WFSM Office of Women in Medicine and Science

Women's Health Internship Projects
Spring 2014

www.wakehealth.edu/School/OWIMS/Internships.htm

The Office of Women in Medicine and Science (OWIMS) is committed to the promotion of women's health and we know that the recruitment of future top-notch researchers and physicians begins at the undergraduate level of college. The OWIMS coordinates women's health internships between Wake Forest University School of Medicine (WFSM) researchers and healthcare providers and undergraduate students from area colleges who are looking for projects for course credit and/or experience (these are *unpaid* positions).

To inquire about submitting or applying for an internship project or if you have any additional questions about the program, please contact Rita Groce at rgroce@wakehealth.edu.

Projects currently recruiting for interns:

Understanding the genetics underlying gender bias in autoimmune diseases

Background: A significant subset of autoimmune diseases disproportionately affects females (i.e., women and girls). These diseases have a very strong genetic contribution to risk.

Tasks: Under my guidance,

1) Identify the autoimmune diseases with a strong female bias (e.g., systemic lupus erythematosus has a 9:1 female to male ratio, juvenile arthritis has a 4:1 to 9:1 ratio depending on subtype).
2) Identify which of these autoimmune diseases have genome-wide association studies completed and available on dbGaP.
3) Assist in applying for these data in collaboration with Laurie Russell (project manager) and me.

Result: Upon completion of this survey of diseases and their availability in dbGaP, I plan to submit a NIH grant to intensively study chromosome X and its impact on gender bias in autoimmune diseases. In addition, we plan to scan the entire genome for gene-gender interactions that are consistent across multiple autoimmune diseases. Are these interactions the same for children (girls) and adults (women)? Opportunities also exist for assisting in analysis and contributing to manuscripts.

Conclusion: If successful, this will help unify a large proportion of autoimmune disease genetics and provide deeper insight into those that differentially effect females.

Alternative methods to generate pluripotent stem cells

The project centers around stem cell technologies. We have used forced expression of selected genes to induce pluripotency in human fetal cells. Other groups have used small molecule inhibitors to induce pluripotency without use ofectopic gene expression.

The intern will be introduced to lab life and selected technologies as expertise is acquired. Located at the downtown campus (A1/Dean). This project can support one intern.

Evaluating Eyelid Contour Abnormalities in Tanzanians Who have had Eyelid Surgery
In many developing countries, a large proportion of the population suffers from a disease called trachoma. It is a bacterial ocular infection (essentially pink eye) that children get repeatedly. Years of repeat infection cause the eyelid to scar and turn in, such that lashes touch the eye (trichiasis). This can lead to blindness if left uncorrected; currently 8 million people worldwide have trichiasis. Surgery is used to correct in-turned eyelashes, but often surgical results are poor.

In this project, we are evaluating photographs of eyelids that have had surgery to determine whether they have an eyelid contour abnormality, and if so, how that abnormality changes over a 2 year period. Students would be involved in helping to finalize the grading scheme and in grading photographs from 2 clinical trials. Time permitting, students may also be involved in preparing manuscripts for publication. This study can support 1-2 interns.

Association of age-related decline in gut and physical function in female monkeys
This project will explore the effects of regular heated hydrotherapy on cardiovascular and gastrointestinal function in elderly diabetic and non-diabetic monkeys as compared to younger monkeys. This project will require significant training in working with nonhuman primates, twice weekly contact with primates for 4 hour sessions, and the ability to maintain data in Excel spreadsheets. Project can support 1-2 interns.

Arterial remodeling in non-human primates
Project highlight-Arterial remodeling is described as the compensatory enlargement in the diameter of arteries secondary to atherosclerotic plaque accumulation. Arterial remodeling is an important mechanism to maintain the lumen of the artery. Some arteries on the contrary, fail to remodel, which results in arterial stenosis and severe heart disease caused by ischemia. Despite significant medical advances, development of an effective way to predict whether a patient with atherosclerotic disease is going to develop a clinical event continues to be a challenge. Our laboratory is interested characterizing the coronary arteries remodeling patterns of cynomolgus monkeys with coronary artery disease as an animal model to study the phenomenon. Furthermore, we sought to determine the pathophysiological mediators of the remodeling process (e.g. expression of metalloproteinases and inflammatory cells). In this project the potential intern would have the opportunity to learn standard tissue staining techniques (H&E, Toluidine blue, PSR and VVG) as well as immunohistochemistry. Furthermore, the intern will be exposed to understanding the histopathology of atherosclerotic disease. Laboratory location: Friedberg Campus (Primate Center). Project can support one intern.

Role of Substance P in myocardial remodeling in non-human primates
Project highlight-Myocardial remodeling refers to alterations in the cellular and extracellular components of the Heart and it occurs as a result of adverse stimuli such as pressure overload (e.g. hypertension, aortic stenosis), volume overload (e.g. mitral regurgitation) or injury (e.g. myocardial infarction). The laboratory is interested in uncovering the mechanisms leading to adverse myocardial remodeling and ultimately heart failure. Specifically, we are interested in the role of sensory nerves and mast cells as possible mediators of myocardial fibrosis. The laboratory utilizes cultured cardiac fibroblasts to investigate the role of Substance P and inflammatory cells in the activation of pro-fibrotic genes. The potential intern will be exposed to cell culture techniques, preparation of standard laboratory solutions and microscopy (light and confocal). In addition, the Project investigator is committed to spend time with the potential intern to teach cardiovascular basic science, anatomy and physiology as well as basic medical concepts of heart disease. Laboratory location: Friedberg Campus (Primate Center). Project can support one intern.