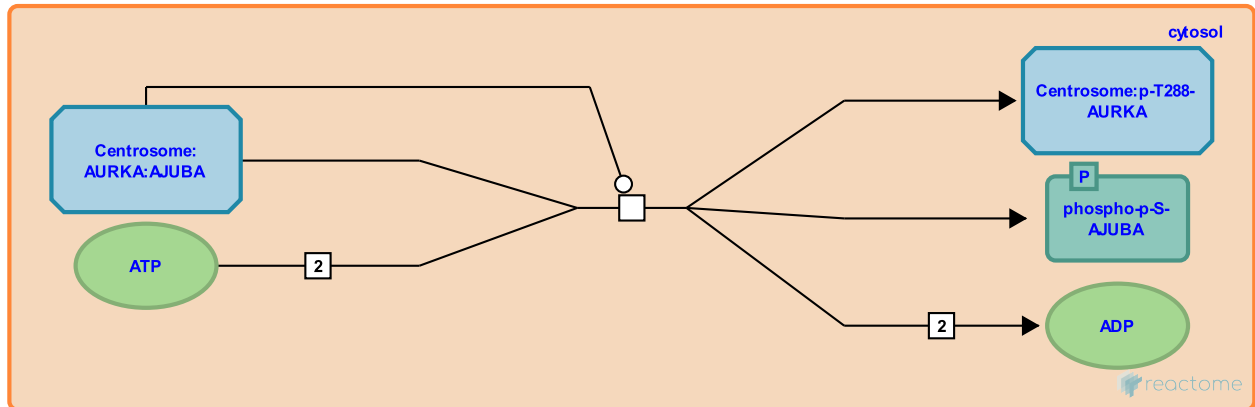
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-2574840

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [AJUBA facilitates AURKA autophosphorylation \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [AJUBA binds centrosome-associated AURKA](#)

**Followed by:** [BORA binds PLK1 and AURKA](#)

## CDK1 phosphorylates BORA ↗

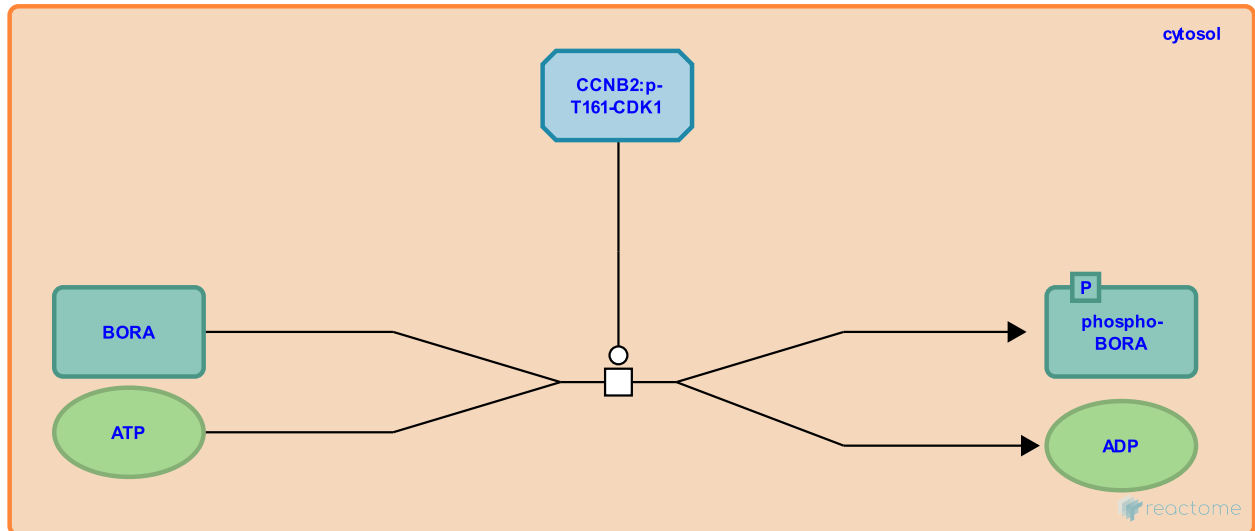
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-4086410

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [CDK1 phosphorylates BORA \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Followed by:** [BORA binds PLK1 and AURKA](#)

