**Geogenic Dust Impacts Cell Viability and Inflammatory Cytokines in Human Airway Epithelial Cells**

HD Clifford1, A Kicic1,2,3,4, K Perks1, LJ Berry1, K-M Ling1, EN Sutanto1, AN Larcombe1 & GR Zosky1

*1Clinical Sciences, Telethon Institute for Child Health Research, University of Western Australia, Perth, WA*

*2School of Paediatrics and Child Health, UWA, Perth, WA*

*3Department of Respiratory Medicine, Princess Margaret Hospital for Children, Perth, WA*

*4Centre for Cell Therapy and Regenerative Medicine, UWA, Perth, WA*

**Introduction** Environmental particulate matter (PM) exposure has been linked epidemiologically to exacerbations of lung disease. We have previously shown using *in vivo* animal models that geogenic (earth-derived) PM can exacerbate the response to respiratory infection. However, the specific impact of geogenic PM on human airway cells is not known.

**Aim** To determine the effects of community-sampled geogenic dust PM10 (PM <10µm diameter) in human airway epithelial cells.

**Methods** Geogenic dust was sampled from four remote Western Australian communities (Kalgoorlie, Karratha, Tom Price and Port Hedland), and the PM10 fraction was extracted. Two immortalized human airway epithelial cell (AEC) models (NuLi-1 – healthy; CuFi-1 – cystic fibrosis) were exposed *in vitro* to geogenic PM10 (10µg/mL in PBS). After 24h incubation, cell viability and inflammatory cytokine production (IL-6, IL-8, RANTES) were assessed using MTS assay and ELISA, respectively.

**Results** Cell viability was significantly decreased in the cystic fibrosis CuFi-1 AECs, when exposed to geogenic PM10 from Kalgoorlie (18.5% ±7.8; p=0.008), Karratha (18.9% ±3.6; p=0.007), Tom Price (20.7% ±6.0; p=0.003) and Port Hedland (19.2% ±5.7; p=0.006), compared with control. No loss of viability was observed in the healthy NuLi-1 cells. In CuFi-1 AECs, IL-6 levels were significantly higher compared with control when exposed to geogenic PM10 at all sites (all p<0.001). IL-8 was detectable only in the NuLi-1 cells, where levels were also significantly increased compared with control in all four towns (all p<0.001).

**Conclusion** Geogenic dust particles impact on human AECs, affecting viability and cytokine production. This has important implications for respiratory health in individuals living in the remote, arid regions of Australia who are exposed to high particulate loads of geogenic origin, particularly those with pre-existing respiratory conditions.

**Supported by** University of Western Australia