

**Mechanisms of Strial Cell Migration Process**

*Primary Investigator: George Dunaway, Ph.D.  
Funding Agency: SIU Central Research Committee*

The goal of this project is to gain insight into the hearing loss associated with impairment and damage to the inner ear. There is persuasive evidence that this type of deafness is associated with a variety of causative factors, such as developmental or genetic defects, aging, disease, noise and chemotherapeutic agents. To more clearly understand how these pathological processes occur, scientists must first know the basic mechanisms that protect the inner ear from damage.

One of these mechanisms is a regenerative process, termed the strial cell migration process (SCMP). This process repairs damage to the stria vascularis, a layer of cells on the outer wall of the cochlear duct.

The goal of this project is to investigate the mechanisms underlying the SCMP by examining the appearance of strial cells during the maturation of hearing. The specific aim is to elucidate the molecular components of the cochlear duct as it develops.

The research will measure SCMP responsiveness to growth factors that can affect cell proliferation. It also will examine the role of specific proteins in the onset of cellular death. This project will provide basic knowledge and insight into mechanisms of strial function and could provide insight into mechanisms of hearing loss of strial origin.

**Restructuring the Smell Identification Test**

*Primary Investigator: Larry Hughes, Ph.D.  
Funding Agency: SIU Central Research Committee*

Alzheimer Disease (AD) affects more than four million people in the

U.S. The number of people with AD is projected to more than double by 2030. There is no cure for AD. Currently, the best strategy to deal with the growing AD problem is to implement existing therapies that delay, arrest or slow the progression of the disease.

Studies have indicated that the neuropathology of the earliest known stages of AD, "preclinical" AD and mild cognitive impairment (MCI) stages, involve major parts of the olfactory system. Additionally, many studies have shown olfactory identification deficits in early AD. Together, these studies suggest that the earliest possible signs of AD may be detected through the administration of a simple, noninvasive olfactory test.

However, a recent psychometric analysis of the University of Pennsylvania Smell Identification Test (UPSIT), the most widely-used olfactory identification test, revealed that the test contained few, if any items that could be used to discriminate among better-performing individuals. The distinction between normal and the earliest AD individuals would require a test with items targeted for this purpose.

This study will use current item response theory methods to analyze and restructure the existing UPSIT to produce an improved test that is unbiased, sensitive and appropriate to the normal, "preclinical" AD, MCI, and mild AD populations. The restructured test could be reliably used to augment early detection of AD.

**Brain Derived Neurotrophic Factor (BDNF) as a Marker for Major Depressive Disorder**

*Primary Investigators: Kathy Bottum M.D., Ph.D.; David Resch, MD  
Funding Agency: SIU Central Research Committee*

Major depressive disorder

(depression) is a devastating illness that can lead to severe disability or death. Many drugs can treat depression, but not every drug works for every patient. Each drug trial can require as long as two months to confirm the drug's effect. Any method to predict whether a patient will respond to a particular medication earlier would be valuable.

Evidence is growing that antidepressant therapies to treat depression involve brain-derived neurotrophic factor (BDNF), a naturally occurring compound found in the brain and blood. BDNF has been shown to increase the growth of and the connections between brain cells. Studies in humans have shown that depressed patients have lower blood BDNF than non-depressed controls. In animals, blood levels of BDNF correlate with brain levels, suggesting that looking at blood levels of BDNF may provide information about antidepressant response.

The purpose of this study is to follow blood BDNF levels in patients during a treatment course for depression. Dr. Bottum and Dr. Resch will study women between the ages of 18 and 65. At two-week intervals for 12 weeks, they will measure the severity of depression, and antidepressant therapy will be adjusted. At the end of the study, the BDNF levels at each point of the study will be correlated with the severity of depression.

BDNF may prove to be both a good marker of depression and a useful tool for measuring response to antidepressant therapy.

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*For more information about these projects, contact the Office of Research and Faculty Affairs at 217-545-7936.*