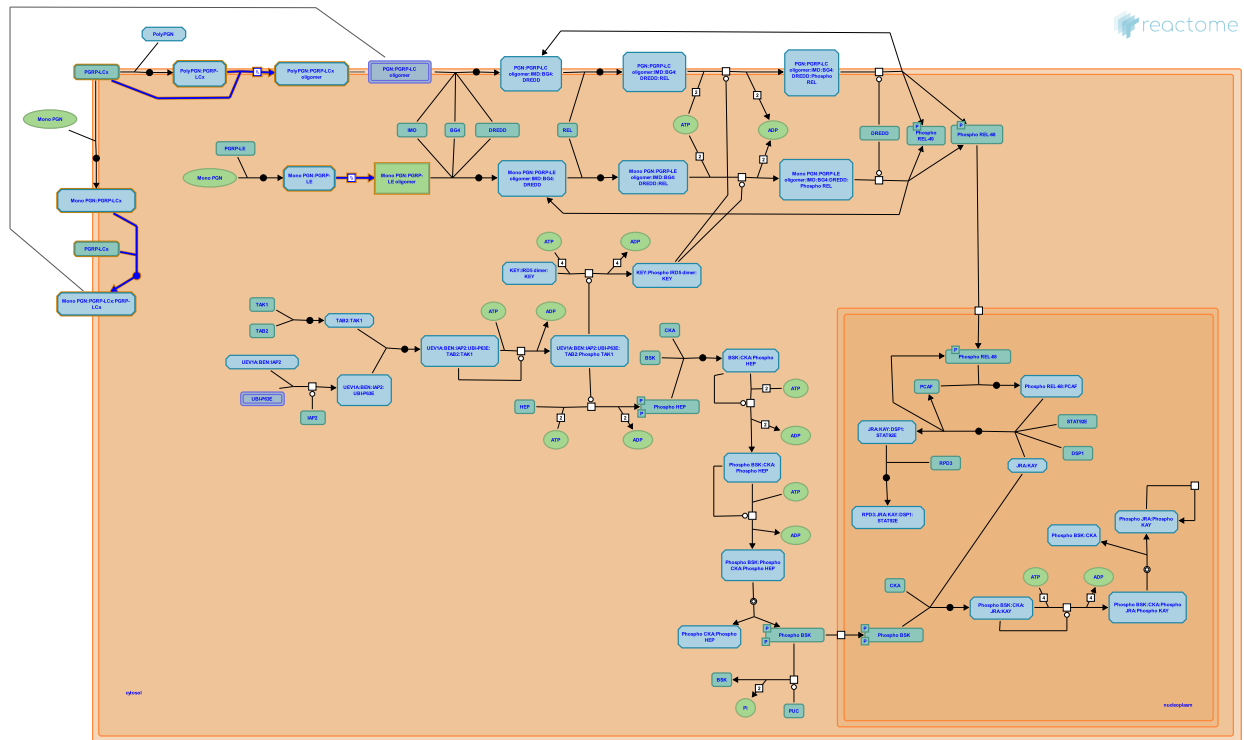


# Peptidoglycan bound PGRP-LC/LE oligomerises



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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](https://reactome.org/textbook/).

