Your food is your best medicine. Nowhere else is this more real than for those suffering from inflammatory bowel disease (IBD). Thus, we developed the IBD-Anti-Inflammatory Diet (IBD-AID™) to relieve IBD symptoms while providing nutrient adequacy. The IBD-AID™ was designed to increase the diversity of bacteria that produce short-chain fatty acids (SCFAs) to modulate the local immune response. After 4 weeks on the IBD-AID™, patients have reported a reduction of symptoms and medication.

Our goal is to define diet-microbiome-inflammation interactions that promote health while consuming the IBD-AID™. We posit that IBD-AID™ favors SCFA-producing bacteria resulting in dampening of inflammation and assisting patient’s remission. We recruited 19 patients with mild to severe CD or UC, to determine diet-dependent changes in the microbiota that could support the hypothesis. The study was designed as a single-arm prospective pre-post intervention trial. After a baseline period of 4 weeks, the dietary Intervention phase started and continued for 8–10 weeks (Fig 1).

We performed metagenomic sequencing of 400+ fecal samples and analyzed 1000-food frequency questionnaires. Most (88.2%) patients achieved >50% diet compliance. The IBD-AID™ significantly promoted microbiota signatures that have been associated with colonic health. We found that increased intakes of probiotics foods during intervention correlated with the abundance of SCFAs-producing members of the Bacteroidetes and Parabacteroides. Similarly, increase intakes of probiotics foods during intervention correlated with the abundance of Clostridium bovine, a bacterium known to play a critical role in the induction of regulatory T cells. We found that vegetable and nuts intake—encouraged in IBD-AID™, correlated with the abundance of butyrate-producing Roseburia hominis, Eubacterium rectale, and Faecalibacterium prausnitzii. The increased abundance of those SCFAs-producing bacteria after the intervention was accompanied by declines in putative pathogenic strains, such as Escherichia sp., Alitipes sp., and Eggerthella sp. The majority (63.1%) of patients treated for at least 8 weeks, who achieved as minimum as 50% dietary compliance reported a dramatic decrease in disease severity.

To examine the role of those diet-dependent microbiome signatures in inflammation, we use P-glycoprotein (P-gp) expression as a biomarker. P-gp is an ABC transporter in epithelial cells implicated in the development and persistence of chronic intestinal inflammation in IBD. We found that fecal supernatants from IBD patients adopting the IBD-AID™ induced P-gp expression. Altogether, these results uncover a novel molecular mechanism of the diet-microbiome-immune interaction allowing us to customize dietary guidelines to emphasize foods with known effect on microbiome signatures associated with health.

Fig 1. Schematic representation of the study design and sampling schedule.

### P078

**DONOR SELECTION INFLUENCES THERAPEUTIC EFFECTS OF FECAL MICROBIOTA TRANSPLANTATION FOR ULCERATIVE COLITIS**

Keichi Haga, Dai Ishikawa, Koki Okahara, Kei Nomura, Shoko Itó, Masahito Takahashi, Tomoyoshi Shibuya, Akihito Nagahara

Background: We have recently reported the efficacy of combination of triple-antibiotic therapy and fecal microbiota transplantation (A-FMT) for patients with ulcerative colitis (UC). It has been reported that FMT with frozen donor faeces (frozen-FMT) is as effective as fresh-FMT for Clostridium difficile infection. However, it is still unclear which donor and condition is suitable for FMT on UC. The aim of this study was to examine the effectiveness of frozen-FMT compared to fresh-FMT, and verify effective conditions. Moreover, we explore the concept of best donor for A-FMT success.

Methods: This prospective and randomized controlled study was conducted from July 2014 to March 2017 at Juntendo University Hospital. Eligible patients were ≥20 years of age, with a diagnosis of active UC which were required a Lichtiger’s clinical activity index (CAI) of 5 or more, and an endoscopic Mayo score of 1 or more. Patients were randomly allocated fresh or frozen faeces from 2 healthy donors. Triple-antibiotic therapy (Amoxicillin, Fosfomycin, Metronidazole; AFM) was administered to patients with UC for 2 weeks, and up to 2 days before FMT. Clinical outcomes were assessed at week 8 and 1 year after treatment. Clinical response was defined as a decrease of CAI of ≥3 points or more, and remission was defined as ≥6 points or less. Maintenance of efficacy was defined as no exacerbation of CAI and no intensification of treatments.

Results: 29 patients completed protocol (fresh-FMT; n = 15, frozen-FMT; n = 14). At 8 weeks, 86.7% (13/15) of fresh-FMT patients reported a dramatic decrease in disease severity compared to 57.1% (8/14) of frozen-FMT patients (p = 0.02). On the other hand, in cases which age difference between donor and patient was more than 16 years, higher therapeutic effect was observed in cases treated with fresh-FMT. Conclusion: This study showed that A-FMT with fresh faeces is as effective as cases treated with frozen faeces. In conclusion, we found that donor selection influences treatment effects, and age difference between patient and donor might be an important factor for A-FMT success.

### P074

**HUMAN-DERIVED CLOSTRIDIUM VE202 STRAINS REDUCE ENTEROBACTERIACEAE AND FUSOBACTERIA AND REVERSE EXPERIMENTAL COLITIS INDUCED BY HUMAN GUT MICROBIOTA**

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Background: We have previously reported the efficacy of combination of triple-antibiotic therapy and fecal microbiota transplantation (A-FMT) for patients with ulcerative colitis (UC). It has been reported that FMT with frozen donor faeces (frozen-FMT) is as effective as fresh-FMT for Clostridium difficile infection. However, it is still unclear which donor and condition is suitable for FMT on UC. The aim of this study was to examine the effectiveness of frozen-FMT compared to fresh-FMT, and verify effective conditions. Moreover, we explore the concept of best donor for A-FMT success.

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### Keywords

- Inflammatory bowel disease
- Bifidobacterium
- Xyloglucan

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