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# Potential Beneficial Effects Of Butyrate Against Food Allergy

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## Abstract

The intestinal immune system has coevolved with gut microbiota for the maintenance of body health. An imbalance in gut microbiota composition, named dysbiosis, has been associated with various gastrointestinal and extraintestinal diseases, including food allergies. Gut microbiota is a crucial factor for food oral tolerance and it regulates an appropriate balance between immune effectors and regulatory pathways. Regulatory T cells (Tregs), that express the transcription factor Foxp3, are also critical for the induction and the maintenance of food oral tolerance and for the regulation of intestinal inflammation. Short chain fatty acids (SCFAs) such as propionate, acetate and butyrate are gut microbiota derived bacterial fermentation products that selectively expand Tregs in the large intestine. These SCFAs stimulate the expansion and immune suppressive properties of Tregs, such as the production of IL-10. Among the SCFAs, butyrate has received particular attention for its multiple beneficial effects from the intestinal tracts to the peripheral tissues. The mechanisms of action of butyrate are multiple and involve also an epigenetic regulation of gene expression through the inhibition of histone deacetylase. In particular, the inhibition of histone deacetylase 9 and 6 increases Foxp3 gene expression, as well as the production and suppressive function of Tregs. The identification of bacterial metabolites, that affect host immunity, may be an interesting strategy to prevent and/or to treat food allergy and promote human health.

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