

Genetic Analysis of Tissue Remodeling and Lipid Storage in *Drosophila melanogaster*

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Tissue remodeling is the process of reorganization of existing tissues, and it plays a key role in health and disease, including cancer, development disorders, wound healing and metastasis¹. *Drosophila melanogaster*, used as a model organism in which to study tissue remodeling, has four major stages in its life cycle: embryo, larva, pupa and adult. During metamorphosis, which is the transition between the larval stage and the adult stage, the larval fat body remodels from a single-cell layered sheet to individual sphere-like motile cells². The remodeling of the larval fat body allows it to supply energy to the cells of the organism during metamorphosis, and failure or abnormality in larval fat body remodeling can lead to death during the pupal stage³.

In previous studies, *D. melanogaster* mutant lines with failure to remodel the larval fat body (the “no fat body remodeling” phenotype) had been identified. Each of these lines has a single mutation on the third chromosome. In my project, I examined the no fat body remodeling phenotype of three mutant lines by dissections during the pupal stage, and all three were found to be incompletely penetrant for the no fat body remodeling phenotype. Developmental delay was observed in the three mutant lines. In addition, two types of remodeled fat bodies, one whitish and the other clear, were observed in both mutant and control pupae. To explore the cause of this difference in fat body color, I stained remodeled larva fat bodies from wild type controls to visualize lipid droplets and nucleus under fluorescence. Future studies should focus on similar staining but on identified whitish or clear remodeled fat bodies.

¹ Lu, Pengfei, et al. "Extracellular Matrix Degradation and Remodeling in Development and Disease." Cold Spring Harbor Perspectives in Biology, vol. 3, no. 12, 2011, pp. a005058.

² Franz, Anna, Will Wood, and Paul Martin. "Fat Body Cells are Motile and Actively Migrate to Wounds to Drive Repair and Prevent Infection." Developmental Cell, vol. 44, no. 4, 2018, pp. 460-470. e3.

³ Nelliott, Archana, Nichole Bond, and Deborah K. Hoshizaki. "Fat body Remodeling in *Drosophila Melanogaster*." Genesis, vol. 44, no. 8, 2006, pp. 396-400.