Toll Like Receptor 2 (TLR2) Cascade
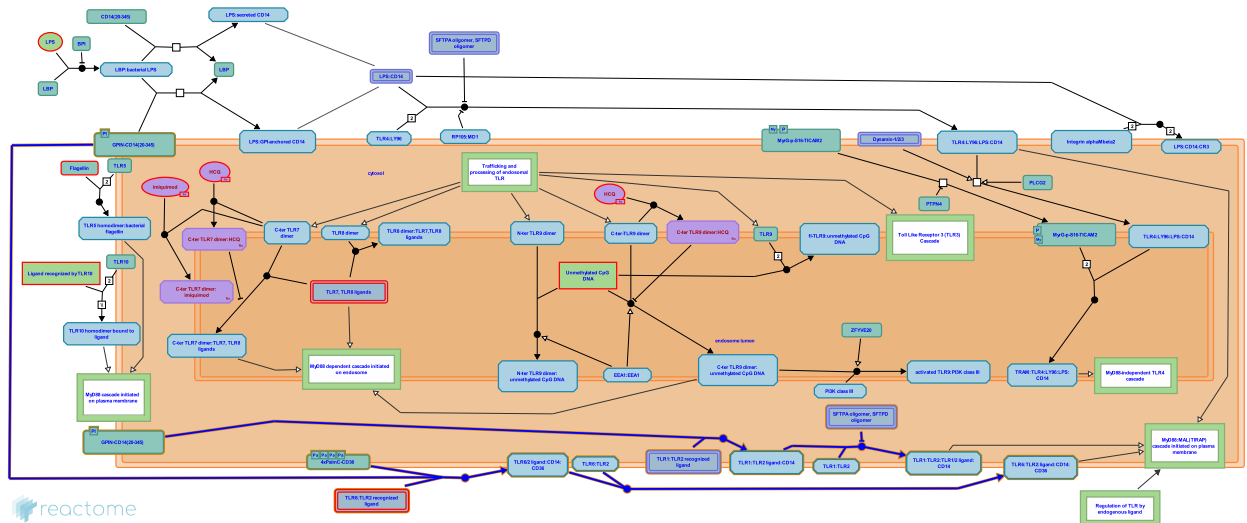

D'Eustachio, P., Gale M, Jr., Gay, NJ., Shamovsky, V., Zwaginga, JJ.

This is just an excerpt of a full-length report for this pathway. To access the complete report, please download it at the Reactome Textbook.

28/04/2024

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 3 pathways (see Table of Contents)

Toll Like Receptor 2 (TLR2) Cascade ↗

Stable identifier: R-HSA-181438
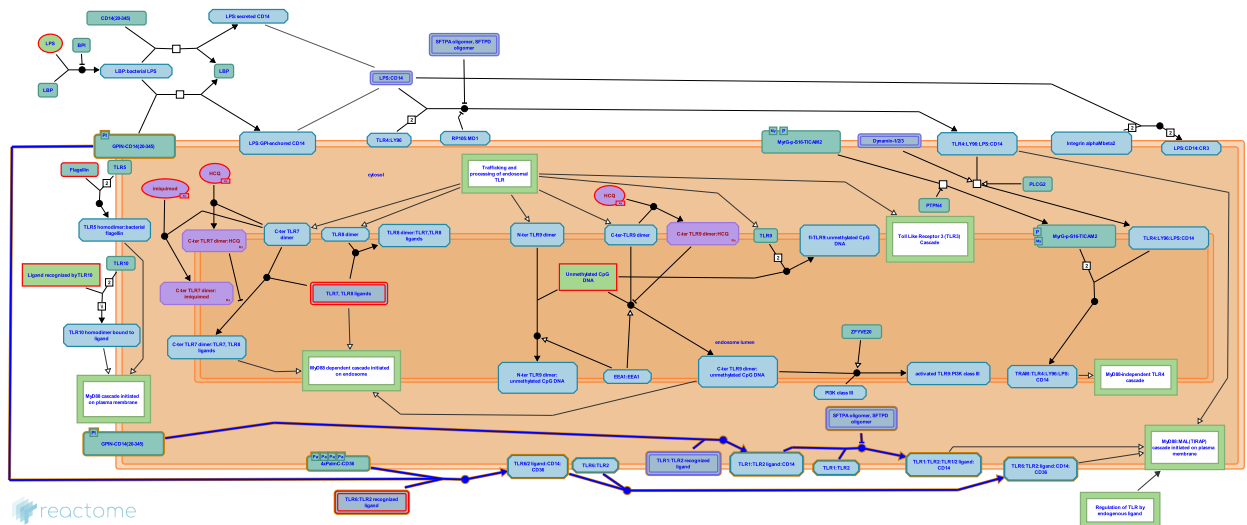
TLR2 is involved in recognition of peptidoglycan from gram-positive bacteria, bacterial lipoproteins, mycoplasma lipoprotein and mycobacterial products. It is quite possible that recognition of at least some other TLR2 ligands may be assisted by additional accessory proteins, particularly in association with TLR1 or TLR6. TLR2 is expressed constitutively on macrophages, dendritic cells, and B cells, and can be induced in some other cell types, including epithelial cells. TLR1 and TLR6, on the other hand, are expressed almost ubiquitously (Muzio et al. 2000). TLR2 may be a sensor and inductor of specific defense processes, including oxidative stress and cellular necrosis initially spurred by microbial compounds.

