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Association of Diet Quality Measured by Three A Priori-Defined Dietary Patterns With Gut Microbiota and Intestinal Permeability Among Obese Individuals

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Objectives: The human gastrointestinal tract (GI) may play a critical role in the prevention of obesity and metabolic diseases. Considering the importance of a healthy diet for optimal health, this study examined associations of diet quality assessed by three a priori-defined dietary patterns (Healthy Eating Index 2010 [HEI-2010], Mediterranean Eating Pattern for Americans [MEPA], and Dietary Approaches to Stop Hypertension [DASH]) with gut microbiota, short-chain fatty acids (SCFA) and intestinal permeability markers in adult obese participants.

Methods: Analyses utilized baseline data from 103 obese subjects (43.8 ± 11.3 years, body mass index ≥ 30 kg/m², 72.8% females, 64.1% blacks) who participated in a probiotic/prebiotic supplement trial. Diet was assessed using a validated food frequency questionnaire. Associations of diet quality with outcome measures were assessed

using partial correlation coefficient adjusting for relevant covariates. General linear models (GLM) were applied to compare covariate-adjusted means of outcomes for tertiles of respective dietary patterns scores.

Results: Scores of HEI-2010 ($r = 0.25$, $P = 0.02$), MEPA ($r = 0.24$, $P = 0.03$) and DASH ($r = 0.28$, $PP = 0.008$) were positively associated with *Blautia* abundance. HEI-2010 score was positively associated with butyrate and propionate to total SCFA ratio ($r = 0.24$, $P = 0.048$). Intestinal permeability marker, urinary 24-hr sucralose levels were inversely associated with HEI-2010 ($r = -0.30$, $P = 0.009$) and MEPA ($r = -0.26$, $P = 0.02$) score. The results were similar when GLM models were performed. No significant associations were observed between scores of dietary patterns and measures of microbial diversity.

Conclusions: *Blautia* abundance and inversely associated with intestinal permeability markers such as urinary 24-h sucralose levels suggesting diet quality may have positive impact on the human GI community.

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