SUMOylation of immune response proteins

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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.

31/10/2022

https://reactome.org
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


Reactome database release: 82

This document contains 1 pathway and 5 reactions (see Table of Contents)

https://reactome.org
SUMOylation of immune response proteins

Stable identifier: R-HSA-4755510

Compartments: nucleoplasm, cytosol

NF-kappaB transcription factors are sequestered in the cytosol due to their association with IkappaB. During activation of NF-kappaB, IKK phosphorylates IkappaB, releasing NF-kappaB for importation into the nucleus. NF-kappaB transcription factors, the NFKBIA component of IkappaB, and subunits of the IKK complex can be SUMOylated (reviewed in Kracklauer and Schmidt 2003, Liu et al. 2013). SUMOylations of IkappaB, NFKBIA, and RELA inhibit NF-kappaB signaling; SUMOylation of NFKB2 is required for proteolytic processing.

Literature references


Editions

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TOPORS SUMOylates IKBKE with SUMO1

Location: SUMOylation of immune response proteins

Stable identifier: R-HSA-4755478

Type: transition

Compartments: nucleoplasm

TOPORS SUMOylates phosphorylated IKBKE (IKKI, IKKE) with SUMO1 at lysine-231 (Renner et al. 2010). SUMOylation causes IKBKE to localize with PML in the nucleus and is required for IKBKE to trigger phosphorylation of NF-kappaB p65.

Literature references


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PIAS4 SUMOylates IKBKG with SUMO1

Location: SUMOylation of immune response proteins

Stable identifier: R-HSA-4755411

Type: transition

Compartments: nucleoplasm

PIAS4 SUMOylates IKBKG with SUMO1 at lysine-277 and lysine-309 (Huang et al. 2003, Mabb et al. 2006). SUMOylation occurs in the nucleus when IKBKG is unbound to IKK. The interaction between PIAS4 and IKBKG is increased by genotoxic stress. SUMOylation is independent of ATM.

Literature references


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SUMOylation of NFKBIA with SUMO1

**Location:** SUMOylation of immune response proteins

**Stable identifier:** R-HSA-4656914

**Type:** transition

**Compartments:** nucleoplasm


**Literature references**


**Editions**

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Unprocessed NFKB2 p100 is SUMOylated with SUMO1 at lysine-90, lysine-298, lysine-689, and lysine-863 (Vatsyayan et al. 2008). SUMOylation of p100 is required for phosphorylation of p100 prior to processing to yield p52. Blockage of SUMOylation consequently interferes with import of NFKB2 p52 into the nucleus.

**Literature references**


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PIAS3 SUMOylates RELA with SUMO3

Location: SUMOylation of immune response proteins

Stable identifier: R-HSA-4755536

Type: transition

Compartments: nucleoplasm

PIAS3 SUMOylates RELA with SUMO3 at lysine-37, lysine-121, and lysine-122 (Liu et al. 2012, Hendriks et al. 2014). SUMOylation occurs when RELA is bound to NF-kB binding sites on DNA in the nucleus. SUMOylation represses transcriptional activity of RELA and is enhanced by NF-kB activation by TNF-alpha.

Literature references


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