Efficacy of a new pollen protection material

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Introduction

Allergic diseases such as allergic rhinoconjunctivitis or allergic asthma are global health problems which have significant impact on patient quality of life, health-care costs, and economic productivity. In allergic patients who have been sensitized to a certain allergen, mast cells are activated after contact with the respective allergen by cross-linking of antigen-specific IgE bound to the high affinity IgE receptor FcεRI. The activation of mast cells then results in the release of a plethora of mediators, among them histamine and leukotrienes, i.e. products responsible for allergic symptoms. To prevent allergic symptoms, different approaches can be chosen alone or in combination: 1) pharmacological inhibition of mast cell mediators (e.g. receptor antagonists of histamine and leukotrienes), 2) pharmacological abrogation of mast cell activation, 3) Reduction of circulating allergen-specific IgE, and 4) Avoidance of the eliciting allergen. Obviously, the avoidance of allergens is the optimal method for the prevention of allergic symptoms; however, certain disadvantages make it difficult to achieve efficient allergen control. Here, we tested whether a light- and air-transmissive the novel textile material poll-tex® can prevent the inflow of pollen in a standardized pollen chamber.

Figure 1. Pollen chamber at the Allergie-Centrum-Charité. Room "A" represents an interior room, e.g. a living room, room "B" represents pollen-containing open air. Pollen are released in chamber B at 0h, 2h, and 4h to provide a steady state level of pollen circulating in the chamber. The pollen protective grid (poll-tex®, provided by L. von Heek Textiles) is attached to the open window, and high concentrations of different pollen are released in the "outside" room. The amount of pollen entering room A are then assessed using a volumetric Burkard pollen and spore trap.

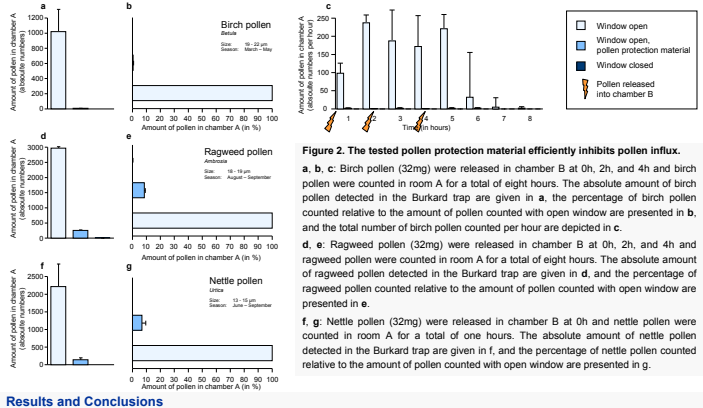

Figure 2. The tested pollen protection material efficiently inhibits pollen inflow.

a, **b**, **c**: Birch pollen (32mg) were released in chamber B at 0h, 2h, and 4h and birch pollen were counted in room A for a total of eight hours. The absolute amount of birch pollen detected in the Burkard trap are given in **a**, the percentage of birch pollen counted relative to the amount of pollen counted with open window are presented in **b**, and the total number of birch pollen counted per hour are depicted in **c**.

d, **e**: Ragweed pollen (32mg) were released in chamber B at 0h, 2h, and 4h and ragweed pollen were counted in room A for a total of eight hours. The absolute amount of ragweed pollen detected in the Burkard trap are given in **d**, and the percentage of ragweed pollen counted relative to the amount of pollen counted with open window are presented in **e**.

f, **g**: Nettle pollen (32mg) were released in chamber B at 0h and nettle pollen were counted in room A for a total of one hours. The absolute amount of nettle pollen detected in the Burkard trap are given in f, and the percentage of nettle pollen counted relative to the amount of pollen counted with open window are presented in g.

Results and Conclusions

- **The repeated release of pollen into the "outside" room (chamber B) results in steady state levels of pollen in the air.**
- **The new pollen protection material poll-tex® completely blocks birch pollen (>99% inhibition of pollen inflow), and almost completely blocks nettle (>93%) and ragweed pollen (>90%).**
- **Even very small pollen, i.e. from nettles, are efficiently blocked from entering.**
- **These results indicate that the tested material could provide a significant benefit for patients suffering from pollen allergies.**