Interactions Between the Gut Microbiome and Circadian Rhythm in *Drosophila melanogaster*

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Circadian rhythms are cyclic variation in behavior and physiology over a roughly 24-hour period and are under genetic control. Metabolites produced by the gut microbiome may influence the circadian rhythm through changes in gene expression. At the same time, the circadian rhythm influences the composition of bacteria found within the gut microbiome throughout the day. Interactions between circadian clock status and the microbiome on feeding rhythms have not been thoroughly investigated. This research aims to elucidate the effects of the gut microbiome on the circadian rhythm in the fruit fly (*Drosophila melanogaster*). We compared circadian mutant flies, which lack a fuctional circadian clock, with wild-type flies with a functional clock. The CAFE assay was used to monitor feeding activity, allowing us to determine the effects of mutations in central circadian clock genes and the gut microbiome on feeding activity. Our preliminary results suggest that feeding rhythms are not soley under genetic control and different clock genes may affect feeding rhythms in different ways. These preliminary findings support the idea that previous research has overlooked the complexities of feeding rhythms. In the future, the feeding rhythms of germ-free flies will be compared to conventional flies using the CAFE assay.