

The Graduate Program in Biomedical Sciences is proud to announce the



Ph.D. Dissertation Defense of

TREVOR BIDDLE

Biomedical Sciences Ph.D.

Candidate in the Lo Lab

Dr. David Lo, Chairperson

The Effects of Aerosols From the Salton Sea Basin on Pulmonary Health

The Salton Sea is a large inland lake located in California on the border between Riverside and Imperial Counties. The communities surrounding the Salton Sea have unusually high rates of asthma. In this dissertation, I explain how different aerosol sources play a role in pulmonary inflammation. We used a specially designed environmental exposure chamber that allows mice to be exposed to a controlled and consistent dose of aerosols for up to 7 days without having to open the chamber. Once mice were exposed, we collected bronchoalveolar lavage fluid and lung tissue and analyzed whole lung tissue gene expression, inflammatory cell infiltration, performed histological analysis, and determined changes in airway hyperreactivity. We found that aerosolized Salton Sea Water, selected to mimic the effects of aerosolized sea spray, resulted in a minor change in inflammatory gene regulation without overt inflammatory cell infiltration. This was in stark contrast to a T2-like response to the fungal allergen *Alternaria alternata* and *Alternaria tenuis*. To understand if there was a link between these, we exposed mice to the water followed by *Alternaria* sp. We found that there was no sensitization from pre-exposure to the water, which suggests that the primary aerosol driving the pulmonary inflammation is not the sea spray from the Salton Sea. To investigate other avenues of potential pulmonary inflammation, we exposed mice to aerosolized dust extract collected from around the Salton Sea. This produced a neutrophilic response with substantial upregulation of genes related to innate immune response. This was greater at 48-hours than at 7-days, mimicking the kinetics of acute, innate inflammation. This closely matched the response to TLR2/4 agonists LTA and LPS, providing insight into a potential mechanism for dust-related pulmonary inflammation.

Wednesday, May 31, 2023

10:00AM - 12:00PM (PST)

School of Medicine Research Building, Rm. 321 (3rd floor)