

MEDICINE/CARDIOLOGY
COLLEGE OF MEDICINE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

APPLICATION DEADLINE: 03/01/2024

PROJECT TITLE: Investigation of the Role of LPS Binding Protein in Inflammation in Atherosclerosis Among Patients with Diabetes.

Donald Lynch, MD MSCI
Assistant Professor of Medicine
Department of Medicine
Division of Cardiovascular Health and
Disease
231 Albert Sabin Way
CVC BLDG 3964
Cincinnati, Ohio 45267

Project Description

Diabetes is an important risk factor for the development of coronary artery disease (CAD). Cardiovascular disease remains the major cause of death among patients with diabetes. Many patients with diabetes who develop CAD remain asymptomatic until presenting with a life changing vascular event, such as stroke or heart attack. Despite advances in -omic technology, no suitable biomarkers have been shown to accurately predict presence of CAD. There is an urgent need for strategies to identify diabetic patients at the highest risk of adverse outcomes from CAD. We have recently developed a panel of plasma proteomic and lipidomic biomarkers which predict presence of CAD in patients with diabetes.

The specific research project, as a part of UPRISE, aims to evaluate the role LPS binding protein, one of the identified biomarkers, on monocyte activation in patients with diabetes. This will be achieved by first isolating monocytes from healthy donors utilizing the RoboSep, an automated cell separation system, and then incubating with isolated plasma from patients with diabetes. We will also evaluate inflammation in presence of LPS (lipopolysaccharide). A second aim of this study will be to isolate LPS binding protein from plasma and evaluate the ability of LPS binding protein to inhibit cytokine release from monocytes following LPS exposure. The selected undergraduate student will have the opportunity to learn isolation techniques along with fluorescent imaging utilizing various fluorochrome markers. They will also achieve familiarity with flow cytometry and microscopy. Lastly, you will gain experience with analyzing quantitative data.