## BORA binds PLK1 and AURKA ↗

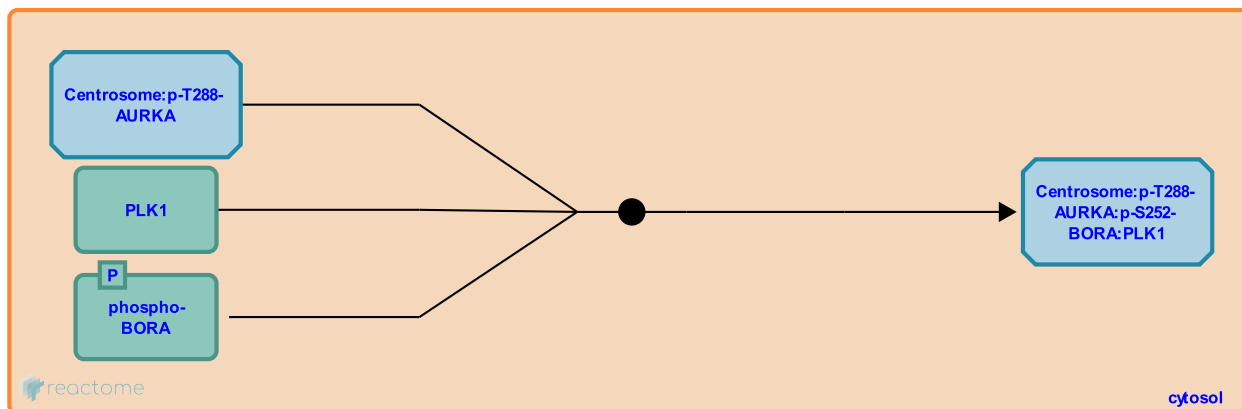
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-3000319

**Type:** binding

**Compartments:** cytosol

**Inferred from:** [BORA binds PLK1 and AURKA \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [CDK1 phosphorylates BORA](#), [AJUBA facilitates AURKA autophosphorylation](#)

**Followed by:** [AURKA phosphorylates PLK1](#)

## AURKA phosphorylates PLK1 ↗

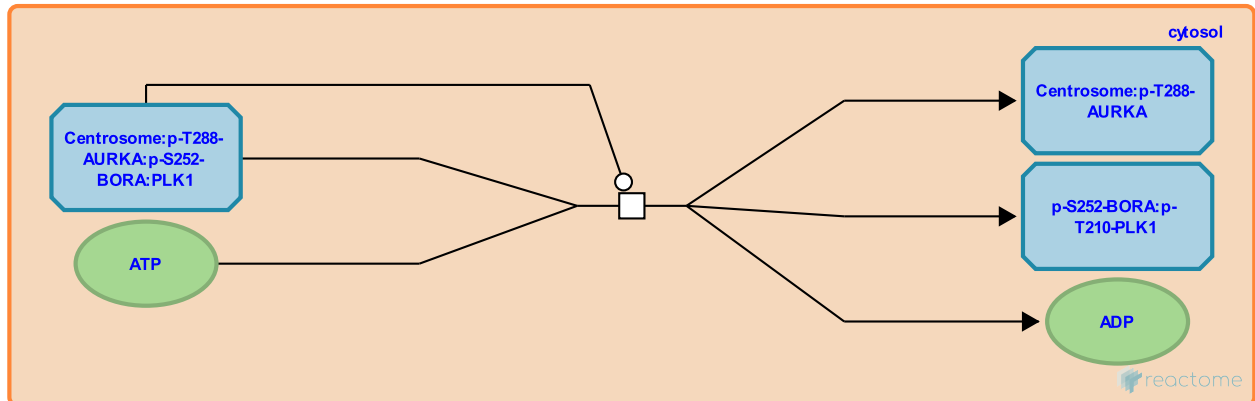
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-3000310

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [AURKA phosphorylates PLK1 \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [BORA binds PLK1 and AURKA](#)

