INFLAMMATORY BOWEL DISEASE-ANTI-INFLAMMATORY DIET (IBD-AID™):

AN ANALYSIS ON THE FEASIBILITY OF DIETARY ADOPTION BY IBD PATIENTS AND EFFECTS ON THE GUT MICROBIOME

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INTRODUCTION

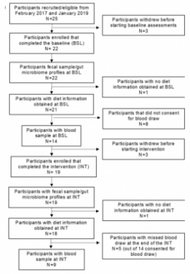
'*What to eat'?* Is the most common question patients with inflammatory bowel disease (IBD) ask their physician, often met with uninformed answers. Much research is needed to provide evidence-based dietary guidelines that can aid with IBD remission. The IBD-Anti-Inflammatory Diet (IBD-AID™) was created to help patients manage symptoms and remission via diet-dependent changes of the microbiome.

AIM

We conducted in two trials with the IBD-AID to address two primary outcomes: 1) the impact of the IBD-AID on the gut microbiome, and 2) the feasibility of adopting long-term dietary changes amongst IBD patients.

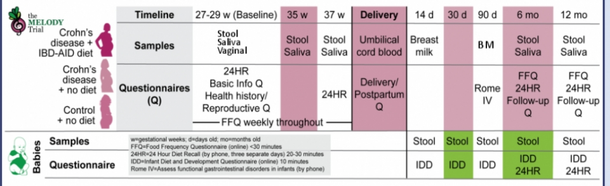
METHODS

A pilot study (completed 2019) was a single arm, pre-post intervention trial was conducted. A total of 340 stool samples were analyzed (143 and 197, at BSL and INT; respectively) and 553 dietary records (223 and 330; at BSL and INT; respectively).



Study design	Baseline (BSL) Weeks 1- 6	Intervention (INT) Weeks 7-14
Dietary information (24-hour IBD-AID Food Query)	Up to 3 times per week	Up to 3 times per week
Shotgun microbiome analyses (stool sampling)	Up to 2 times per week	Up to 2 times per week
Cytokine profiling (Blood sampling)	Once at week 1	Once at week 14

An ongoing MELODY trial comprises a 3-arm study with pregnant IBD patients following the IBD-AID (arm 1, N=28), or no diet (arm 2, N=47), and healthy pregnant individuals with no dietary intervention as controls (arm 3, N=108). Our results comprise analyses of 979 food records: 199 from participants in arm 1, 209 from arm 2, and 571 from arm 3.



	Timeline	27-29 w (Baseline)	35 w	37 w	Delivery	14 d	30 d	90 d	6 mo	12 mo
the MELODY Trial	Samples	Stool Saliva Vaginal	Stool Saliva	Stool Saliva	Umbilical cord blood	Breast milk		BM	Stool Saliva	Stool Saliva
Crohn's disease + IBD-AID diet	Questionnaires (Q)	24HR Basic Info Q Health history/ Reproductive Q		24HR	Delivery/ Postpartum Q			Rome IV	FFQ 24HR Follow-up Q	FFQ 24HR Follow-up Q
Crohn's disease + no diet		FFQ weekly throughout								
Control + no diet										
Babies	Samples					Stool	Stool	Stool	Stool	Stool
	Questionnaire					IDD	IDD	IDD	IDD 24HR	IDD 24HR

w=gestational weeks; d=days old; mo=months old
FFQ=Food Frequency Questionnaire (online) <30 minutes
24HR=24 Hour Diet Recall (by phone, three separate days) 20-30 minutes
IDD=Infant Diet and Development Questionnaire (online) 10 minutes
Rome IV=Assess functional gastrointestinal disorders in infants (by phone)

RESULTS

- In the pilot study, we demonstrated that adoption of the IBD-AID reverted dysbiosis by favoring the abundance of short chain fatty acids producing bacteria, mainly *Clostridia* and *Bacteroides* species. These bacterial species are commonly depleted in IBD patients and are linked to flares. (**Fig. 1**)
- Moreover, we demonstrate that increased dietary abundance of prebiotics, probiotics, and beneficial fatty acids (i.e.; whole oats, plain yogurt and nuts, respectively) are associated with this microbiome shift. (**Fig. 2**)
- For the ongoing MELODY Trial we found that patients can adopt the IBD-AID dietary pattern that is found to be associated with the microbiome changes in our pilot study, specifically prebiotics, probiotics, beneficial nutrients, and adverse foods. (Kruskal Wallis test; P=0.0001). (**Fig. 3**)
- Participants in the MELODY trial can sustain dietary changes 3-months post-intervention. (**Fig. 4**)

