

Inducing immune tolerance to allergens

Implications for treatment

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Extensive progress has been made in understanding of mechanisms of allergic disease with the complex interaction of effector T cells, NK-T cells, other effector cells, resident tissue cells and T_{Reg} cells. Various populations of regulatory T (Treg) cells have been shown to play a central role in the maintenance of peripheral homeostasis and the establishment of controlled immune responses. Immune tolerance in the context of allergy can be defined as persistence of efficacy following discontinuation of treatment, implying an altered allergen-specific memory T and B cell response. Various populations of T_{Reg} cells have been shown to play a central role in the maintenance of peripheral homeostasis and establishment of controlled immune responses. Their identification as key regulators of immunological processes in peripheral tolerance to allergens has opened an important era in the prevention and treatment of allergic diseases. Both naturally occurring CD4⁺ CD25⁺ T_{Reg} cells and inducible populations of allergen-specific interleukin-10 (IL-10)-secreting T regulatory type 1 (Tr1) cells inhibit allergen-specific effector cells in experimental models. Skewing of allergen-specific effector T cells to a regulatory phenotype appears as a key event in the development of healthy immune response to allergens and successful outcome in allergen-specific immunotherapy. FoxP3⁺ CD4⁺CD25⁺ T_{Reg} cells and Tr1 cells contribute to the control of allergen-specific immune responses in several major ways, which can be summarized as suppression of dendritic cells that support the generation of effector T cells; suppression of effector Th1, Th2 and Th17 cells; suppression of allergen-specific IgE, induction of IgG4; suppression of mast cells, basophils and eosinophils; interaction with resident tissue cells and remodeling, suppression of effector T cell migration to tissues. Current strategies for drug development and allergen-specific immunotherapy exploit these observations with the potential for preventive therapies and cure for allergic diseases.