

James & Esther King Biomedical Research Program

Casalino-Matsuda, S. Marina

*Department of Medicine
University of Miami*

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

Project Title: Role of Monocyte Chemoattractant Protein -1/CCR2 on Oxidative Stress-Induced Mucous Phenotype

Project Summary: Cigarette smoke is the major risk factor of chronic bronchitis, chronic obstructive pulmonary disease (COPD), and other respiratory diseases that represent a significant health care problem. Our research is aimed at understanding how cigarette smoke induces these pathologies in order to delineate new strategies aimed at improving the current therapies, especially for COPD, a severe condition characterized by progressive, irreversible airflow limitation and excessive mucus secretion. In particular, we are trying to identify the mechanisms responsible for two important features of this disease: increased mucus production and changes in the cells that produce mucus (known as goblet cells). To accomplish this, we will use a model of airway in which airway cells are grown in the laboratory with one side directly exposed to the air and the other to a solution of nutrients. This type of cell culture, known as air liquid interface, resembles the cells that line the inside of human airways. These cells will be exposed to some of the components of the cigarette smoke called reactive oxygen species or ROS. We believe that ROS induce a series of “unfortunate events” that result in excessive mucus production. To test our hypothesis, we will expose our cells to ROS, measure the production of some mucus components, and learn about the cascade of events that leads to mucus excess by blocking the different steps of this pathway. The overall goal of this project is to advance our understanding of how cigarette smoke can lead to smoking-related respiratory diseases. The exploration of these mechanisms will provide important new information that might open the possibility for new therapeutic interventions.