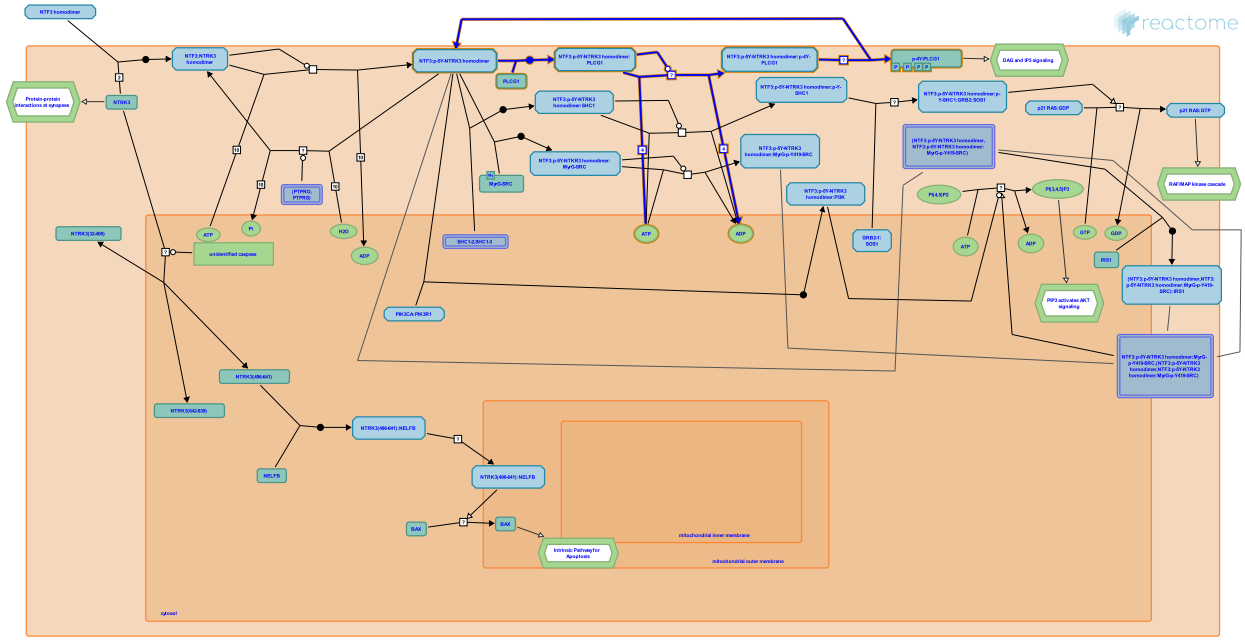
Activated NTRK3 signals through PLCG1



Orlic-Milacic, M., Tsoulfas, P.

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

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.

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. ↗

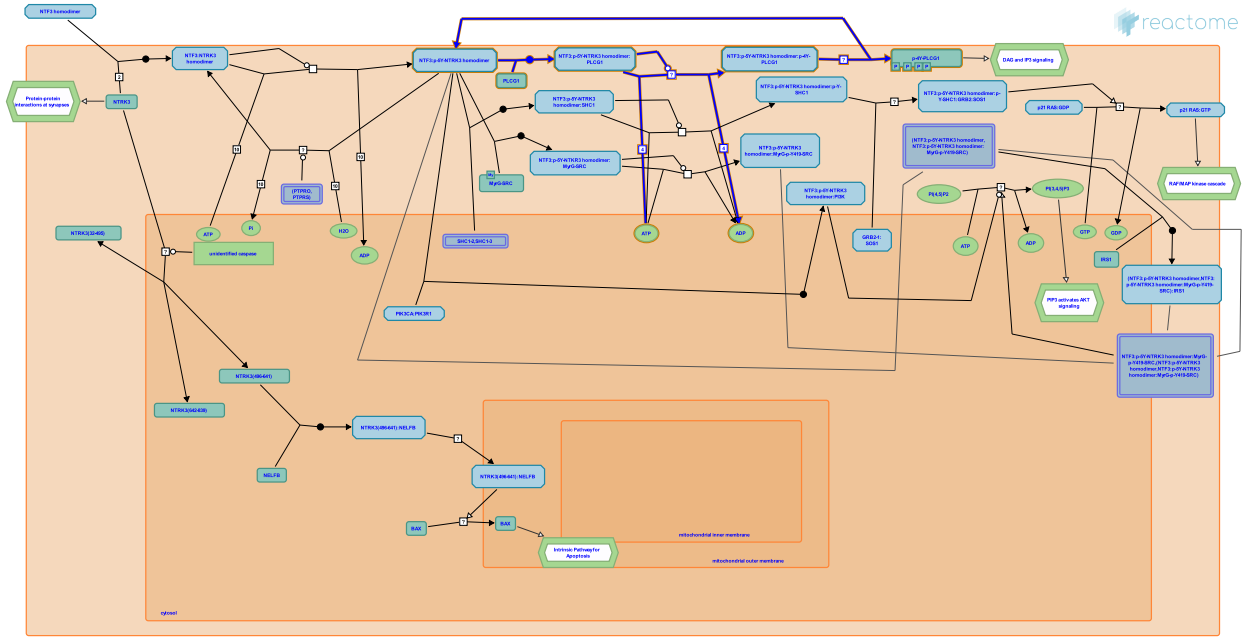
Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics, 33*, 3461-3467. ↗

