FALL 2020

Biochemistry and Molecular Biology Brown Bag Series

Michael Craig

Research Assistant Professor

"Differential MicroRNA Biomarker Expression in Response to Moderate and High Intensity Exercise Regimen"

Tuesday, September 8, 2020

11:00 AM

Blackboard Collaborate

https://us.bbcollab.com/guest/63a1b38f991a44808125ab87d4766c20

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https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract

The US military relies on high-intensity physical training to develop and maintain warfighter readiness, but specialized skills training such as the US Air Force Combat Rescue Officer program are plagued by high washout rates. Recent advances have enabled epigenetic analyses to identify individuals who would best respond to a particular training protocol and assess when they have reached peak performance while avoiding overtraining and injury. The goal of this study is to identify miRNA expression as biomarkers in response to exercise. The study is a 5-year two-arm, single-blind, randomized, dose-response trial designed to identify whether miRNA can serve as biomarker of high performance in our warfighters. We have currently tested samples from 67 men and women who either completed a moderate intensity (MOD) or high-intensity (HI) exercise training program in which they exercised 3d/wk for 12wk, followed by a 4wk detraining period. Our preliminary analysis has led to the identification of differential expression of miRNA biomarkers of the detraining response and MOD and HI exercise regime. Using Partek Genomics Suite, validated human mRNA targets of differentially expressed miRNA were identified. Pathway analysis confirmed enrichment of these mRNA in exercise-related pathways, including AMPK, mTOR and p13K/AKT canonical pathways. Taken together, our analyses confirm that miRNA biomarkers may be used to predict training status, and suggests their potential utility in the optimization of high-intensity physical training programs for reduced washout and injury in our warfighters.