ROLES OF HIPPOCAMPAL/NEOSTRIATAL SYSTEMS IN MULTIPLE FORMS OF MEMORY

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Description:

The broad research goal of this project is to systematically define relationships between two brain regions known to support different types of memory among mammalian species: the neostriatum and the hippocampal formation. Although the roles of these two systems have been dissociated experimentally, the extent to which they function independently, cooperatively, competitively, or in temporal sequence is not known currently. Moreover, the time courses and cellular mechanisms of memory formation supported by these two systems are not understood well. Memory formation is accompanied by changes among some neurons involved in, or influenced by, information processing. Experiments conducted in this laboratory will test hypotheses that these changes are memory- and brain region-specific: neostriatal activation supports response, nonspatial, and procedural memory, whereas hippocampal activation supports place, spatial, and declarative memory. The current experiments employ two primary research strategies. The first is to use behavioral manipulations to induce learning-related changes in cellular mechanisms of memory formation and to quantify those changes within the neostriatum and hippocampal formation. The second research strategy is to test the effects of highly selective protein inhibition on acquisition and retention of neostriatal- and hippocampal-dependent memory. By combining these research strategies, we intend to elucidate the relationships between the hippocampal formation and neostriatum during multiple types of memory formation at the behavioral, brain systems, and neuronal levels of analyses.

Objectives:

Undergraduate student interns will work closely with graduate students on continuing experiments. Opportunities exist to learn and practice methods of behavioral and cognitive assessment in rodents as well as other techniques including stereotaxic surgery, western blotting, immunocytochemistry, design and use of oligodeoxynucleotides for selective protein suppression, and data analysis.

Prerequisites:

Some coursework and background in neuroscience, biological psychology, or chemistry.