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Research interest

Modulating the immune system
with dietary supplements to
improve health

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Modulation of cytokine profiles in healthy and IBS subjects following supplementation with the unique probiotic strain, *Bifidobacterium infantis* 35624

Background: Clinical benefits in irritable bowel syndrome (IBS) have been observed with a unique strain of *Bifidobacterium infantis*.

Aim: To evaluate *B. infantis* 35624 effect on cytokine production by peripheral blood mononuclear cells (PBMC) in healthy (n=10) and IBS (n=13) subjects.

Methods: For 3 weeks, subjects were fed a preparation of *B. infantis* 35624 (10¹⁰ CFU/day). Venous blood was drawn before and after the feeding period, and systemic cytokines analyzed. Isolated PBMC were cultured *in vitro* for 3 days, either alone with medium or stimulant (LPS, or *Bifidobacteria*). The presence of human cytokines (IL-1- β , IL10, IL12, TNF- α , IFN- γ , TGF- β) in the supernatant was analyzed with LINCplex kit assay (Linco) in a Bioplex bead flow cytometerTM (Bio Rad). Differences in cytokine levels were analyzed using analysis of variance.

Results: Pre-feeding: no differences in cytokine levels were found in unstimulated PBMC in IBS and healthy subjects; while *in vitro* LPS stimulation of PBMC from IBS subjects produced a significantly (p < 0.1) higher level of pro-inflammatory cytokines (IL12, TNF- α) and a lower ratio of anti-inflammatory/pro-inflammatory cytokines (IL10/IL12, TGF- β /IL12) than the healthy. Post-feeding: probiotic-feeding did not significantly affect the spontaneous production level of cytokines between the study populations. However, *in vitro* LPS stimulation of PBMC from *Bifidobacteria*-fed IBS subjects produced a significantly lower level (p < 0.1) of IL12 and a higher ratio of IL10/IL12. When PBMC from IBS subjects were stimulated *in vitro* with *B. infantis* 35624, the same change pattern in the aforementioned cytokines was observed, along with changed levels in other cytokines (elevated IL10 and IL10/IFN- γ ratio, decreased IFN- γ).

Conclusions: PBMC in IBS subjects exhibit altered function that becomes apparent following LPS stimulation by: (i) producing an elevated level of pro-inflammatory cytokines (IL12, TNF- α) and (ii) a reduced ratio of anti-inflammatory/pro-inflammatory cytokines (IL10/IFN- γ and TGF- β /IL12). PBMC of the IBS skewed a bias toward greater Th1 activity in the Th1-Th2 cytokine balance. Feeding with *B. infantis* 35624 improved the function of IBS PBMC by producing: (i) a higher level of anti-inflammatory cytokine (IL10) when stimulated *in vitro* with *Bifidobacteria*; (ii) an elevated ratio of anti-inflammatory/pro-inflammatory cytokines (IL10/IL12, IL10/IFN- γ , TGF- β /IL12) when stimulated *in vitro* with LPS or *B. infantis* 35624.

