The cell adhesion molecule Hemomucin is a key determinant of host-parasitoid interactions

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Wasps in the genus Leptopilina are common endoparasitoids of fruit fly (genus Drosophila) larvae, causing up to 80% mortality in wild populations. Encapsulation of wasp eggs before hatching is the predominant immune defense strategy employed by parasitized host larvae and involves the attachment of different classes of host blood cells to the parasitoid egg surface. These blood cells then form a multi-cellular multi-layered melanized capsule, isolating the wasp egg from the hemocoel and ultimately stopping its development. Many of the steps involved in encapsulation are still unknown, especially the beginning steps of wasp egg recognition and immune cell attachment. To this end, we are currently investigating the role of hemomucin, an O-glycosylated mucin found on Drosophila melanogaster hemocytes, in the cellular immune response against Leptopilina eggs. Hemomucin loss-of-function D. melanogaster larvae are severely impaired in their ability to encapsulate eggs of the normally semivirulent wasp L. victoriae. The impairment of encapsulation ability in the loss-of-function mutants is restored when hemomucin expression is rescued in immune-active blood cells only. Finally, mutants for hemomucin show no change in the number of blood cells when compared to wildtype-like fly strains. These results suggest a vital role for hemomucin in the Drosophila-Leptopilina host-parasitoid system. We plan to test for time point- and tissue-specific effects of hemomucin expression during the encapsulation response against several wasp species to further characterize the role of the hemomucin protein in the encapsulation response.