p-SYK and LYN phosphorylate BTK

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18/05/2024

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
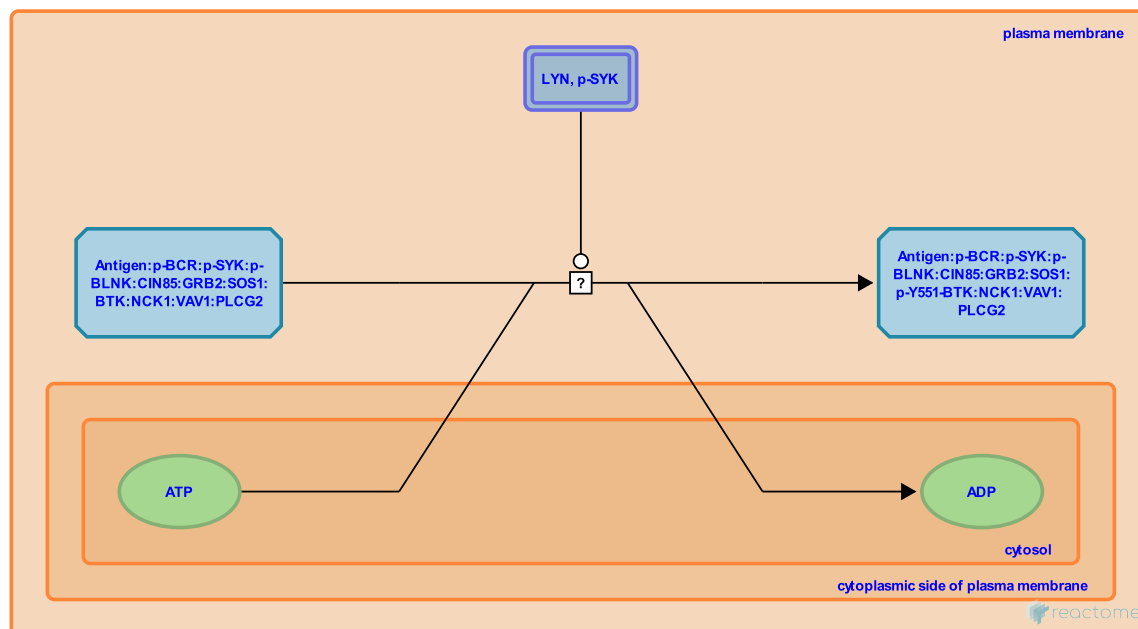
This document contains 1 reaction (see Table of Contents)

p-SYK and LYN phosphorylate BTK ↗

Stable identifier: R-HSA-9606163

Type: uncertain

Compartments: plasma membrane

Inferred from: LYN,SYK phosphorylate BTK (Gallus gallus), Lyn, p-Syk phosphorylate Btk (Mus musculus)

LYN and activated (phosphorylated) SYK phosphorylate BTK (Baba et al. 2001, Lin et al. 2009, also inferred from chicken homologs and mouse homologs) after BTK is recruited to the plasma membrane by phosphorylated BLNK (Baba et al. 2001) and phosphoinositol 3,4,5-trisphosphate (PIP3) (Salim et al. 1996). Phosphorylation of tyrosine-551 occurs within 30 seconds of B cell receptor activation and returns to low phosphorylation after 30 minutes (Nisitani et al. 1999).

Literature references

Witte, ON., Kato, RM., Wahl, MI., Rawlings, DJ., Nisitani, S. (1999). In situ detection of activated Bruton's tyrosine kinase in the Ig signaling complex by phosphopeptide-specific monoclonal antibodies. *Proc. Natl. Acad. Sci. U.S.A., 96*, 2221-6. ↗

Czerwinski, R., Kelleher, K., Stahl, M., Aulabaugh, A., Lin, L., Kriz, R. et al. (2009). Activation loop phosphorylation modulates Bruton's tyrosine kinase (Btk) kinase domain activity. *Biochemistry, 48*, 2021-32. ↗

Salim, K., Smith, CI., Margolis, RL., Querfurth, E., Waterfield, MD., Gout, I. et al. (1996). Distinct specificity in the recognition of phosphoinositides by the pleckstrin homology domains of dynamin and Bruton's tyrosine kinase. *EMBO J., 15*, 6241-50. ↗

Kishimoto, T., Tsukada, S., Baba, Y., Hashimoto, S., Matsushita, M., Watanabe, D. et al. (2001). BLNK mediates Syk-dependent Btk activation. *Proc Natl Acad Sci U S A, 98*, 2582-6. ↗

Editions

2018-04-14	Authored, Edited	May, B.
2018-07-18	Reviewed	Wienands, J.