

Mismatch in a Neurodevelopmental Disorder

September 13

Tuesday, 12:30pm

Hybrid: Rosedale Room and Zoom

For Researchers



Speaker:

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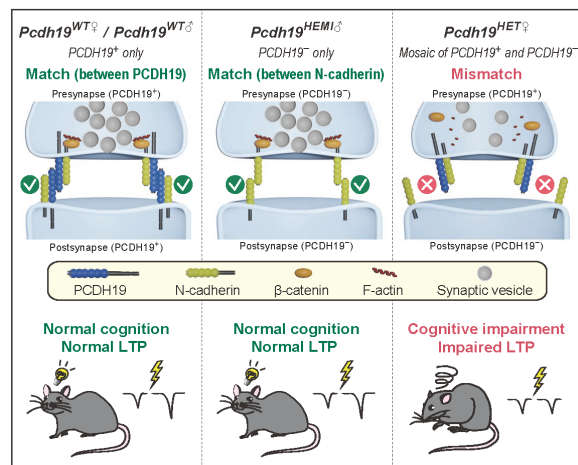
Abstract

Information processing in the brain occurs at synapses. Defects in synapse development underlie many neurological and psychiatric diseases. We are therefore interested in the molecules and manner by which specific and functional synaptic circuits are established in the mammalian brain.

Specifically, we identify molecules and mechanisms that regulate:
1) Development of specific synaptic circuits. In the brain, there are many distinct circuits that regulate a variety of behaviors. We investigate how specific synaptic circuits are established and function to regulate specific behaviors.

2) Activity-dependent refinement of synaptic circuits. To establish the most efficient synaptic circuits, synaptic connections must be refined by neural activity during the final stage of synapse development. We investigate how functional synaptic circuits are established in the brain in vivo.

We use molecular and cellular, mouse genetic, imaging, physiological, behavioral, and optogenetic techniques. We aim to understand the principle of mammalian brain wiring and how the functional brain is built. We then apply our findings to the prevention and treatment of disorders associated with abnormal synapse development, such as autism, schizophrenia, and epilepsy.



- Hoshina N, Johnson-Venkatesh EM, Rally VR, Sant J, Hoshina M, Seiglie MP, Umemori H. ASD/OCD-linked Protocadherin-10 regulates synapse, but not axon, development in the amygdala and contributes to fear- and anxiety-related behaviors. *J Neurosci*. 2022 May 25;42(21):4250-4266. doi: 10.1523/JNEUROSCI.1843-21.2022.
- Yasuda M, Nagappan-Chettiar S, Johnson-Venkatesh EM, Umemori H. An activity-dependent determinant of synapse elimination in the mammalian brain. *Neuron*. 2021 Apr 21;109(8):1333-1349.e6. doi: 10.1016/j.neuron.2021.03.006.
- Hoshina N, Johnson-Venkatesh EM, Hoshina M, Umemori H. Female-specific synaptic dysfunction and cognitive impairment in a mouse model of PCDH19 disorder. *Science*. 2021 Apr 16;372(6539):eaa3893. doi: 10.1126/science.aaz3893.