THE ANALYSIS OF THE *RASPBERRY* GENE IN THE IMMUNE RESPONSE OF *DROSOPHILA*

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Introduction: *Drosophila melanogaster* has an effective immune system consisiting of humoral and cellular arms, resembling the innate immune system of vertebrates. This feature makes *Drosophila* a suitable model organism to study general mechanisms of innate immunity. The effector elements of the immune response are the hemocytes. A subset of hemocytes, the plasmatocytes are capable of engulfing microorganisms, the crystal cells are involved in the melanization. The third hemocyte type in the larvae, the lamellocytes, mainly differentiate from plasmatocytes upon immune induction and participate in the encapsulation of large foreign particles, like the eggs of the parasitoid wasp *Leptopilina boulardi*.

Methods: We developed and validated a method, which imitates injury that often occurs in the natural habitat (Kari *et al*., J. Immunol. Methods., 2013) and provides a tool to identify factors instrumental in the defense after septic injury.

Results: By using the above technique in a directed screen, we have found that the *raspberry* gene is involved in the defense after septic injury. *raspberry* encodes the *Drosophila* enzyme inosine monophosphate dehydrogenase (IMPDH), a key enzyme of the *de novo* synthesis of guanine nucleotides. The *raspberry* mutant flies have decreased survival rate after *B. cereus* infection. Furthermore, after exposure to the parasitic wasp *Leptopilina boulardi*, improper capsule formation and a decrease in the melanotic encapsulation rate is observed in the mutants. In addition, the eclosion rate of wasps is higher in the *raspberry* mutants compared to the control wild type flies.

Conclusions: Our results show that *raspberry* gene is involved in defense to bacterial and parasitic infection. The mammalian orthologues, the IMPDH proteins also have a role in

immune-phenomena, therefore we may conclude that they could regulate phylogenetically conserved mechanisms in innate immunity.

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