

Project Title: Spatial and temporal rules of synaptic plasticity

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Summary: (1000 characters)

The maintenance of synaptic plasticity involves the interplay between input-specific synaptic tags and the allocation or capture of plasticity-related proteins (PRPs)^{1,2}. This allows different pools of synapses to interact by sharing a common pool of PRPs. We have evidence that depending on synaptic activation and the availability of PRPs, synapses can either cooperate or compete^{3,4}. However, the spatial and temporal rules that determine whether synapses cooperate or compete are unknown. To address this question, we will 1) use a combination of electrophysiology techniques with imaging of dendritic calcium signals to assess the spatial and temporal rules of synaptic cooperation and competition; 2) follow the sub-cellular localization of CaMKII, a key molecule involved in synaptic plasticity, while challenging synapses with different stimulation paradigms; 3) manipulate actin dynamics by local pharmacological inhibition of actin polymerization and depolymerization to block the capture of PRPs.

Bibliographic references:

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