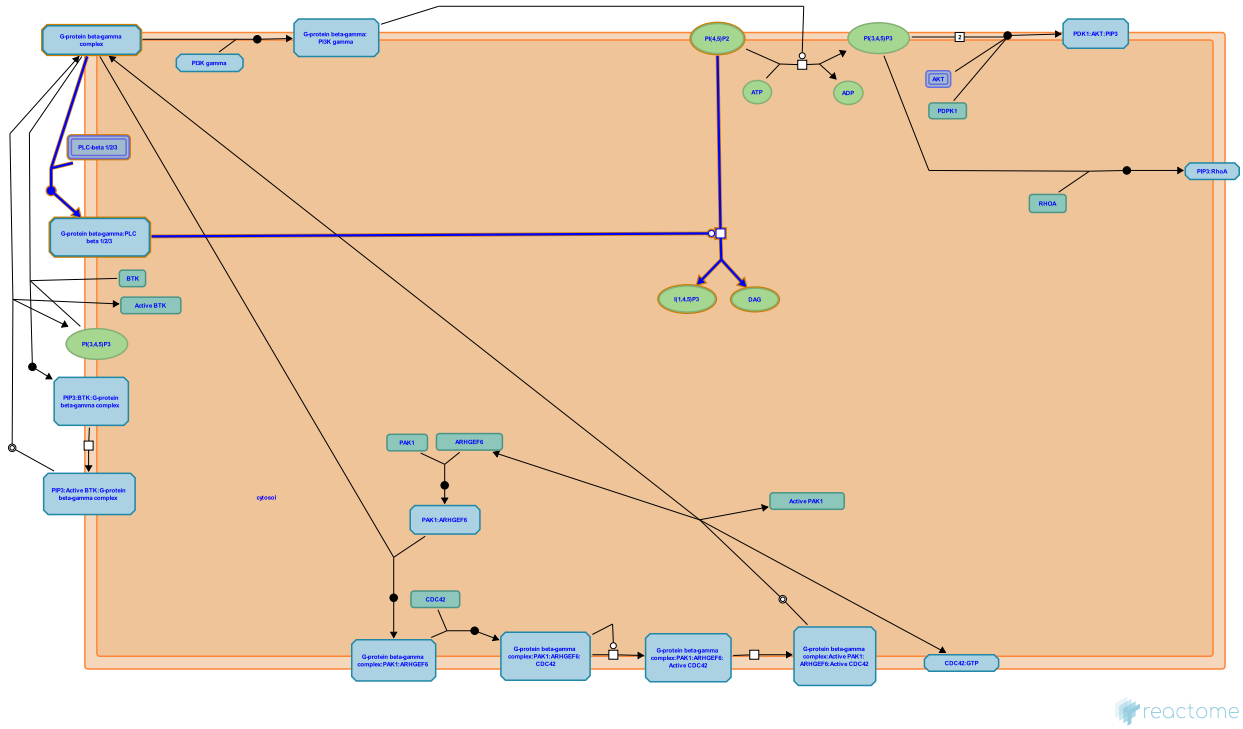
G beta:gamma signalling through PLC beta



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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.
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. ↗

