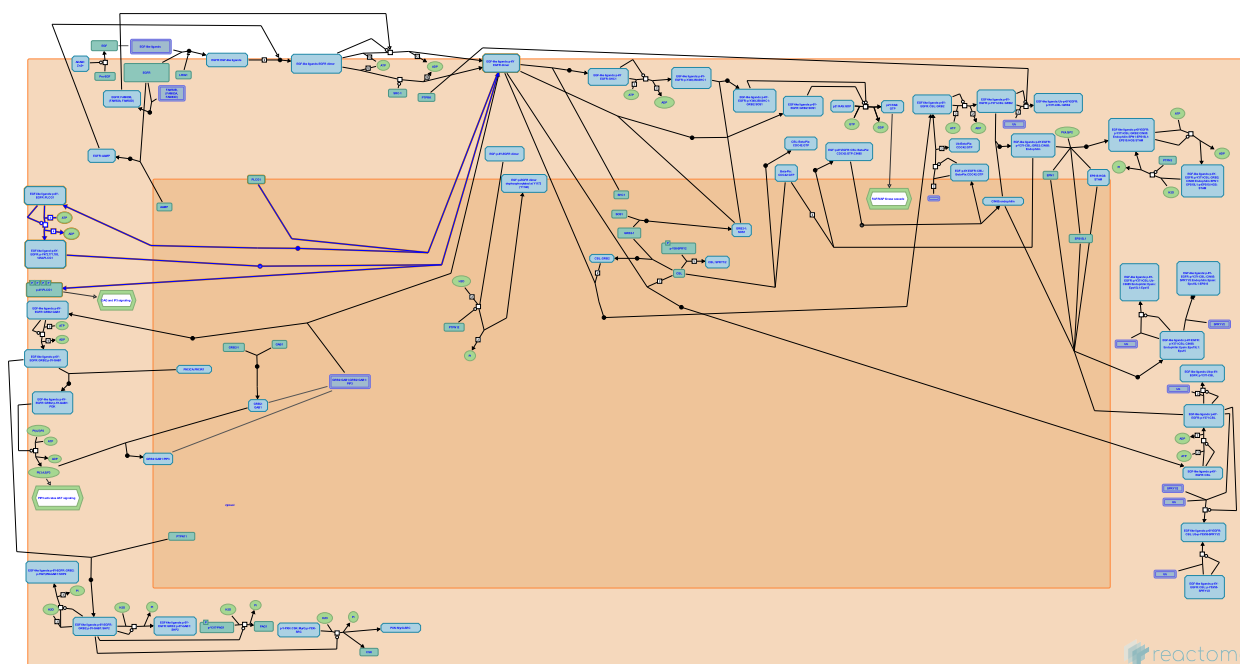


EGFR interacts with phospholipase C- gamma



Heldin, CH., Jassal, B.

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](https://creativecommons.org/licenses/by/4.0/). For more information see our [license](https://reactome.org/about/reactome-license).

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](https://reactome.org/textbook).

02/05/2024

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. [↗](#)

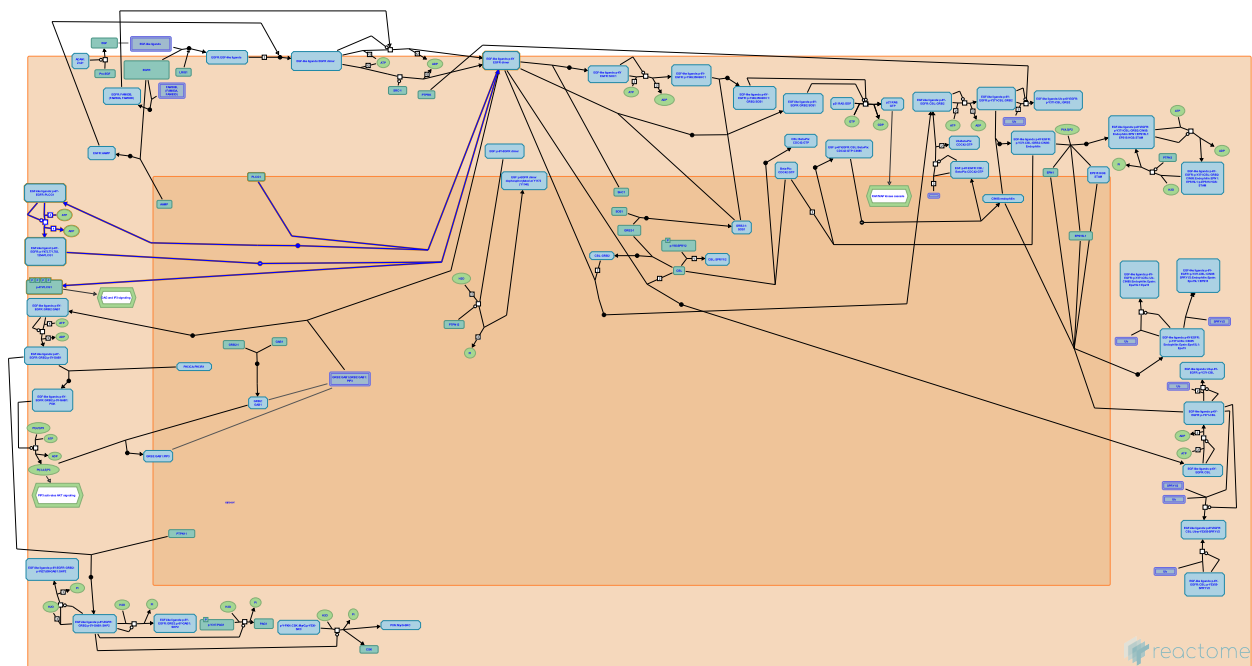
Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