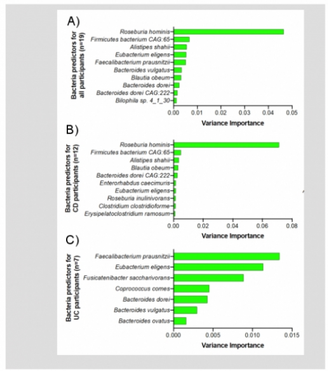


Figure 1. Mixed effect random forest classification analysis identified microbes affected by the IBD-AID intervention. Bar plots show the variance of the importance of bacterial species found to be enriched during the intervention in all (A), participants with Crohn's disease (B), or participants with Ulcerative Colitis (C) subjects completing the intervention (BH p-value > 0.05).

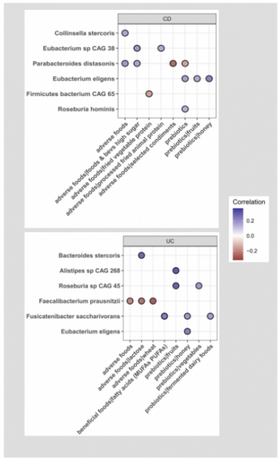


Figure 2. Significant correlations of foods with bacterial species enriched at baseline (red) or intervention (blue) in A) CD participants and B) UC participants

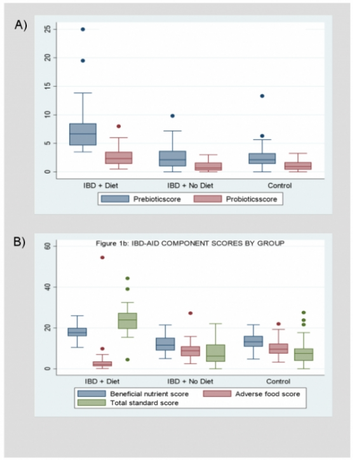


Figure 3. IBD-AID food component scores, by group, at follow-up: Prebiotics, probiotics, dietary quality, adverse foods. MELODY Trial.

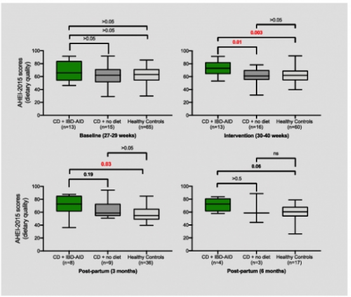


Figure 4. Significant higher dietary quality associated with IBD-AID adoption is achieved by participants during the dietary intervention and up to three months after intervention has stopped.

CONCLUSIONS

- The pilot study and the ongoing MELODY Trial have demonstrated the feasibility of IBD-AID adoption by non-pregnant adults and pregnant IBD patients.
- Our results demonstrated that specific foods can directly favor the increase of butyrate-producing species deficient in IBD patients and linked to gut health.
- The IBD-AID reverts dysbiosis independently of IBD-subtype (Crohn's disease or ulcerative colitis)

REFERENCES

Olendzki Barbara, Bucci Vanni, Cawley Caitlin, Maserati Rene, McManus Margaret, Olendzki Effie, Madziar Camilla, Chiang David, Ward Doyle V, Pellish Randall, Foley Christine, Bhattarai Shakti, McCormick Beth A, Maldonado-Contreras Ana. Dietary manipulation of the gut microbiome in inflammatory bowel disease patients: A pilot study. Gut Microbes 14(1): 2046244 (2022). PMCID: PMC8942410

Peter Inga, Maldonado-Contreras A, *et al.* "A Dietary Intervention to Improve the Microbiome Composition of Pregnant Women with Crohn's Disease and their Offspring: the MELODY (Modulating Early Life Microbiome through Dietary Intervention in Pregnancy) Trial Design". Contemporary Clinical Trials Communications, 18: 100573 (2020). PMID: 32617430

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