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LIST OF ARTICLES

1. Tropical Enteropathies. ([Abstract & UW comment] [Full article])
   - Review of the history, terminology, and etiology of tropical enteropathy, also known as environmental enteropathy.

2. Detrimental Impact of Microbiota-Accessible Carbohydrate-Deprived Diet on Gut and Immune Homeostasis: An Overview ([Abstract & UW comment] [Full article])
   - Review of the deleterious impact of diets lacking microbiota-accessible carbohydrates on gut microbiota, gut epithelium, and immune cells.

3. The path towards microbiome-based metabolite treatment. ([Abstract & UW comment] [Full article])
   - Review of several microbiome therapies including probiotic and faecal microbiome transplantation, and discusses the current state of evidence around metabolite treatment.

4. A methodologic framework for modeling and assessing biomarkers of environmental enteropathy as predictors of growth in infants: an example from a Peruvian birth cohort. ([Abstract & UW comment] [Full article])
   - Cohort study of the association between three biomarkers and length-for-age z scores in Peruvian infants.

5. Organs-on-chips with integrated electrodes for trans-epithelial electrical resistance (TEER) measurements of human epithelial barrier function. ([Abstract & UW comment] [Full article])
   - Novel microfluidic organ chip for range of epithelial cells, including intestinal cells, to measure barrier function.

6. New insights into environmental enteric dysfunction. ([Abstract & UW comment] [Full article])
   - Brief review of EED morphology, biological pathways, and proposed interventions.

7. Gastrointestinal inflammation by gut microbiota disturbance induces memory impairment in mice. ([Abstract & UW comment] [Full article])
   - Mouse-model experiment linking overexpression of lipopolysaccharides to inflammation and memory impairment.

8. Improving the detection of environmental enteric dysfunction: a lactulose, rhamnose assay of intestinal permeability in children aged under 5 years exposed to poor sanitation and hygiene. ([Abstract & UW comment] [Full article])
   - Cohort study of intestinal permeability using a two-saccharide assay in three small cohorts from Zambia, Peru, and the United States.

9. Parasitic protozoa and interactions with the host intestinal microbiota. ([Abstract & UW comment] [Full article])
   - Review of recent research related to the intestinal microbiota and infectious protozoa.

10. Early Antibiotic Exposure in Low-Resource Settings is Associated with Increased Weight in The First Two Years of Life. ([Abstract & UW comment] [Full article])
    - A MAL-ED birth cohort study of the effects of antibiotic exposure on child health in early life.
DETAILS OF ARTICLES

1. **Tropical Enteropathies.**
   Louis-Auguste J, Kelly P.

   **ABSTRACT**
   
   **Purpose of Review:** The term 'tropical enteropathy' originated in observations in the 1960s that small intestinal morphology and function differed in the tropics from the norms found in temperate climates. It was subsequently shown that this enteropathy is more closely related to environmental conditions than latitude, and it was re-labelled 'environmental enteropathy'. It is now recognised that environmental enteropathy (also now called environmental enteric dysfunction) has implications for the health and linear growth of children in low- and middle-income countries, and it may underlie poor responses to oral vaccination in these countries. The purpose of this review is to define and clarify this enteropathy despite the confusing terminology it has attracted and to contrast it with other enteropathic states.

   **Recent Findings:** Recent work has begun to demonstrate the nature of the mucosal lesion and the relationship with microbial translocation which is currently thought to link a failure of mucosal barrier function and the cascade of systemic inflammation which inhibits growth. The evidence is still correlative rather than definitive, but derives some additional support from animal models. There are some common features between environmental enteropathy and other enteropathies, but there are important differences also. The mechanism of the link between enteropathy and vaccine failure is not understood, and neither is it clear how the more severe form of enteropathy, which we refer to as malnutrition enteropathy, is driven by nutrient depletion and intestinal infection. Tropical enteropathies form a group of disorders which include environmental and nutritional enteropathies. The long-term health implications of these disorders for health in low-income countries are just being explored, but the scale of their effects is very large, with millions of people affected.

   **WEB:** [https://link.springer.com/article/10.1007%2Fs11894-017-0570-0](https://link.springer.com/article/10.1007%2Fs11894-017-0570-0)
   **IMPACT FACTOR:** 1.0
   **CITED HALF-LIFE:** n/a

   **UW EDITORIAL COMMENT:** Table 1 gives a clear cross-comparison of eight small bowel enteropathies by identifying whether each disorder is associated with 11 different characteristics, such as systematic inflammation, malabsorption, diarrhea, and weight loss. This article summarizes the current literature published on environmental enteropathy, highlights key distinctions between various forms of enteropathy, and provides a history of the development of the terminology and knowledge of this group of disorders.

