



Locus Coeruleus and Dopamine-Dependent Memory Consolidation in the Hippocampus

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Memory consolidation, crucial for preserving memories, is influenced by novel experiences around memory encoding. Noradrenergic neurons in the locus coeruleus (LC) co-release dopamine (DA) and norepinephrine (NE), enhancing DA-dependent memory retention (Takeuchi et al., *Nature*, 2016). This study delves into the dynamics of DA and NE in LC axons within the hippocampus and the molecular mechanisms of novelty-induced memory enhancement. A genetically encoded red fluorescent DA biosensor was developed for high-resolution detection of DA release in the hippocampus. Dual-color fluorescence live imaging revealed selective detection of extracellular DA even in the presence of NE at a single neuron level (Nakamoto et al., *Molecular Brain*, 2021). Exploring the molecular basis, a 5-minute novel environment exploration up-regulated *Agap3* mRNA expression in the dorsal hippocampus, potentially influencing AMPA-type glutamate receptor trafficking and functional plasticity maintenance. Understanding *AGAP3*'s role in memory consolidation may offer insights into the process, guiding future research.

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