



Increased Number of CCR4-positive Cells in the Duodenum of Ovalbumin-induced Food Allergy Model NC/jic Mice and Antiallergic Activity of Fructooligosaccharides

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Background: Fructooligosaccharides (FOS) in prebiotic foods can alter intestinal immune responses. The combination of probiotics with oligosaccharides has been reported to alter intestinal flora and suggested to be beneficial against food allergy in humans.

Methods: All male Nc/jic mice used in this 8-week study were 6 weeks of age and were allotted to the following three groups: (1) the non-sensitization group; (2) the ovalbumin (OVA) sensitization +5% fructose-containing control food administration group; and (3) the OVA sensitization +5% FOS-containing food administration group. Duodenal tissues were collected and then immunohistochemically stained with monoclonal antibodies to CCR4 and CCR5. The number of mast cells and the villus edema formation rate in the duodenum were determined by image analysis.

Results: The number of CCR4-positive cells increased significantly in Group 2 as compared with Group 1 and tended to decrease in Group 3 as compared with Group 2. Relatively few CCR5-positive cells were observed in the duodenum. FOS tended to reduce the number of CCR4-positive cells but significantly reduced the number of mast cells and the edema formation rate in the duodenum.

Conclusions: This study demonstrated a correlation between the number of CCR4-positive cells and villus edema formation rate. Therefore, FOS, which we inferred to show antiallergic activity for food allergy in this study and which has already been established to be safe for use as food in humans, can be considered to be potentially useful for the prevention of food allergy in pediatric patients with allergy.

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