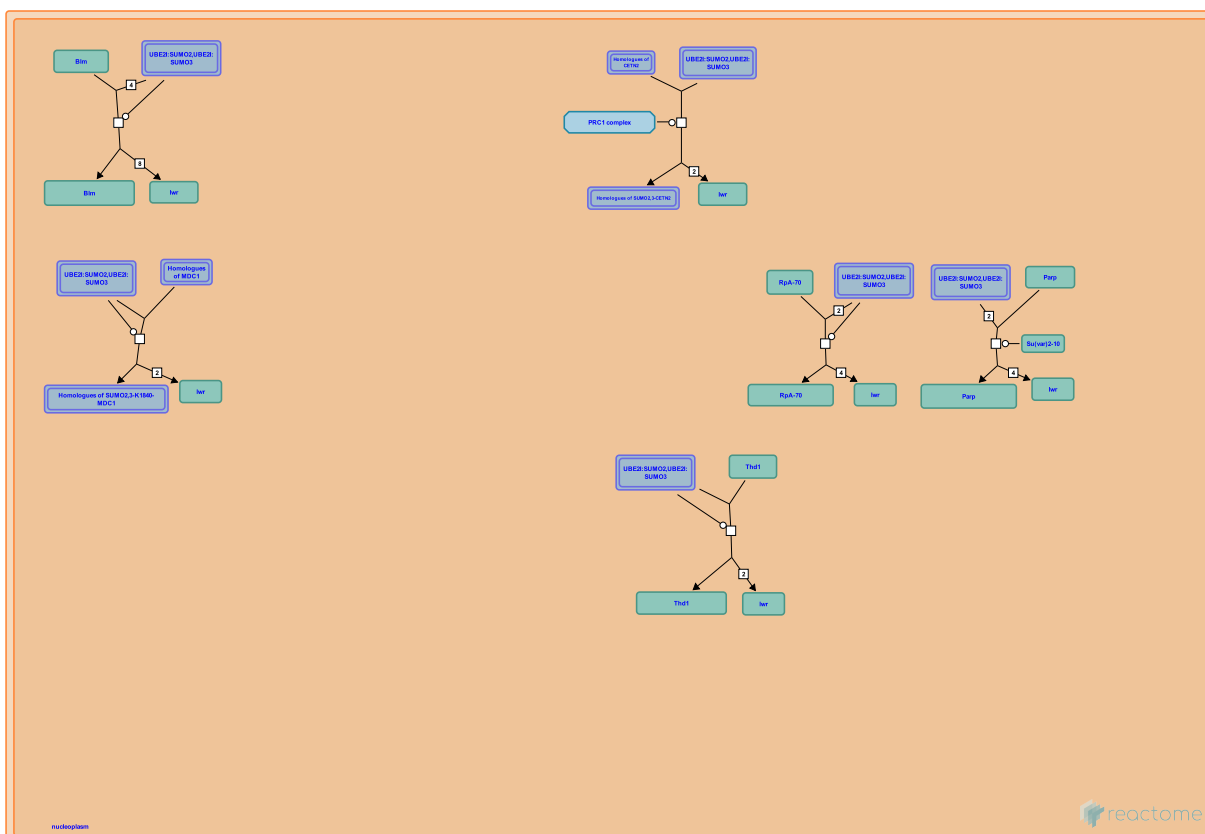


# SUMOylation of DNA damage response and repair proteins



European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

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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.

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. [↗](#)
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- 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: 76

