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Title: Wound Healing Responses in Populations of *Drosophila melanogaster* Selected for Evolved Immunity

Authors: R, Reshma (/jspui/browse?type=author&value=R%2C+Reshma)

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Abstract: The ability to mount an immune response against a pathogenic attack is very important for an organism to survive. Invertebrates like insects lack a well developed adaptive immune component, but they can mount complex immune responses using their innate immune components, which falls under two categories: cellular and humoral, the components of the former being constitutively expressed whereas that of the latter specifically induced. This study is aimed at exploring the mechanism of evolved immunity, particularly the wound healing responses in replicate populations of *Drosophila melanogaster* which are being selected against the gram-negative bacteria *Pseudomonas entomophila*. There are injury controls as well as unhandled controls for this experiment. Since it has been reported from the previous studies that the humoral components of the immune response have not evolved, further studies were focused on the cellular components of innate immunity. One of such studies which measured the activity of crystal cells (part of cellular immunity) by monitoring wound healing responses showed that the injury controls have evolved a better wound healing response than the selected populations. In order to study the wound healing responses of these populations in the presence of pathogenic infection, we modified this experiment by assaying the responses at three different time points after giving the treatments: injury with infection and without infection. Our results support the previous finding that the injury controls are better in wound healing. Further studies like checking the differential expression of cellular immunity-related genes need to be carried out for unravelling the mechanism of evolved immunity in these selected populations.


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