SKIN AND INTESTINAL MICROBIOTA INFLUENCE THE EPICUTANOUS SENSITIZATION AND FOOD ALLERGY IN MOUSE MODEL

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Objectives: Atopic dermatitis (AD), one of the most common skin disorders, is very often accompanied by the subsequent development of food allergy (FA) due to epicutaneous sensitization (EC) by food allergens. Environmental factors such as skin and intestinal microbial dysbiosis contribute to its development. We aimed to assess the role of skin and intestinal microbiota in the development of the AD and FA symptoms in experimental mouse model.

Methods: Three weeks old germ-free mice were gavaged with fecal microbiota from healthy infant or infant with manifested AD symptoms. Swab of infant skin microbiota was applied on the mouse skin before and after EC sensitization on the half of the experimental mice (FS group) only. Mice were three times EC sensitized by one-week exposures to ovalbumin (OVA, 2mg/ml) applied as a patch to tape stripped skin. Then, mice were orally gavaged three times a week for 2 weeks with 50 mg OVA. Fifteen minutes after the gavage, drop in body temperature was assessed. Microbiome analysis was performed in samples of skin swabs and feces collected throughout the experiment. The specific OVA antibody response was measured in sera by ELISA or by rat basophile leukemia cell-based assay. Histopathological changes and mast cell infiltration in skin and jejunum were evaluated.

Results and Conclusion: Epicutaneous sensitization and oral challenge by OVA led in mice colonized by fecal and skin microbiota (FS group) from AD infant to higher manifestation of anaphylactic hypothermia compared to mice colonized by healthy microbiota. Similarly, they exhibited trend to increased levels of OVA-specific antibodies in sera. On the other hand, histological analysis showed the significant occurrence of mast cells and tissue structure changes in skin and jejunum of these mice. Microbiome analysis revealed distinct bacterial pattern of both colonization. The colonization of mice by fecal microbiota together with skin microbiota from pediatric AD patient have impact on skin and intestinal morphology as well as number of mast cells in mice after the EC sensitization and FA induction.

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