

VCP-catalyzed ATP hydrolysis promotes the translocation of Hh-C into the cytosol

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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: 88

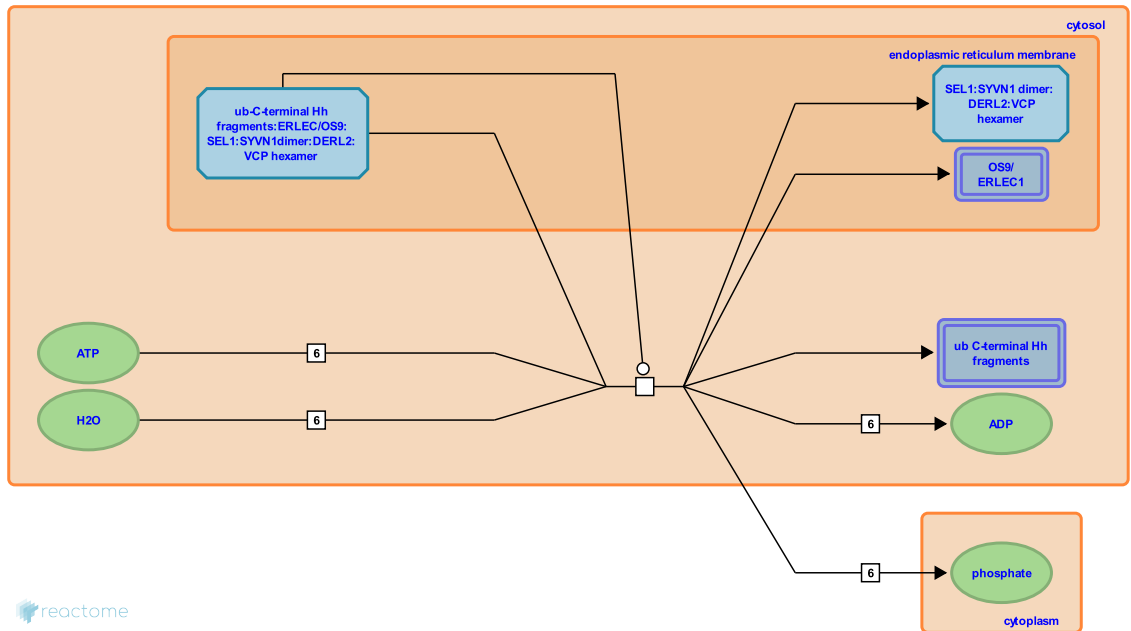
This document contains 1 reaction ([see Table of Contents](#))

VCP-catalyzed ATP hydrolysis promotes the translocation of Hh-C into the cytosol ↗

Stable identifier: R-HSA-5362459

Type: transition

Compartments: cytosol



The ATPase activity of VCP is required for the retrotranslocation of Hh-C across the ER membrane (Chen et al, 2011). Although in this pathway, the VCP hexamer is shown as part of the SEL1:SYVN1:DERL2 retrotranslocon, the details, order of events and even the full complement of protein players in this process are not known. In yeast, the VCP homologue Cdc48 is associated with two additional proteins Ufd1 and Npl4 -both of which are also conserved in mammals- and this complex interacts with several ER components including derlins and the yeast SYVN1 homologue, Hrd1 (reviewed in Vembar and Brodsky, 2009). Consistent with the yeast data, VCP interacts with DERL2 by co-immunoprecipitation in HEK293 cells (Huang et al, 2013).

Literature references

- Jao, C., Rapoport, TA., Tang, HY., Chu, YR., Schulman, S., Huang, CH. et al. (2011). Processing and turnover of the Hedgehog protein in the endoplasmic reticulum. *J. Cell Biol.*, 192, 825-38. ↗
- Ye, Y., Chu, YR., Hsiao, HT., Huang, CH., Chen, X. (2013). Derlin2 protein facilitates HRD1-mediated retro-translocation of sonic hedgehog at the endoplasmic reticulum. *J. Biol. Chem.*, 288, 25330-9. ↗
- Vembar, SS., Brodsky, JL. (2008). One step at a time: endoplasmic reticulum-associated degradation. *Nat. Rev. Mol. Cell Biol.*, 9, 944-57. ↗

Editions

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