

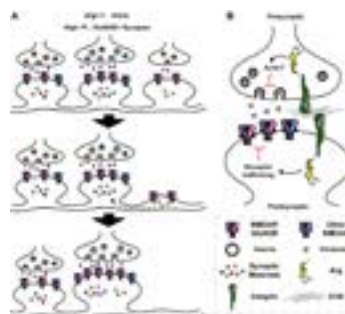
Critical period controls coordinated pre- and postsynaptic maturation

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The perinatal brain is dominated by immature excitatory synapses containing high release probability (Pr) presynaptic terminals coupled to postsynaptic specializations with GluN2B subunit-containing NMDA receptors (high Pr, GluN2B+ synapses). These synapses mature in an activity-dependent manner to low Pr, GluN2B-deficient synapses. Virtually nothing is known about how or why this transition occurs, including whether and how immature vs. mature synapses differentially contribute to circuit plasticity and stability. Answering these fundamental questions should provide essential clues to why synapses do not develop normally in autism and intellectual disability or destabilize prematurely in psychiatric and neurodegenerative diseases. Disruption of the Abl2/Arg kinase in mice yields a population of high Pr, GluN2B+ synapses that persist into early adulthood. The persistence of these immature synapses drives a significant net loss of hippocampal synapses between postnatal day (P) 21 and P42, and impairs synaptic plasticity and behavior. Building on these findings, we have identified new regulators of synapse maturation, and determined how they act to regulate synaptic function, plasticity, and stability.



Biography

Xiao Xiao is an Associate Professor/Principle Investigator at Fudan University, Institute of Science and Technology for Brain-Inspired Intelligence (ISTBI). After receiving a B.S. in Biological engineering at Xi'an Jiaotong University, Xiao performed her Ph.D. studies with Yuqiu Zhang and Zhiqi Zhao at Fudan University, Institute of Neurobiology. Xiao's thesis work focused on the circuitry and molecular mechanisms that mediate aversive behavior to pain, which was supported by the Excellent Doctor Project Foundation of the Ministry of Education in China. Xiao went on to do a postdoc fellowship with Anthony Koleske and Michael Higley at Yale University School of Medicine, where she identified molecular pathology of synapse stabilization and neural circuit plasticity. Xiao is the recipient of numerous awards including the Glaxo Smith Kline (GSK) Tomorrow's Star Award, American Heart Association Postdoc Fellowship, etc. Xiao is interested in exploring neural circuit and molecular mechanism of pain related emotions and memories.

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