

The effects of environmental pollution and climate change on allergic diseases

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The effects of environmental pollution and climate change on non-communicable inflammatory diseases like allergies and asthma have been a key focus of many organizations (including the World Allergy Organization) and governments in the past decade [1, 2]. July's issue of the journal coincides with South East Asia encountering its worst case of environmental pollution in the last two decades. In June, Indonesia, Singapore and Malaysia were severely affected by haze from illegal "slash-and-burn" agricultural fires in Sumatra, an inexpensive way to clear large areas of land for palm oil plantations. This resulted in restriction on outdoor activities in schools and childcare centres, cessation of military training, widespread public demand for face/N95 masks and increased outpatient and emergency room attendances for haze-related ailments. The review by Lee et al. [3] from South Korea, provides an Asia-Pacific perspective on the role of indoor and outdoor pollutants. This is timely, especially when other recent studies from the region, have demonstrated higher concentrations of polycyclic aromatic hydrocarbons and metals in haze compared to non-haze aerosols [4].

Biodiversity loss and climate change secondary to human

activities are now being associated with various adverse health effects, including an increase in allergic and respiratory diseases [5]. This loss of biodiversity may also affect environmental and commensal (indigenous) microbiotas, additional risk factors for immune dysregulation and impaired tolerance [6]. The intestinal microbiota, which has been the most well-studied, plays an important role in immune development and may play a role in the development of allergic disorders. Manipulation of the intestinal microbiota may theoretically therefore, offer an approach to the prevention or treatment of allergic diseases [7]. Probiotic bacteria have been defined as live microorganisms, which when consumed in adequate amounts, confer a health benefit for the host e.g. *Lactobacillus rhamnosus* GG, and certain strains of *L. casei* or the *L. acidophilus*-group. Prebiotics are non-digestible food ingredients that stimulate the growth and/or activity of bacteria in the digestive system in ways claimed to be beneficial to health. They may be short-chain, long-chain, and full-spectrum prebiotics; and include trans-galactooligosaccharide and inulin [8]. Although there have been some evidence on the use of probiotics in the treatment of atopic dermatitis (AD) and

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other allergic diseases, this remains tenuous and more research is needed before this can be considered standard clinical practice [9]. Kulthanan et al. [10] from Thailand look at the pH of water from various sources in the management of the skin-barrier dysfunction in AD. Their interesting discussion on the varying pH and quality of the various natural water sources is a further reminder of the effects that pollution may also have on rain water, waterfall water and river water.

The hygiene, microbiota and biodiversity hypotheses [7], and cohort studies from Europe [11] and Asia [12-14] have demonstrated protective effects of raising children in farms on asthma and atopy [15]. However one might postulate whether pollution and climate change will one day also modify rural environments, and produce similar prevalence and patterns of allergic diseases as urban areas.

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