Proceedings of the Nutrition Society (2013), **72 (OCE1)**, E12 doi:10.1017/S0029665113000141

6th International Workshop on Immunonutrition, 15th–17th October 2012, Palma de Mallorca

β2–1 fructans have a bifidogenic effect in healthy middle-aged humans and enhance the antibody response to seasonal influenza vaccination, but do not alter immune responses examined in the absence of vaccination: results from a randomised controlled trial

A. R. Lomax[1], P. S. Noakes[1], E. A. Miles[1], L. V. Y. Cheung[1], K. M. Tuohy[2] and P. C. Calder[1]
[1]*Institute of Human Nutrition and Human Development and Health Academic Unit, Faculty of Medicine, University of Southampton, IDS Building, MP887 Southampton General Hospital, Tremona Road, Southampton SO16 6YD, UK and*
[2]*Food Microbial Sciences Unit, Department of Food and Nutritional Sciences, School of Chemistry, Food Biosciences and Pharmacy, The University of Reading, Whiteknights, Reading RG6 6AP, UK*

Prebiotics selectively stimulate the growth and/or activity of gut microbes that confer health benefits to the host. β2–1 fructans are considered to be prebiotics, and current literature indicates that β2–1 fructans may modulate some aspects of immune function, improve the host's ability to respond to certain intestinal infections, and modify some inflammatory outcomes in human subjects. However, there is a need to find out more about the modulation of immune markers by β2–1 fructans in humans. In the study described here, healthy humans aged 45 to 63 years were randomly allocated to consume β2–1 fructans (Orafti® Synergy1; 8 g/day; $n = 22$) or maltodextrin (8 g/day) as placebo ($n = 21$) for eight weeks. They were vaccinated with the 2008/2009 seasonal influenza vaccine after four weeks (to provide an in vivo immune challenge). Blood and saliva samples were collected at study entry (week 0), immediately before vaccination (week 4) and two and four weeks later (weeks 6 and 8) and were used to measure various immune parameters (blood immune cell subsets, total serum immunoglobulins, salivary sIgA, neutrophil and monocyte phagocytosis of *Escherichia coli* and respiratory burst in response to *E. coli* or phorbol ester, natural killer cell activity, T cell activation and proliferation, production of six cytokines by T cells). Faecal samples were collected weeks 0 and 4. The primary outcome was the serum concentration of anti-vaccine antibodies. Faecal bifidobacteria numbers increased in the β2–1 fructan group ($P<0{\cdot}001$) and were different at 4 weeks from numbers in the placebo group ($P = 0{\cdot}001$), confirming the bifidogenic effect of Orafti® Synergy1. There was no significant effect of Orafti® Synergy1 on any of the immune parameters measured in the absence of an in vivo immune challenge (between weeks 0 to 4). However following vaccination, the β2–1 fructan group showed higher post-vaccination serum antibody titres against the HAH3_UR strain of the vaccine ($P = 0.020$) and had higher serum concentrations of vaccine-specific IgG1 ($P = 0.0019$) compared with to the placebo group. Serum antibody titres against the other two strains of the vaccine and most other immune parameters measured were not different between groups, although production of some T-cell derived cytokines was higher in the β2–1 fructan group. In conclusion, Orafti® Synergy1 has a bifidogenic effect in healthy middle-aged human subjects and although it does not alter immune responses examined in the absence of an in vivo immune challenge, it can enhance some aspects of the immune response following an in vivo immune challenge, in healthy middle-aged adults.