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## Thirty days of multi-strain probiotic supplementation was associated with reduced incidence of post-prandial dietary endotoxin, triglycerides, and disease risk biomarkers

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Dietary or metabolic endotoxemia is a condition that affects approximately 1/3 of individuals living in Western society. It is characterized by increased serum endotoxin concentration during the first five hours of the post-prandial period following consumption of a meal with a high-fat, high-calorie content. Long-term repeated dietary endotoxemia may increase the risk of developing a variety of chronic diseases. Of the available treatments, oral probiotic supplementation has been purported to reduce gastrointestinal permeability to endotoxin, which in theory should suppress the dietary endotoxin response. The purpose of this study was to determine if 30-d of oral probiotic supplementation could reduce post-prandial dietary endotoxemia in “responder” subjects. Apparently healthy men and women (N=75) were screened for post-prandial dietary endotoxemia. Subjects whose serum endotoxin concentration increased by at least 5-fold from pre-meal levels at 5-h post-prandial were considered “responders” and were randomized to receive either placebo (rice flour) or multi-strain probiotic supplement (*Bacillus indicus* (H36), *Bacillus subtilis* (H58), *Bacillus coagulans*, and *Bacillus licheniformis*, and *Bacillus clausii*) for 30-d. The dietary endotoxemia test was repeated after the supplementation period. Dietary endotoxin (LAL) and triglycerides (enzymatic) were measured using an automated chemistry analyzer. Serum disease risk biomarkers were measured using bead-based multiplex assays as secondary, exploratory measures. Data were statistically analyzed using repeated measures ANOVA and a  $P < 0.05$ . We found that probiotic supplementation was associated with a 42% reduction in endotoxin ( $P=0.011$ ) and 24% reduction in triglyceride ( $P=0.004$ ) in post-prandial period. Placebo subjects presented with a 36% increase in endotoxin and 5% decrease in triglycerides over the same post-prandial period. We also found that probiotic supplementation was associated with significant post-prandial reductions in IL-12p70 ( $P=0.017$ ), IL-1 ( $P=0.020$ ), and ghrelin ( $P=0.017$ ) compared to placebo subjects. The key findings of the present study, were that oral probiotic supplementation reduced responses that were consistent with “leaky gut syndrome” and transient reductions in chronic/metabolic disease risk.

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