UC RIVERSIDE
School of Medicine
DIVISION OF BIOMEDICAL SCIENCES

The Graduate Program in Biomedical Sciences is proud to announce the

Ph.D. Dissertation Defense of

KATHY PHAM

Biomedical Sciences Ph.D. Candidate in the Heinrich Lab

Dr. Erica Heinrich, Chairperson

Inflammatory Profiles and Immune Responses to High Altitude Acclimatization

High altitude is a physiologically stressful environment due to oxygen limitation and low atmospheric pressure. Despite these conditions, over 160 million people live, work, or travel to high altitude annually. To adapt, several systemic physiological changes in response to hypoxia promote acclimatization to high altitude. Evolutionary conserved inflammatory responses to oxygen limitation promote adaptation to the hypoxic environment. However, while the hypoxia and inflammatory responses may be key for acute adaptation to hypoxia, they may become maladaptive if not properly mediated during chronic hypoxia exposure. As a result, poorly acclimatized individuals or long-term hypoxic exposure may develop high-altitude illnesses, such as Acute and Chronic Mountain Sickness. However, the underlying mechanism to high-altitude illnesses are poorly understood. We demonstrate that acute high-altitude exposure increases inflammatory gene expression, as well as promotes a pro-inflammatory immunophenotype. Furthermore, the hypoxia-inducible factor (HIF) plays a role in immune cell surface marker expression, most notably CD14. As sojourners acclimatize, the inflammatory profile favors an anti-inflammatory phenotype. This may indicate initial priming of the innate immune system via TLR4-induced sensitization to subsequent inflammatory stimuli and neutrophil activation and recruitment. We also demonstrate that in the chronic time domain of high-altitude acclimatization, maladaptive native Andean highlanders have a pro-inflammatory profile, suggesting that failure to resolve the initial inflammatory response is maladaptive and a health risk. Overall, these studies provide important insights into the role of inflammation in high-altitude acclimatization and characterize a potential mechanism underlying hypoxia-induced immune sensitization.

Thursday, September 07, 2023 at 12:00PM (PST)
School of Medicine Research Building, Rm. 321 (3rd floor)
Join Via Zoom:
https://ucr-edu-hipaa.zoom.us/j/94606035786?pwd=SkZWZVozUzUzbEk2YUhqQ041MythZz09