

James & Esther King Biomedical Research Program

Rodrigues, Claudia

*Molecular and Cellular Pharmacology
University of Miami*

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

Project Title: Mechanisms of Intercellular Communication During Angiogenesis

Project Summary: Cardiovascular disease (CVD) is the leading cause of death in the United States. Smokers have twice the risk of heart attack as nonsmokers, and one-fifth of the annual 1,000,000 deaths from CVD are attributable to smoking. Chemicals present in tobacco smoke damage the heart and blood vessels, compromising their function and worsening clinical symptoms related to CVD. Blood vessel injury is the first step in the development of atherosclerosis, which can block blood flow to vital tissues such as the heart. Current treatment of damaged blood vessels consists of surgical restoration of blood flow to compromised tissues. Therapeutic angiogenesis is a new treatment that consists of induction of new blood vessel growth and might help patients who cannot benefit from current treatments.

Understanding how blood vessels are formed is critical for the development of therapeutic angiogenesis. Blood vessel formation involves the interaction of different cell types. Progenitor cells have the potential to become different cell types like endothelial cells (ECs), smooth muscle cells (SMCs) or pericytes. ECs form the inner layer of all blood vessels, while SMCs and pericytes are located on the outer side, in direct contact or not with ECs, and control blood vessel permeability. Progenitor cells are recruited to sites of new blood vessel growth where signals from this microenvironment trigger their transformation into new ECs, SMCs, and/or pericytes. We have recently shown that the protein c-Myc is required for blood vessel growth. Our goal is to understand the mechanisms by which c-Myc regulates this process. We will specifically determine the requirement of c-myc for progenitor cell attachment to endothelial cells and the molecular mechanisms involved.