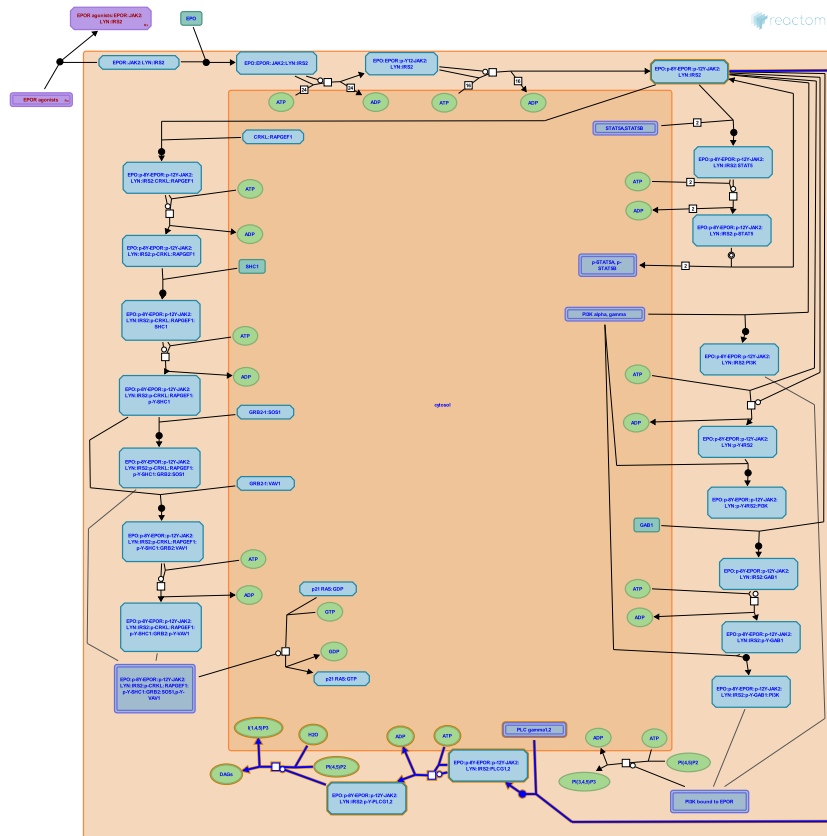


Erythropoietin activates Phospholipase C gamma (PLCG)



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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/).

28/04/2024

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

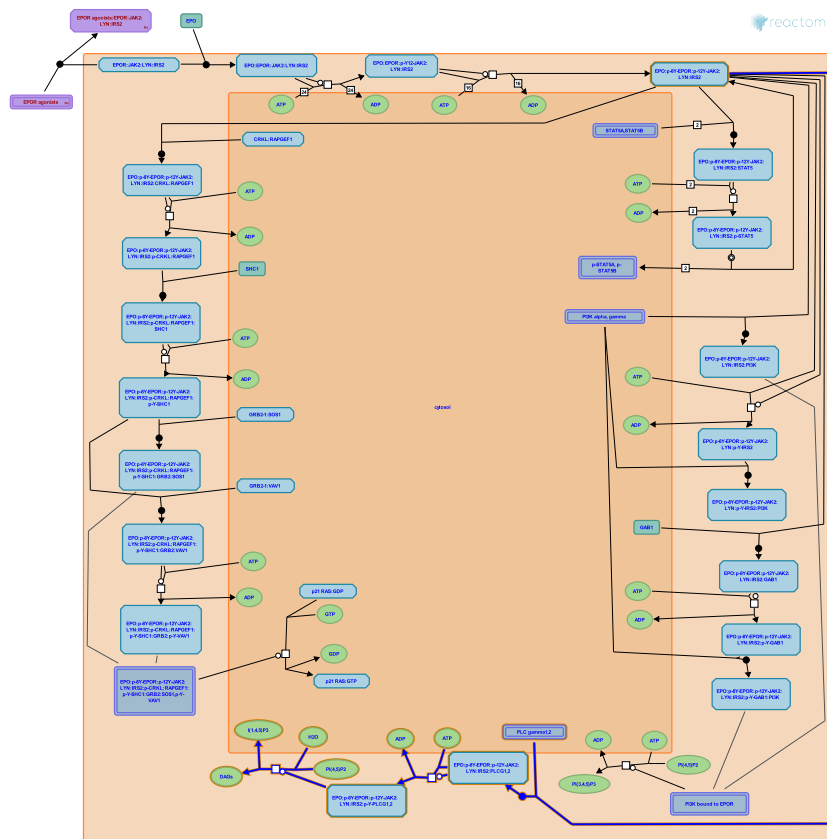
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- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
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- Fabregat, A.,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

