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Title: Effect of prostaglandin-E_2 on phagocytosis of carbon black and particulate matter by rat alveolar macrophages

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Body: Background: Alveolar Macrophages (AMs) are responsible for clearing inhaled particles. Since prostaglandin E2 (PGE_2) suppresses AMs phagocytosis of opsonised bacteria (Aronoff et al. 2004), we sought to test the hypothesis that that PGE2 suppresses phagocytosis of inhaled particulate matter air pollution in vitro. Methods: Rat AM were pre-incubated in PGE_2 (10^{-6}M) then incubated with 10 μg of either ultrafine carbon black (ufCB) or urban Particulate Matter less than 10 μm in aerodynamic diameter (PM_{10}) for 1 h. Phagocytosis of PM was assessed using image analysis of 50 AM per experiment. Results were compared using the Wilcoxon signed rank test. Results: PGE_2 attenuated AM phagocytosis of both ufCB to 75% of medium control ($p < 0.05$, Figure 1A), and urban PM10 to 76.9% of medium control ($p < 0.05$, figure 1B).

Conclusion: PGE_2 inhibits AM phagocytosis of ufCB and PM_{10}. This mechanism may contribute to the adverse health effects of poor air quality in conditions associated with increased airway PGE_2, such as asthma and COPD.