COBRE
Investigators

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Title of project: Role of the rodent medial prefrontal cortex in behavioral plasticity

Summary:

A significant challenge in the field of neurophysiology is correctly identifying unique neural correlates that are unambiguously and selectively linked to a particular cognitive process. Although the field has been revolutionized by the use of single-neuron recording in freely-moving animals, there are often multiple possible interpretations of what the firing patterns signify, particularly when complex tasks are used, such as tasks designed to test working memory. In the current literature, there is a lack of studies comparing neuronal activity across comparable tasks to delineate which behavioral correlates are related to working memory. Our laboratory has developed a method to quickly train rats to perform two separate tasks on a T-maze that are similar except for the fact that one task (visual-tactile conditional discrimination) does not require working memory and that the other task (delayed spatial alternation) does. Two brain regions that have been linked to working memory are the hippocampus and the medial prefrontal cortex (mPFC). Recording the same population of neurons across the two different tasks enables us to precisely identify neural correlates related to working memory. Our long-term goal is to extend this experimental approach to hippocampal-prefrontal interactions in order to determine if these interactions are indeed specific to working memory.