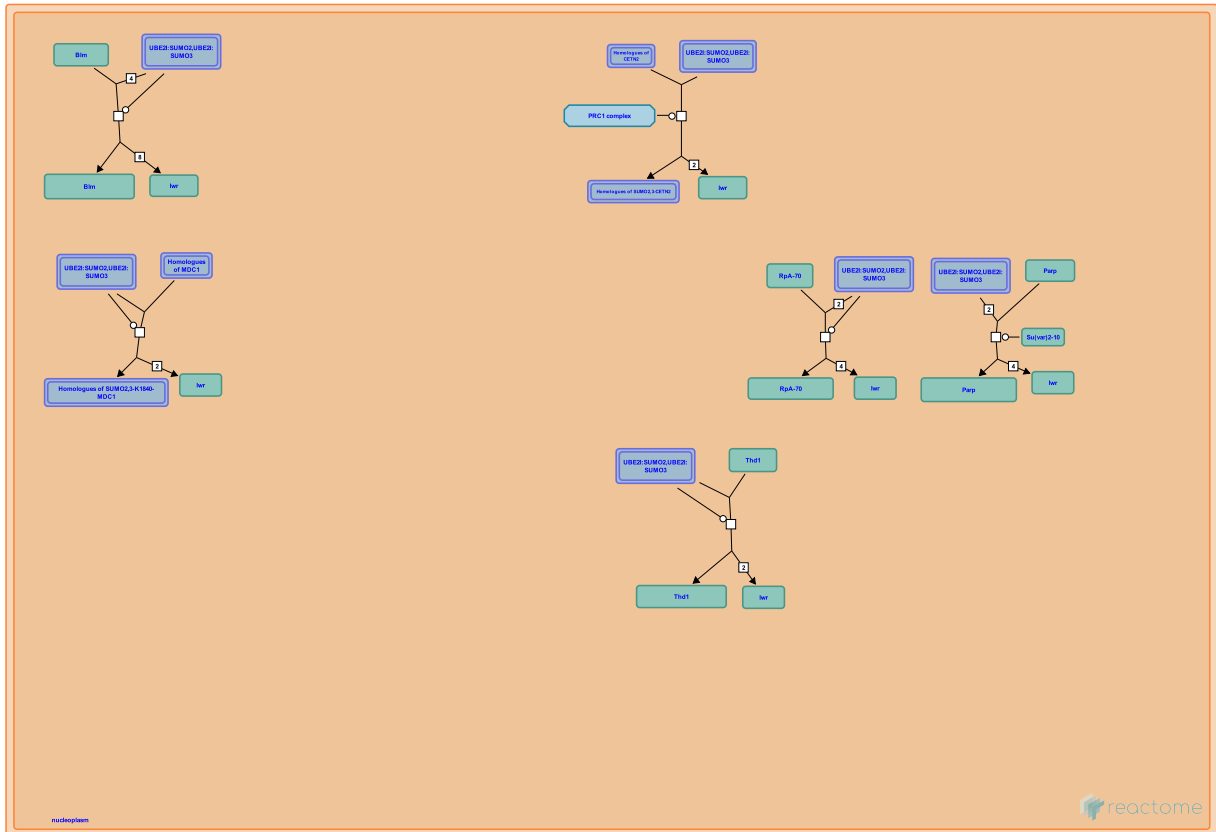
This document contains 1 pathway and 6 reactions ([see Table of Contents](#))

## SUMOylation of DNA damage response and repair proteins ↗

**Stable identifier:** R-DME-3108214

**Compartments:** nucleoplasm

**Inferred from:** SUMOylation of DNA damage response and repair proteins (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.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## SUMOylation of BLM with SUMO2,3 ↗

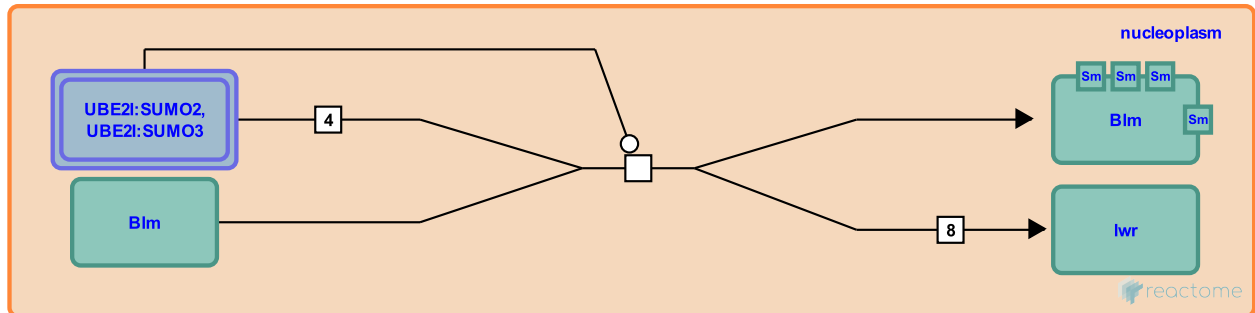
**Location:** [SUMOylation of DNA damage response and repair proteins](#)

**Stable identifier:** R-DME-4568914

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** [SUMOylation of BLM with SUMO2,3 \(Homo sapiens\)](#)



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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## CBX4 (Pc2) SUMOylates CETN2 with SUMO2,3 ↗

