

Molecular origins of allergy to house dust mites discovered

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Scientists at the Charité - Universitätsmedizin Berlin found which molecules of the house dust mites are initially targeted by the immune system of children developing, even years later, allergic rhinitis and asthma. The discovery, published in the *Journal of Allergy and Clinical Immunology*, will open up new avenues not only to novel and more precise therapies, but also to a successful prediction and prevention of chronic rhinitis and asthma caused or aggravated by allergy to house dust mites.

The study team was lead by Professor Paolo Maria Matricardi, head of the Molecular Allergology Group at the Department of Pediatric Pulmonology and Immunology of the Charité and included researchers from the Medical University of Vienna, lead by Prof. Rudolf Valenta, and statisticians from Rome, Italy. The team examined the data and blood samples prospectively collected over 20 years from a cohort of 722 German children born in 1990 and monitored since their birth in the framework of the Multicenter Allergy Study (MAS). Purified or engineered molecules of the mite *Dermatophagoides pteronyssinus* were used with nanotechnology procedures to characterize the origins and evolution of the antibody response during the children's first decades of life.

The scientists found that IgE-antibodies against three dust mite molecules (Der p 1, Der p 2 and Der p 23) appeared very early in the children's blood, often before the onset of their disease. In some (but not all) children, this first step was followed by a "cascade" of events

involving other mite molecules, through a phenomenon defined as "molecular spreading". Children producing IgE to many molecules ("polymolecular sensitization") had a higher risk of developing allergic rhinitis and [asthma](#). Earlier onset of [allergic sensitization](#), high exposure to house dust mite allergens, and having one or both parents affected by hay fever increased the risk of polymolecular sensitization. Interestingly, healthy pre-school [children](#) showing IgE antibodies to Der p 1 or Der p 23 developed more frequently asthma at school age. These and other molecules may be used for disease prevention in early life and to precisely tailor allergen immunotherapy in pediatric and adult patients.

"Mite allergy develops in childhood like an avalanche. It starts early with only one or a very few molecules and then grows to many", says Dr Daniela Posa,, first Author of the publication. "The greater the spreading of molecular sensitization, the highest the risk of developing Asthma." PD. Dr. Matricardi adds: "Our findings open new perspectives to the use of mite allergen molecules for prediction, prevention and therapy of [allergic rhinitis](#) and asthma caused or triggered by House Dust Mites."

More information: [DOI: 10.1016/j.jaci.2016.10.XXX](https://doi.org/10.1016/j.jaci.2016.10.XXX)

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