

Hunter College of the City University of New York
Department of Biological Sciences
Spring 2024 Inga Richter Seminar Series

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Wiring up the brain during development: Coordination and propagation of cell fate choice in neural circuit assembly

How vast numbers of neurons are specified into correct cell fates and connected with their proper targets during development represents a fascinating area of developmental neuroscience. Little is known about the coordination between neuronal specification and specific connectivity patterns, especially when two synaptic partners undergo two different modes of cell specification (stochastic vs. deterministic). In the fly retina, pale (**p**) and yellow (**y**) subtypes of color photoreceptors (R7 and R8) are stochastically specified, whereas their synaptic partners in the optic lobe are produced through highly deterministic programs. How do stochastically determined **p** vs. **y** R7 and R8 find their respective targets that are deterministically specified in the optic lobes?

Previous work from our lab identified one pair of Dprs and DIPs, members of an interacting network of immunoglobulin superfamily proteins, is important for the synaptic connection between **y**R7 and its downstream target. I therefore hypothesize that different pairs of cell adhesion molecules can mediate the matching of other synaptic partners. By using advanced single-cell RNA sequencing technology, CRISPR gene editing, and sophisticated genetic manipulation in the *Drosophila* color vision circuit, I have identified candidates of cell adhesion molecules for synaptic partner matching. I will be presenting the molecular logic for coordinating between cell-type specification and the synaptic connectivity at the system level. Overall, our work has uncovered novel molecular mechanisms regulating synaptic pairing and probes the fundamental principles underlying the propagation of stochastic cell fate choices during circuit assembly.

Monday, September 23, 2024
12:30pm
Hunter College 926HN
Host: Hualin Zhong