

On the road to allergy prophylaxis

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Vision of a single vaccination against allergies

Researchers of MedUni Vienna succeeded in binding allergens to endogenous, endogenic white blood corpuscles to trigger a tolerance reaction in case of a future, possible contact with the respective allergen.

The results in animal models are promising and give rise to hope that it may be possible in future to prevent allergens before they appear - be it by "vaccination" with endogenic cells or other vaccination strategies.

For this purpose, the researchers availed themselves of a method which is, in fact, originally applied in transplantation medicine - namely the triggering of an immunological tolerance reaction for the donor organ. Accordingly, the study, which has now appeared in the magazine EBioMedicine, an offshoot of the renowned *Lancet* journal, is a cooperation between the University Clinic for Surgery (Thomas Wekerle, Ulrike Baranyi) and the Institute for Pathophysiology and Allergy Research of MedUni Vienna (Rudolf Valenta).

Allergens as "Trojan Horse"

The pivotal result: The mice, whose white blood corpuscles were combined with the respective allergens - these are proteins to which the immune system reacts more intensive in case of an [allergy](#) - remain consistently resistant also with respect to the allergy. Initially, the cells (white blood corpuscles) are removed, "diluted" with the allergen and subsequently re-injected into the organism together with a biologicum known from rheumatology (effective ingredient Abatacept) and an agent from immunosuppression and oncology (Sirolimus). The allergen, thus introduced, practically sleeps on the cell similar to a "Trojan Horse"; once a contact is established with the allergen, i.e. through grass pollen, the body is immune against this "attack" from the outside.

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Thomas Wekerle, expert for transplantation immunology at MedUni Vienna: "The long-term effect gives rise to the hope for our vision of a life-long protection from allergies with a single vaccination. However, it

is much too early for an application in the clinic." This requires further studies over many years. Principally, particularly risk groups could be initially vaccinated - e.g. children, whose parents suffer from allergies. Objective: to prevent the allergy from breaking out at all to avoid severe consequences such as asthma.

In Austria, approximately every fifth person suffers from allergies, tendency rising. "Often, it starts with hay fever, but can frequently lead to asthma up to life-threatening symptoms", explains allergy researcher Rudolf Valenta. All the more important is the early recognition and respective treatment. The new findings may be a major step in this direction.

As Valenta states, it is practical that there is a virtual map of allergens. "It is known precisely which allergens work at an allergy; thus, one could use this fact to specifically immunise cells and render them tolerant."

Five research clusters at MedUni Vienna

In total, five research clusters are established at MedUni Vienna. Here, the emphasis is increasingly on basics as well as clinical research at the MedUni Vienna. The research clusters comprise medical imaging, cancer research/oncology, cardiovascular medicine, medical neurosciences and immunology. This research paper is included in the topics of the immunology cluster.

More information: Ulrike Baranyi et al. Cell Therapy for Prophylactic Tolerance in Immunoglobulin E-mediated Allergy, *EBioMedicine* (2016). [DOI: 10.1016/j.ebiom.2016.03.028](https://doi.org/10.1016/j.ebiom.2016.03.028)

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