PROJECT TITLE: How breast cancers optimize HER3 signaling to drive therapeutic resistance.

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Project Description

The WISE student will be offered a specific research project within the 2 areas of Dr. Garrett’s research program. The overarching aim of our research program is a better understanding of signal transduction pathways involved in cancer. Dr. Garrett’s research interests include the role of signal transduction including the ErbB family in cancers.

Research aims for potential WISE projects:
A). How breast cancers optimize HER3 signaling to drive therapeutic resistance. This project seeks to 1) determine the role of mutant HER3 in human mammary epithelial cells and 2) identify mechanisms of HER3 activation and regulation.
B). The role of HER3 in mutant BRAF melanoma. This project seeks to 1) elucidate the role of HER3 in modulating the DNA damage response of BRAF-mutant melanomas that are sensitive or resistant to BRAF inhibitors 2) Identify mechanisms of HER3 activation and regulation.

The WISE student will coordinate with post-doctoral fellows, faculty, and graduate students to complete projects and conduct experiments in our laboratory designed to understand the biological mechanisms behind various types of cancers including melanoma and breast cancer. Our work covers the gamut of basic cancer biology through translational studies in mouse models and human tissues, and interfaces with clinical trials. Our lab uses a variety of technologies including mammalian tissue culture, molecular analyses of gene and protein expression, gene expression microarrays, next-generation DNA sequencing, bioinformatics, protein microarrays, mass spectrometry, mouse models, and live animal imaging. The WISE student will have opportunities to learn applications of cutting edge molecular biology concepts and techniques to further our understanding of cancer. The student will be engaged in summer research with graduate students and
postdoctoral fellows at different stages of their academic and research program; initially, both observing techniques for the assigned project and “sitting in” on the discussions of experimental design. Over time, the goal for the student is to develop significant independence with minimal, but continued, guidance from the faculty mentor and lab personnel, including learning to operate and performing the techniques and experiments as well as the data evaluation and figure/table representation, on her project.

The student will participate in weekly one-on-one research progress meetings with Dr. Garrett. In addition, the WISE student will interact with the laboratory team on a daily basis, and may be assigned to a postdoctoral fellow or senior graduate student for assistance with methods, data analysis, regarding the summer research project. Other mentoring activities with Dr. Garrett (and possibly lab personnel) are: 1) exposure to and understanding of the relevant scientific literature; 2) experience in organizing poster and oral presentations; 3) discussion of educational (graduate or professional) or pharmacy career opportunities; and 4) obtaining oral communication skills.