**Followed by:** [PLK1 phosphorylates OPTN](#), [PLK1 phosphorylates BORA](#)



## PLK1 phosphorylates BORA ↗

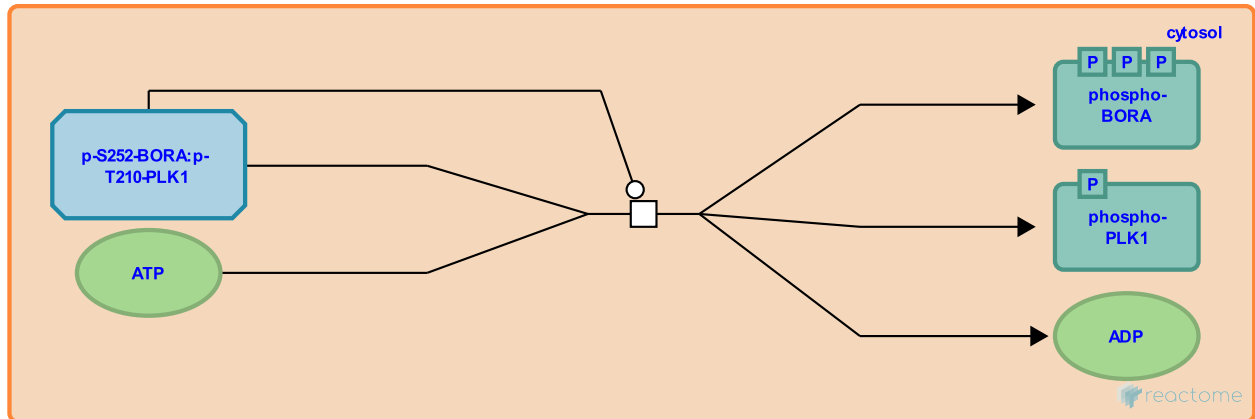
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-3000327

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [PLK1 phosphorylates BORA \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [AURKA phosphorylates PLK1](#)

**Followed by:** [Phosphorylated BORA binds SCF-beta-TrCp1/2](#), [Cytosolic PLK1 translocates to the nucleus](#)

## Phosphorylated BORA binds SCF-beta-TrCp1/2 ↗

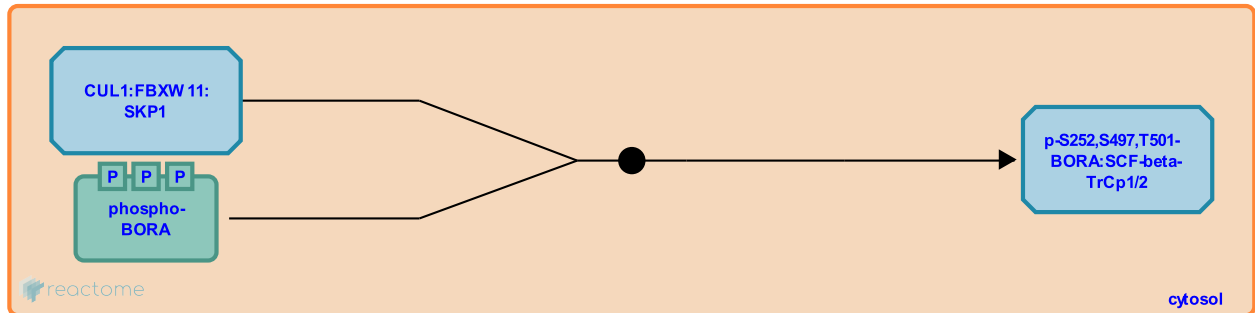
**Location:** Regulation of PLK1 Activity at G2/M Transition

**Stable identifier:** R-GGA-3000339

**Type:** binding

**Compartments:** cytosol

**Inferred from:** Phosphorylated BORA binds SCF-beta-TrCp1/2 (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** PLK1 phosphorylates BORA

**Followed by:** SCF-beta-TrCp1/2 ubiquitinates phosphorylated BORA

## SCF-beta-TrCp1/2 ubiquitinates phosphorylated BORA ↗

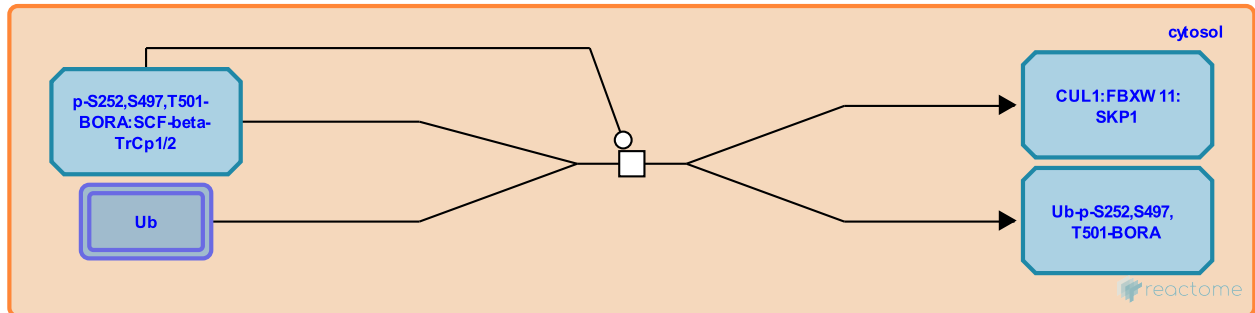
**Location:** Regulation of PLK1 Activity at G2/M Transition

