



Invitation to Seminar Talk

Molecular mechanism of synchronous neurotransmitter release

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Host: Peter Jonas

All thought and action requires communication between excitable cells in the brain and the peripheral nervous system. A hallmark property of synaptic communication is speed. Overall, the time from the invasion of the action potential into the presynaptic element to the generation of electrical signals in the postsynaptic cell is less than a millisecond. This high speed is remarkable, because synaptic transmission requires a complex series of electrical and chemical events, including the opening of presynaptic calcium channels, calcium binding to a calcium sensor, exocytosis of synaptic vesicles, and activation of postsynaptic receptors. Recent studies have revealed the molecular and structural basis of the process of fast exocytosis. Synchronous transmitter release requires SNARE complexes, the calcium sensor synaptotagmin, and several modulatory proteins, such as complexin. Detailed biochemical data explain the structural basis underlying the speed and temporal precision of synchronous neurotransmitter release.

References:

Gao Y, Zorman S, Gunderson G, Xi Z, Ma L, Sirinakis G, Rothman JE, Zhang Y (2012) Single reconstituted neuronal SNARE complexes zipper in three distinct stages. *Science* 337:1340-1343.

Shi L, Shen QT, Kiel A, Wang J, Wang HW, Melia TJ, Rothman JE, Pincet F (2012) SNARE proteins: one to fuse and three to keep the nascent fusion pore open. *Science* 335:1355-1359.

Krishnakumar SS, Radoff DT, Kümmerl D, Giraudo CG, Li F, Khandan L, Baguley SW, Coleman J, Reinisch KM, Pincet F, Rothman JE (2011) A conformational switch in complexin is required for synaptotagmin to trigger synaptic fusion. *Nat Struct Mol Biol* 18:934-940.

Friday, Feb. 22, 2013, 2.00pm

Lecture Hall, Central Building, Ground Floor



2013-02-22

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