Ambient air pollution and asthma

To the Editor:

We read with great interest the recent article by Cai *et al.* [1] on the likely role of PM₁₀ (particulate matter with aerodynamic diameter $\leq 10 \mu\text{m}$) in the development of asthma in adults. This report is a significant contribution to the debate about how important air pollution by particulate matter might be in the pathogenesis of asthma. Moreover, it adds to the growing body of work that supports a role for particulate air pollutants in the development of allergic asthma, including in children [2–5], as well as in triggering exacerbations of asthma [6, 7].

The authors note that the cross-sectional design of the study limits its value in terms of establishing causality. In experimental studies using animal models, and airway epithelial cells *in vitro*, we have demonstrated a cause-and-effect relationship between ambient PM₁₀ and allergic asthma in both the induction and exacerbation phases. In addition, we have shown that airway epithelial injury *via* oxidative stress, with release of interleukin-33, is a likely pathogenetic mechanism in both settings [8, 9]. It is heartening to note the accumulating evidence of convergence between epidemiological studies and experimental work.

Also of considerable interest is the fact that the authors examined the relationship between asthma and exposure to PM₁₀. As Cai *et al.* correctly point out, particulate matter air pollution can derive from sources other than traffic. Many recent studies have examined relationships to exposure with PM_{2.5} (which includes so-called fine and ultrafine particles and is primarily traffic-derived) and have thus ignored PM_{2.5–10} (coarse particles which are included within PM₁₀). We have demonstrated that PM₁₀ may in fact be more injurious to airway epithelium than PM_{2.5}, possibly because of the iron content of coarse particles [10]. The findings of Cai *et al.*, who have demonstrated a relatively large effect for PM₁₀, lend strong support to our earlier suggestion that regulatory and research activities related to the health effects of airborne particulate matter should not focus solely on fine particles.

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Air pollution by PM₁₀ is related to induction of asthma and its exacerbations <http://ow.ly/5GPA30aCrC4>

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