

Liganded Gi-activating GPCR acts as a GEF for Gi

D'Eustachio, P., Jassal, B., Varusai, TM.

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](#). For more information see our [license](#).

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: 78

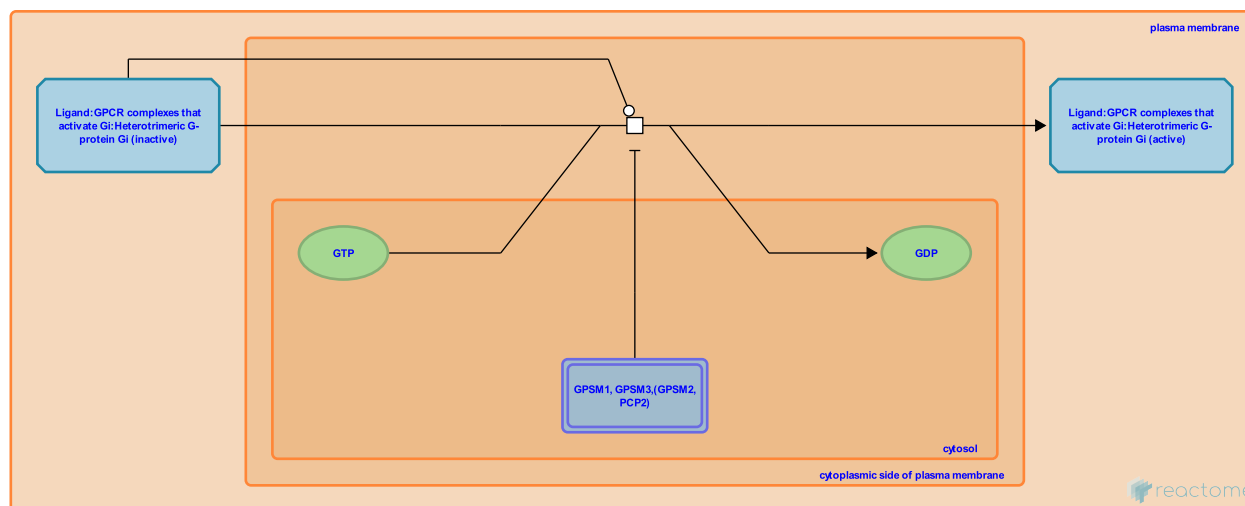
This document contains 1 reaction ([see Table of Contents](#))

Liganded Gi-activating GPCR acts as a GEF for Gi ↗

Stable identifier: R-HSA-380073

Type: transition

Compartments: cytoplasmic side of plasma membrane



The liganded receptor undergoes a conformational change, generating a signal that is propagated in a manner that is not completely understood to the G-protein. This stimulates the exchange of GDP for GTP in the G-protein alpha subunit, activating the G-protein.

This event is negatively regulated by some Activators of G protein signaling (AGS) proteins, a class of proteins identified in yeast functional screens for proteins able to activate G protein signaling in the absence of a G protein-coupled receptor (GPCR) (Cismowski et al. 1999, Takesono et al. 1999). AGS proteins contain G protein regulatory (GPR) motifs (also referred to as the GoLoco motif) that bind and stabilize the Galpha subunit in its GDP-bound conformation (Mochizuki et al. 1996, Peterson et al. 2000, Cao et al. 2004, Blumer & Lanier 2014). Some RGS proteins similarly bind to Galpha preventing the exchange of GDP for GTP (Soundararajan et al. 2008).

Literature references

- Lerea, CL., Bunt-Milam, AH., Hurley, JB. (1989). Alpha transducin is present in blue-, green-, and red-sensitive cone photoreceptors in the human retina. *Neuron*, 3, 367-76. ↗
- Itoh, H., Tsukamoto, T., Kozasa, T., Matsuoka, M., Kaziro, Y., Toyama, R. (1988). Presence of three distinct molecular species of Gi protein alpha subunit. Structure of rat cDNAs and human genomic DNAs. *J Biol Chem*, 263, 6656-64. ↗
- Margolskee, RF., Getchell, TV., Takami, S., McLaughlin, SK., Getchell, ML. (1994). Human taste cells express the G protein alpha-gustducin and neuron-specific enolase. *Brain Res Mol Brain Res*, 22, 193-203. ↗
- Van Dop, C., Apone, LM., Medynski, DC. (1989). Nucleotide sequence for a cDNA encoding the alpha subunit of retinal transducin (GNAT1) isolated from the human eye. *Nucleic Acids Res*, 17, 4887. ↗

Editions

2008-11-07	Authored	Jassal, B.
2008-11-29	Reviewed	D'Eustachio, P.
2017-07-10	Revised	Varusai, TM.