Seminar Series 2017 - 2018

Southern Ontario Centre for Atmospheric Aerosol Research
University of Toronto

Airborne interactions between viruses and PM2.5 as an unexplored modifier of viral viability

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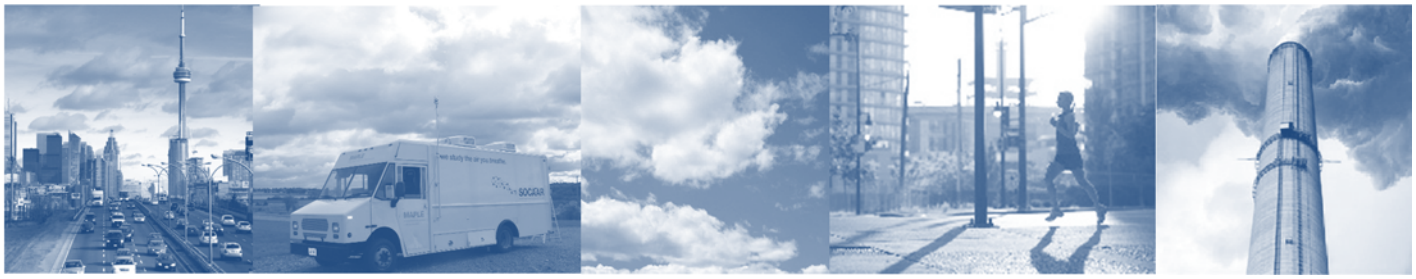
Anthropogenic air pollution is ubiquitous in urban areas worldwide. Microorganisms such as bacteria and fungi in addition to other biological matter like endotoxins and spores comingle with particulate matter (PM) air pollutants but have rarely been considered in air pollution research. Microorganisms may be influenced by interactions with ambient particles in matrices such as soil and dust leading to the inhibition or enhancement of viability and environmental stability (e.g. tolerance to variation in seasonality, temperature, humidity, etc.). Similar effects of airborne particles on microbes are plausible; however, to our knowledge the influence of PM on airborne microbes has remained largely unexamined. In the case of microbial agents of communicable disease, such as viruses, the potential for interactions with pollution may have public health implications. Here we describe an experimental platform to study aerosol-aerosol interactions between PM2.5 particulate from urban air and artificially generated viral bioaerosol. Preliminary studies using this platform have revealed interactions between PM2.5 and the enveloped bacteriophage Φ6 that reduce infectivity of the bacteriophage by 44% compared to a control exposed only to HEPA-filtered air. Co-aerosolization and aging of concentrated PM2.5 with Φ6 in combination with ΦX174 (a non-enveloped bacteriophage) showed a similar trend in reduction of Φ6 infectivity but revealed an antithetical enhancement of ΦX174 infectivity compared to control exposures in HEPA-filtered air. Ongoing investigations are needed to understand the nature of interactions between bioaerosols and PM2.5 particles.

Wednesday, March 7, 2018 3:00 - 4:00PM

Wallberg Building, 200 College Street, Room 407



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