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## Early T cell responses to oral food challenge stratify peanut allergic donors

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Food allergies are IgE-mediated hypersensitivities where type 2 T helper cells (Th2) and IgE-producing B cells play a pivotal role in induction and maintenance. Oral food challenge (OFC) is the gold standard diagnostic test. However, the *in vivo* behaviour of allergen-specific T and B cells following OFC are so far not well understood.

Hence, we performed kinetic experiments with Peanut (PN) allergic (n=7) and non-allergic donors (n=5) after OFC over a period of 4 weeks (d0, d7, d14, d21, d28) monitoring allergen-specific CD40L+41BB+ conventional and CD40L-41BB+ regulatory T cells, Ara h 2 (a major peanut allergen)-specific B cells as well as peanut-specific antibody levels.

In all PN allergic donors, PN sIgE levels increased until d28 to variable extent. Cellular responses exhibited substantial variability that was resolved by stratifying the donors according to early T cell responses. At d7, some donors increased the number of PN-specific T cells (TcUp, n=3/7) while others decreased (TcDown, n=4/7). TcUp exhibited stronger *in vivo* activation of T (HLA-DR+, CD38+) and B cells (Ki-67+), stronger increase of PN sIgE and prominent induction of CD23 in Ara h 2+ B cells and of Helios and PD-1 in PN-specific T cells. At baseline, TcUp and TcDown clearly differed regarding Tfh, PN-specific Treg and Helios-expressing PN-specific conventional T cells as well as clinically with TcUp being overweight (BMI > 25) and exhibiting smaller wheal sizes in Skin Prick Test.

Here, we present a mid-term kinetic of adaptive responses following OFC. Our data indicate differential response towards OFC in PN allergics, depending on different baseline conditions. We hypothesize that the elevated pro-inflammatory state in overweight allergic patients leads to a more pronounced reaction towards allergen, resulting in maintenance of allergy-driving pathways.