

Preventive effects of a combination of dietary scGOS:lcFOS and n-3 PUFA in a murine cow's milk allergy model

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Objectives and Study: Cow's milk allergy (CMA) affects 2% of children younger than 4 years and no effective prevention or treatment strategies are available. The dietary components short-chain galacto- and long-chain fructo-oligosaccharides (scGOS:lcFOS) and omega-3 poly-unsaturated fatty acids (n-3 PUFA) have immune regulatory capacities and have been demonstrated to reduce the allergic symptoms in a murine model of CMA, however, it is unknown if an additional effect occur when these dietary components are combined. The objective of this study was to evaluate the preventive effect of a combination of scGOS:lcFOS and n-3 PUFA on CMA development in a mouse model.

Method: 3-4 weeks old C3H/HeOuj female mice received a control or a supplemented diet with 1% (9:1) scGOS:lcFOS, 6% n-3 PUFA or a combination of 1% scGOS:lcFOS and 6% n-3 PUFA (n=12-15) from day -14. For 5 weeks (day 0-28) the mice were weekly sensitized to 20 mg cow's milk whey protein in PBS with 10 ug cholera toxin (CT) or CT only (control). Clinical parameters were measured after intradermal and oral challenge. After the mice were killed (day 43) mesenteric lymph nodes (MLN), spleen and lamina propria (LP) were isolated to measure the levels of Th1 and Th2 subsets. Serum was collected to determine levels of mouse mast cell protease 1 (mMCP-1) and antigen specific immunoglobulins.

Results: The scGOS:lcFOS diet or n-3 PUFA diet reduced the acute allergic skin response significantly. The combination diet showed no significant reduction of the acute allergic skin response. All the tested diets caused no significant reduction in CMA-induced mMCP-1 and immunoglobulins IgE, IgG1 and IgG2a serum levels. Th1 and Th2 subsets in spleen, MLN and LP were neither affected by CMA nor by the dietary supplementations.

Conclusion: A dietary supplementation with scGOS:lcFOS or n-3 PUFA in a preventive setting reduce the acute allergic skin response in CMA mice. No additional effect was observed when these components were combined. CMA appeared to have no influence on Th1 and Th2 subsets in spleen and gut-associated lymphoid organs.

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