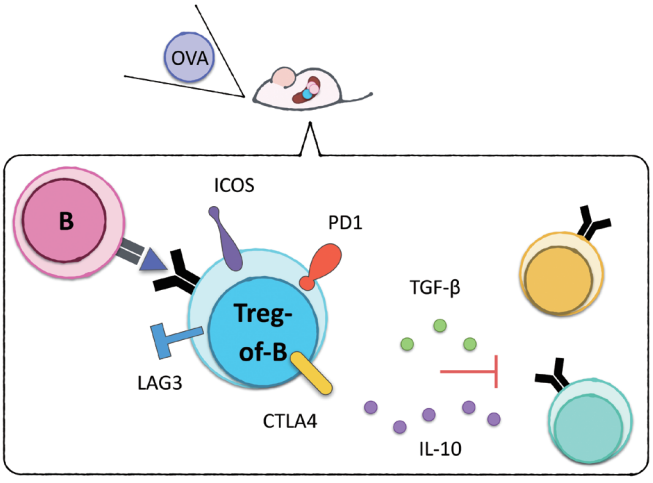
Single allergen-induced oral tolerance inhibits airway inflammation in conjugated allergen-immunized mice



The presentation of antigen derived from the oral route by B cells and the induction of Treg-of-B cells. Treg-of-B cells expressed regulatory molecules and cytokines to suppress antigen-specific and non-antigen-specific effector T cell responses.

The suppression of immune responses to proteins administered through oral routes is referred to as oral tolerance. The underlying mechanism of oral tolerance is sophisticated and has been studied for decades. Many patients develop allergic responses to house dust mites, which include more than 20 groups of allergens. The current study investigated the effect of oral tolerance induced through oral exposure to single proteins on animals with allergies to 2 or more proteins.

The mice were sensitized with conjugated proteins to mimic patients with allergies to multiple house dust mite allergens. We observed that single-protein-induced oral tolerance inhibited the immune responses to other allergens. This effect could be observed in animal models of allergic asthma and in vitro cell culture systems. These results demonstrated the existence of non-antigen-specific regulation of oral tolerance.

We further addressed the role of B-cell-induced regulatory T cells (also called Treg-of-B cells) in this model. B-cell-deficient mice showed defects in cytokine production after oral treatment, and we observed that antigen-presenting B cells modulated the proliferative responses of splenocytes to antigens ex vivo. Furthermore, we observed several similarities between oral-treated antigen-activated Treg cells and Treg-of-B cells, including marker expression, cytokine production, and suppressive function in vitro and in vivo. These data suggest that Treg-of-B cells play a role in the sophisticated mechanism of oral tolerance (Figure).

Few studies have reported the non-antigen-specific regulation of oral tolerance and the role of B-cell-induced Treg cells, and our findings provide information for the development of future therapeutic treatments for multiple allergen-induced allergic diseases.

Reference
Chien-Hui Chien, Hsin-Hui Yu & Bor-Luen Chiang. Single allergen-induced oral tolerance inhibits airway inflammation in conjugated allergen immunized mice. J Allergy Clin Immunol. 136(4): 1110-3.e4 (2015). DOI: 10.1016/j.jaci.2015.04.018.

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