Erythropoietin activates Phospholipase C gamma (PLCG) ↗

Stable identifier: R-HSA-9027277



PLCG1 (Phospholipase C gamma 1) or PLCG2 bound to the activated EPOR is phosphorylated on tyrosine residues by the kinase LYN (Ren et al. 1994, and inferred from mouse homologs). PLCG1 and PLCG2 produce inositol 1,4,5-trisphosphate which then activates calcium signaling, and diacylglycerol (DAG) which then activates protein kinase C (PKC).

Literature references

Ren, HY., Shimizu, R., Miura, Y., Okada, K., Komatsu, N. (1994). Erythropoietin induces tyrosine phosphorylation and activation of phospholipase C-gamma 1 in a human erythropoietin-dependent cell line. *J. Biol. Chem.*, 269, 19633-8. ↗

Editions

2017-10-29	Authored, Edited	May, B.
2018-08-14	Reviewed	McGraw, KL.

EPO:phospho-EPOR:phospho-JAK2:LYN:IRS2 binds PLCgamma ↗

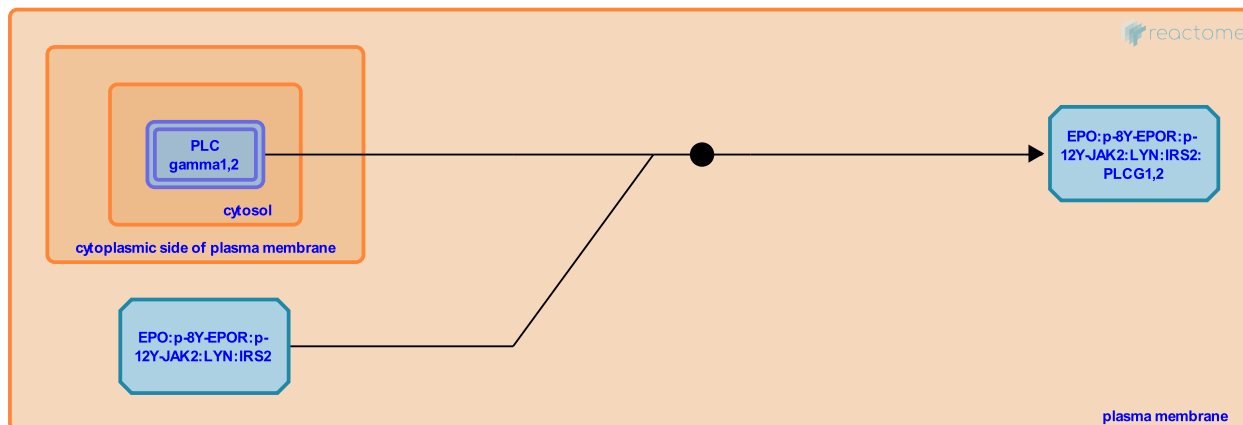
Location: Erythropoietin activates Phospholipase C gamma (PLCG)

Stable identifier: R-HSA-9027373

Type: binding

Compartments: plasma membrane

Inferred from: Epo:p-8Y-Epor:p-12Y-Jak2:Lyn:Irs2 binds Plcg1,2 (Mus musculus)



PLCG2 (PLCgamma2) binds phosphotyrosine-432 and phosphotyrosine-480 of EPOR (Montoye et al. 2005, and inferred from mouse homologs). PLCG1 can also bind the phosphorylated EPOR (inferred from mouse homologs). After binding, PLCG2 is phosphorylated (Ren et al. 1994)