Literature references

Mantovani, A., van't Veer, C., Bosisio, D., Penton-Rol, G., Polentarutti, N., Allavena, P. et al. (2000). Differential expression and regulation of toll-like receptors (TLR) in human leukocytes: selective expression of TLR3 in dendritic cells. *J Immunol, 164*, 5998-6004. ↗
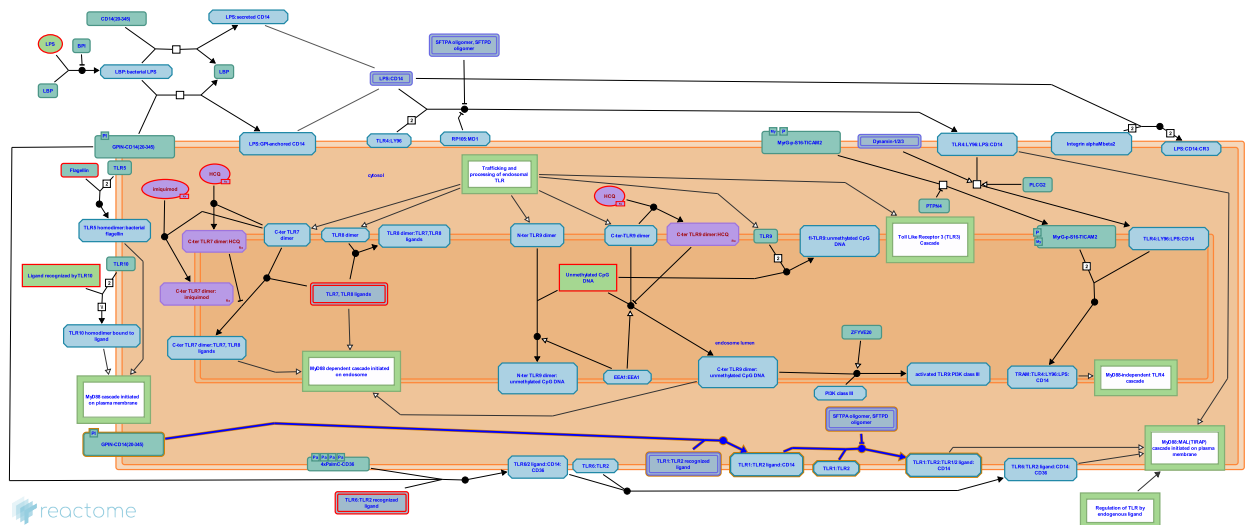
Editions

2006-04-19	Authored	D'Eustachio, P., Gay, NJ., Gale M, Jr., Zwaginga, JJ.
2006-07-04	Reviewed	D'Eustachio, P.
2010-08-25	Revised	Shamovsky, V.
2010-11-17	Edited	Shamovsky, V.

Toll Like Receptor TLR1:TLR2 Cascade ↗

Location: Toll Like Receptor 2 (TLR2) Cascade

Stable identifier: R-HSA-168179

TLR1 is expressed by monocytes. TLR1 and TLR2 cotranslationally form heterodimeric complexes on the cell surface and in the cytosol. The TLR2:TLR1 complex recognizes Neisserial PorB and Mycobacterial triacylated lipoproteins and peptides, amongst others, triggering up-regulation of nuclear factor-kappaB production and apoptotic cascades. Such cooperation between TLR1 and TLR2 on the cell surface of normal human peripheral blood mononuclear cells, for instance, leads to the activation of pro-inflammatory cytokine secretion (Sandor et al. 2003).

