



Differential Activity of Ucp1 Gene Between Mouse Strains

Carlos Medina (EAS 2019)

Advisor: Raymond Soccio

Through PURM, I was able to expand my knowledge in genetics and molecular biology, something I would have never thought of, being a Materials Engineering major myself. PURM gave me the opportunity to connect with a professor from the Perelman School of Medicine, Dr. Raymond Soccio, and become able to study Diabetes and Metabolism, two topics that are not so related to my intended major but long-lasting interests of mine. Given that I was surrounded by such an intensive research environment, it was easy for me to understand what my coworkers were fiddling with at the time, even with an almost non-existent biology background.

During my ten weeks at the Soccio Lab, we mainly studied the expression of an energy related gene called Ucp1 (Uncoupling protein 1). This protein has its highest expression in brown adipocytes, the cells that form brown fat. Brown adipose tissue produces heat instead of storing energy like white adipose tissue does, and the responsible component to carry out this process is Ucp1. There are also inducible brown-like adipocytes that express Ucp1 in white fat depots, often called “beige” adipocytes. We studied two common laboratory mouse strains, C57Bl/6 (or “B6”) and 129S1/SvIm (or “129”), the latter one being leaner and having more brown and beige fat. My project involved understanding the differential expression of Ucp1 in the two mouse strains, by studying the progeny of B6 and 129 mice with 50% genetic contributions from each parent. We identified imbalance in white fat Ucp1 gene expression favoring 129 over B6 alleles and correlated this with imbalanced binding of an important adipocyte transcription factor, nuclear receptor PPAR- γ .

To obtain all of this information, I had to learn several laboratory skills and techniques to carry out the tests, which included Q-PCRs (Quantitative Polymerase Chain Reaction) and SNPs (Single Nucleotide Polymorphisms) analyses. I will definitely never forget all of the skills I acquired during my research experience and I will continue to study these topics to share some more of this knowledge with community.