B0263: A Pilot Study for Precision Nutrition in Irritable Bowel Syndrome: In-Vitro Stimulation of Pro-and Anti-inflammatory Cytokine Release

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Introduction

- Inflammation plays a role in the pathogenesis of irritable bowel syndrome (IBS).
- Foods can trigger and exacerbate IBS flare-ups and symptoms where individuals can react differently to the same food.
- Diet could induce immune activation by releasing cytokines and identifying an increase of pro-inflammatory or decreased anti-inflammatory cytokines after food exposure appeared clinically valuable.
- A comprehensive assay capable of measurement individual inflammatory responses to foods that could lead to therapeutic improvements are unmet needs for IBS.
- Additionally, the lack of evidence regarding which diet is ideal for IBS underlined the need for personalized and more precise dietary treatment options.

Objective

- To determine in-vitro the degree of blood inflammatory cytokines release in response to food antigens exposure in subjects with IBS.

Methods and Materials

- Blood samples were collected at Oxford Biomedical Technologies, Inc. from 12 subjects diagnosed with IBS.
- Whole blood was diluted with buffered physiologic saline, and then an aliquot was pipetted into eight reaction wells, each containing a single food extract. Following a predetermined incubation period at 37°C, plasma was extracted and stored at -20°C until cytokine analysis were performed.
- Cytokines [interleukin-8 (IL) and IL-10] reactivity to food antigens challenge was evaluated using Bio-Plex 200 System (Bio-Rad, CA).
- The IBS-Severity Scoring System (IBS-SSS) was used to measure the severity and intensity of symptoms. The questionnaire scores range from 0 to 500, with cutoffs rated as mild (75-175), moderate (175-300), and severe (> 300).
- The study received approval from an independent Institutional Review Board (IRB), and all statistical analyses were performed using SPSS version 27.0 (IBM Corp., NY).

Table 1. Characteristics of the participants (N=12)

Variables	M±SD
Age (years)	52.2±17.5
Gender (Female)	10(83%)
BMI (kg/m²)	26.2±5.7
IBS-SSS Scores	
Moderate (175-300)	8 (67%)
Severe (> 300)	4 (33%)

Table 2. Pro-inflammatory cytokine (IL-8)

IL-8 (pg/mL)					
Antigen	Pre-Incubation	Post-Incubation	Mean Difference ±SE	95 CI LB–UB	P-Value
Broccoli	0.52±0.09	2.69±0.72	2.17±0.75	0.50-3.82	0.016
Corn	0.52±0.09	1.77±0.45	1.25±0.44	0.26-2.24	0.018
Milk	0.50±0.09	1.90±0.52	1.40±0.48	0.30-2.48	0.017
Egg	0.52±0.91	1.69±0.50	1.17±0.48	0.10-2.23	0.034
Navy bean	0.52±0.09	1.35±0.30	0.83±0.30	0.16-1.49	0.019
Orange	0.52±0.09	2.71±1.06	2.19±1.04	0.14-4.52	0.063
Tomato	0.52±0.09	3.29±1.13	2.77±1.15	0.19-5.35	0.038
Wheat	0.52±0.09	1.42±0.36	0.90±0.36	0.09-1.71	0.033

Table 3. Anti-inflammatory cytokine (IL-10)

IL-10 (pg/mL)					
Antigen	Pre-Incubation	Post-Incubation	Mean Difference ±SE	95 CI LB–UB	P-Value
Broccoli	0.54±0.15	0.48±0.16	-0.05±0.09	-0.16-0.26	0.587
Corn	0.49±0.14	0.28±0.08	-0.21±0.09	0.01-0.42	0.041
Milk	0.54±0.15	0.35±0.11	-0.19±0.10	-0.04-0.42	0.097
Egg	0.55±0.15	0.40±0.15	-0.15±0.11	-0.11-0.42	0.231
Navy bean	0.51±0.14	0.37±0.11	-0.14±0.01	0.05-0.22	0.004
Orange	0.55±0.15	0.41±0.13	-0.14±0.07	-0.03-0.32	0.106
Tomato	0.55±0.15	0.29±0.10	-0.26±0.13	-0.03-0.56	0.073
Wheat	0.54±0.15	0.26±0.07	-0.27±0.08	0.08-0.47	0.011

Discussion

- Currently, the process of determining individual responses to foods in patients with IBS is based on trial and error through a series of oral food challenges.
- The findings from this study generate much-needed data to aid the understanding of non-physiological inflammatory responses to foods that can optimize targeted dietary therapy for IBS.

Conclusion

- Advance groundbreaking research on biomarkers could influence the impact of IBS management.
- Further work is needed to develop an assay that could be used to create a precise and personalized diet for clinical practice.