

Nanotechnology against pollen allergy

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Scientists at the Charité – Universitätsmedizin Berlin have now been able to identify the grass pollen molecule, against which the allergic response of hay fever in children is initiated. In addition, it was shown that the first individual antibodies generated in children against individual pollen molecules can be identified even before the initial symptoms of a pollen allergy are developed. The findings of this long-term study have appeared in the *Journal of Allergy and Clinical Immunology*.

In its study, the Molecular Allergology working group headed by Adj. Professor Dr. Paolo Matricardi of the Department of Pediatrics, Division of Pneumonology and Immunology at the Campus Virchow-Klinikum, investigated the data and [blood samples](#) taken from 820 children. These children come from five cities in Germany and had been taking part in this multicenter allergy study since their birth in 1990. As part of a sub-project investigating the development of the allergic [immune response](#) in childhood, which was funded by the Deutsche Forschungsgemeinschaft (German Research Foundation), the working group was for the first time also able to examine the data using nanotechnological methods at a molecular level. Hitherto in current allergy diagnostics, [antibodies](#) against a natural grass [pollen](#) extract (a mixture of several allergenic modules) are detected. In this study, a so-called allergen chip was used, which enables antibodies against individual, microscopically small pollen molecules to be made visible and identified.

The research findings of the study show that the special proteins used by

the body's immune system to repel invading pathogens, the so-called IgE antibodies, can be developed years before the first symptoms occur. These antibodies can be identified in children even at pre-school age. They represent key [biomarkers](#) that indicate whether a child will suffer from a grass pollen allergy. In addition, a single pollen molecule was identified, the so-called Phl p 1, which in most cases stands at the head of the reaction chain: although the children affected initially only develop a few IgE antibodies to a specific type of pollen, they subsequently create other IgE antibodies to other pollen molecules as well. The immune system responds to an increasing number of different allergens, often before allergic symptoms are recognisable. Methods of treatment, such as hypo- or desensitisation, do not invariably lead to success. One reason for this might be that the therapy does not start until the children affected are already suffering from the allergy, and the body has already created antibodies against a range of different allergen molecules.

"The detection of IgE antibodies at an early stage could enhance the prospects of a successful therapeutic and even preventative intervention", according to a confident Laura Hatzler, the first author of the study. "The investigation of allergen-specific, immunological treatments at early stages of the disease process in childhood represents the next step in our research."

More information: Hatzler, Laura et al. 2012. Molecular spreading and predictive value of preclinical IgE response to *Phleum pratense* in children with hay fever. *Journal of Allergy and Clinical Immunology*, Volume 130, 827-1016. [doi: 10.1016/j.jaci.2012.05.053](https://doi.org/10.1016/j.jaci.2012.05.053)

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