06/05/2024

## 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

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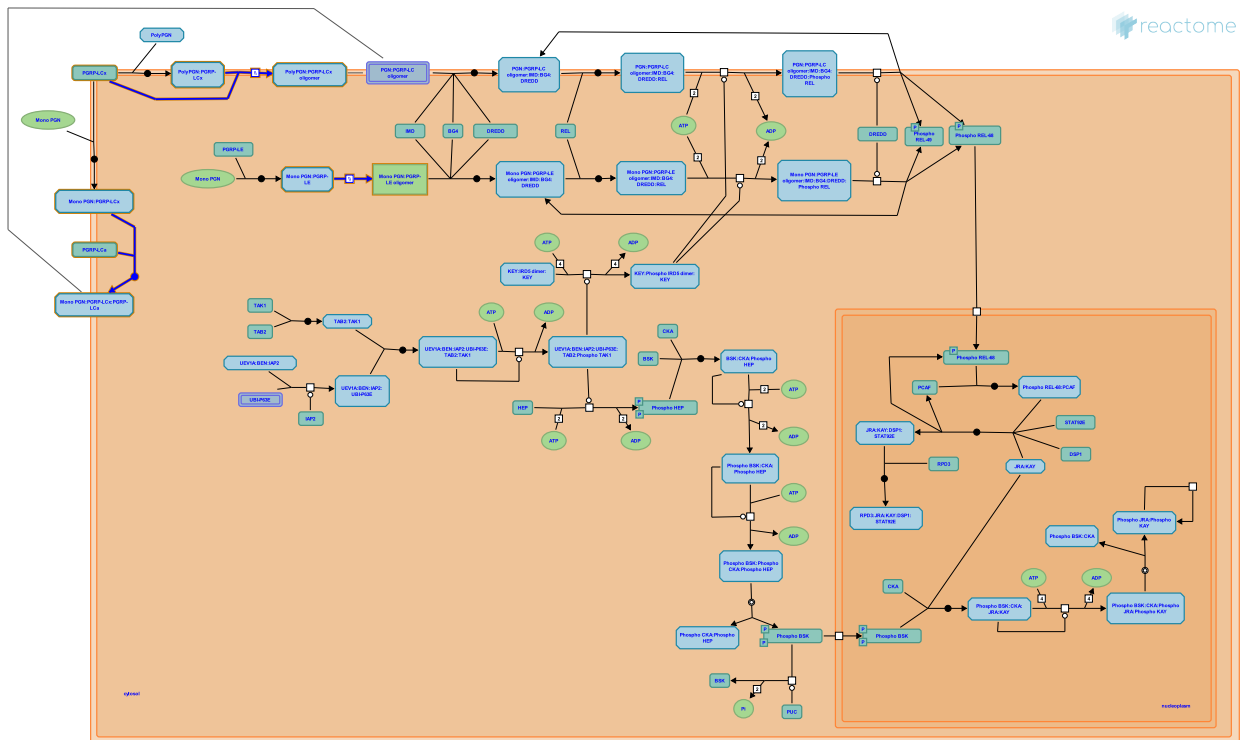
Reactome database release: 88

This document contains 1 pathway and 3 reactions ([see Table of Contents](#))

# Peptidoglycan bound PGRP-LC/LE oligomerises ↗

Stable identifier: R-DME-209266

Compartments: plasma membrane



Spatzle (SPZ) dimer binding leads to Toll (TL) receptor homodimerisation and activation.

## Literature references

Leclerc, V., Reichhart, JM. (2004). The immune response of *Drosophila melanogaster*. *Immunol Rev*, 198, 59-71. ↗

## Editions

2007-07-11	Authored	Williams, MG.
2007-07-12	Edited	Williams, MG.
2008-06-20	Reviewed	Lemaître, B., Silverman, N.

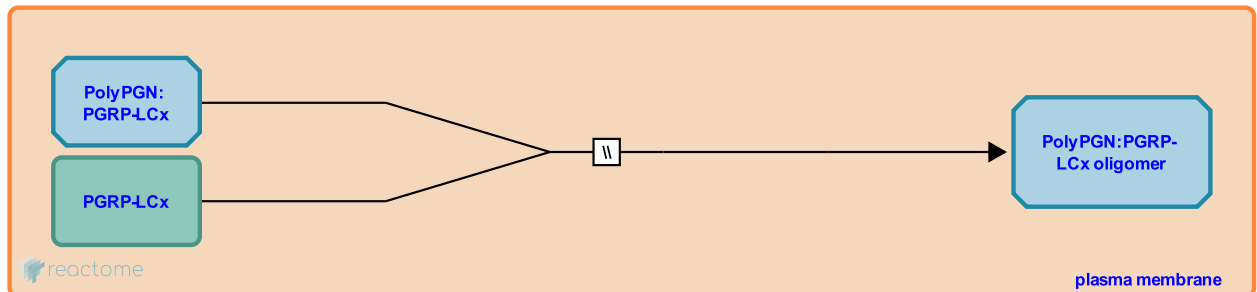
## Polymeric PGN bound PGRP-LCx multimerises at the plasma membrane [↗](#)