Followed by: LYN phosphorylates PLCG1,2 in EPO:phospho-EPOR:phospho-JAK2:LYN:IRS2:PLCG1,2

Literature references

Ren, HY., Shimizu, R., Miura, Y., Okada, K., Komatsu, N. (1994). Erythropoietin induces tyrosine phosphorylation and activation of phospholipase C-gamma 1 in a human erythropoietin-dependent cell line. *J. Biol. Chem.*, 269, 19633-8. ↗

Lemmens, I., Eyckerman, S., Catteeuw, D., Tavernier, J., Montoye, T. (2005). A systematic scan of interactions with tyrosine motifs in the erythropoietin receptor using a mammalian 2-hybrid approach. *Blood*, 105, 4264-71. ↗

Editions

2017-10-30	Authored, Edited	May, B.
2018-08-14	Reviewed	McGraw, KL.

LYN phosphorylates PLCG1,2 in EPO:phospho-EPOR:phospho-JAK2:LYN:IRS2:PLCG1,2 ↗

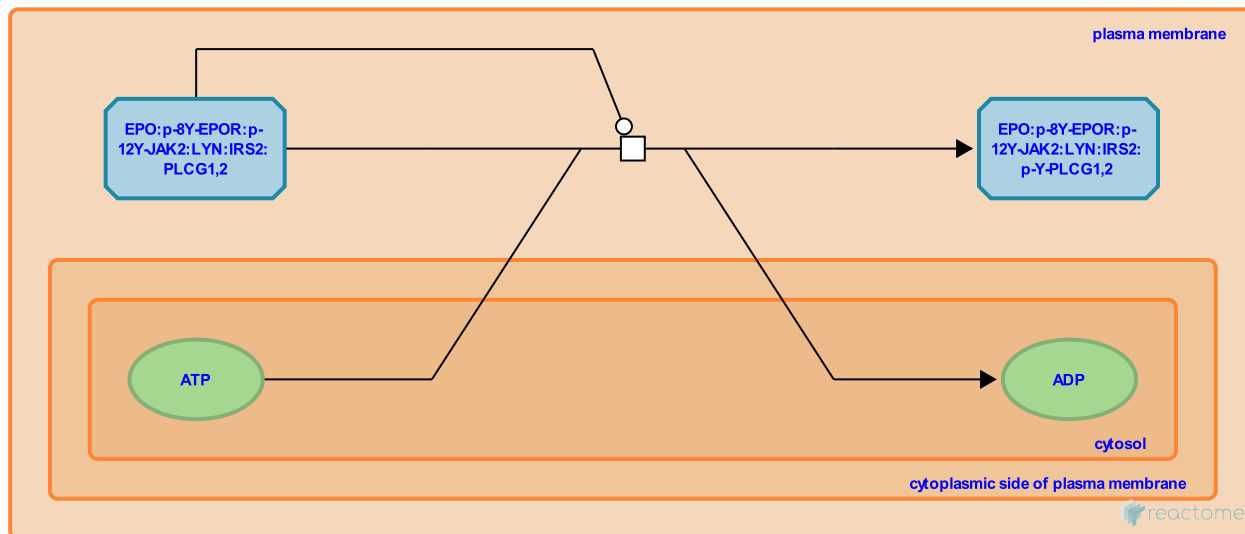
Location: Erythropoietin activates Phospholipase C gamma (PLCG)

Stable identifier: R-HSA-9027425

Type: transition

Compartments: plasma membrane

Inferred from: Lyn phosphorylates Plcg1,2 in Epo:phospho-Epor:phospho-Jak2:Lyn:Irs2:Plcg1,2 (Mus musculus)



PLCG1 (Phospholipase C gamma1) or PLCG2 bound to the activated EPOR is phosphorylated on tyrosine residues by the kinase LYN (Ren et al. 1994, and inferred from mouse homologs).

Preceded by: EPO:phospho-EPOR:phospho-JAK2:LYN:IRS2 binds PLCgamma

Followed by: EPOR-associated PLCG hydrolyzes 1-Phosphatidyl-1D-myo-inositol 4,5-bisphosphate

Literature references

Ren, HY., Shimizu, R., Miura, Y., Okada, K., Komatsu, N. (1994). Erythropoietin induces tyrosine phosphorylation and activation of phospholipase C-gamma 1 in a human erythropoietin-dependent cell line. *J. Biol. Chem.*, 269, 19633-8. ↗

Editions

2017-10-30	Authored, Edited	May, B.
2018-08-14	Reviewed	McGraw, KL.

