ImmunoTools *special* Award 2017

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Olive pollen allergy: therapeutic potential of peptides, defined from the main allergen, Ole e 1

Allergen-specific immunotherapy (AIT) is the only treatment able to change the course of the allergic diseases. Although applied for 100 years to cure allergy, this approach is not fully optimal: AIT can cause anaphylactic reactions as well as new IgE sensitization to other allergens present in the extract. Furthermore, the lengthy duration (3 to 5 years), the frequent administration, and the high cost of treatment are other disadvantages. For these reasons, there is a need for safer and more effective AIT strategies. Novel approaches include recombinant allergens, hypoallergenic allergen derivatives, peptides derived from the main epitopes of the allergens.

The design of peptide vaccines uses a strategy based on the knowledge of the primary structure of allergens. This promising therapy could solve some of the main problems of conventional AIT, and also offers additional advantages, as the high stability, easy purification and standardization and low cost production.

Olive (*Olea europaea*) pollen is one of the most important causes of respiratory allergy in the Mediterranean countries. Olive pollen induces mainly nasal and conjunctival symptoms, although it may also induce exacerbation of asthma in areas with high antigenic load. The major allergen, Ole e 1, is a single polypeptide chain of 145 amino acids that shows a high degree of sequence homology and IgE cross-reactivity with the main allergens in other Oleaceae-family pollens such us lilac, privet, and, in particular, to ash.

Our team has been researching about Ole e 1 epitopes for developing a new peptide therapeutic strategy. We have defined some peptides with important capacities to induce tolerance in olive pollen allergy[(1)]. We have demonstrated that these peptides induce the secretion of regulatory cytokines such as IL-10 and TGF-β. Furthermore, 51 genes are specifically regulated by these peptides in olive pollen allergic patients, most of them that codify proteins implicated in the maintenance of peripheral Tcell-tolerance and inflammatory response[(2)]. We also demonstrated, by mRNA

expression, that the peptides lead to a downregulation of the Th2 response with a shift towards Th1 profile.

ImmunoTools products would be of great benefit to this project. We have found several genes which expression is modulated by these peptides. Next step would be to evaluate their expression at a protein level with ImmunoTools ELISA kits and to identify the cell populations by ImmunoTools anti-human conjugated antibodies for flow cytometry.

ImmunoTools reagents would be very helpful to understand immunological mechanism implicated in these peptides-treatments and also, very usefull to identify immunotherapy targets in the future.

References:

1. Cárdaba B., Del Pozo V., Jurado A., Gallardo S., Cortegano I., Arrieta I., Del Amo A., Tramón P., Florido F., Sastre J., Palomino P., Lahoz C. (1998). Olive pollen allergy: searching for immunodominant T-cell epitopes on the Ole e 1 molecule. *Clin Exp Allergy*. 28(4): 413-422.

2. Calzada D., Aguerri A., Baos S., Montaner D., Mata M., Dopazo J., Quiralte J., Florido F., Lahoz C., Cárdaba B. (2015). Therapeutic targets for Olive pollen allergy defined by gene-markers modulated by Ole e 1-derived peptides. *Molecular Immunology.* 64(2): 252-261.