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EPIT is Safe and Efficacious in Filaggrin Deficient Mice Sensitized to Peanut

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Background: Epicutaneous immunotherapy (EPIT) has proven safe and efficacious in the treatment of food allergy utilizing allergen loaded patches applied on intact skin. The integrity of the skin may be altered by key proteins of epithelial structure, such as filaggrin (FLG). The present study investigates the association between a complete FLG deficiency and peanut EPIT efficacy in a FLG knock-out mouse model.

Method: Mice fully deficient in filaggrin (FLG-/-) and wild-type (WT) mice were sensitized by 6 weekly gavages with peanut protein extract and cholera toxin. Sensitized mice received EPIT for 8 weeks using Viaskin (100 µg peanut proteins / patch; 1 patch per week) and were then submitted to a peanut enriched regimen. Data recorded included eosinophil infiltration in esophageal mucosa, humoral and cellular responses (specific IgE production and ex-vivo stimulation of splenocytes by peanut proteins) and the different steps of allergen capture and transportation by dendritic cells following peanut EPIT patch application using flow cytometry.

Results: Sensitization of mice was confirmed by a significant increase of specific Th2 biased immunological responses. In sensitized mice, whether FLG deficient or not, EPIT significantly reduced IgE levels, Th2 cytokines secretion by splenocytes and eosinophil recruitment into the esophagus, compared to Sham. The allergen applied onto the skin of FLG-/- mice did not passively permeate the epithelium. Instead, the allergen was captured by skin $CD205^{high}$DCs, which migrated to afferent lymph nodes, as previously described in WT mice.

Conclusion: The immunomodulatory effects of EPIT were unaltered in this mouse model of filaggrin deficiency, suggesting that in humans, EPIT would be efficacious and safe in the presence of FLG polymorphism or mutations.