

James & Esther King Biomedical Research Program

Bolanos, Carlos

*Department of Psychology and Neuroscience
Florida State University*

*2007 Program
New Investigator (3-year project)*

Project Title: Long-term Neurobiological Effects of Nicotine Exposure During Adolescence in Male Rats

Project Summary: Tobacco dependence through cigarette smoking is the leading preventable cause of death in the world, killing nearly 4 million people annually. In the United States, cigarette smoking is also the major cause of death and disability, accounting for over 440,000 deaths every year. Yet, over 30 percent of the U.S. population aged 12 and over (approximately 71.5 million Americans) report past month use of a tobacco product. Nearly all of current adult smokers began their habit during their juvenile or teenage years, and almost all current smokers report to have had become daily smokers by the age of 20. Thus, initiation of smoking during adolescence is highly associated with higher daily consumption of nicotine and lower probability of quitting smoking. In addition, 30-60 percent of cigarette smokers have a lifetime prevalence of major neuropsychiatric disorders, and smokers have about four-times greater risk of mood disorders and depression than non-smokers. Though many studies have focused on identifying social and psychological risk factors underlying teen's susceptibility to smoking, very little is known about the biological mechanisms and the long-term neurobiological effects of nicotine exposure during the adolescent years. Therefore, the major experimental goal of this grant is to characterize the long-term behavioral and biochemical changes induced by nicotine exposure during adolescence using animal models. In addition, this study will identify genes regulated by nicotine exposure during this developmental period that may influence future sensitivity to drugs and enhanced vulnerability to psychiatric disorders later in life. This will be accomplished by determining changes in behavioral sensitivity to nicotine, cocaine and morphine, natural rewards, and alterations in behavioral reactions to anxiety- and stress-induced environments in adult rodents. Moreover, gene transfer therapy will be used to more directly assess the functional role played by the identified genes in mediating pathological behavior. The results from these experiments will contribute to better understanding of how biochemical and behavioral mechanisms interact to mediate nicotine-induced vulnerability to disorders of mood and motivation and increase susceptibility to other drugs of abuse. Together, the experiments will advance the science and practice of smoking cessation treatment in the general population and among individuals with psychiatric illness.