Mapping Genes Involved in *Drosophila melanogaster* Larval Fat Body Remodeling

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The process of tissue remodeling in multicellular organisms refers to the separation of previously connected cells and reconstruction of tissue. Tissue remodeling plays a key role in regulating an organism’s growth and development, in wound healing, and in metastasis of tumors. *Drosophila melanogaster*, the fruit fly, is an excellent model organism in which to study this process. Successful metamorphosis in *Drosophila* is contingent on proper remodeling of the larval fat body, a tissue remodeling process in which sheets of polygonal fat body cells transform into detached individual, spherical cells. Prevention or inhibition of larval fat body remodeling (FBR) results in abnormalities and death during metamorphosis.

Previously, through a mass mutagenesis, lines with unknown mutations on the *Drosophila melanogaster* third chromosome were generated. These mutations cause two abnormal phenotypes: pharate adult lethality\(^1\) and abnormal larval FBR. These mutant lines were screened and categorized according to severity of the larval FBR phenotype, which included no FBR, partial FBR, and normal FBR. Complementation tests among the 7 no FBR lines indicated that the 7 mutations occur in 7 different genes. In this project, I am using the linkage mapping methodology outlined in Sapiro *et al.* (2013)\(^2\) to map the position of one of these mutations relative to two distinct, dominant marker mutations with known chromosomal positions. This will reveal where on the third chromosome the mutation of interest exists and will help to identify the specific affected gene. I hope to determine the role of this gene in the process of larval FBR, and to gain insights into the mechanisms that drive tissue remodeling in general.

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\(^1\) When an organism successfully undergoes metamorphosis but dies at the pharate stage due to the inability to eclose, the process is termed pharate adult lethality (Nelliot *et al.* 2006).