

Airborne Tire Particles in the Environment: A Possible Asthma Risk from Latex Proteins?

Brent L. Finley,¹ Dennis R. Ownby,² and Sean M. Hays³

¹Exponent, Santa Rosa, California, USA; ²Medical College of Georgia, Augusta, Georgia, USA; ³Exponent, Boulder, Colorado, USA

ABSTRACT

A marked increase in asthma incidence has been reported worldwide over the past 10 years, particularly among children. Some authors have postulated that the increase could be related to the presence of natural rubber latex (NRL) proteins in airborne, respirable tire-wear particles. We reviewed the scientific literature to assess the plausibility of this hypothesis. Specifically, we reviewed the literature to determine the measured levels of tire particles in air, the bioavailability of the NRL antigenic proteins in tire particles, and whether the airborne levels of bioavailable NRL proteins might be sufficient to elicit asthma in a previously sensitized individual. Combining reported concentrations of ambient-air tire particles with the levels of extractable NRL antigens in tire particles yields a conservative estimate of approximately 0.004 ng bioavailable NRL antigen/m³ of ambient air. In a controlled exposure in which latex-sensitive patients were exposed to latex antigens from NRL gloves, a No-Adverse-Effect Level was found to be at airborne allergen levels ranging from 55 to 100 ng/m³. Hence, the current weight of evidence does not support the hypothesis that NRL in tire particulates is a significant contributor to asthma.

Key Words: tire, latex, asthma, airborne particulates.