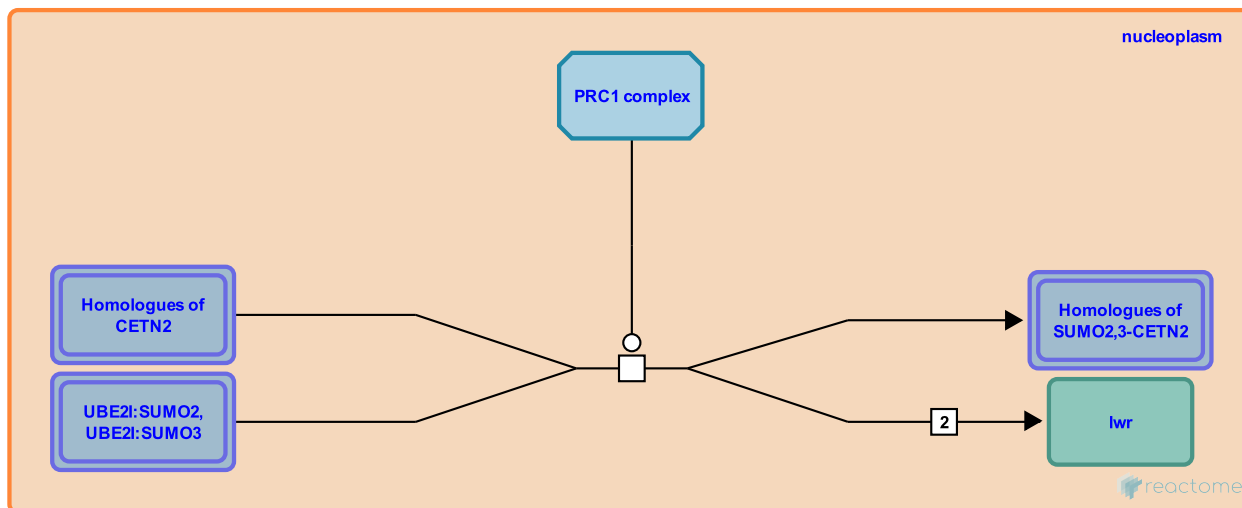
**Location:** SUMOylation of DNA damage response and repair proteins

**Stable identifier:** R-DME-4570463

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** CBX4 (Pc2) SUMOylates CETN2 with SUMO2,3 (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.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## SUMOylation of MDC1 with SUMO2,3 ↗

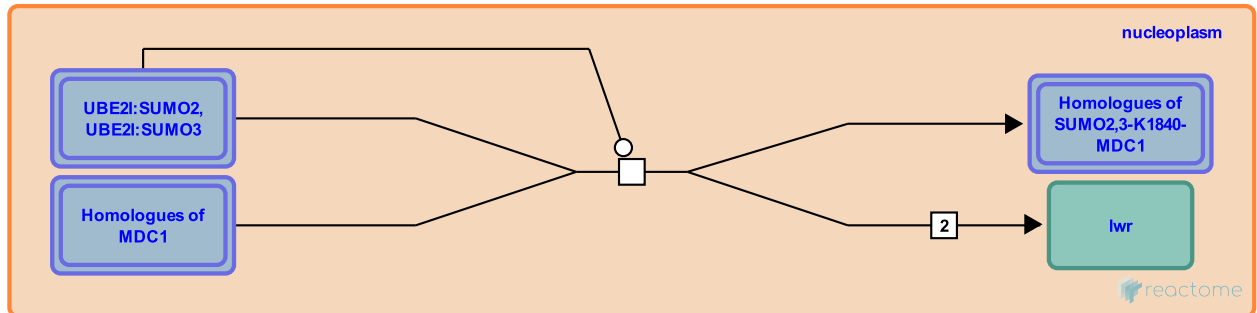
**Location:** [SUMOylation of DNA damage response and repair proteins](#)

**Stable identifier:** R-DME-4570553

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** [SUMOylation of MDC1 with SUMO2,3 \(Homo sapiens\)](#)



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.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## PIAS4 SUMOylates PARP1 with SUMO2,3 ↗

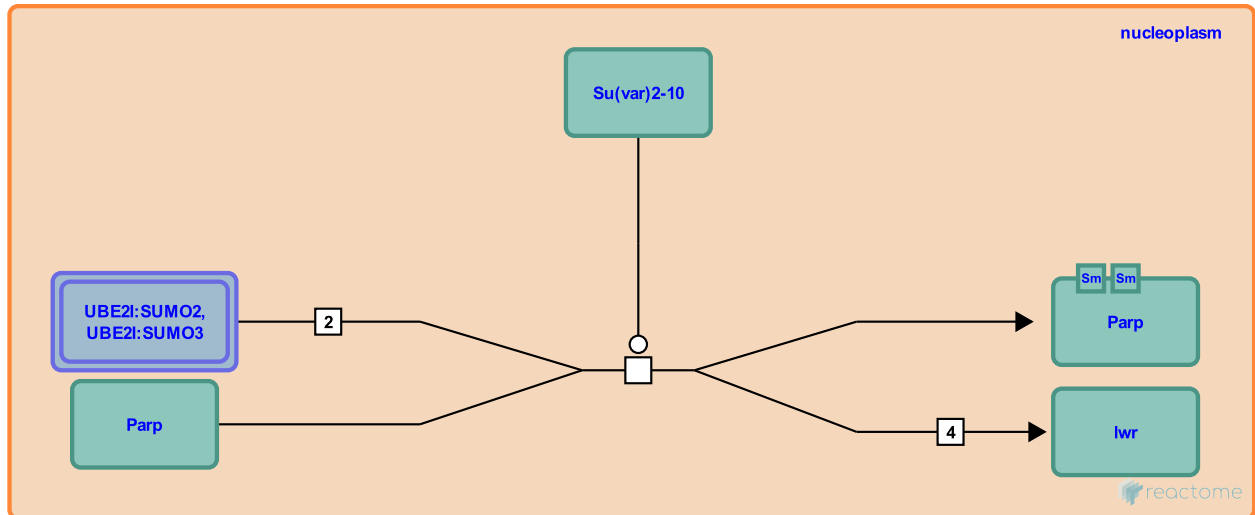
**Location:** [SUMOylation of DNA damage response and repair proteins](#)