   2. **Detrimental Impact of Microbiota-Accessible Carbohydrate-Deprived Diet on Gut and Immune Homeostasis: An Overview**
      Daïen CI, Pinget GV, Tan JK, Macia L.

   **ABSTRACT**
   
   Dietary fibers are non-digestible polysaccharides functionally known as microbiota-accessible carbohydrates (MACs), present in inadequate amounts in the Western diet. MACs are a main source of energy for gut bacteria so the abundance and variety of MACs can modulate gut microbial composition and function. This, in turn, impacts host immunity and health. In preclinical studies, MAC-deprived diet
and disruption of gut homeostasis aggravate the development of inflammatory diseases, such as allergies, infections, and autoimmune diseases. The present review provides a synopsis on the impact of a low-MAC diet on gut homeostasis or, more specifically, on gut microbiota, gut epithelium, and immune cells.

IMPACT FACTOR: 3.35
CITED HALF-LIFE: n/a

UW EDITORIAL COMMENT: The authors focus their discussion on the impact of a diet lacking microbiota-accessible carbohydrates (MACs), rather than focusing on the benefits of supplementation of MACs, as much of the research has done in this area. By concentrating their review on the negative impacts of low quantities of MACs on gut microbiota, gut epithelium, immune cells, and disease development, the authors are able to highlight the deleterious effect of a MAC-deprive diet which may aid in engendering a shift in the standard Western diet that typically lacks MACs.

Suez J, Elinav E.

ABSTRACT
The increasing evidence pointing towards the involvement of the gut microbiome in multiple diseases, as well as its plasticity, renders it a desirable potential therapeutic target. Nevertheless, classical therapies based on the consumption of live probiotic bacteria, or their enrichment by prebiotics, exhibit limited efficacy. Recently, a novel therapeutic approach has been suggested based on metabolites secreted, modulated or degraded by the microbiome. As many of the host-microorganism interactions pertaining to human health are mediated by metabolites, this approach may be able to provide therapeutic efficacy while overcoming caveats of current microbiome-targeting therapies, such as colonization resistance and inter-individual variation in microbial composition. In this Perspective, we will discuss the evidence that supports pursuing the metabolite-based therapeutic approach as well as issues critical for its implementation. In a broader context, we will discuss how recent advances in microbiome research may improve and refine current treatment modalities, and the potential of combining them with metabolite-based interventions as a means of achieving a person-specific, integrated and efficient therapy.

WEB: 10.1038/nmicrobiol.2017.75
IMPACT FACTOR: 26.8
CITED HALF-LIFE: n/a

UW EDITORIAL COMMENT: Authors discuss the potential benefits of microbiome-based metabolite therapies and ways in which this approach can overcome the challenges faced by other therapies, such as faecal microbiome transplantation (FMT), probiotic and prebiotic therapy. With an emphasis on the importance of tailoring microbiome therapy to the individual, authors suggest an integrated approach to microbiome therapy that combines metabolites, FMT, probiotics, and prebiotics. Figure 1 gives a visual that compares the current approach versus the suggested integrated approach.
4. **A methodologic framework for modeling and assessing biomarkers of environmental enteropathy as predictors of growth in infants: an example from a Peruvian birth cohort.**

Colston JM, Peñatari Peñatari P, Colantuoni E, Moulton LH, Ambikapathi R, Lee G, Rengifo Trigoso D, Siguas Salas M, Kosek MN.


**ABSTRACT**

**BACKGROUND:** Environmental enteropathy (EE) impairs the gut's absorptive capacity and immune function and causes decelerations in statural growth that manifest gradually over time.

**OBJECTIVE:** To illustrate an approach for assessing emerging biomarkers of EE, we separately assessed the associations between 3 such markers and subsequent nutritional status.

**DESIGN:** Stool samples were routinely collected between January 2010 and November 2014 from a cohort of 303 Peruvian infants and analyzed for concentrations of the biomarkers α-1-antitrypsin (AAT), myeloperoxidase, and neopterin. For each marker, a mixed-effects linear regression model was fitted for length-for-age z scores (LAZs) obtained from anthropometric assessments that incorporated covariate predictors, polynomial terms for age, and product interaction terms to test associations over varying lag lengths. The biomarkers' contribution to the models was assessed with the use of the likelihood ratio test and partial R² statistics.