**Location:** [Peptidoglycan bound PGRP-LC/LE oligomerises](#)

**Stable identifier:** R-DME-209158

**Type:** omitted

**Compartments:** plasma membrane



The binding of polymeric peptidoglycan (PGN) to PGRP-LCx receptor results in adjacent PGRP-LCx receptors additionally binding to PGN. This brings the receptors into close enough proximity for them to multimerise.

### Literature references

Hakansson, J., Mellroth, P., Schultz, N., Karlsson, J., Goldman, WE., Steiner, H. (2005). Ligand-induced dimerization of *Drosophila* peptidoglycan recognition proteins in vitro. *Proc Natl Acad Sci U S A*, 102, 6455-60. [↗](#)

Harley, W., Kaneko, T., Silverman, N., Mellroth, P., Golenbock, D., Goldman, WE. et al. (2004). Monomeric and polymeric gram-negative peptidoglycan but not purified LPS stimulate the *Drosophila* IMD pathway. *Immunity*, 20, 637-49. [↗](#)

Lee, H., Anderson, KV., Choe, KM. (2005). *Drosophila* peptidoglycan recognition protein LC (PGRP-LC) acts as a signal-transducing innate immune receptor. *Proc Natl Acad Sci U S A*, 102, 1122-6. [↗](#)

### Editions

2007-07-11	Authored	Williams, MG.
2008-06-20	Reviewed	Lemaitre, B., Silverman, N.
2014-05-20	Edited	Williams, MG.

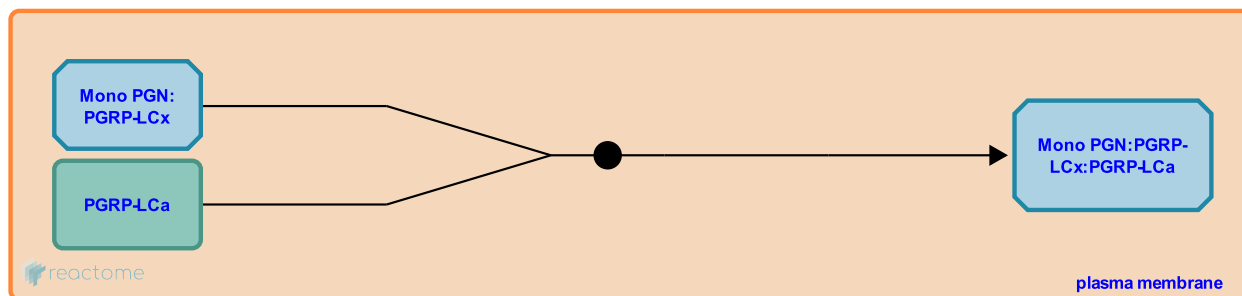
## Monomeric PGN bound PGRP-LCx heterodimerises with PGRP-LCa at the plasma membrane ↗

**Location:** Peptidoglycan bound PGRP-LC/LE oligomerises

**Stable identifier:** R-DME-209185

**Type:** binding

**Compartments:** plasma membrane



Peptidoglycan recognition protein, PGRP-LCa receptor shows only a low affinity for monomeric peptidoglycans (PGN). However, when monomeric PGN binds to PGRP-LCx receptor primarily through its elongated stem peptide, the unique disaccharide GlcNAc-MurNAc(anhydro) residues of the ligand are then presented by PGRP-LCx receptor in such a way as to make favourable interactions with the PGRP-LCa receptor ectodomain. The receptors are now in close proximity and can heterodimerise.

