LSU Health Sciences Center

Neuroscience Center of Excellence

**FACULTY CANDIDATE**

# Maria Bykhovskaia, Ph.D.

**Presenting**

# PRESYNAPTIC VESICLE CYCLING AND PLASTICITY

Neurotransmitters are packed in synaptic vesicles and released from nerve terminals by the fusion of vesicles with presynaptic membrane. As vesicles release neurotransmitters and recycle, they undergo a number of highly regulated preparatory steps, which are required for exocytosis. Our goal is to understand how different steps of vesicle cycling regulate presynaptic plasticity. Our study is focused on the role of synaptic proteins synapsin and Rab3a in vesicle cycling and transmitter release. Employing neuromuscular synapses of knockout mice and Drosophila, we investigated how these proteins regulate distribution of synaptic vesicles in the nerve terminal, docking of vesicles to the synaptic membrane, the releasable pool of vesicles, and transmitter release. We demonstrated that the action of these proteins is calcium-dependent, and that calcium is a potent regulator of vesicle pools. Our results suggest cooperative action of synapsin-dependent and calcium-dependent mechanisms in maintaining vesicle stores and mobilization of vesicles to the releasable pool.

**Friday May 9, 2008 11:30am,**
**8th Floor Neuroscience Center Conference Room,**
**LSU Lion's Building, 2020 Gravier Street New Orleans**