**RESULTS:** Test statistics for the combined inclusion of the 4-model terms that involved the biomarker were highly statistically significant for AAT (28.71; P < 0.0001) and myeloperoxidase (62.79; P < 0.0001) over a 3-mo lag and moderately so for neopterin (13.97; P = 0.0074). AAT and myeloperoxidase seemed to interact strongly with age, with the magnitude and direction of the effect varying considerably over the first 3 y of life. The largest proportion of the variance explained by any biomarker (2.8%) and the largest difference in LAZ predicted between the 5th and 95th percentile (0.25) was by myeloperoxidase over a 2-mo lag.

**CONCLUSIONS:** Of the 3 fecal biomarkers studied, 2 that related to intestinal function-AAT and myeloperoxidase-were associated with small but highly statistically significant differences in future statural growth trajectories in infants in this cohort, lending further evidence to the EE hypothesis that increased gut permeability and inflammation adversely affects subsequent nutritional status. This association exhibited a complex interaction with age. This trial was registered at clinicaltrials.gov as NCT02441426.

**WEB:** 10.3945/ajcn.116.151886
**IMPACT FACTOR:** 4.56
**CITED HALF-LIFE:** 9.60

**UW EDITORIAL COMMENT:** Appropriate adjustments were made for calendar time, seasonality, sex, birth weight, maternal height, stool consistency (concentration of analytes), and infant feeding. The interaction between age and biomarker was also accounted for in the model, as the authors hypothesized that baseline inflammation rates may change as children age. To ensure adequate temporality for the association of biomarkers to predict LAZ, LAZ measures were correlated with biomarker levels from three months prior. This three-month lag time is clinically appropriate to allow for the effects of a nutritional intervention.

5. **Organs-on-chips with integrated electrodes for trans-epithelial electrical resistance (TEER) measurements of human epithelial barrier function.**

Olivier Y. F. Henry, Remi Villeneuve, Michael J. Cronce, William D. Leineweber, Maximilian A. Benza and Donald E. Ingber.
ABSTRACT
Trans-epithelial electrical resistance (TEER) is broadly used as an experimental readout and a quality control assay for measuring the integrity of epithelial monolayers cultured under static conditions in vitro, however, there is no standard methodology for its application to microfluidic organ-on-a-chip (organ chip) cultures. Here, we describe a new microfluidic organ chip design that contains embedded electrodes, and we demonstrate its utility for assessing formation and disruption of barrier function both within a human lung airway chip lined by a fully differentiated mucociliary human airway epithelium and in a human gut chip lined by intestinal epithelial cells. These chips with integrated electrodes enable real-time, non-invasive monitoring of TEER and can be applied to measure barrier function in virtually any type of cultured cell.

WEB: 0.1039/c7lc00155j
IMPACT FACTOR: 4.07
CITED HALF-LIFE: 4.0

UW EDITORIAL COMMENT: The authors tested their TEER chip design using human intestinal epithelium and found some instability at lower frequencies but confirmed the design is effective for other types of epithelium. Figure 5C provides evidence that the measured TEER values are associated with the presence of tight junctions (decrease in percent impedance over treatment time, compared to the control cell chips).

6. New insights into environmental enteric dysfunction.
Trehan I, Kelly P, Shaikh N, Manary MJ.

ABSTRACT
Environmental enteric dysfunction (EED) has been recognised as an important contributing factor to physical and cognitive stunting, poor response to oral vaccines, limited resilience to acute infections and ultimately global childhood mortality. The aetiology of EED remains poorly defined but the epidemiology suggests a multifactorial combination of prenatal and early-life undernutrition and repeated infectious and/or toxic environmental insults due to unsanitary and unhygienic environments. Previous attempts at medical interventions to ameliorate EED have been unsatisfying. However, a new generation of imaging and 'omics' technologies hold promise for developing a new understanding of the pathophysiology of EED. A series of trials designed to decrease EED and stunting are taking novel approaches, including improvements in sanitation, hygiene and nutritional interventions. Although many challenges remain in defeating EED, the global child health community must redouble their efforts to reduce EED in order to make substantive improvements in morbidity and mortality worldwide.

