IL21 receptor STAT phosphorylation

Jupe, S., Meldal, BH.

European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

18/04/2021

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. ↗

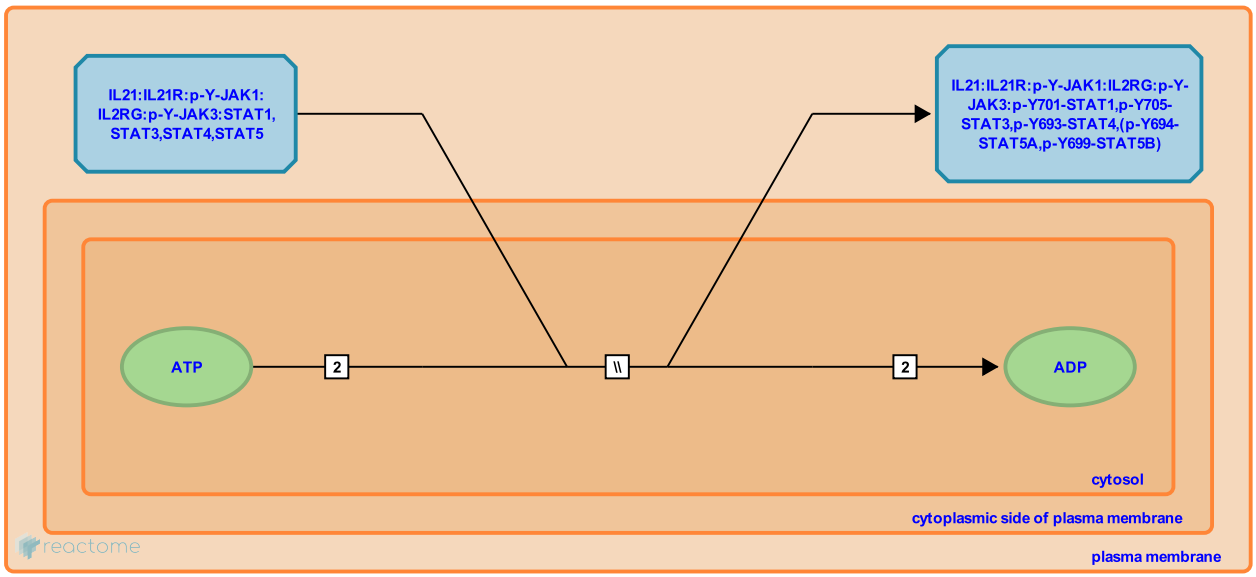
Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology, 14*, e1005968. ↗

IL21 receptor STAT phosphorylation ↗

Stable identifier: R-HSA-9006870

Type: omitted

Compartments: cytosol, extracellular region, plasma membrane



The IL21R:IL2RG complex can activate Signal transducer and activator of transcription 1 (STAT1), STAT3, STAT4 and STAT5, depending on the cell type. In cultured T-cells IL21 induced phosphorylation of JAK1, JAK3, STAT1, STAT3 and weakly STAT5 (Asao et al. 2001). In primary CD4+ T cells IL21 induced the phosphorylation of STAT1 and STAT3 but not STAT5, whereas IL2 induced the phosphorylation of STAT5 and STAT1 but not STA3 (Bennet et al. 2003). IL21 stimulation of primary splenic B cells and the pro-B-cell line Ba-F3 induced the activation of JAK1, JAK3 and STAT5 (Habib et al. 2002). In primary human NK cells or the NK cell line NK-92, IL21 induced the activation of STAT1, STAT3, and STAT4 but not STAT5 (Strengell et al. 2002, 2003). IL21 activated STAT1 and STAT3 in human monocyte-derived macrophages (Vallières & Girard 2016).

Literature references

Asao, H., Okuyama, C., Kumaki, S., Ishii, N., Tsuchiya, S., Foster, D. et al. (2001). Cutting edge: the common gamma-chain is an indispensable subunit of the IL-21 receptor complex. *J. Immunol., 167*, 1-5. ↗

Strengell, M., Sareneva, T., Foster, D., Julkunen, I., Matikainen, S. (2002). IL-21 up-regulates the expression of genes associated with innate immunity and Th1 response. *J. Immunol., 169*, 3600-5. ↗

Strengell, M., Matikainen, S., Sirén, J., Lehtonen, A., Foster, D., Julkunen, I. et al. (2003). IL-21 in synergy with IL-15 or IL-18 enhances IFN-gamma production in human NK and T cells. *J. Immunol., 170*, 5464-9. ↗

Bennett, F., Luxenberg, D., Ling, V., Wang, IM., Marquette, K., Lowe, D. et al. (2003). Program death-1 engagement upon TCR activation has distinct effects on costimulation and cytokine-driven proliferation: attenuation of ICOS, IL-4, and IL-21, but not CD28, IL-7, and IL-15 responses. *J. Immunol., 170*, 711-8. ↗

Habib, T., Senadheera, S., Weinberg, K., Kaushansky, K. (2002). The common gamma chain (gamma c) is a required signaling component of the IL-21 receptor and supports IL-21-induced cell proliferation via JAK3. *Biochemistry, 41*, 8725-31. ↗

Editions

2017-05-11	Authored	Jupe, S.
2017-11-03	Edited	Jupe, S.
2017-11-03	Reviewed	Meldal, BH.