The MU Neurobehavioral Core Facility: Progressing from Molecules to Behavior

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Attention-Deficit Disorder

The Center for Translational Neuroscience Research at the University of Missouri has been established to promote understanding and treatment of neurological disorders, provide centralized facilities that encourage sharing of technology and expertise, and foster greater productivity through synergy.

The Center consists of four cores that provide expertise and state-of-the-art research facilities.

Why Study Behavior?

An important component of modern neuroscience research is the ability to measure systematically and objectively different aspects of behavior. Behavioral analysis is crucial to a strong neuroscience research program because it evaluates the impact of molecular or neurochemical changes on the functioning of the entire organism.

A unique strength of the MU Translational Neuroscience Center is the presence of "bench" scientists working at the molecular level in pathology, biochemistry and genetics in collaboration with neurobehavioral experts. The Center's modern facilities and trained personnel are available to the MU neuroscience community to help design, conduct and evaluate behavioral research. This will help translate research from the molecular laboratory to the human clinic.

Examples of Research Techniques Used at the Core Facility

Barnes Maze

The Barnes maze is a tool used in psychological laboratories to measure spatial learning and memory. Ongoing work by Center researchers with transgenic mice has identified a role for a specific gene in the learning and memory impairments found in Alzheimer disease and other degenerative disorders.

Shuttle/Avoidance Box

Avoidance learning is the process by which an individual learns a behavior or response to avoid a stressful or unpleasant situation. Avoidance learning is subject to drug treatment (e.g., a "cognitive enhancer") or neurodegeneration (e.g., Alzheimer disease). For example, in studies performed by Center researchers, infusion of a glutamate receptor blocker into the brain decreases learning about an aversive outcome (Sholl; Simonyi et al [2007] Neurobiol Learning & Memory 88: 305). These data suggest a role for this brain region in cognitive-degenerating diseases and a target for the development of anti-Alzheimer disease drugs.

Operant Responding

Operant responding is based on learning theories proposed by Thorndike and Skinner where responses (e.g., lever pressing) result in, or prevent, the delivery of an outcome (e.g., food or shocks). As a result, behavior can be shaped and modified based on the response-outcome relationship. For example, the mild psychostimulant modafinil increased the psychological properties of amphetamine in studies performed by Center researchers (Dopeheide et al [2007] Eur J Pharmacol 568: 112). This suggests that modafinil could be a treatment for methamphetamine abuse and dependence.

Rotarod

Rotarod treadmills are used to assess the effect of drugs, motor coordination and fatigue resistance on mice and rats. Ongoing work by Center researchers has found that botanical phenols can minimize ischemia/reperfusion-induced impairments in rotarod performance. This suggests phenols could aid recovery following stroke.

Want to Learn More About the Center or Behavioral Research at MU?

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