WEB: 10.1136/archdischild-2015-309534
IMPACT FACTOR: 0.19
CITED HALF-LIFE: n/a

UW EDITORIAL COMMENT: Figure 1 provides a list of pathways, transcripts, and host responses activated in EED. The review recaps EED morphology, transcriptome and metabolomic profiles, and the need for a standardized case definition and biomarkers for EED in order to more precisely assess the effectiveness of a variety of interventions.
7. **Gastrointestinal inflammation by gut microbiota disturbance induces memory impairment in mice.**
   Jang SE, Lim SM, Jeong JJ, Jang HM, Lee HJ, Han MJ, Kim DH.

**ABSTRACT**
In this study, we tested our hypothesis regarding mechanistic cross-talk between gastrointestinal inflammation and memory loss in a mouse model. Intrarectal injection of the colitis inducer 2,4,6-trinitrobenzenesulfonic acid (TNBS) in mice caused colitis via activation of nuclear factor (NF)-κB and increase in membrane permeability. TNBS treatment increased fecal and blood levels of lipopolysaccharide (LPS) and the number of Enterobacteriaceae, particularly Escherichia coli (EC), in the gut microbiota composition, but significantly reduced the number of Lactobacillus johnsonii (LJ). Indeed, we observed that the mice treated with TNBS displayed impaired memory, as assessed using the Y-maze and passive avoidance tasks. Furthermore, treatment with EC, which was isolated from the feces of mice with TNBS-induced colitis, caused memory impairment and colitis, and increased the absorption of orally administered LPS into the blood. Treatment with TNBS or EC induced NF-κB activation and tumor necrosis factor-α expression in the hippocampus of mice, as well as suppressed brain-derived neurotrophic factor expression. However, treatment with LJ restored the disturbed gut microbiota composition, lowered gut microbiota, and blood LPS levels, and attenuated both TNBS- and EC-induced memory impairment and colitis. These results suggest that the gut microbiota disturbance by extrinsic stresses can cause gastrointestinal inflammation, resulting in memory impairment.

**WEB:** [10.1038/mi.2017.49](https://doi.org/10.1038/mi.2017.49)
**IMPACT FACTOR:** 5.53
**CITED HALF-LIFE:** 3.10

**UW EDITORIAL COMMENT:**
The findings in this study add to growing evidence of the gut-brain axis to explain the interactions between enteric microbiota and the central nervous system. Figure 5 provides a comparison of microbiota composition in mice exposed to a colitis-inducer and *L. johnsonii* (a beneficial bacteria).

8. **Improving the detection of environmental enteric dysfunction: a lactulose, rhamnose assay of intestinal permeability in children aged under 5 years exposed to poor sanitation and hygiene.**

**ABSTRACT**
**BACKGROUND:** Environmental enteric dysfunction (EED) is an asymptomatic intestinal disorder affecting populations living in conditions of poor sanitation and hygiene. The study tested intestinal barrier function in infants with EED.

**METHODS:** We prospectively studied an advanced high-performance liquid chromatography mass spectrometry assay of urine collected after oral intake of the monosaccharide, L-rhamnose and the disaccharide, lactulose, in 112 children from three continents.

**FINDINGS:** Compared to the US cohort (n=27), the cohorts of children from Peru (n=19) and Zambia (n=85) were older with evidence of growth impairment. The median (range) of age (months) was 8.0 (2.0 to 13.0), 27.0 (15.0 to 29.0) and 21.0 (12.0 to 36.0), respectively. The median (range) of height for
age Z score was -0.1 (-1.8 to 2.4), -1.8 (-3.3 to -0.2) and -2.3 (-8.5 to 1.2), respectively. Among children with valid sugar data (n=22 USA, n=19 Peru, n=73 Zambia), there were no significant differences in the median rhamnose urine concentrations between the three groups. The median (range) lactulose concentration (µg/mL) was 6.78 (0.29 to 31.90), 47.60 (4.23 to 379.00) and 75.40 (0.67 to 873.00) in the US, Peruvian and Zambian cohorts, respectively (p<0.001). The lactulose/rhamnose ratio (LRR) was higher in cohorts from Peru (0.75, 0.15, 5.02) and Zambia (2.26, 0.08, 14.48) compared to the US (0.14, 0.06, 1.00) cohort (p<0.001). In a multivariate effect modification model, higher weight-for-age z scores were associated with lower post-dose lactulose when rhamnose excretion was constant (p=0.003).

