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Title: Particulate matter (PM_{10}) alters the virulence of pseudomonas aeruginosa strain PA01

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Body: Background: A cause of chronic respiratory morbidity is infection by Pseudomonas aeruginosa (PS) – especially during exacerbations in Cystic Fibrosis (CF) and Chronic Obstructive Pulmonary Disease (COPD)[1,2,3]. Associations between exposure to particulate matter air pollution (PM) and CF and COPD exacerbations have been reported[4,5], but the mechanisms are unclear. We sought to assess whether PM_{10} alters the secretion of virulence factors in vitro. Methods: An overnight growth of PS strain PA01 was inoculated into cell culture medium, +/- 50ug/ml of urban PM_{10} and harvested. Cultures were then filter sterilised and the supernatant incubated with the lung alveolar epithelial cell line (A549) for 2hrs. Cytotoxicity was then assessed by the MTT assay. Results: PM_{10} increased the virulence of the PA01 strain as observed by the MTT assay. Compared with control, PS+50ug/ml of PM_{10} supernatants statistically increased cytotoxicity p=0.0001.

Conclusion: Exposure of PS to PM_{10} results in the production of virulence factors that are cytotoxic to airway epithelial cells. This may contribute to the association between exposure to air pollution and exacerbations of COPD and CF patients. 1.Murphy TF. Clin Inf Dis 2008 Aug ; 47 :1534-6 2.Juan C et al. AAC. June 2008 ; 52(6) 2285-6 3.Goss et al. Thorax 2007 ; 62(4) : 360-367 4.Zanobetto A. Env H. Persp. 2000 Nov;108(11):1071-7. 5.Goeminne P. Chest. 2012 Oct 15.