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. ↗

Activated NTRK3 signals through PLCG1 ↗

Stable identifier: R-HSA-9034793



The receptor tyrosine kinase NTRK3 (TRKC), when activated by its ligand NTF3 (NT-3), induces PLCG1 phosphorylation, triggering PLCG1 signaling (Marsh and Palfrey 1996, Yuen and Mobley 1999).

Literature references

Marsh, HN., Palfrey, HC. (1996). Neurotrophin-3 and brain-derived neurotrophic factor activate multiple signal transduction events but are not survival factors for hippocampal pyramidal neurons. *J. Neurochem., 67*, 952-63. ↗

Yuen, EC., Mobley, WC. (1999). Early BDNF, NT-3, and NT-4 signaling events. *Exp. Neurol., 159*, 297-308. ↗

Editions

2018-01-02	Authored	Orlic-Milacic, M.
2018-05-09	Edited	Orlic-Milacic, M.
2018-05-09	Reviewed	Tsoulfas, P.

Activated NTRK3 binds PLCG1 ↗

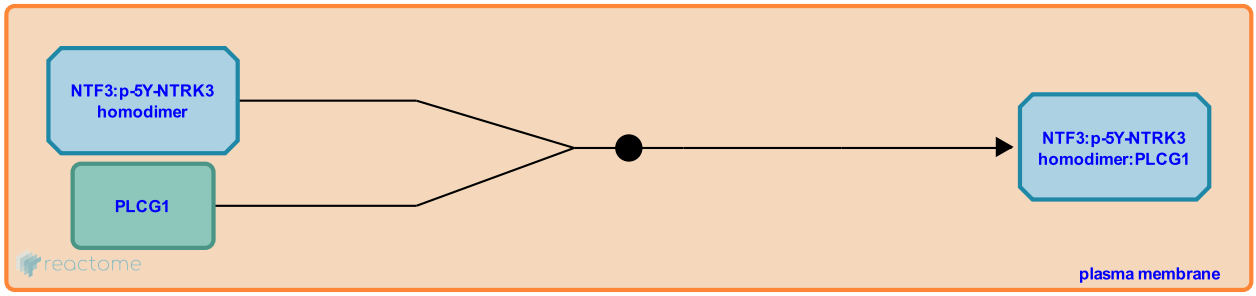
Location: Activated NTRK3 signals through PLCG1

Stable identifier: R-HSA-9034796

Type: binding

Compartments: plasma membrane

Inferred from: Activated Ntrk3 binds Plcg1 (Homo sapiens)



Upon activation by NTF3 (NT-3), autophosphorylated NTRK3 (TRKC) binds Phospholipase C gamma1 (PLCG1) (Yuen and Mobley 1999, Huang and Reichardt 2001).

Followed by: NTRK3 phosphorylates PLCG1

Editions

2018-01-02	Authored	Orlic-Milacic, M.
2018-05-09	Edited	Orlic-Milacic, M.
2018-05-09	Reviewed	Tsoulfas, P.

