Learning and memory: How neurons activate PP1

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A study in *The Journal of Cell Biology* describes how neurons activate the protein PP1, providing key insights into the biology of learning and memory.

PP1 is known to be a key regulator of synaptic plasticity, the phenomenon in which neurons remodel their synaptic connections in order to store and relay information—the foundation of learning and memory. But how PP1 is controlled has been unclear. Now, a team led by researchers from the LSU Health Science Center describes several mechanisms for PP1 regulation that close some major gaps in our understanding of its role in neuronal signaling.

Among the novel findings, the researchers describe how the neurotransmitter NMDA leads to activation of PP1. They show that, when NMDA activates neuronal synapses, it switches off an enzyme, Cdk5, that would otherwise inhibit PP1. This allows PP1 to activate itself and promote synaptic remodeling. In addition, the researchers suggest that, despite its name, a regulatory protein called inhibitor-2 helps promote PP1 activity in neurons. Together, these findings significantly extend our understanding of how PP1 is regulated in the context of synaptic plasticity.

More information: Hou, H., et al. 2013. J. Cell Biol. DOI: 10.1083/jcb.201303035

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