CONCLUSIONS: This non-invasive two saccharide permeability protocol measures changes in intestinal permeability in children with EED and permits the identification of individuals for interventional trials.

WEB: 10.1136/bmjgh-2016-000066
IMPACT FACTOR: 1.43
CITED HALF-LIFE: 2.60

UW EDITORIAL COMMENT: There are significant demographic differences among the study cohort groups (Table 1), namely differences in age and sex, which weakens the interpretation of differences in absorption as an indicator of differential intestinal permeability. Based on the demographic differences, differences in permeability might be expected regardless of EED condition. Furthermore, the variation observed between the two saccharides measured suggests that both need to be evaluated in order to have sufficient sensitivity for the detection of EED.


ABSTRACT
Parasitic protozoan infections represent a major health burden in the developing world and contribute significantly to morbidity and mortality. These infections are often associated with considerable variability in clinical presentation. An emerging body of work suggests that the intestinal microbiota may help to explain some of these differences in disease expression. The objective of this minireview is to synthesize recent progress in this rapidly advancing field. Studies in humans, animal models and in vitro concerning the contribution of the intestinal microbiota to infectious disease will be discussed. We hope to provide an understanding of the human-protozoal pathogen-microbiome interaction and to speculate on how that might be leveraged for treatment.

WEB: 10.1128/IAI.00101-17
IMPACT FACTOR: 2.66
CITED HALF-LIFE: n/a

UW EDITORIAL COMMENT: This review suggests a role for mucosal parasites in microbiota interactions and recaps recent findings in murine models of host microbiome interactions and parasite infections. The authors also note that the gut microbiota can be difficult to study using metagenomics, since many microbiota are multiple morphologically identical but genetically distinct.

10. Early antibiotic exposure in low-resource settings is associated with increased weight in the first two years of life.

ABSTRACT

OBJECTIVES: The potential growth-promoting effects of antibiotics are not well understood among undernourished children in environments with high pathogen exposure. We aimed to assess whether early antibiotic exposure duration and class were associated with growth to two years of age across 8 low-resource sites in the MAL-ED birth cohort study.

METHODS: We followed 1,954 children twice per week from birth to two years to record maternally-reported antibiotic exposures and measure anthropometry monthly. We estimated the associations between antibiotic exposure before 6 months of age and weight-for-age (WAZ) and length-for-age (LAZ) z-scores to two years. We assessed the impact of class-specific exposures and duration, and compared these results to effects of antibiotic exposures after 6 months of age.

RESULTS: Antibiotic use before 6 months of age was associated with increased weight from 6 months to 2 years, while associations with length were less consistent across sites and antibiotic classes. Compared to unexposed children, two or more courses of metronidazole, macrolides, and cephalosporins were associated with adjusted increases in WAZ of 0.24 (95% confidence interval (CI): 0.04, 0.43), 0.23 (95% CI: 0.05, 0.42), and 0.19 (95% CI: 0.04, 0.35) from 6 months to 2 years, respectively.

CONCLUSIONS: Antibiotic use in low-resource settings was most associated with the ponderal growth of children who had multiple exposures to antibiotics with broad spectrum and anaerobic activity in early infancy. Opportunities for rational and targeted antibiotic therapy in low resource settings may also promote short-term weight gain in children, though longer-term physical growth and metabolic impacts are unknown.

WEB: 10.1097/MPG.0000000000001640
IMPACT FACTOR: 1.48
CITED HALF-LIFE: 7.00

UW EDITORIAL COMMENT: The authors found important differences in outcomes depending on which antibiotics were used. For example, just one dose of metronidazole was associated with improved weight gain, while two or more doses of macrolides and cephalosporins were needed before the association was significant. Only fluoroquinolones were associated with increases in size at age two, suggesting that the effect of early life antibiotics is limited to short-term changes in microbiota and improved growth outcomes.

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ADDITIONAL ARTICLES OF INTEREST
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Targeting of microbe-derived metabolites to improve human health: The next frontier for drug discovery
Mechanisms Linking the Gut Microbiome and Glucose Metabolism
Intestinal Epithelial Sirtuin 1 Regulates Intestinal Inflammation during Aging in Mice by Altering the Intestinal Microbiota.

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ARTICLE ARCHIVE (JAN 2016-PRESENT)

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EED Biology & Review Articles

Age and Sex Normalization of Intestinal Permeability Measures for the Improved Assessment of Enteropathy in Infancy and Early Childhood: Results from the MAL-ED Study.

