Lineage-Based Dissection of the Nervous System Development

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The precise and largely stereotyped connectivity patterns of neurons underlie all animal behavior from simple knee-jerk-like reflexes to complex behaviors, like playing the violin. While we have a good understanding of the conserved genetic and molecular mechanisms that drive the initial steps of nervous system formation, we possess a far more rudimentary knowledge of those that drive neural circuit formation and animal behavior. By focusing on the development and function of the Drosophila adult ventral nerve cord (VNC), which controls behaviors, such as walking, flying, and grooming, our research leverages the power of the fly model system to dissect the genetic and cellular basis of neural circuit formation and behavior. Our group currently has two major goals: (i) generate a split GAL4 library to target individual lineages in the VNC during development and adult life and (ii) use these genetic drivers to dissect the molecular, genetic and developmental basis of neural circuit formation.