

Activation of Rap1 by cytosolic GEFs

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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.

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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

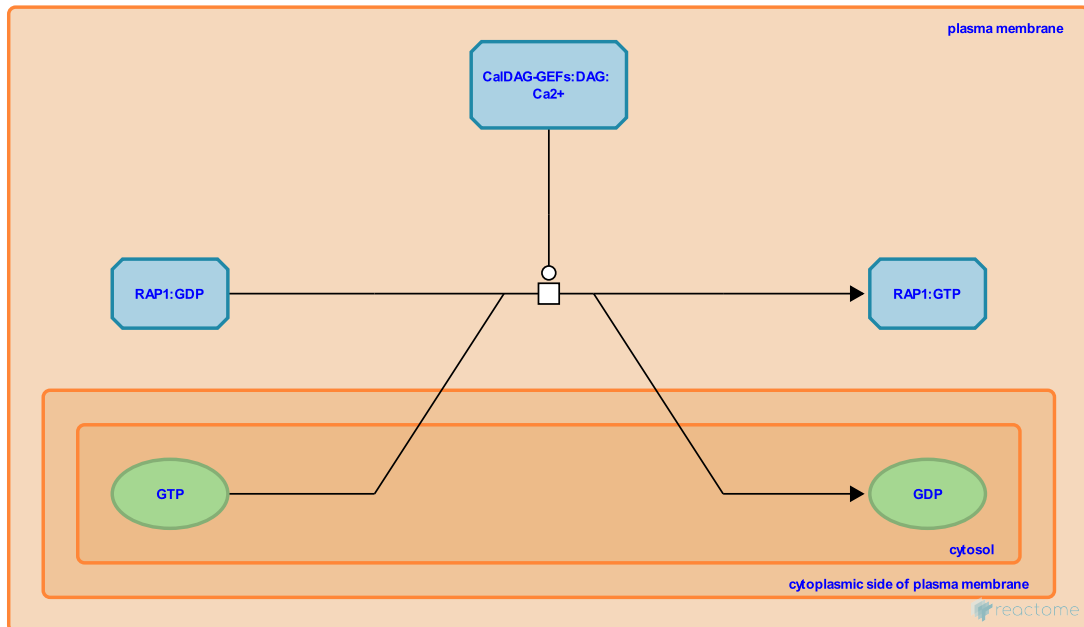
This document contains 1 reaction ([see Table of Contents](#))

Activation of Rap1 by cytosolic GEFs [↗](#)

Stable identifier: R-HSA-354173

Type: transition

Compartments: cytosol, plasma membrane



Signals from agonist receptors (such as GPVI) trigger the production of PIP3, DAG, cAMP and elevated Ca^{++} levels. This leads to the activation and translocation of active Rap1-GTP to the plasma membrane. Rap-GEFs stimulate the replacement of GDP for GTP, activating Rap1. Several Rap1 GEFs have been identified enabling Rap1 to respond to diverse stimuli. CalDAG-GEFs activate Rap1 in response to calcium and DAG, downstream of Phospholipase C. EPAC (exchange proteins directly activated by cAMP) GEFs are activated by binding cAMP.

Literature references

- Boussiotis, VA., Lafuente, E. (2006). Rap1 regulation of RIAM and cell adhesion. *Methods Enzymol*, 407, 345-58. [↗](#)
- Stork, PJ., Dillon, TJ. (2005). Multiple roles of Rap1 in hematopoietic cells: complementary versus antagonistic functions. *Blood*, 106, 2952-61. [↗](#)
- Zhang, Y., Housman, DE., Liang, Y., Piffath, CL., Graybiel, AM., Wagner, DD. et al. (2004). CalDAG-GEFI integrates signaling for platelet aggregation and thrombus formation. *Nat Med*, 10, 982-6. [↗](#)
- Constantine, E., Krause, M., van Puijenbroek, AA., Springer, TA., Lafuente, EM., Gertler, FB. et al. (2004). RIAM, an Ena/VASP and Profilin ligand, interacts with Rap1-GTP and mediates Rap1-induced adhesion. *Dev Cell*, 7, 585-95. [↗](#)

Editions

2008-06-16	Authored, Edited	Garapati, P V.
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