Infant Nutritional Status and Markers of Environmental Enteric Dysfunction are Associated with Midchildhood Anthropometry and Blood Pressure in Tanzania.

Biomarkers to Stratify Risk Groups among Children with Malnutrition in Resource-Limited Settings and to Monitor Response to Intervention

Association between Enteropathogens and Malnutrition in Children Aged 6-23 mo in Bangladesh: a Case-Control Study.

Causal Pathways from Enteropathogens to Environmental Enteropathy: Findings from the MAL-ED Birth Cohort Study.

Biomarkers of Environmental Enteric Dysfunction: The good, the bad and the ugly.

Application of penalized linear regression methods to the selection of environmental enteropathy biomarkers.

Environmental enteropathy is associated with cardiometabolic risk factors in Peruvian children.

Biomarkers of Environmental Enteric Dysfunction Among Children in Rural Bangladesh.

Environmental Enteric Dysfunction is Associated with Carnitine Deficiency and Altered Fatty Acid Oxidation.

Determinant Variables, Enteric Pathogen Burden, Gut Function, and Immune-Related Inflammatory Biomarkers Associated with Childhood Malnutrition: A Prospective Case-Control Study in Northeastern Brazil.

The Association Between Fecal Biomarkers of Environmental Enteropathy and Rotavirus Vaccine Response in Nicaraguan Infants.

Systemic inflammation, growth factors, and linear growth in the setting of infection and malnutrition

Environmental Enteric Dysfunction and the Fecal Microbiota in Malawian Children

Environmental Enteric Dysfunction and Growth Failure/Stunting in Global Child Health

Biomarkers of Environmental Enteropathy, Inflammation, Stunting, and Impaired Growth in Children in Northeast Brazil.

Environmental enteropathy.

Environmental Enteropathy: Elusive but Significant Subclinical Abnormalities in Developing Countries.
Endomicroscopic and Transcriptomic Analysis of Impaired Barrier Function and Malabsorption in Environmental Enteric Dysfunction in Children.

Environmental Enteric Dysfunction Includes a Broad Spectrum of Inflammatory Responses and Epithelial Repair Processes.

The Impact of Environmental Enteropathy and Systemic Inflammation on Infant Growth Failure

Small Intestine Bacterial Overgrowth and Environmental Enteropathy in Bangladeshi Children.

Decoding Hidden Messages: Can Fecal Host Transcriptomics Open Pathways to Understanding Environmental Enteropathy?

Plasma Tryptophan and the Kynurenine–Tryptophan Ratio are Associated with the Acquisition of Statural Growth Deficits and Oral Vaccine Underperformance in Populations with Environmental Enteropathy

Malnutrition Is Associated with Protection from Rotavirus Diarrhea: Evidence from a Longitudinal Birth Cohort Study in Bangladesh

Nutrition/metabolism

Chronic consequences on human health induced by microbial pathogens: Growth faltering among children in developing countries.

The effects of micronutrient deficiencies on bacterial species from the human gut microbiota.

Gut microbiota interactions with the immunomodulatory role of vitamin D in normal individuals.

The association of serum choline with linear growth failure in young children from rural Malawi.

Starved Guts: Morphologic and Functional Intestinal Changes in Malnutrition.

Which dietary components modulate longitudinal growth?

Influence of diet on the gut microbiome and implications for human health.

Nopal feeding reduces adiposity, intestinal inflammation and shifts the cecal microbiota and metabolism in high-fat fed rats

Western diets, gut dysbiosis, and metabolic diseases: Are they linked?

Nutrition, infection and stunting: the roles of deficiencies of individual nutrients and foods, and of inflammation, as determinants of reduced linear growth of children

Microbiome, Growth Retardation, and Metabolism: Are they related?
Linking Dietary Patterns with Gut Microbial Composition and Function.

Impacts of resistant starch and wheat bran consumption on enteric inflammation in relation to colonic bacterial community structures and short-chain fatty acid concentrations in mice.

Diet-Microbiota Interactions Mediate Global Epigenetic Programming in Multiple Host Tissues

Systemic inflammation, growth factors, and linear growth in the setting of infection and malnutrition.

Environmental Enteric Dysfunction is Associated with Altered Bile Acid Metabolism

Metabolic alterations in children with environmental enteric dysfunction.

Genetic and Metabolic Signals during Acute Enteric Bacterial Infection Alter the Microbiota and Drive Progression to Chronic Inflammatory Disease

Interactions between intestinal pathogens, enteropathy and malnutrition in developing countries.

