

Hh-Npp binds GAS1 and PTCH

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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

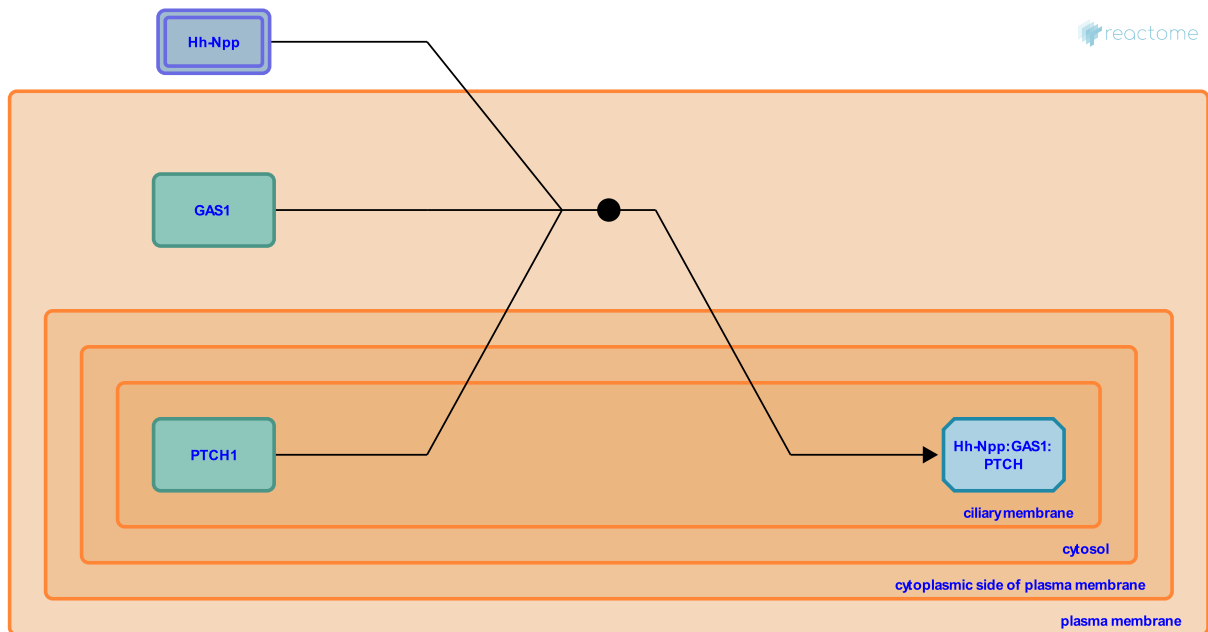
This document contains 1 reaction ([see Table of Contents](#))

Hh-Npp binds GAS1 and PTCH [↗](#)

Stable identifier: R-HSA-5632649

Type: binding

Compartments: plasma membrane



GAS1 is a vertebrate-specific Hh coreceptor that binds directly to Hh ligand to promote signaling (Martinelli and Fan, 2007; McLellan et al, 2008; Izzi et al, 2011; Pineda-Alvarez et al, 2012). GAS1 interacts directly with PTCH as well as BOC and CDON and contributes in an unclearly defined manner to Hh signal transduction (Martinelli and Fan, 2007; Allen et al, 2007; Izzi et al, 2011; Allen et al, 2011; reviewed in Sanchez-Arrones et al, 2012).

Literature references

- Fan, CM., Martinelli, DC. (2007). Gas1 extends the range of Hedgehog action by facilitating its signaling. *Genes Dev.*, 21, 1231-43. [↗](#)
- Allen, BL., McMahon, AP., Tenzen, T. (2007). The Hedgehog-binding proteins Gas1 and Cdo cooperate to positively regulate Shh signaling during mouse development. *Genes Dev.*, 21, 1244-57. [↗](#)
- Charron, F., Morin, S., Krauss, RS., Allen, BL., Laniel, D., Lévesque, M. et al. (2011). Boc and Gas1 each form distinct Shh receptor complexes with Ptch1 and are required for Shh-mediated cell proliferation. *Dev. Cell*, 20, 788-801. [↗](#)
- Muenke, M., Solomon, BD., Hu, P., Fan, CM., Srivastava, K., Roessler, E. et al. (2012). Missense substitutions in the GAS1 protein present in holoprosencephaly patients reduce the affinity for its ligand, SHH. *Hum. Genet.*, 131, 301-10. [↗](#)
- Nieto-Lopez, F., Cardozo, M., Bovolenta, P., Sanchez-Arrones, L. (2012). Cdon and Boc: Two transmembrane proteins implicated in cell-cell communication. *Int. J. Biochem. Cell Biol.*, 44, 698-702. [↗](#)

Editions

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