

Effects of a fermented-food versus a high-fiber diet on gut microbiota diversity and inflammatory markers in healthy adults: an exploratory dietary intervention study

Writing sample. Abstract prepared by Ana Bodenlle from the original article; not reviewed by the study authors.

BACKGROUND: Low gut microbiota diversity and chronic low-grade inflammation are common in industrialized populations. This study examined whether diets targeting the microbiota could modulate immune status in healthy adults.

METHODS: In this prospective, open-label study at Stanford University, healthy adults with low habitual intake of fiber and fermented foods were assigned to a high-fiber or a high-fermented-food diet. The 17-week protocol included a 3-week baseline, a 4-week ramp-up, a 6-week maintenance phase, and a 4-week follow-up during which participants ate freely. Intake targets were at least 20 g/day of additional fiber or 6 servings/day of fermented foods (e.g., yogurt, kefir, kimchi, kombucha). Stool and blood samples were analyzed using 16S rRNA sequencing, metagenomics, serum proteomics, and mass cytometry. The primary outcome was the change in cytokine response score from baseline to the end of the intervention.

RESULTS: Of 39 participants assigned, 36 (18 per arm) were analyzed. Mean (SD) fiber intake increased from 21.5 (8.0) to 45.1 (10.7) g/day, and fermented-food intake from 0.4 (0.6) to 6.3 (2.9) servings/day. The primary outcome did not change significantly in either arm. In the fermented-food arm, microbiota diversity increased steadily and remained elevated during follow-up; most newly detected taxa were not found in the fermented foods consumed. Levels of 19 circulating inflammatory proteins, including interleukin 6, decreased, and basal signaling decreased in 14 of 60 cell type-specific readouts across four major immune cell types. In the fiber arm, diversity was unchanged, but 11 microbial carbohydrate-active enzymes increased in abundance, and immune responses followed three distinct profiles associated with baseline diversity. Participants reported a transient increase in bloating with fermented foods and softer stools with fiber.

CONCLUSIONS: In healthy adults, a fermented-food diet increased microbiota diversity and reduced inflammatory markers, whereas a high-fiber diet mainly altered microbiome function. The study was small and open-label, with no control arm; these exploratory findings need confirmation in larger trials.

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