Elucidation of neural circuitry that drives grooming behavior in *Drosophila*

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Serial movements are an essential component of animal behavior and are necessary for survival. Upon receiving different types of stimuli, animals are capable of choosing a particular movement instead of others. The model of hierarchical suppression proposes that different components of the animal's neural circuitry, and therefore the movements it can perform, are organized in parallel and occur in a hierarchical sequence. At the Seeds-Hampel lab, this model has been studied using the innate grooming behavior of the fruit fly *Drosophila*. Using genetic tools such as UAS/Gal4 and LexA-targeted expression, they identified specific neuron or neuron types that comprise the circuit of antenna grooming, one of the first in the hierarchy. The goal of this project is to characterize the circuits that elicit other grooming behaviors in the head area of the fly and the possible connections between the circuits that causes the hierarchical suppression mechanism. We hypothesize that the different grooming circuits are organized independently, in parallel, and contain inhibitory components between them that drive suppression of one behavior over the other. My work focuses on screening genetic crosses to target the neurons that compose these circuits. I am currently using the UAS/Split Gal4 system to drive the expression of channelrhodopsins in specific neurons or neuron types and screen for the behaviors they elicit.