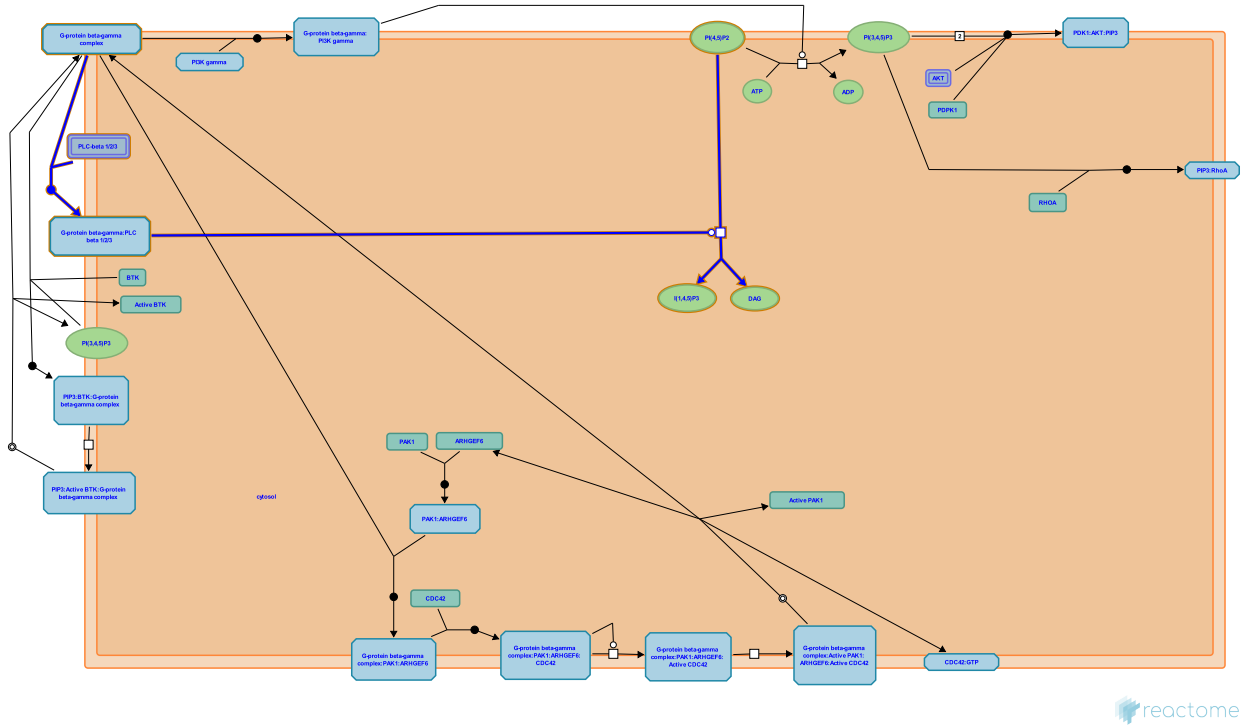
Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res, 46*, D649-D655. ↗

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. ↗

G beta:gamma signalling through PLC beta ↗

Stable identifier: R-HSA-418217

Compartments: cytoplasmic side of plasma membrane



Phospholipase C beta (PLCbeta) isoforms are activated by G-protein beta:gamma in the order PLCB3 > PLCB2 > PLCB1. Gbeta:gamma binds to the pleckstrin homology domain of PLC beta, increasing phospholipase activity and leading to increased hydrolysis of PIP2 to DAG and IP3.

Literature references

Lee, CW., Park, D., Rhee, SG., Jhon, DY., Lee, KH. (1993). Activation of phospholipase C isozymes by G protein beta gamma subunits. *J Biol Chem, 268*, 4573-6. ↗

Editions

2009-04-17	Authored	Jupe, S.
2009-06-03	Reviewed	Akkerman, JW.
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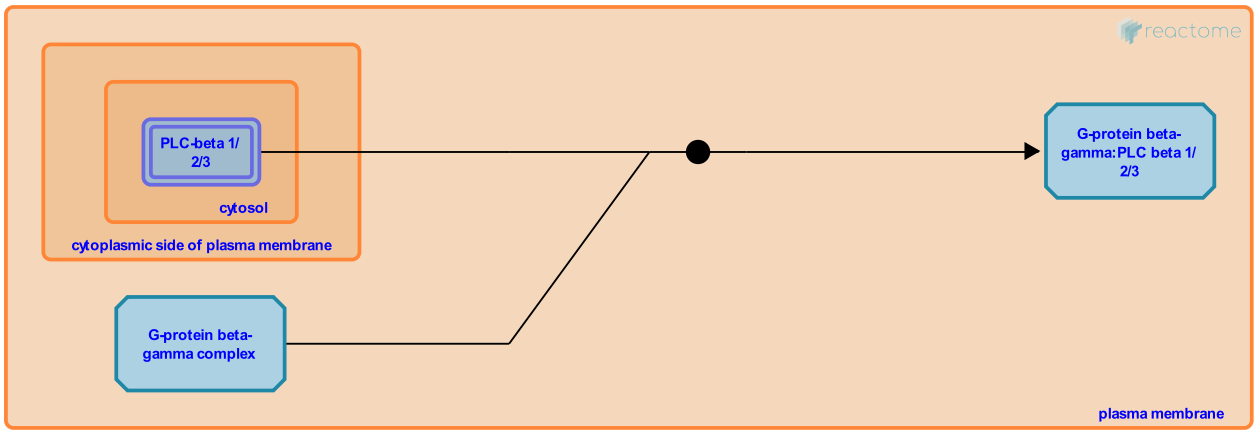
Gbeta:gamma activation of PLC beta ↗

Location: G beta:gamma signalling through PLC beta

Stable identifier: R-HSA-398040

Type: binding

Compartments: plasma membrane, cytosol



G beta:gamma engages the PH domain of Phospholipase C beta, stimulating phospholipase activity, resulting in increased PIP2 hydrolysis.

