

**McLean, Mark.**

*Department of Obstetrics & Gynecology,  
Biochemistry & Molecular Biology  
University of South Florida College of Medicine*

*2004 Program  
Team Science Project  
(2-year project)*

**Project Title:** Molecular Mechanisms of Hormonal Regulation of Cholesterol Homeostasis

**Project Summary:** Inhalation of tobacco smoke has been considered as the single most important risk factor for the development and progression of cardiovascular diseases. The major negative effect of smoking that leads to the development of cardiovascular diseases is the alteration of the serum lipoprotein profile. In comparison to non-smokers, smokers are characterized by having decreased levels of high-density lipoprotein (HDL)-cholesterol, the so called "good" cholesterol, while having increased levels of low-density lipoprotein (LDL)- and very low density lipoprotein (VLDL)-cholesterol, the so called "bad" cholesterols. These factors are involved in the development of arterial disease, and they place smokers at a higher risk of both heart attack and stroke. Eradicating the smoking induced deleterious changes in serum lipoprotein profiles requires examination of the molecular mechanisms involved in the regulation of key genes responsible for maintaining cholesterol homeostasis that are altered by tobacco. The long-term objective of this research plan is to understand the effects of nicotine on these regulatory processes and characterize the molecular mechanisms involved in the regulation of the SR-B, SCPx, LDLR, and HMGR genes in response to hormones such as estrogen, insulin, and thyroid hormone. This research should provide crucial information that could help in the understanding of how tobacco smoke induces deleterious changes in serum lipoprotein profiles leading to the onset of cardiovascular diseases.