

The Effects of a Dopamine D1/D5 Agonist on Local Protein Synthesis in Cultured Hippocampal Neurons

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It is well established that *de-novo* protein synthesis is required for long-term memory storage. Furthermore, the activity-dependent regulation of local protein synthesis in the dendritic compartment is believed to be essential for the persistence of late-phase long term potentiation. Although it has been demonstrated that isolated dendrites of mature hippocampal neurons are able to synthesize proteins (Aakalu and Smith et al., *Neuron* 2001), the synaptic mechanisms governing this local translation have yet to be elucidated. Previous studies have implicated D1/D5 receptors in a wide range of behavioral and cellular processes: the receptors are critically involved in spatial learning and have also been shown to enhance glutamatergic transmission in the hippocampus. In order to test the hypothesis that D1/D5 receptors regulate dendritic translation, we are examining the effects of the D1/D5-selective agonist (+) SKF-38393 (100 μ m) on dendritic GFP synthesis in cultured hippocampal neurons. Between-dish comparisons as well as single-cell time lapse imaging experiments show that bath application of the D1/D5 agonist stimulates GFP synthesis in neurons. Using local perfusion of the agonist to small regions (5-15 microns) of the distal dendritic arbor, we are also investigating the spatial specificity of D1/D5-induced protein synthesis. Our preliminary results indicate that focal application of the agonist results in increased GFP expression that is often restricted to the area of the agonist perfusion.