Literature references

Latz, E., Mandell, L., Re, F., Repik, G., Finberg, RW., Golenbock, DT. et al. (2003). Importance of extra- and intracellular domains of TLR1 and TLR2 in NFkappa B signaling. *J Cell Biol, 162*, 1099-110. ↗
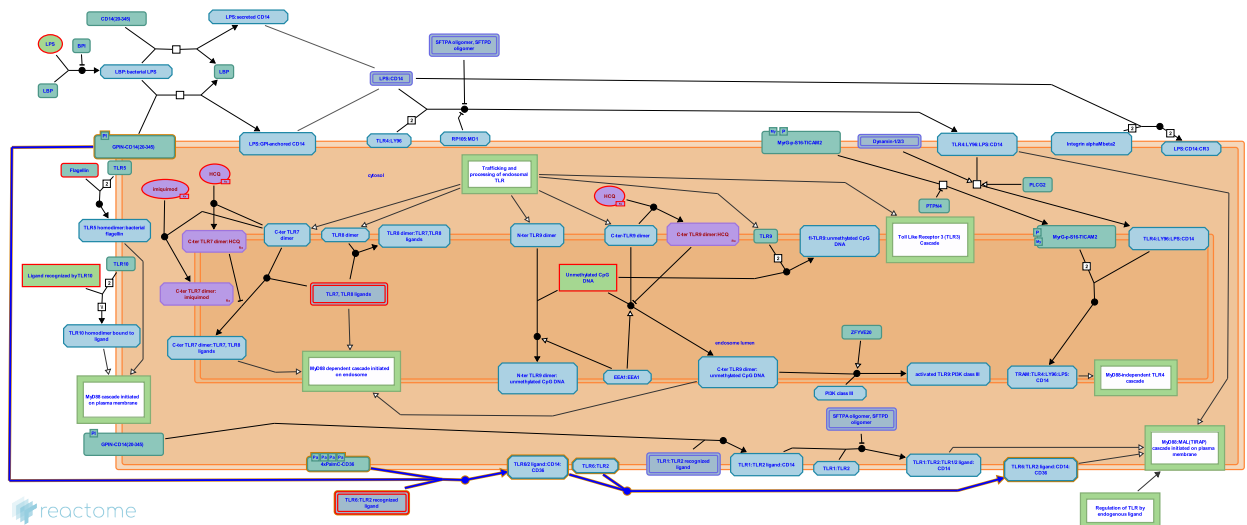
Editions

2006-04-19	Authored	D'Eustachio, P., Gay, NJ., Gale M, Jr., Zwaginga, JJ.
2006-07-04	Reviewed	D'Eustachio, P.
2012-11-02	Revised	Shamovsky, V.
2012-11-06	Edited	Shamovsky, V.

Toll Like Receptor TLR6:TLR2 Cascade ↗

Location: Toll Like Receptor 2 (TLR2) Cascade

Stable identifier: R-HSA-168188

TLR2 and TLR4 recognize different bacterial cell wall components. While TLR4 is trained onto Gram-negative lipopolysaccharide components, TLR2 - in combination with TLR6 - plays a major role in recognizing peptidoglycan wall products from Gram-positive bacteria, as well as Mycobacterial diacylated lipopeptides. In particular, TLR6 appears to participate in discriminating the subtle differences between dipalmitoyl and tripalmitoyl cysteinyl residues (Okusawa et al. 2004).

Literature references

Hasebe, A., Shibata, K., Into, T., Hara, Y., Nakamura, J., Ogawa, T. et al. (2004). Relationship between structures and biological activities of mycoplasmal diacylated lipopeptides and their recognition by toll-like receptors 2 and 6. *Infect Immun, 72,* 1657-65. ↗

Editions

2006-04-19	Authored	D'Eustachio, P., Gay, NJ., Gale M, Jr., Zwaginga, JJ.
2006-07-04	Reviewed	D'Eustachio, P.
2012-11-02	Revised	Shamovsky, V.
2012-11-20	Edited	Shamovsky, V.

Table of Contents