St. Boniface Hospital Research

Neuroscience Seminar Series

Hosted by the Division of Neurodegenerative Disorders

Dr. Sheena Josselyn

Friday, October 19th, 2012

Theatre C

Bannatyne Campus

12:00 Noon

Everyone is invited to attend!

For more information contact
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Topic: Making and Breaking Memories

A fundamental goal of neuroscience is to understand how memories are encoded and stored in the brain. Indeed, identifying the physical basis of memory within the brain (the memory trace) has been a long-standing challenge for scientists since Karl Lashley's "search for the engram" in the 1950's. Memories are thought to be encoded by sparsely distributed groups of neurons. However, identifying the precise neurons supporting a given memory (the memory trace) has been a long-standing challenge. We have shown previously that lateral amygdala (LA) neurons with increased CREB are preferentially activated by fear memory expression, suggesting they are selectively recruited into the memory trace. Here we used an inducible diphtheria-toxin strategy to specifically ablate these neurons. Selectively deleting neurons overexpressing CREB (but not a similar portion of random LA neurons) after learning blocked expression of that fear memory. The resulting memory loss was robust and persistent, suggesting that the memory was permanently erased. These results establish a causal link between a specific neuronal subpopulation and memory expression, thereby identifying critical neurons within the memory trace.

Short bio: The research in Dr. Josselyn's lab is dedicated to understanding the neural basis of cognitive function and dysfunction. To unravel the molecular, cellular and circuit processes that underlie learning and memory, her lab uses a multidisciplinary approach include the use of genetically-engineered mice, viral vectors, cellular imaging, electrophysiology and detailed behavioral analysis. Her program of research focuses on two main elements 1) examining the brain regions and molecules responsible for normal memory formation and 2) using this knowledge to intervene in conditions in which memory is impaired (for instance in neurodegenerative diseases such as Alzheimer's disease). She has published extensively in the top scientific journals on these subjects and has shown that fear memories in mice can be "erased" and is currently examining novel treatments for the memory disorders that characterize Alzheimer's disease.

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