

KIF7 is recruited to the ciliary tip through interaction with axonemal microtubules

Gillespie, ME., Liu, Y C., Rothfels, K.

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

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of [Creative Commons Attribution 4.0 International \(CC BY 4.0\) License](#). For more information see our [license](#).

03/05/2024

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. [↗](#)
- 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

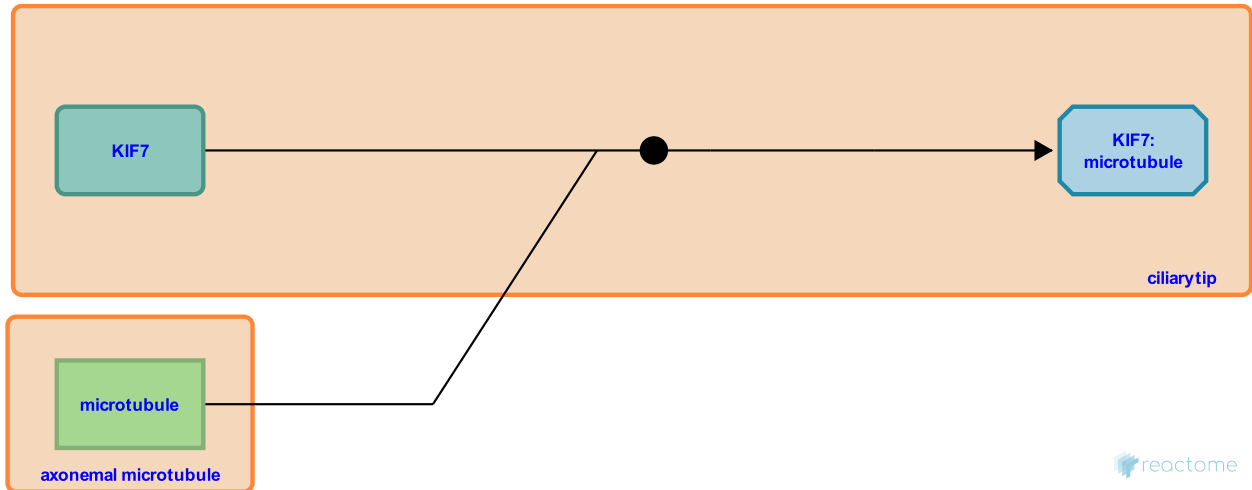
This document contains 1 reaction ([see Table of Contents](#))

KIF7 is recruited to the ciliary tip through interaction with axonemal microtubules [↗](#)

Stable identifier: R-HSA-5610733

Type: binding

Compartments: ciliary tip



KIF7, the human ortholog of *Drosophila* COS2, is a kinesin-4 motor protein that binds directly to the plus ends of axonemal microtubules and inhibits their growth in an ATP-dependent manner (He et al, 2014). KIF7 is required for the processing and activity of GLI in the absence of Hh signal, and KIF7 function depends on the primary cilium (Liem et al, 2009; Cheung et al, 2009; Endoh-Yamagami et al, 2009). KIF7 has been shown to bind to GLI3 and to SUFU and may act in part by promoting the transit of the GLI:SUFU complex through the primary cilium, which is required for GLI processing (Endoh-Yamagami et al, 2009; Maurya et al, 2013). How KIF7 itself is localized to the cilia tip is unknown, although localization depends on the KIF7 motor domain (Liem et al, 2009; He et al, 2014). KIF7 localization is further enhanced at the primary cilia tip in response to Hh signaling, as is also the case for GLI2, GLI3 and SUFU (He et al, 2014; Varjosalo et al, 2008; Haycraft et al, 2005; Wen et al, 2010; Qin et al, 2011; Tukachinsky et al, 2010).

Literature references

- Lee, RT., Yu, W., Niah, W., Elworthy, S., Ben, J., Zhao, Z. et al. (2013). Positive and negative regulation of Gli activity by Kif7 in the zebrafish embryo. *PLoS Genet.*, 9, e1003955. [↗](#)
- Ocbina, PJ., Liem, KF., He, M., Anderson, KV. (2009). Mouse Kif7/Costal2 is a cilia-associated protein that regulates Sonic hedgehog signaling. *Proc. Natl. Acad. Sci. U.S.A.*, 106, 13377-82. [↗](#)
- Theunissen, JW., Scales, SJ., Phamluong, K., Endoh-Yamagami, S., Wen, X., Wilson, D. et al. (2009). The mammalian Cos2 homolog Kif7 plays an essential role in modulating Hh signal transduction during development. *Curr. Biol.*, 19, 1320-6. [↗](#)
- Ko, HW., Lin, Y., Qin, J., Eggenchwiler, JT., Norman, RX. (2011). Intraflagellar transport protein 122 antagonizes Sonic Hedgehog signaling and controls ciliary localization of pathway components. *Proc. Natl. Acad. Sci. U.S.A.*, 108, 1456-61. [↗](#)
- Yoder, BK., Haycraft, CJ., Banizs, B., Aydin-Son, Y., Zhang, Q., Michaud, EJ. (2005). Gli2 and Gli3 localize to cilia and require the intraflagellar transport protein polaris for processing and function. *PLoS Genet.*, 1, e53. [↗](#)

Editions

2014-05-07	Authored	Rothfels, K.
2014-07-25	Edited	Gillespie, ME.
2014-08-01	Reviewed	Liu, Y C.