

James & Esther King Biomedical Research Program

Bixby, John

*Molecular & Cellular Pharmacology
University of Miami*

*2009 Program
Florida Research Challenge
(2-year project)*

Project Title: Combination Therapy in SCI: Proof-of-Concept for New Compounds and Candidate Genes

Project Summary: Long-term smoking or other uses of tobacco lead to a variety of health problems; one of the most serious of these is stroke. Smoking is a strong risk factor for strokes, increasing the overall risk of these debilitating events by two-four fold. Stroke refers to a variety of processes that cause a loss of normal blood flow to the brain. This loss of blood flow in turn leads to the irreversible loss of some nerve cells, and the disconnection of other nerve cells from their normal brain circuits. The loss of connections in the brain can result in paralysis, weakness, confusion, loss of speech, and many other serious deficits. Although stroke patients can recover some function with rehabilitation, at present some losses are permanent. Such permanent deficits could be reversed if we could find a way to cause injured nerve cells to sprout new connections and regenerate the long fibers (axons) that allow them to communicate with other structures, such as muscles and the spinal cord. This grant is designed to test whether ideas we have developed in tissue culture (growing nerve cells in lab dishes) can be translated to improvements in the regeneration of axons in a living mouse. We will test whether new chemical compounds we have identified will be able to promote regeneration of damaged brain axons. In parallel, we will test whether causing nerve cells to make regeneration-promoting proteins, or to stop making regeneration-inhibitory proteins, will help them regenerate.