

Updating the brain's memory base: UpMemo

Subproject 1:

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Title: Updating the brain's memory base: experimental perspective

Subproject 2:

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Title: Updating the brain's memory base: computational perspective

Ministry of Science and Innovation - Biosciences and Biotechnology

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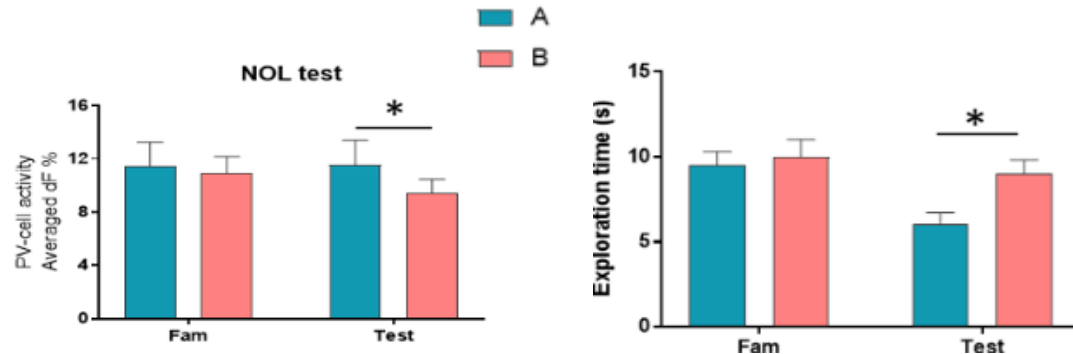
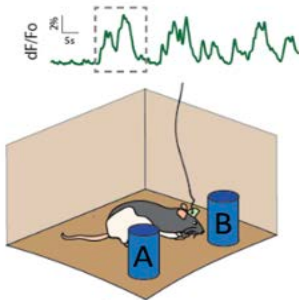
Jaime Sánchez

Let's be clear, **memory is the most important function** of the nervous system, only matched by the ability to move and sense the environment.

Aim of UpMemo:

To investigate **how hippocampal dependent episodic memories are updated to keep track of the ongoing experience**

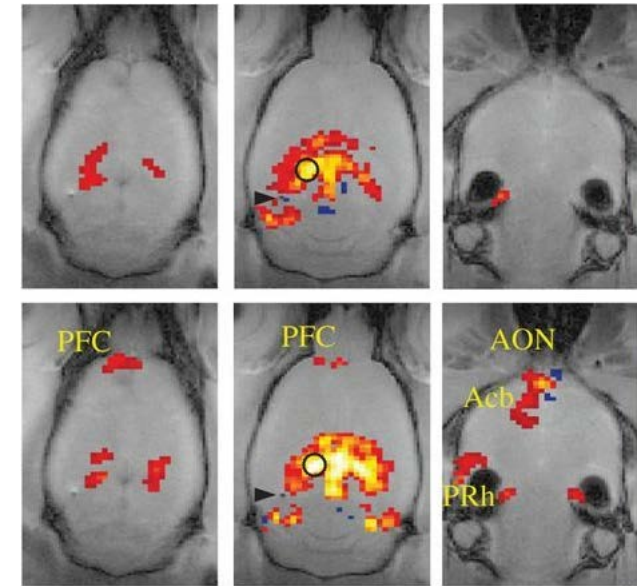
To formalize a novel theoretical framework: **memory updating is under the control of neuronal synchronization** in brain networks



Hypothesis

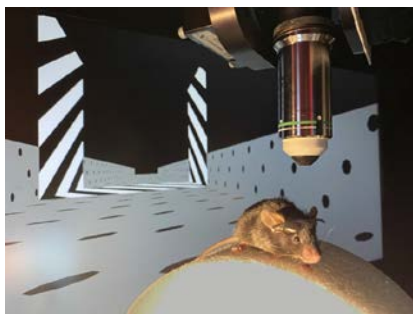
- The dentate gyrus of the hippocampus is a critical node coordinating communication in the brain network for memory updating.
- The key mechanism for coordination is E/I balance in the DG.
- Setting the level of inhibition in the DG thus defines whether new information is assimilated, updating the memory base, or not, preserving the existing memory.

Changes in the hippocampal long-range functional connectivity after potentiation

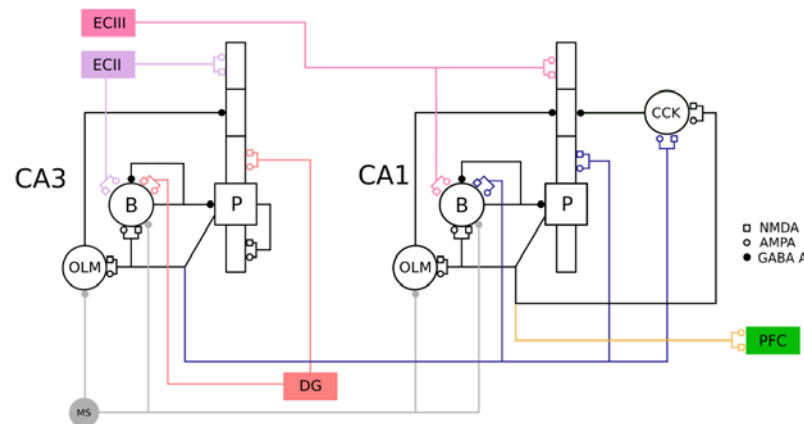
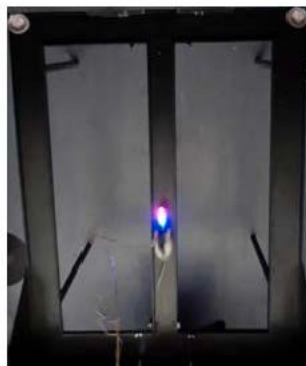


Objectives & Methodology

- Provide evidence and computational understanding on the proposed memory updating theoretical framework.
- Identify/manipulate circuit elements of the DG gating mechanism.
- Explore biomedical and neuro-inspired computational applications.



T-Maze



Applications

- Study the coordination between the HC and PFC in rodent models of Alcohol Use Disorders
- Inspire new technological advances that can be useful in other fields of science such as computer science, robotics or artificial intelligence