



Summer Research Internship 2022

Dr. Wang (Chandler Cupp and Gabriel Velez)

Cystic fibrosis is a multisystem genetic disease that impacts over 30,000 people in the U.S. This disease is caused by functional defects in the cystic fibrosis transmembrane conductance regulator (CFTR), a cAMP-activated anion channel on the plasma membrane of cells in a number of human tissues. Small-molecule modulators that target the CFTR protein represents a novel and highly efficacious approach to therapy. In addition to high-throughput screening, a new approach to developing efficacious modulators with desirable clinical outcomes is to use computation-based rational design. By targeting a key domain in CFTR known as the first nucleotide binding domain (NBD1), CFTR modulators with unique properties can be developed. Chandler Cupp and Gabriel Martinez are working on characterizing subsets of these NBD1-targeting CFTR modulators this summer to identify novel CFTR modulators that are capable of enhancing the functional expression of the most common CFTR mutant seen among patients.

Drs. Arnold and Gorman (Tina Cao)

Cannabidiol (CBD) and cannabinoid containing products have gained an enormous degree of popularity in the past few years. While oral administration remains one of the most common dosing routes, there are an increasing number of topically applied products purporting both local and systemic effects of CBD and related cannabinoids. The aim of our study is to determine the degree of transdermal penetration of CBD from these products to estimate the amount of systemic exposure and to correlate that with systemic CBD potencies. To accomplish this, we will use HPLC-tandem mass spectrometry to analyze samples from Franz cells to first determine release of CBD from topically applied products via a dialysis membrane. The second step will be to determine penetration through skin of products that have a measurable release of CBD from the base. Lastly, formulation modifications may be used to increase release and potentially systemic exposure of CBD.

Dr. Bui (Leigh Ballard and Lauren Shouse)

Leigh Ballard and Lauren Shouse are taking the role of research assistants and co-investigators for the project "Interprofessional Approach to Understanding How Faith Affects Patient Medication Choices." Their involvements with the project include recruiting study participants, developing assessment tools, monitoring study participants' activities and conducting a literature review on how faith affects medication choices in cancer patients.

Dr. Jumbo (Katie Fella, Ezaldeen Kahil)

Ezaldeen Kahil is testing the effects of oral beta-PGG on the behavioral deficits of a *Drosophila melanogaster* model of Alzheimer's disease. Kahil has completed dose optimization experiments as the first step before proceeding with in-depth behavioral testing. Once an optimal dose was identified, he has assessed the effect of age as a modifier of outcome in betaPGG-treated and untreated Alzheimer flies. His findings underscore the therapeutic potential of betaPGG in Alzheimer's disease.

Katie Fella is testing the role of neprilysin as a modifier of behavioral outcomes in a *Drosophila* model of Alzheimer's disease. Through a genetic approach, Fella has assessed the role of the neprilysin gene, the predominant enzyme degrading amyloid beta, as a modifier of physical function in a beta-amyloid fly model of Alzheimer's disease. She has identified interesting age-dependent findings that underscore neprilysin as a potential therapeutic target in Alzheimer's disease.