



## 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: 81

This document contains 1 pathway and 2 reactions ([see Table of Contents](#))



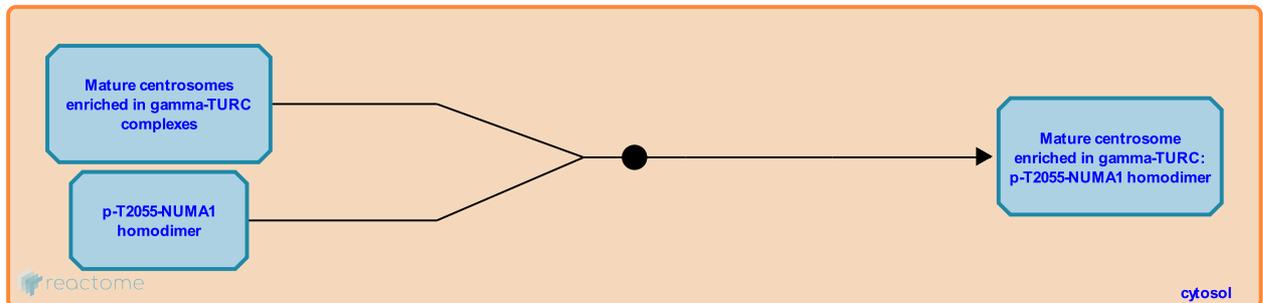
## Translocation of NuMA to the centrosomes ↗

**Location:** [Recruitment of NuMA to mitotic centrosomes](#)

**Stable identifier:** R-HSA-380508

**Type:** binding

**Compartments:** cytosol



After the nuclear envelope breakdown, phosphorylated NuMA rapidly moves to the centrosomal region (Compton and Luo 1995, Hsu and Yeh 1996, Kotak et al. 2013).

**Followed by:** [Association of NuMA with microtubules](#)

### Literature references

- Compton, DA., Luo, C. (1995). Mutation of the predicted p34cdc2 phosphorylation sites in NuMA impair the assembly of the mitotic spindle and block mitosis. *J Cell Sci*, 108, 621-33. ↗
- Busso, C., Kotak, S., Gönczy, P. (2013). NuMA phosphorylation by CDK1 couples mitotic progression with cortical dynein function. *EMBO J.*, 32, 2517-29. ↗
- Hsu, HL., Yeh, NH. (1996). Dynamic changes of NuMA during the cell cycle and possible appearance of a truncated form of NuMA during apoptosis. *J Cell Sci*, 109, 277-88. ↗

### Editions

2008-11-11	Authored	Matthews, L.
2008-11-12	Edited	Matthews, L.
2008-11-17	Reviewed	Merdes, A.
2017-03-17	Edited	Orlic-Milacic, M.

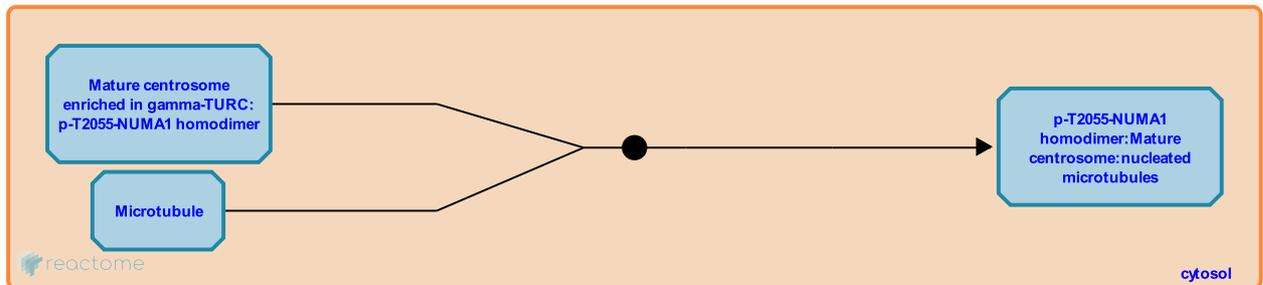
## Association of NuMA with microtubules ↗

**Location:** [Recruitment of NuMA to mitotic centrosomes](#)

**Stable identifier:** R-HSA-380316

**Type:** binding

**Compartments:** cytosol



NuMA can interact with microtubules by direct binding to tubulin. Binding occurs through amino acids 1868-1967 of human NuMA (tail IIA) and appears to play a role in the organization of the spindle poles by stably crosslinking microtubule fibers (Haren and Merdes 2002). While the exact mechanism of microtubule bundling is not known, NuMA has been shown to form large fibrous networks (Saredi et al. 1996, Gueth-Hallonet et al.1998, Harborth et al.1999) apparently as a result of dimerization of the NuMA rod domains followed by association of multiple NuMA dimers through their tail domains.

**Preceded by:** [Translocation of NuMA to the centrosomes](#)

### Literature references

Haren, L., Merdes, A. (2002). Direct binding of NuMA to tubulin is mediated by a novel sequence motif in the tail domain that bundles and stabilizes microtubules. *J Cell Sci*, 115, 1815-24. ↗

### Editions

2008-11-09	Edited	Matthews, L.
2008-11-11	Authored	Matthews, L.
2008-11-17	Reviewed	Merdes, A.
2008-11-24	Edited	Matthews, L.
2017-03-17	Edited	Orlic-Milacic, M.

# Table of Contents

Introduction	1
☒ Recruitment of NuMA to mitotic centrosomes	2
↳ Translocation of NuMA to the centrosomes	3
↳ Association of NuMA with microtubules	4
Table of Contents	5