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Establishment of an *Apis mellifera* Immune Signaling Model in *Drosophila Melanogaster* S2 Cells

The innate immune system acts as an important and efficient line of defense against invading pathogens in both mammalian and invertebrate organisms. The insect immune responses to invading pathogens involve a varied set of actions including phagocytosis, the enzymatic degradation of pathogens, and secretion of antimicrobial peptides (AMPs). AMP gene expression is regulated by both the Toll and IMD pathways. The IMD pathway is an evolutionarily conserved immune pathway of the innate immune system that is activated through recognition of bacterial peptidoglycan. The receptor, peptidoglycan recognition protein (PGRP-LC), interacts with the IMD adaptor protein upon pathway stimulation and activates downstream signaling to produce AMP expression. *Drosophila melanogaster* is regularly used as a model for other insects, however immune pathways of insects with different life histories are likely to have unique features despite the high degree of pathway conservation. Although the IMD pathway is well characterized in *D. melanogaster*, little is known about how the pathway works in other insects such as *Apis mellifera*. Here, *A. mellifera* PGRP-LC and IMD adaptor protein were transfected into *D. melanogaster* Schneider 2 (S2) cells to test how the *A. mellifera* IMD pathway components function in *Drosophila* cells. Using a nuclear factor (NF)- κB-induced luciferase reporter, *A. mellifera* PGRP-LC was shown to activate the IMD pathway and induce expression of firefly luciferase driven by the AttacinA promoter. These studies are the beginning steps to further characterization of the *A. mellifera* IMD pathway and help to establish a model to study other *A. mellifera* cell functions using *D. melanogaster* cells.