**Stable identifier:** R-DME-4551768

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** [PIAS4 SUMOylates PARP1 with SUMO2,3 \(Homo sapiens\)](#)



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.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## SUMOylation of RPA1 (RPA70) with SUMO2,3 ↗

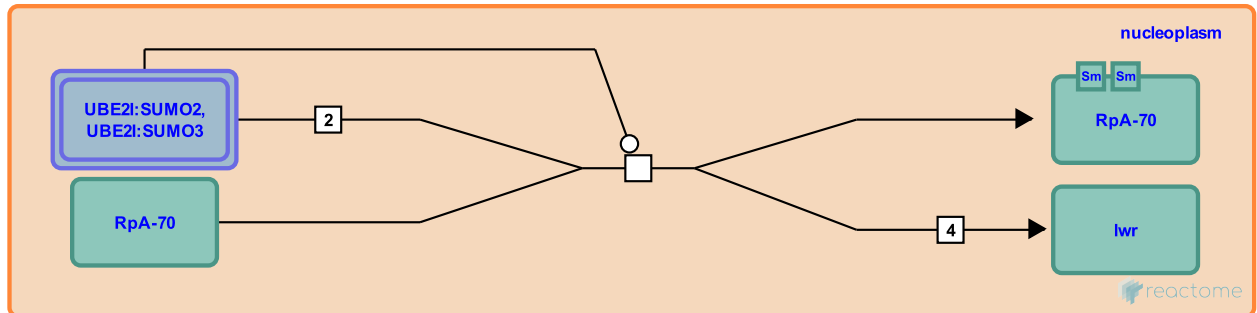
**Location:** [SUMOylation of DNA damage response and repair proteins](#)

**Stable identifier:** R-DME-4551616

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** [SUMOylation of RPA1 \(RPA70\) with SUMO2,3 \(Homo sapiens\)](#)



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.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>



## SUMOylation of TDG with SUMO2,3 ↗

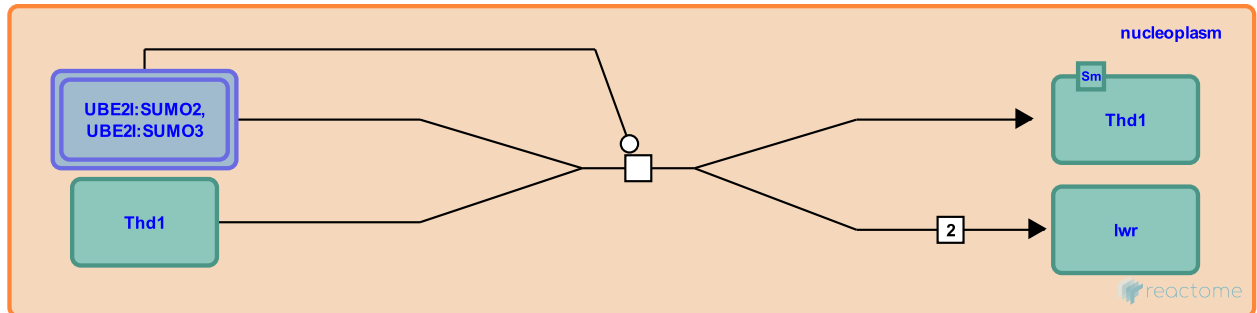
**Location:** [SUMOylation of DNA damage response and repair proteins](#)

**Stable identifier:** R-DME-4551738

**Type:** transition

**Compartments:** nucleoplasm

**Inferred from:** [SUMOylation of TDG with SUMO2,3 \(Homo sapiens\)](#)



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.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

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