

## **FACULTY INTEREST SHEET: AM. Brady**

### **A. Neurobiology of forebrain dopamine systems and schizophrenia**

Dopamine projections to the nucleus accumbens (mesolimbic pathway) and prefrontal cortex (mesocortical pathway) are involved in cognition, motivation, and emotional behaviors, but the exact mechanisms of dopamine's control of behavior are not well understood. Several directions are possible to investigate the behavioral neurobiology of dopamine systems, potentially including the role of these systems in various cognitive and motivational behaviors, the effects of various drugs that affect this system, and anatomical investigations of the dopamine system. In addition, this system is believed to be fundamentally disrupted in schizophrenia. Animal models of schizophrenia are available to investigate the neural, behavioral, and cognitive dysfunctions of this disorder, as well as efficacy of drug treatments or other manipulations.

### **B. Animal models of drug addiction**

Chronic recreational drug use causes significant changes in brain structure and function. Furthermore, these changes are widely believed to alter behavioral patterns and lead to compulsive drug-seeking and drug-taking behavior ("addiction"). Interactions between cortical and subcortical brain areas, including dopamine and glutamate systems, are thought to be involved in regulating addictive behaviors. Various animal models of addictive behavior are available to investigate the neural and behavioral variables that contribute to addiction. In humans, chronic drug use is thought to compromise normal cognitive abilities, potentially contributing to compulsive drug-seeking behavior despite harmful consequences. Hypotheses related to this idea could be investigated by assessing various cognitive abilities in animals following repeated exposure to addictive drugs.

### **C. Neuroscience outreach and education**

Educating the general public about neuroscience is an important goal of neuroscientists and psychologists. Recently, there have been increased efforts to include neuroscience topics in elementary and secondary education, but the nervous system represents a particularly challenging topic to introduce at this level. Multiple avenues are available to suggest ways to improve neuroscience education and outreach; some options might include curriculum development, design of activities and teaching materials, or continuing education programs for elementary or secondary school teachers. Increasing the general public's awareness of the goals and accomplishments of neuroscience research is also critical. Projects in this area might include designing informational web sites, print publications, or public lectures.