### Literature references

Chelliah, Y., Deisenhofer, J., Chang, CI., Borek, D., Mengin-Lecreulx, D. (2006). Structure of tracheal cytotoxin in complex with a heterodimeric pattern-recognition receptor. *Science*, 311, 1761-4. ↗

Hakansson, J., Mellroth, P., Schultz, N., Karlsson, J., Goldman, WE., Steiner, H. (2005). Ligand-induced dimerization of *Drosophila* peptidoglycan recognition proteins in vitro. *Proc Natl Acad Sci U S A*, 102, 6455-60. ↗

Yano, T., Kaneko, T., Silverman, N., Lim, JH., Kurata, S., Peach, C. et al. (2006). PGRP-LC and PGRP-LE have essential yet distinct functions in the *drosophila* immune response to monomeric DAP-type peptidoglycan. *Nat Immunol*, 7, 715-23. ↗

Wakatsuki, S., Chelliah, Y., Deisenhofer, J., Ihara, K., Chang, CI., Mengin-Lecreulx, D. (2005). Structure of the ectodomain of *Drosophila* peptidoglycan-recognition protein LCa suggests a molecular mechanism for pattern recognition. *Proc Natl Acad Sci U S A*, 102, 10279-84. ↗

Yano, T., Silverman, N., Lim, JH., Kurata, S., Oshima, Y., Kim, HE. et al. (2006). Structural basis for preferential recognition of diaminopimelic acid-type peptidoglycan by a subset of peptidoglycan recognition proteins. *J Biol Chem*, 281, 8286-95. ↗

### Editions

2007-07-11	Authored	Williams, MG.
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2014-05-20	Edited	Williams, MG.

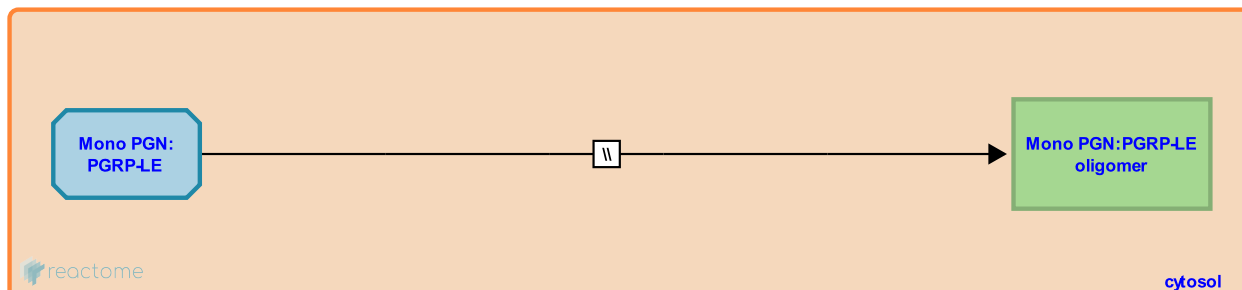
## Monomeric PGN bound PGRP-LE oligomerises in the cytosol ↗

**Location:** [Peptidoglycan bound PGRP-LC/LE oligomerises](#)

**Stable identifier:** R-DME-214395

**Type:** omitted

**Compartments:** cytosol



The binding of monomeric peptidoglycans (PGN) to PGRP-LE receptor results in adjacent PGRP-LE receptors binding to the complex and forming a PGRP-LE oligomer.

### Literature references





Yano, T., Kaneko, T., Silverman, N., Lim, JH., Kurata, S., Peach, C. et al. (2006). PGRP-LC and PGRP-LE have essential yet distinct functions in the drosophila immune response to monomeric DAP-type peptidoglycan. *Nat Immunol*, 7, 715-23. ↗

Yano, T., Silverman, N., Lim, JH., Kurata, S., Oshima, Y., Kim, HE. et al. (2006). Structural basis for preferential recognition of diaminopimelic acid-type peptidoglycan by a subset of peptidoglycan recognition proteins. *J Biol Chem*, 281, 8286-95. ↗

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