
The 173rd iCeMS SEMINAR

**Fri 05 Sep 2014
16:00-17:00**

Spatial Regulation of Gene Expression in Neurons

Lecturer: **Prof and Chair Kelsey Martin**

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University of California, Los Angeles
Presidential Special Lecturer at SfN 2014
Symposist at Neuroscience 2014

Venue: 2nd Floor Seminar Room (#A207)
iCeMS Main Building (#77), Kyoto University

Experience-dependent changes in synaptic connectivity, such as those that occur during brain development, learning, and memory in the adult, require new gene expression. My lab is interested in how activity regulates transcription, mRNA localization and local translation at synapses to spatially and temporally control gene expression within neurons. I will discuss recent studies on the transcriptional regulator, CRTC1, which localizes to synapses in unstimulated neurons but undergoes active translocation into the nucleus following glutamatergic stimulation. The phosphorylation state of CRTC1 may serve to couple neural activity with distinct downstream programs of gene expression. I will also present data indicating that local stimuli regulate local translation but do not regulate the transport of localized mRNAs from the nucleus to stimulated synapses. Our data uncover a role for the calcium-dependent release of netrin-1 in stimulating local translation at synapses. I will argue that the uncoupling of transcriptional and translational regulation during neuronal plasticity decentralizes gene expression such that activity-dependent transcription sets the entire neuronal arbor in a state of readiness to respond to local cues to dynamically and locally regulate synaptic structure and function through compartmentalized translation.

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