A receptor guanylyl cyclase mediates humoral and cellular responses in *Drosophila* immunity

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Innate immunity is an evolutionarily conserved host defense system against infections. The conservation makes *Drosophila* an ideal model for understanding the principles of innate immunity, which comprises both humoral and cellular responses. The mechanism of coordination between humoral and cellular responses, however, has been unclear. Here we show that the identification of Gyc76C, a receptor-type guanylyl cyclase producing cyclic guanosine monophosphate (cGMP), as an immune receptor reveals the existence of a novel cGMP-dependent signaling pathway leading to the induction of antimicrobial peptides, a humoral immune response. *Gyc76C* is also required for the bacterial infection-dependent proliferation of blood cells called hemocytes, a cellular immune response, independent of the cGMP-dependent signaling pathway. Moreover, the importance of these responses in host defense is evidenced by the fact that *Gyc76C* is crucial for host survival against Gram-positive bacterial infections in *Drosophila*. Thus, our results demonstrate a novel cGMP-dependent signaling pathway regulating innate immunity and suggest that *Gyc76C* is involved in coordinating the humoral and cellular responses in innate immunity.