

Activated FGFR1 mutants phosphorylate

FRS2

Ezzat, S., Rothfels, K.

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](#).

21/10/2019

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: 70

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

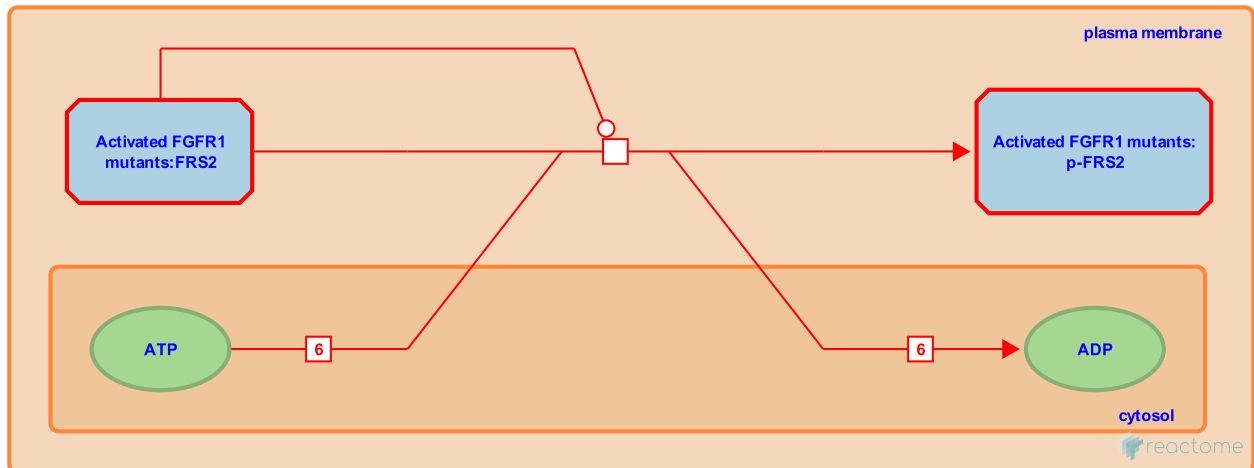
Activated FGFR1 mutants phosphorylate FRS2 ↗

Stable identifier: R-HSA-5655278

Type: transition

Compartments: plasma membrane, cytosol

Diseases: cancer, bone development disease



After recruitment to activated FGFR mutants, FRS2 is believed to be phosphorylated, potentially on all 6 of the tyrosines phosphorylated by wild-type FGFRs. Phosphorylation of FRS2 by FGFR has been demonstrated in some cases (see for instance Qing, 2009; Bai, 2010; Ahmed, 2008; Raffioni, 1998) and is inferred to occur in others based on activation of downstream signaling modules (reviewed in Wesche, 2011; Turner and Grose, 2010).

Literature references

- Bai, A., Meetze, K., Vo, NY., Kollipara, S., Mazsa, EK., Winston, WM. et al. (2010). GP369, an FGFR2-IIIb-specific antibody, exhibits potent antitumor activity against human cancers driven by activated FGFR2 signaling. *Cancer Res*, 70, 7630-9. ↗
- Dutt, A., Ramos, AH., Hammerman, PS., Mermel, C., Cho, J., Sharifnia, T. et al. (2011). Inhibitor-Sensitive FGFR1 Amplification in Human Non-Small Cell Lung Cancer. *PLoS One*, 6, e20351. ↗
- Turner, N., Grose, RP. (2010). Fibroblast growth factor signalling: from development to cancer. *Nat Rev Cancer*, 10, 116-29. ↗
- Wesche, J., Haglund, K., Haugsten, EM. (2011). Fibroblast growth factors and their receptors in cancer. *Biochem J*, 437, 199-213. ↗
- Qing, J., Du, X., Chen, Y., Chan, P., Li, H., Wu, P. et al. (2009). Antibody-based targeting of FGFR3 in bladder carcinoma and t(4;14)-positive multiple myeloma in mice. *J Clin Invest*, 119, 1216-29. ↗

Editions

| | | |
|------------|----------|--------------|
| 2012-02-09 | Authored | Rothfels, K. |
| 2012-05-15 | Reviewed | Ezzat, S. |
| 2012-05-16 | Edited | Rothfels, K. |