

## James & Esther King Biomedical Research Program

***Ibrahim, El-Sayed***

*Radiology  
University of Florida*

*2009 Program  
New Investigator (3-year project)*

**Project Title:** Evaluation of the Relationship between Right Ventricular Myocardial Mechanics and Pulmonary Artery Vessel and Flow Dynamics in Pulmonary Artery Hypertension by MRI

**Project Summary:** Pulmonary arterial hypertension (PAH) is a challenging pathological condition characterized by progressive elevation in the blood pressure of the arteries of the lung, which could lead to substantial morbidity and mortality from right ventricular (RV) failure if not treated properly. The direct effect of tobacco smoking on the PAH has been established. Smoking causes progressive increase in pulmonary arterial (PA) pressure. RV is affected by impaired diastolic function due to elevated PA pressure. However, the relationship between RV dysfunction and PA compliance has not been fully investigated. The purpose of this grant is to evaluate this relationship using state-of-the-art high-field magnetic resonance imaging (MRI). MRI with its superior tissue contrast, high spatial and temporal resolution, and non-invasive nature is an important modality for assessment of cardiac function. In the first stage of this grant, computer simulations will be conducted to optimize the imaging parameters. Volunteer scans will then follow to develop the imaging protocol. Different MRI techniques will be optimized for measuring RV function and PA compliance. The high-field MRI scanner will allow for improved image quality. Finally, PAH patients will be recruited and imaged with the developed MRI exam to measure RV strain, volume, and filling rate, as well as PA stiffness and flow patterns. A thorough statistical analysis will be conducted on the results to help further understand the relationship between RV dysfunction and PA compliance in PAH. The results of this study would allow for a comprehensive MRI cardiac exam of PAH in the future.