Reactome database release: 88

This document contains 1 pathway and 3 reactions ([see Table of Contents](#))

EGFR interacts with phospholipase C-gamma ↗

Stable identifier: R-HSA-212718



Activated epidermal growth factor receptors (EGFR) can stimulate phosphatidylinositol (PI) turnover. Activated EGFR can activate phospholipase C-gamma1 (PLC-gamma1, i.e. PLCG1) which hydrolyses phosphatidylinositol 4,5-bisphosphate (PIP2) to inositol 1,4,5-triphosphate (IP3) and diacylglycerol (DAG). IP3 is instrumental in the release of calcium from intracellular stores and DAG is involved in protein kinase C activation.

Literature references

Hernández-Sotomayor, SM., Carpenter, G. (1992). Epidermal growth factor receptor: elements of intracellular communication. *J Membr Biol*, 128, 81-9. ↗

Editions

2008-02-12	Reviewed	Heldin, CH.
2008-02-13	Authored	Jassal, B.

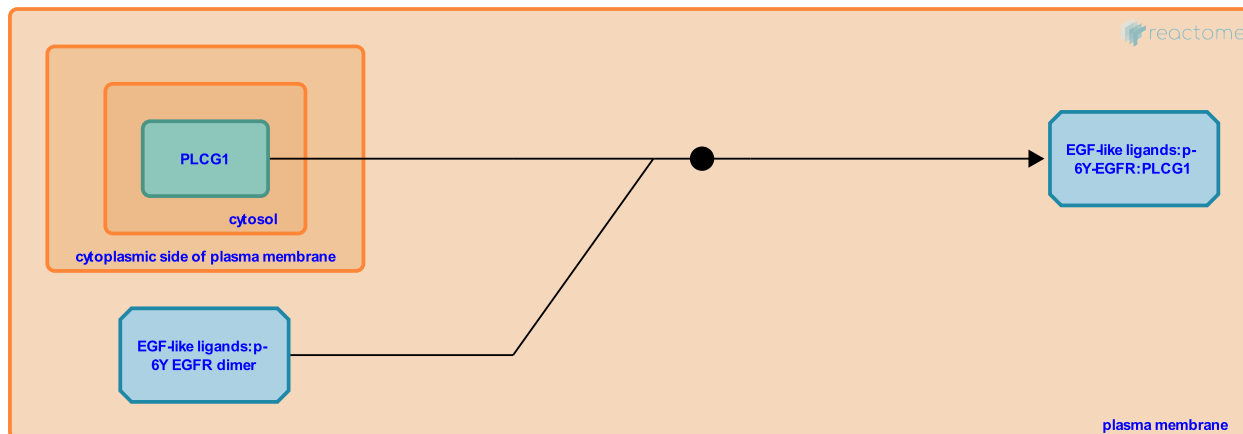
Phospholipase C-gamma1 binds to the activated EGF receptor ↗

Location: [EGFR interacts with phospholipase C-gamma](#)

Stable identifier: R-HSA-212706

Type: binding

Compartments: plasma membrane, extracellular region, cytosol



Inactive phospholipase C-gamma1 (PLCG1) binds to activated epidermal growth factor receptor (EGFR).

Followed by: [EGFR activates PLC-gamma1 by phosphorylation](#)

Literature references

Bellot, F., Schlessinger, J., Ullrich, A., Zilberstein, A., Honegger, AM., Margolis, B. (1990). Tyrosine kinase activity is essential for the association of phospholipase C-gamma with the epidermal growth factor receptor. *Mol Cell Biol*, 10, 435-41. ↗

Meisenhelder, J., Rhee, SG., Suh, PG., Hunter, T. (1989). Phospholipase C-gamma is a substrate for the PDGF and EGF receptor protein-tyrosine kinases in vivo and in vitro. *Cell*, 57, 1109-22. ↗

Editions

2008-02-12	Reviewed	Heldin, CH.
2008-02-13	Authored	Jassal, B.

