

University of Montana

ScholarWorks at University of Montana

UM Graduate Student Research Conference (GradCon)

Apr 18th, 2:50 PM - 3:10 PM

The influence of wood smoke source on pro-inflammatory outcome

Matthew Ferguson

Follow this and additional works at: <https://scholarworks.umt.edu/gsrc>

Let us know how access to this document benefits you.

Ferguson, Matthew, "The influence of wood smoke source on pro-inflammatory outcome" (2015). *UM Graduate Student Research Conference (GradCon)*. 2.

<https://scholarworks.umt.edu/gsrc/2015/oralpres3b/2>

This Oral Presentation is brought to you for free and open access by ScholarWorks at University of Montana. It has been accepted for inclusion in UM Graduate Student Research Conference (GradCon) by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

Title: The influence of wood smoke source on pro-inflammatory outcome

Research has shown that exposure to biomass smoke can lead to adverse health effects. However, the potential impacts of how wood smoke (WS) sources influence health outcomes are unknown. Wildfire and residential WS particulate matter (PM) are health risks to the general population, as well as a source of occupational exposure to those fighting wildfires. These different sources of WS likely constitute different hazards, especially in small mountain communities where wood or other solid fuels are easily accessible. In order to investigate the potential impacts following exposures to these different sources, the particles released during these different burning events were harvested and employed in an *in vitro* model to explore the potential effects on macrophage pro-inflammatory activity and cell viability. In the lung, macrophages are the front line of defense when inhaling foreign particles (e.g., dust, pathogens, etc.) and can trigger an immune response. This response is largely dependent on the source (or chemistry) of the inhaled particles. Determining the impact of these inhaled particles on macrophages will improve our understanding of how WS sources influence health.

Using a versatile aerosol concentration enrichment system particle concentrator (VACES-PC), WS was harvested for the planned *in vitro* studies. Wildfire PM was harvested on the roof of the Skaggs building on the University of Montana's campus downwind from a wildfire occurring just outside of Lolo, Montana in 2013. Wood stove WS particles were harvested from both an "old" wood stove and an EPA-certified wood stove chimney during burns. Each particle type was then concentrated into stock solutions. In a dose-response manner using a human cell line (THP-1 macrophages), cells were exposed to the three different sources of WS and controls (i.e. NIST 1648 standard for urban particulate matter and SiO₂). Results demonstrate that wildfire WS is significantly more pro-inflammatory than particles from an "old" wood stove, an EPA-certified wood stove, and urban particulate matter. Also, other measures (i.e., endotoxin burden) show significant differences in source chemistry. These data suggest that the source of WS likely plays a significant role in health outcome.