**Stable identifier:** R-GGA-3000335

**Type:** transition

**Compartments:** cytosol

**Inferred from:** SCF-beta-TrCp1/2 ubiquitinates phosphorylated BORA (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** Phosphorylated BORA binds SCF-beta-TrCp1/2

## PLK1 phosphorylates OPTN ↗

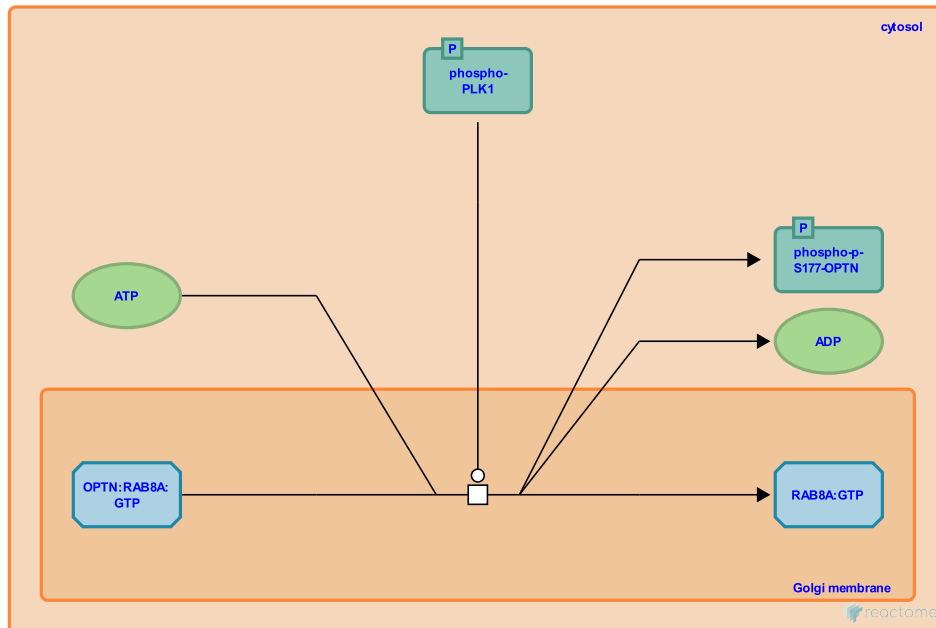
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-2562526

**Type:** transition

**Compartments:** Golgi membrane, cytosol

**Inferred from:** [PLK1 phosphorylates OPTN \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [AURKA phosphorylates PLK1](#)

**Followed by:** [Phosphorylated OPTN translocates to the nucleus](#)

## Phosphorylated OPTN translocates to the nucleus ↗

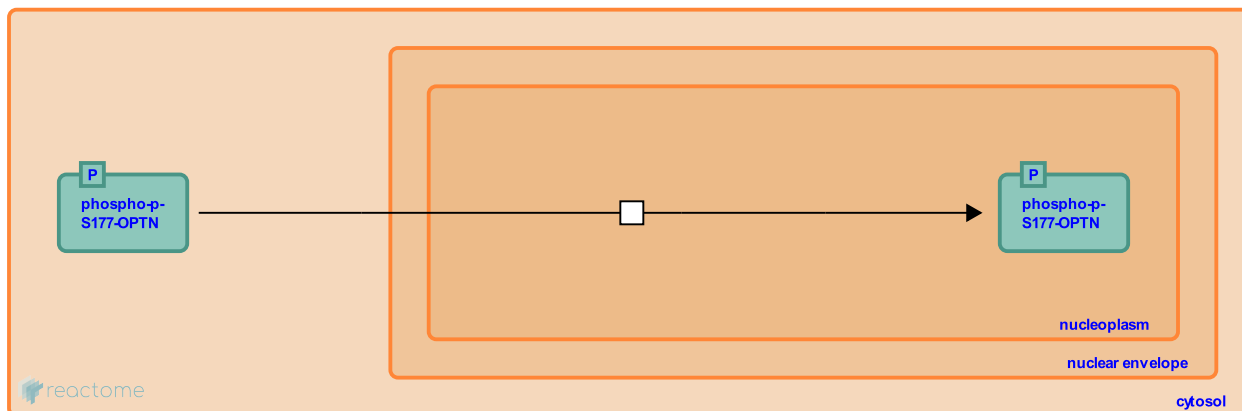
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-2562594

**Type:** transition

**Compartments:** nucleoplasm, cytosol

**Inferred from:** [Phosphorylated OPTN translocates to the nucleus \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [PLK1 phosphorylates OPTN](#)