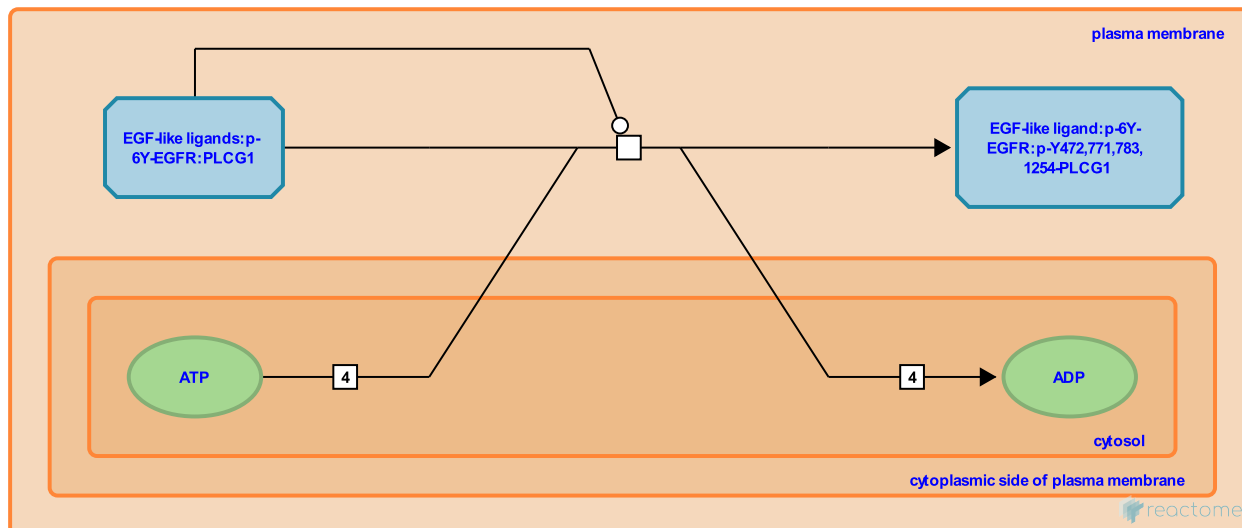
EGFR activates PLC-gamma1 by phosphorylation ↗

Location: [EGFR interacts with phospholipase C-gamma](#)

Stable identifier: R-HSA-212710

Type: transition

Compartments: plasma membrane, extracellular region, cytosol



EGFR phosphorylates PLC-gamma1, thus activating it.

Preceded by: [Phospholipase C-gamma1 binds to the activated EGF receptor](#)

Followed by: [Active PLC-gamma1 dissociates from EGFR](#)

Literature references

Meisenhelder, J., Rhee, SG., Suh, PG., Hunter, T. (1989). Phospholipase C-gamma is a substrate for the PDGF and EGF receptor protein-tyrosine kinases in vivo and in vitro. *Cell*, 57, 1109-22. ↗

Kim, JW., Rhee, SG., Wahl, MI., Kim, H., Nishibe, S., Carpenter, G. (1990). Identification of two epidermal growth factor-sensitive tyrosine phosphorylation sites of phospholipase C-gamma in intact HSC-1 cells. *J Biol Chem*, 265, 3944-8. ↗

Editions

2008-02-12	Reviewed	Heldin, CH.
2008-02-13	Authored	Jassal, B.

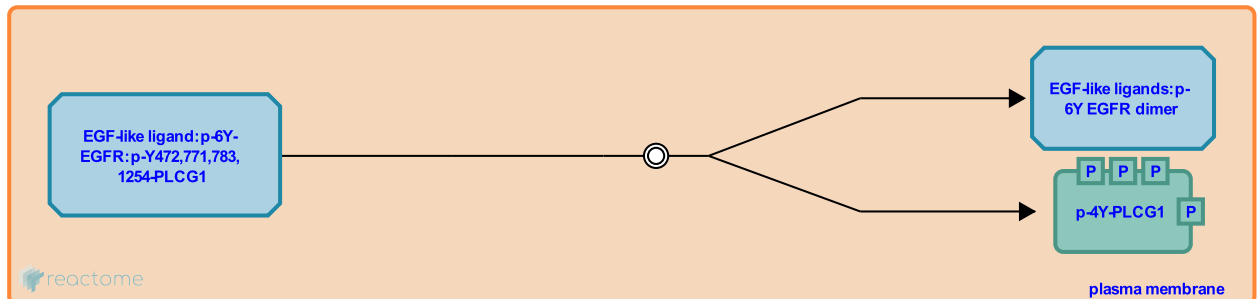
Active PLC-gamma1 dissociates from EGFR ↗

Location: EGFR interacts with phospholipase C-gamma

Stable identifier: R-HSA-212713

Type: dissociation

Compartments: plasma membrane, extracellular region



Once activated PLC-gamma1 dissociates from EGFR, it can hydrolyze PIP2.

Preceded by: EGFR activates PLC-gamma1 by phosphorylation

Literature references

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

Editions

2008-02-12	Reviewed	Heldin, CH.
2008-02-13	Authored	Jassal, B.

Table of Contents

Introduction	1
⚡ EGFR interacts with phospholipase C-gamma	2
➤ Phospholipase C-gamma1 binds to the activated EGF receptor	3
➤ EGFR activates PLC-gamma1 by phosphorylation	4
➤ Active PLC-gamma1 dissociates from EGFR	5
Table of Contents	6