NTRK3 phosphorylates PLCG1 ↗

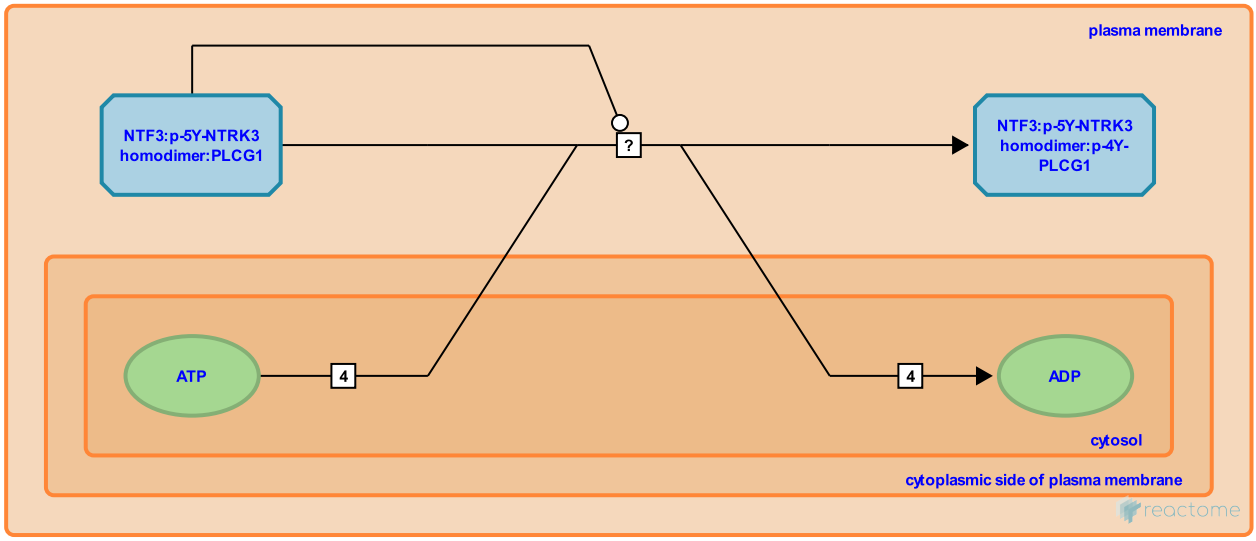
Location: Activated NTRK3 signals through PLCG1

Stable identifier: R-HSA-9034814

Type: uncertain

Compartments: plasma membrane, cytosol

Inferred from: Ntrk3 phosphorylates Plcg1 (Homo sapiens)



Kinase activity of NTRK3 (TRKC) is needed for tyrosine phosphorylation and activation of PLCG1 in response to NTF3 (NT-3) (Guiton et al. 1995, Marsh and Palfrey 1996). NTRK3-mediated phosphorylation sites on PLCG1 have not been determined but are predicted to involve four tyrosine residues whose phosphorylation is known to be required for the phospholipase activity of PLCG1: Y472, Y771, Y783 and Y1253.

Preceded by: Activated NTRK3 binds PLCG1

Followed by: Activated PCLG1 dissociates from NTRK3

Editions

2018-01-02	Authored	Orlic-Milacic, M.
2018-05-09	Edited	Orlic-Milacic, M.
2018-05-09	Reviewed	Tsoulfas, P.

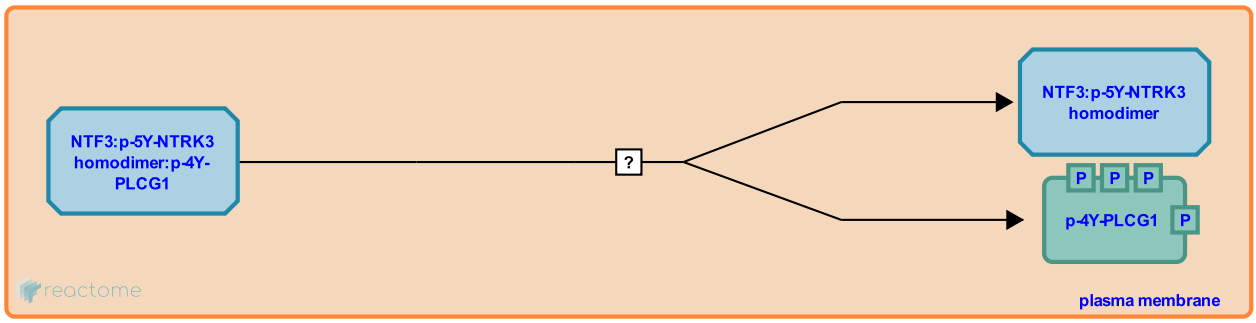
Activated PCLG1 dissociates from NTRK3 ↗

Location: Activated NTRK3 signals through PLCG1

Stable identifier: R-HSA-9034855

Type: uncertain

Compartments: plasma membrane



Based on the accepted model of PLCgamma1 (PLCG1) signaling, although this has not been tested in the context of the NTRK3 (TRKC) receptor-mediated activation of PLCG1, phosphorylated, active, PLCG1 dissociates from the receptor tyrosine kinase and catalyzes formation of DAG and IP3 second messengers (Carpenter and Ji 1999). Activation of rat Ntrk3 by human NTF3 (NT-3) is known to result in tyrosine phosphorylation of rat Plcg1 and activation of DAG and IP3 signaling (Marsh and Palfrey 1996).

Preceded by: NTRK3 phosphorylates PLCG1

Literature references

Ji, Q., Carpenter, G. (1999). Phospholipase C-gamma as a signal-transducing element. *Exp Cell Res, 253*, 15-24. ↗

Editions

2018-01-02	Authored	Orlic-Milacic, M.
2018-05-09	Edited	Orlic-Milacic, M.
2018-05-09	Reviewed	Tsoulfas, P.

Table of Contents