

Activation of Intracellular and Extracellular Immune Responses in *Drosophila*

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In innate immunity, pattern recognition receptors recognize component of invading pathogens and activate subsequent immune responses such as production of cytokines and antimicrobial peptides. Recently, several pattern recognition receptors such as Toll-like receptor family and Nucleotide-binding oligomerization domain protein family in mammals and peptidoglycan recognition protein (PGRP) family in *Drosophila* were identified. However, little is known how the pattern recognition receptors activate subsequent immune responses. Previously, from a *Drosophila* gain-of-function screen, we identified PGRP-LE. PGRP-LE recognizes diaminopimelic acid-type peptidoglycans, and activates the prophenoloxidase cascade leading to melanization and the imd-dependent induction of antibacterial peptides in the hemolymph. In this study, to confirm the extracellular function of PGRP-LE, we performed mosaic analyses. The mosaic analyses revealed that PGRP-LE-mediated expression of antibacterial peptides was not limited to the cells over-expressing PGRP-LE in the fat body which is a major organ producing antimicrobial peptides, indicating that PGRP-LE has non-cell autonomous effects on antibacterial peptide induction in systemic reactions. Whereas, in the malpighian tubules, PGRP-LE-mediated expression of antibacterial peptides was limited to the cells over-expressing PGRP-LE, indicating that PGRP-LE has cell autonomous effects on antibacterial peptide induction in the local epithelial reactions. These results suggest that PGRP-LE has both an intracellular function and an extracellular function on antibacterial peptide induction. We confirmed the intracellular function of PGRP-LE using *Drosophila* S2 cell line. In contrast to *in vivo* situations, expression of PGRP-LE induced antibacterial peptide expression in PGRP-LC, a cell surface receptor, independent manner. PGRP-LE-mediated activation of intracellular and extracellular immune responses will be discussed.