EPOR-associated PLCG hydrolyzes 1-Phosphatidyl-1D-myo-inositol 4,5-bisphosphate



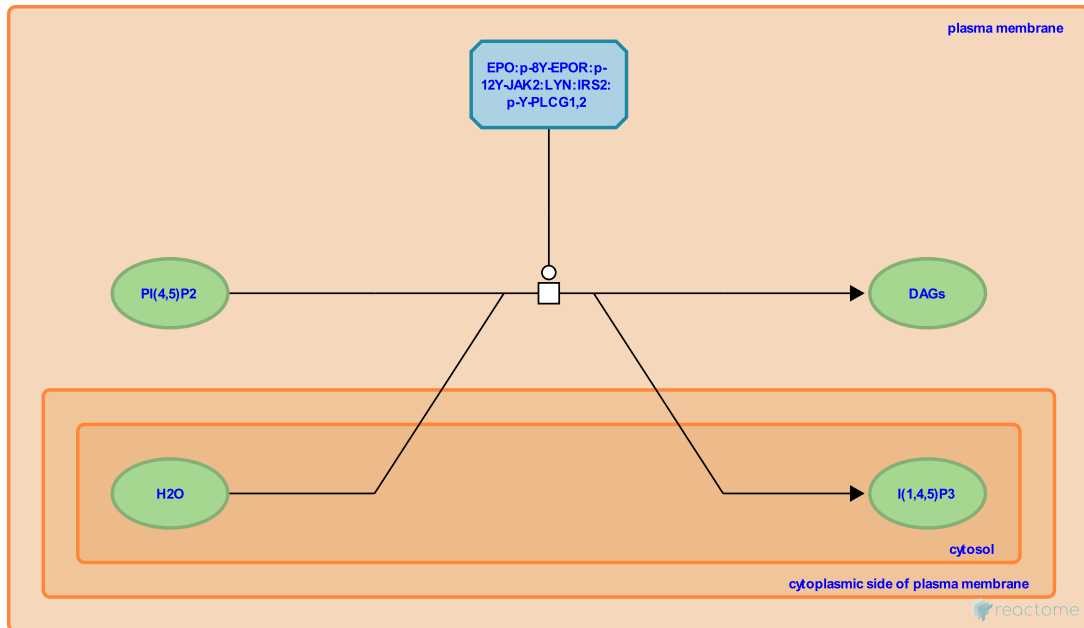
Location: Erythropoietin activates Phospholipase C gamma (PLCG)

Stable identifier: R-HSA-9032478

Type: transition

Compartments: plasma membrane

Inferred from: [Epor-associated Plcg hydrolyzes 1-phosphatidyl-1D-myo-inositol 4,5-bisphosphate \(Mus musculus\)](#)



Phospholipase C gamma (PLCG1 or PLCG2) bound to the phosphorylated cytoplasmic domain of the EPO receptor (EPOR) hydrolyzes 1-phosphatidyl-1D-myo-inositol 4,5-bisphosphate to yield the second messengers diacylglycerol and 1D-myo-inositol 1,4,5-trisphosphate (Ren et al. 1994, and inferred from mouse). Erythropoietin may also activate the hydrolysis of phosphatidylcholine and phosphatidylethanolamine (inferred from mouse homologs),

Preceded by: [LYN phosphorylates PLCG1,2 in EPO:phospho-EPOR:phospho-JAK2:LYN:IRS2:PLCG1,2](#)

Literature references

Ren, HY., Shimizu, R., Miura, Y., Okada, K., Komatsu, N. (1994). Erythropoietin induces tyrosine phosphorylation and activation of phospholipase C-gamma 1 in a human erythropoietin-dependent cell line. *J. Biol. Chem.*, 269, 19633-8. [↗](#)

Editions

2017-12-12	Authored, Edited	May, B.
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