



ABSTRACT

An insight of fiber role in allergy

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Dietary fiber is a complex dietary component, including carbohydrate polymers and oligomers, that resists digestion in the small bowel and enters the large bowel intact and fermented by the bacteria. Prebiotics are non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improving host health. Only a subset of dietary fibers qualifies as prebiotics.

The most common prebiotic substrates that have been studied for immune health benefits to date include inulin, fructooligosaccharides, galactooligosaccharides and xylooligosaccharides. Diets rich in both dietary fiber and prebiotics are associated with improved gastrointestinal, cardiovascular, and metabolic health.

Westernized countries have a higher prevalence of allergic disease, and modern western diets have been associated with differences in the gut microbiome. Studies have also shown that differences in consumption of animal fat, carbohydrates, and fiber can cause changes in gut microbiota that can have profound effects on the immune system.

Dietary fibers have both direct and indirect effects on the host immune system. They can directly support the intestinal barrier by modulating tight junction protein assembly and goblet cell function and indirectly modulate chemokine and cytokine production.

Metabolic products of microbial fermentation have been shown to have immune-enhancing effects. The most well-known are short-chain fatty acids (SCFA) which are primarily acetate, propionate, and butyrate. SCFAs are potent immunomodulators that promote IL-10 secretion by dendritic cells and lymphocytes, influence Treg numbers and effectiveness, influence bone marrow haematopoiesis, reduce effector T cell activity, improve epithelial barrier, support IgA secretion by B lymphocytes, inhibit mast cell degranulation and modulate ILC2 activation.

Fiber consumption or SCFA administration in experimental models protects against colitis, inflammatory arthritis, respiratory syncytial virus infection, allergic airway inflammation and food allergy. Consumption of fruits and vegetables

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during the first year of life is associated with increased levels of fecal butyrate and those children with the highest fecal levels of butyrate and propionate were less likely to develop allergies and asthma later in life.

Keywords: dietary fiber, SCFA, immune system, allergy
