Influence of short-term exposure to airborne Der p 1 and volatile organic compounds on skin barrier function and dermal blood flow in patients with atopic eczema and healthy individuals.

Abstract:
BACKGROUND: Epidemiological studies indicate environmental pollutants to be involved in the increase in the prevalence of allergic diseases. In human exposure studies, volatile organic compounds (VOCs) have been shown to cause exacerbations of allergic asthma whereas, no data concerning atopic eczema (AE) are available.
OBJECTIVE: We investigated the effect of airborne VOCs on the skin of patients with AE and controls in the presence or absence of house dust mite allergen, Der p 1.
METHODS: In a double-blind crossover study, 12 adults with AE and 12 matched healthy volunteers were exposed on their forearms to Der p 1 and subsequently to a mixture of 22 VOCs (M22, 5 mg/m(3)) in a total body exposure chamber for 4 h. Transepidermal water loss (TEWL) and skin blood flow were measured in all subjects before, during and after exposure. Additionally, an atopy patch test (APT) with Der p 1 was applied to the skin after exposure.
RESULTS: A significant increase in transepidermal water loss was observed 48 h after exposure to VOCs as compared with exposure with filtered air in all individuals (mean difference: +34%; 95% Confidence Interval: 7-69%). Prior Der p 1 exposure resulted in a significant rise of dermal blood flow after 48 h in patients with AE but not in...
controls. Six out of seven patients showed enhanced atopy patch test (APT) reactions to HDM allergen after previous exposure to VOCs. CONCLUSION: Our results show that exposure to VOCs - at concentrations commonly found in indoor environments - can damage the epidermal barrier and enhance the adverse effect of Der p 1 on sensitized subjects with AE. These findings may contribute to a better understanding of the mechanisms underlying the increase in prevalence and exacerbation of AE.