Title: **Using Drosophila melanogaster (fruit fly) to investigate the role of two novel immune-induced peptides, IBIN and IBIN-like**

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Abstract
Expanding our understanding of innate immune mechanisms remains vital for developing vaccines and drugs against both infectious diseases and inflammatory conditions. While mammals possess innate and adaptive immune systems, complicating the study of innate immunity, insects such as the fruit fly *Drosophila melanogaster* rely only on an innate immune system. In this project, we work to determine the roles of two novel short peptides in *Drosophila*, IBIN and IBIN-like. Expression of both is highly upregulated with infection by a wide range of pathogens. Our work shows at times opposing roles for these peptides in the immune response, through regulation of key immune processes, including the Toll pathway. While the short sequences of these peptides and their genes makes tracing their evolutionary histories challenging, our analysis shows that *IBIN* and *IBIN-like* are part of a gene family conserved in insects separated by approximately 100 million years of evolution.

The fruit fly model is highly suited to immunology research due to lower genetic redundancy compared to mammalian models. Despite this, a high percentage of disease-relevant genes are conserved between flies and humans. This has, in the past, resulted in key immunology findings being made in the fly, including the discovery of Toll receptors, leading to the description of TLRs in mammals. *Drosophila* researchers have a wide range of genetic tools at their disposal, and fast generation times, reduced ethical constraints, and low cost of maintenance enable experiments with large numbers and therefore high power, making this an excellent model for screening work.