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Multianalyte Association Between Intestinal Alkaline Phosphatase and Pediatric Inflammatory Bowel Disease

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Introduction

Inflammatory bowel disease (IBD) is a generalized inflammatory gastrointestinal (GI) disease that includes Ulcerative Colitis (UC) and Crohn's disease (CD). Consideration of diagnostic choices outside of endoscopy are urgent, and especially so for the pediatric population. A growing number of diagnosed IBD cases with rates up to 25% of all IBD occurrences are pediatric cases. Current available fecal markers have yet to satisfy desired characteristics. For example, thus far, they can achieve moderate specificity but low sensitivity, but they cannot reliably stratify patients into a quiescent, mild, moderately active, or severe disease states.

Intestinal alkaline phosphatase (iAP), an enzyme shed in the gut to maintain microbial homeostasis, has been shown to be a promising fecal marker for diagnosing gastrointestinal bowel disease in preterm infants. This study evaluated iAP as a marker for disease staging in treatment-naïve pediatric IBD patients, who were free from complications for 90 days after their diagnosis.

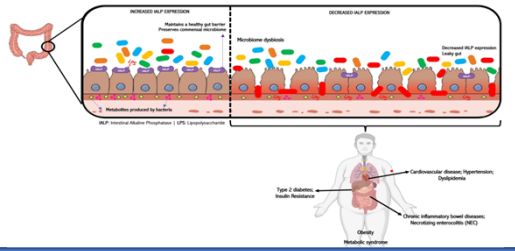
Methods

We performed biochemical analysis on stool samples from 199 enrollees in the national pediatric RISK stratification study, the largest, new-onset prospective study involving 28 clinics in the US and Canada, and from 16 non-IBD patients enrolled at Children's Hospital. Mean and standard deviation of total protein content, iAP abundance, and iAP enzyme activity was determined.

Results

Overall, samples from patients with UC had significantly reduced iAP activity. There was an overall significant increase in the abundance of iAP in these patients and the amount correlated directly with more severe disease. In CD patients, iAP activity was reduced and a modest increase in iAP abundance was observed.

		Mild IBD	Moderate IBD	Severe IBD
AP Activity	Mean	1,070.6	588.6	743.8
	Median	534.7	371.4	477.7
	SD	1,533.4	655.2	909.7
iAP Activity	Mean	797.6	418.2	545.6
	Median	267.9	240.3	386.5
	SD	1,183.8	476.2	704.4
Protein Content	Mean	1.3	1.6	1.6
	Median	1.3	1.0	1.3
	SD	0.6	2.2	1.1



Discussion

Increased abundance of iAP in pediatric stool samples was highly correlative with severe UC. Reduced enzymatic activity in these patients suggest that iAP is dysfunctional and cannot maintain gut homoeostasis and subsequently leads to severe disease.

From this study, we conclude that aberrant human-microbiota crosstalk is correlated with severity of UC and suggests an iAP biomarker may be a promising method to monitor IBD and disease severity.

References

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