**Followed by:** [Myosin phosphatase dephosphorylates PLK1](#)

## Cytosolic PLK1 translocates to the nucleus ↗

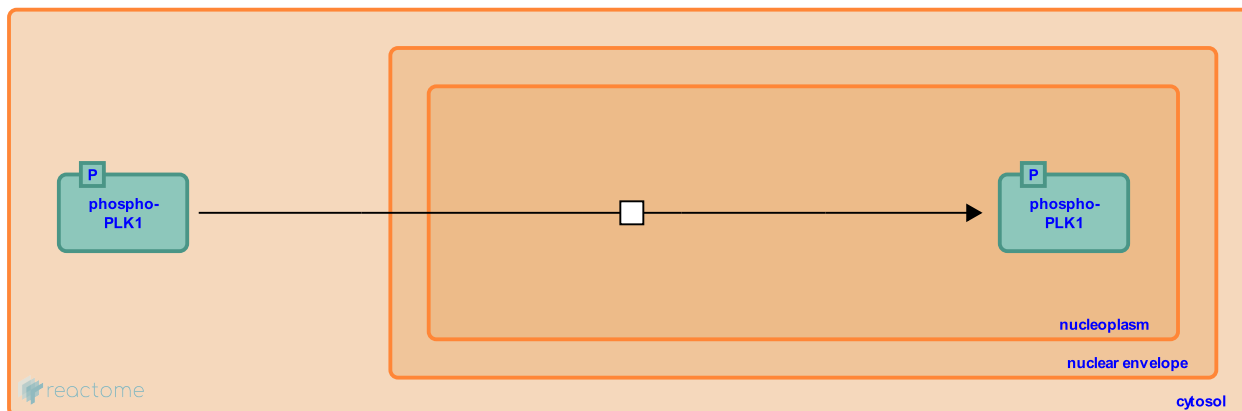
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-3002798

**Type:** transition

**Compartments:** nucleoplasm, cytosol

**Inferred from:** [Cytosolic PLK1 translocates to the nucleus \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [PLK1 phosphorylates BORA](#)

**Followed by:** [Myosin phosphatase dephosphorylates PLK1](#)

## Myosin phosphatase dephosphorylates PLK1 ↗

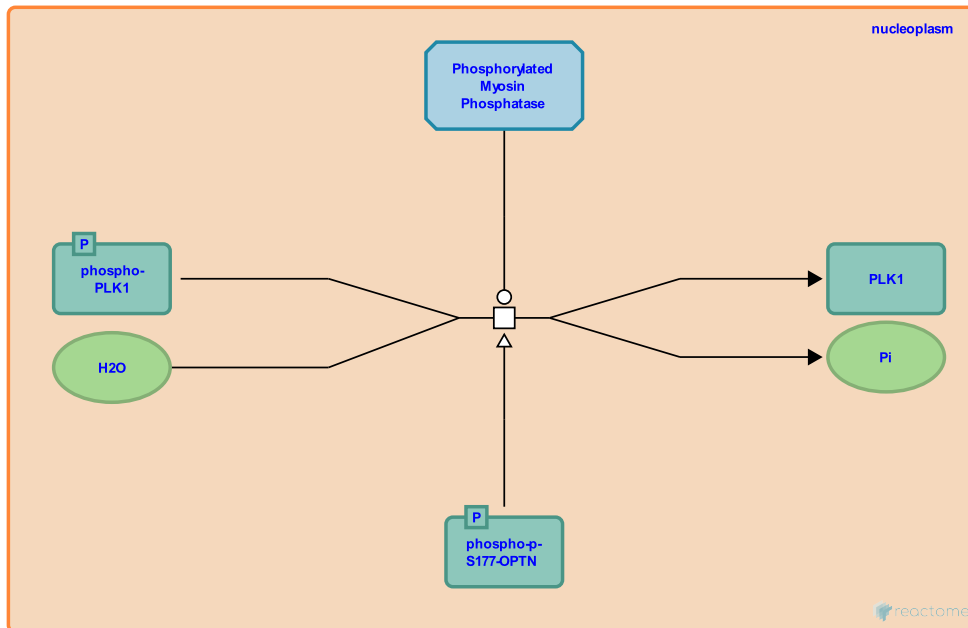
**Location:** [Regulation of PLK1 Activity at G2/M Transition](#)

**Stable identifier:** R-GGA-3002811

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** [Myosin phosphatase dephosphorylates PLK1 \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [Phosphorylated OPTN translocates to the nucleus](#), [Cytosolic PLK1 translocates to the nucleus](#)

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