MEMORY FORMATION
at Synaptic and Circuit Levels

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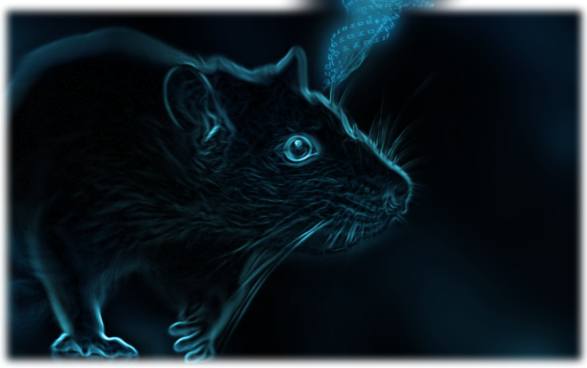
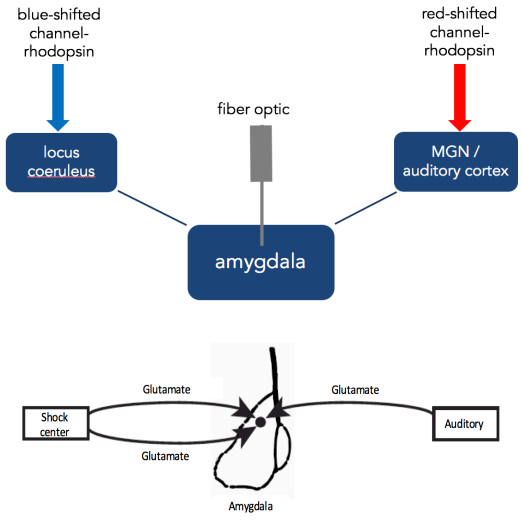
Background

The idea that changes in synaptic strength (synaptic plasticity) is the foundation of memory and learning has a long history. For this reason Long Term Potentiation (LTP) and Long Term Depression (LTD), the electrophysiological manifestations of synaptic plasticity, have been intensely studied. However, the proof of causality, that by changing synaptic strength one can remove and reinstate a memory, had been missing.



Research Description

The amygdala, the fear center of the brain, plays a central role in memory consolidation.



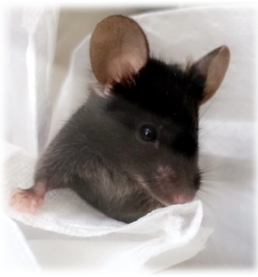
Optogenetics
In order to define the mechanism of memory formation we want to use reverse engineering. The shock and tone pairing will be replaced with stimulation of the input projections to the amygdala. This will be done by activation of specific brain regions with light.

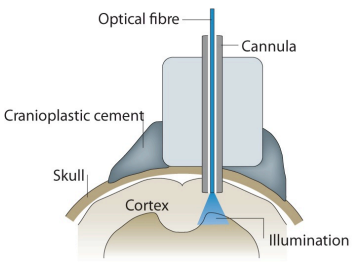
Viral Labeling
Through injection of labeled viruses into certain brain regions, we want to define which cells project to which targets

One year long projects available for students

Methods

- Stereotaxic surgery
- Cloning and virus production
- Optogenetics
- Rodent behavioral studies
- Brain slice and *in-vivo* electrophysiology
- *In-vivo* 2-photon imaging





http://sites.bu.edu/ombs/tag/optogenetics/

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