

Condensin II complex binds H4K20me1- containing nucleosomes

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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

- 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: 76

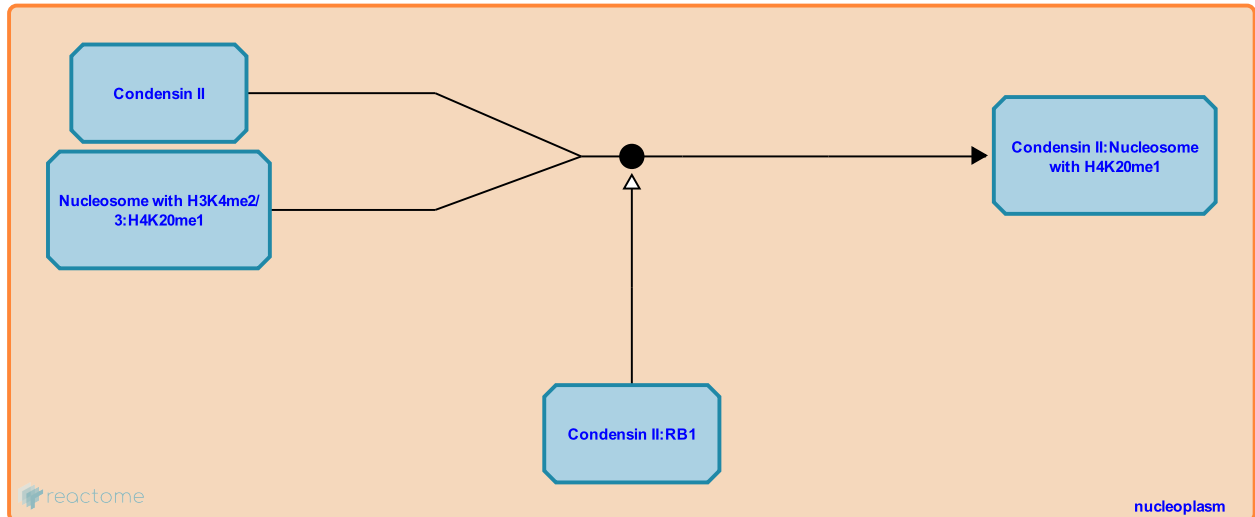
This document contains 1 reaction ([see Table of Contents](#))

Condensin II complex binds H4K20me1-containing nucleosomes [↗](#)

Stable identifier: R-HSA-2288097

Type: binding

Compartments: nucleoplasm



Accumulation of monomethylated histone H4 (H4K20me1) is necessary for loading of the condensin II complex on chromatin. Condensin II binds H4K20me1 through HEAT repeats of two condensin II subunits, NCAPD3 and NCAPG2 (Liu et al. 2010). RB1 is required, at least partially, for the successful association of condensin II with chromatin (Longworth et al. 2008). The precise role of RB1 in condensin II loading and the connection, if any, between histone H4 monomethylation and RB1-facilitated loading of the condensin II complex on chromatin has not, however, been elucidated. RB1 family proteins are known to interact with H4K20 trimethylating enzymes Suv4-20h1 and Suv4-20h2 and promote H4K20 trimethylation at pericentric and telomeric heterochromatin (Gonzalo et al. 2005).

Literature references

Liu, W., Tanasa, B., Tyurina, OV., Zhou, TY., Gassmann, R., Liu, WT. et al. (2010). PHF8 mediates histone H4 lysine 20 demethylation events involved in cell cycle progression. *Nature*, 466, 508-12. [↗](#)

Longworth, MS., Herr, A., Ji, JY., Dyson, NJ. (2008). RBF1 promotes chromatin condensation through a conserved interaction with the Condensin II protein dCAP-D3. *Genes Dev*, 22, 1011-24. [↗](#)

Gonzalo, S., García-Cao, M., Fraga, MF., Schotta, G., Peters, AH., Cotter, SE. et al. (2005). Role of the RB1 family in stabilizing histone methylation at constitutive heterochromatin. *Nat. Cell Biol.*, 7, 420-8. [↗](#)

Editions

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