MEDICINE/DIVISION OF CARDIOVASCULAR HEALTH AND DISEASE
COLLEGE OF MEDICINE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2025

PROJECT TITLE: Investigation of Platelet Function Among Patients with Valvular Heart Disease

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Project Description

Currently, patients undergoing catheter directed heart valve procedures are placed on antiplatelet therapy. The data for this is limited and based on extrapolation of data from the coronary literature. The project will focus on evaluating the impact of valvular hear disease on platelet function among patients undergoing heart surgery. This research aims to understand how platelet function is altered in patients with conditions such as aortic stenosis and mitral valve regurgitation which can lead to changes in blood flow and potentially affect platelet reactivity. Findings from this study will help to guide management of patients undergoing transcatheter valve interventions.

Tasks involved in this research study will include isolation of platelets from patient blood samples from UC Health, that have been consented according to IRB protocol and will likely be undergoing either surgery or catheter-based intervention. From there, the student will engage in various protocols including flow cytometry to analyze platelet activation markers (e.g., CD62P, CD63), microscopy to examine platelet morphology and interactions, western blotting to quantify platelet proteins, PCR to analyze gene expression in platelets and megakaryocytes, analysis of platelet reactivity in response to various agonists (e.g., ADP, collagen), and correlation of platelet function data with clinical parameters.

The training provided by Dr. Lynch and his research staff will provide the student with a comprehensive understanding of proper blood sample handling and cell isolation techniques, operation of flow cytometry equipment along with data analysis, microscopy techniques for platelet imaging, western

blotting protocols for protein quantification, PCR methods for gene expression analysis, data interpretation and statistical analysis, laboratory safety procedures along with good laboratory practices.

Specific requirements:
No specific requirements are needed, as training on these various techniques will be provided by Dr. Lynch and lab staff. However, students should have a strong interest in cardiovascular research and be willing to learn complex laboratory techniques.