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Sublingual immunotherapy for peach allergy regulates the Th2 response by increase of Th1/TReg response

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Background: Pru p 3 is the primary sensitizer of plants fruit and responsible for severe reactions in the Mediterranean area. Sublingual immunotherapy (SLIT) using peach extract enriched in Pru p 3 (Prup3-enriched-SLIT) brings a new perspective to treat patients with severe reactions to peach. However, there is a lack of knowledge regarding immunological response during the immunotherapy.

Aims: To evaluate the lymphocyte modulation from a Th2 pattern to a Th1/Treg profile during one year of Prup3-enriched-SLIT.

Methods: We studied three groups: peach allergic patients who received Prup3-enriched-SLIT for 1 year, peach allergic untreated patients, and healthy controls who tolerated peach. Monocyte-derived dendritic cells (DCs) maturation and lymphocyte proliferation were assessed by flow cytometry from peripheral blood mononuclear cells obtained before treatment, and 1, 6 and 12 months during SLIT, and cultured with Prup3.

Results: We found statistically significant differences in DCs activation and maturation between allergic patients and controls at the basal state. When we analyzed the effect of Pru p 3-SLIT at different times, we found a significant reduction of activation and maturation markers (CCR7, CD40, CD80, CD83 and CD86) at the first month of treatment that was maintained after 1 year. Concerning lymphocytes, we observed a significant decrease of effector cells Th2, Th9, NK^dim and IgE producing plasma cells (IgE-PCs) and an increase in Th1, NK^bright and Treg cells subpopulations. These changes were only observed in the Prup3-SLIT group. These results were similar to those obtained in the specific proliferative response to Pru p 3 in lymphocyte subpopulations. Most of these changes demonstrated to be significant from the first month of treatment.

Discussion: Our results showed for the first time the immunological changes induced by Pru p 3-SLIT in peach allergic patients with severe reactions that include significant decreases of Th2/Th9/(IgE-PCs)/NK^dim and increases of Th1/NK^bright/Treg cells.

Conclusion: Patients treated with Pru p 3-SLIT showed immunological differences compared to untreated patients from a Th2 towards a Th1/Treg response. These changes could be used as biomarkers of therapy evolution during SLIT.