Neuroscience Colloquium
Summer Semester 2011

Special Presentation

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Desynchronization of multivesicular release controls Purkinje cell firing

The release of neurotransmitter-filled vesicles following action potentials occurs with discrete time courses: sub-millisecond phasic release that can be desynchronized by activity followed by 'delayed release' that persists for tens of milliseconds. Delayed release has a well established role in synaptic integration, but it is not clear whether desynchronization of phasic release has physiological consequences. At the climbing fiber to Purkinje cell synapse, the synchronous fusion of multiple vesicles is critical for generating complex spikes. Here we show that stimulation at physiological frequencies drives the temporal dispersion of vesicles undergoing multivesicular release, resulting in a slowing of the EPSC on the millisecond time scale. Remarkably, these changes in EPSC kinetics robustly alter the Purkinje cell complex spike in a manner that promotes axonal propagation of individual spikelets. Thus, desynchronization of multivesicular release enhances the precise and efficient information transfer by complex spikes.

Location: BCCN lecture theater,
Bernstein Center for Computational Neuroscience
Humboldt-Universität zu Berlin
Philippstr. 13, Haus 6

Date: Friday, June 10th , 4 :00 p.m.

Host: Christian Rosenmund

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