

TGFBR2 phosphorylates TGFBR1

Heldin, CH., Huang, T., Huminiecki, L., Jassal, B., Moustakas, A.

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/licenses/).

01/05/2024

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

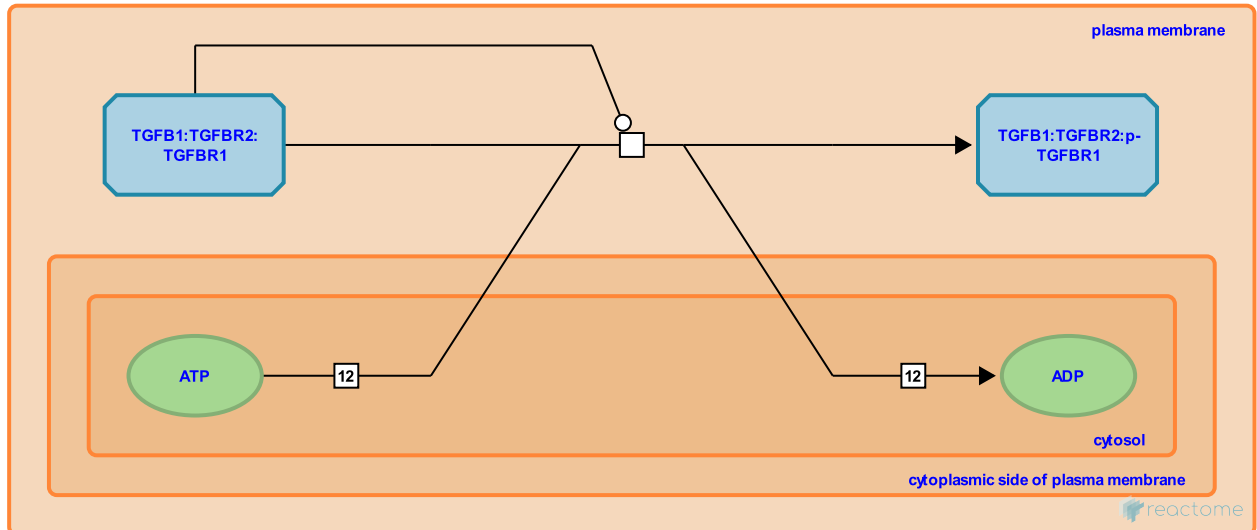
This document contains 1 reaction ([see Table of Contents](#))

TGFB1: TGFB2 phosphorylates TGFB1 [↗](#)

Stable identifier: R-HSA-170843

Type: transition

Compartments: cytosol, plasma membrane



Formation of the hetero-tetrameric TGF- β -1 receptor complex induces receptor rotation, so that TGFB2 and TGFB1 cytoplasmic kinase domains face each other in a catalytically favourable configuration. The constitutively active type II receptor kinase (which auto-phosphorylates in the absence of ligand), trans-phosphorylates specific serine residues at the conserved Gly-Ser-rich juxtapositioned domain (GS domain) of the type I receptor (Wrana et al. 1994, Souchelnytskyi et al. 1996).

In addition to phosphorylation, TGFB1 may also be sumoylated in response to TGF- β -1 stimulation. Sumoylation enhances TGFB1 function by facilitating recruitment and phosphorylation of SMAD3 (Kang et al. 2008).

Literature references

- Miyazono, K., Souchelnytskyi, S., ten Dijke, P., Heldin, CH. (1996). Phosphorylation of Ser165 in TGF- β type I receptor modulates TGF- β 1-induced cellular responses. *EMBO J*, 15, 6231-40. [↗](#)
- Massague, J., Wrana, JL., Wieser, R., Attisano, L., Ventura, F. (1994). Mechanism of activation of the TGF- β receptor. *Nature*, 370, 341-7. [↗](#)
- Derynck, R., Kang, JS., Akhurst, RJ., Saunier, EF. (2008). The type I TGF- β receptor is covalently modified and regulated by sumoylation. *Nat. Cell Biol.*, 10, 654-64. [↗](#)

Editions

2006-01-18	Edited	Jassal, B.
2006-02-02	Authored	Jassal, B., Heldin, CH., Moustakas, A., Huminiecki, L.
2006-04-18	Reviewed	Heldin, CH.
2012-05-14	Reviewed	Huang, T.