Followed by: PLC beta-mediated PIP2 hydrolysis

Literature references

Smrcka, AV., Bonacci, TM., Ghosh, M., Malik, S. (2005). Regulatory interactions between the amino terminus of G-protein betagamma subunits and the catalytic domain of phospholipase Cbeta2. *J Biol Chem, 280*, 10174-81. ↗

Editions

2009-03-16	Authored	Jupe, S.
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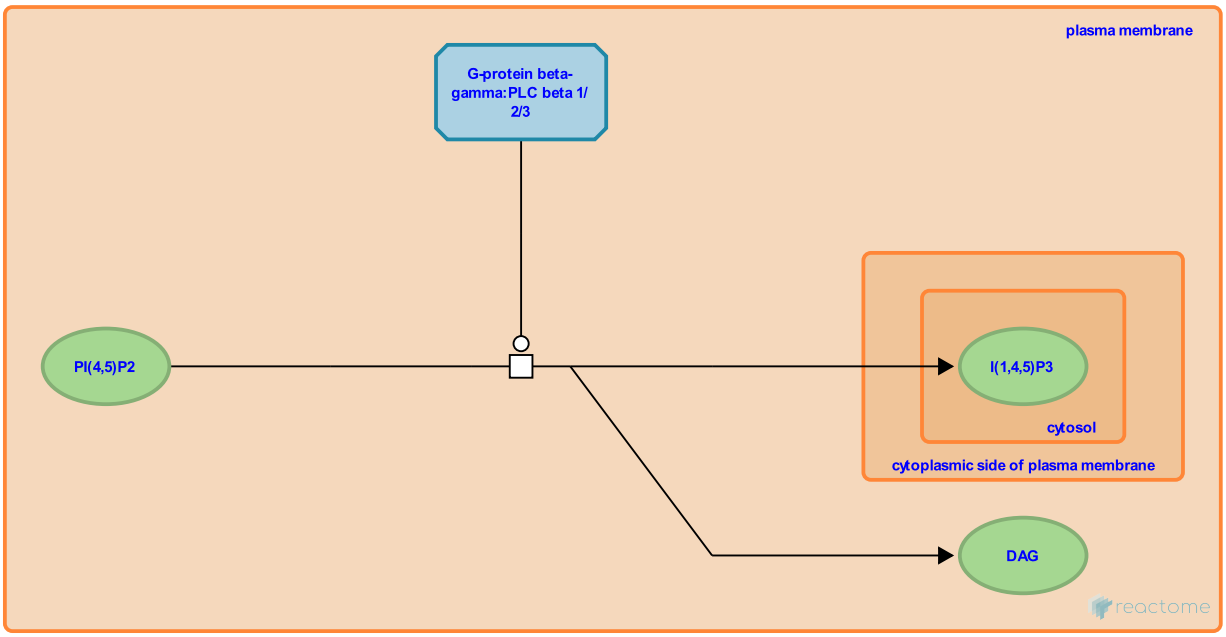
PLC beta-mediated PIP2 hydrolysis ↗

Location: G beta:gamma signalling through PLC beta

Stable identifier: R-HSA-398193

Type: transition

Compartments: plasma membrane, cytosol



Phospholipase C (PLC) isozymes are a group of related proteins that cleave the polar head group from inositol phospholipids, typically in response to signals from cell surface receptors. They hydrolyze the highly phosphorylated lipid phosphatidylinositol 4,5-bisphosphate (PIP2) generating two products: inositol 1,4,5-trisphosphate (IP3), a universal calcium-mobilizing second messenger, and diacylglycerol (DAG), an activator of protein kinase C. PLC-beta isoforms are regulated by heterotrimeric GTP-binding proteins. PLC-beta 1 and 3 are widely expressed, with the highest concentrations found in (differing) specific regions of the brain. PLC-beta 2 is expressed at highest levels in cells of hematopoeitic origin; it is involved in leukocyte signaling and host defense. PLC-beta 4 is highly concentrated in cerebellar Purkinje and granule cells, the median geniculate body, whose axons terminate in the auditory cortex, and the lateral geniculate nucleus, where most retinal axons terminate in a visuotopic representation of each half of the visual field.

Preceded by: Gbeta:gamma activation of PLC beta

Literature references

Nozawa, Y., Yada, Y., Banno, Y. (1988). Purification and characterization of membrane-bound phospholipase C specific for phosphoinositides from human platelets. *J Biol Chem, 263*, 11459-65. ↗

Rebecchi, MJ., Pentyala, SN. (2000). Structure, function, and control of phosphoinositide-specific phospholipase C. *Physiol Rev, 80*, 1291-335. ↗

Editions

2009-03-18	Authored	Jupe, S.
2009-06-03	Reviewed	Akkerman, JW.
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