Child Stunting is Associated with Low Circulating Essential Amino Acids.

Diet–microbiota interactions as moderators of human metabolism

Protein malnutrition impairs intestinal epithelial turnover: a potential mechanism of increased cryptosporidiosis in a murine model

A Comparison of Diarrheal Severity Scores in the MAL-ED Multisite Community-Based Cohort Study.

Metabolomic Changes in Serum of Children with Different Clinical Diagnoses of Malnutrition.

Mortality in children with complicated severe acute malnutrition is related to intestinal and systemic inflammation: an observational cohort study.

Steroid Administration and Growth Impairment in Children with Crohn’s Disease.

Effects of a gut pathobiont in a gnotobiotic mouse model of childhood undernutrition

A Dietary Fiber-Deprived Gut Microbiota Degrades the Colonic Mucus Barrier and Enhances Pathogen Susceptibility

Microbiome Therapies

Next-generation probiotics: the spectrum from probiotics to live biotherapeutics

Severity of pancreatitis-associated intestinal mucosal barrier injury is reduced following treatment with the NADPH oxidase inhibitor apocynin.
Targeting the gut microbiota with inulin-type fructans: preclinical demonstration of a novel approach in the management of endothelial dysfunction.

Interleukin-23 Increases Intestinal Epithelial Cell Permeability In Vitro

Pili-like proteins of Akkermansia muciniphila modulate host immune responses and gut barrier function.

The anti-inflammatory drug mesalamine targets bacterial polyphosphate accumulation.

Akkermansia muciniphila improves metabolic profiles by reducing inflammation in chow diet-fed mice.

Longitudinal change of selected human milk oligosaccharides and association to infants' growth, an observatory, single center, longitudinal cohort study.

Abrupt suspension of probiotics administration may increase host pathogen susceptibility by inducing gut dysbiosis.

Toward a Personalized Approach in Prebiotics Research

Dietary Fiber and Prebiotics and the Gastrointestinal Microbiota.

A microbial protein that alleviates metabolic syndrome.

Can probiotics modulate human disease by impacting intestinal barrier function?

Human Milk Oligosaccharides Influence Neonatal Mucosal and Systemic Immunity.

Oral Microbiota in Infants Fed a Formula Supplemented with Bovine Milk Fat Globule Membranes - A Randomized Controlled Trial.

Dietary Prebiotics and Bioactive Milk Fractions Improve NREM Sleep, Enhance REM Sleep Rebound and Attenuate the Stress-Induced Decrease in Diurnal Temperature and Gut Microbial Alpha Diversity.

Impact of prebiotics on metabolic and behavioral alterations in a mouse model of metabolic syndrome.

Starter formula enriched in prebiotics and probiotics ensures normal growth of infants and promotes gut health: a randomized clinical trial.

Diet-induced extinctions in the gut microbiota compound over generations.

Microbiome: Eating for trillions

An important chapter in the infection-malnutrition story.

Lactobacillus plantarum strain maintains growth of infant mice during chronic undernutrition.

Gut bacteria that prevent growth impairments transmitted by microbiota from malnourished children.
Sialylated Milk Oligosaccharides Promote Microbiota-Dependent Growth in Models of Infant Undernutrition

Effects of bovine colostrum on recurrent respiratory tract infections and diarrhea in children.

Sialylated galacto-oligosaccharides and 2'-fucosyllactose reduce necrotising enterocolitis in neonatal rats

Rebooting the microbiome.

Fecal microbiota transplantation: in perspective.

Fecal Microbiota-based Therapeutics for Recurrent Clostridium difficile Infection, Ulcerative Colitis and Obesity

Microbial therapeutic interventions.

High-affinity monoclonal IgA regulates gut microbiota and prevents colitis in mice

Stable Engraftment of Bifidobacterium longum AH1206 in the Human Gut Depends on Individualized Features of the Resident Microbiome

Protein- and zinc-deficient diets modulate the murine microbiome and metabolic phenotype

Fecal Microbiota-based Therapeutics for Recurrent Clostridium difficile Infection, Ulcerative Colitis and Obesity

Overcoming the limited availability of human milk oligosaccharides: challenges and opportunities for research and application

Efficacy of Probiotics Versus Placebo in the Prevention of Necrotizing Enterocolitis in Preterm Very Low Birth Weight Infants: A Double-Blind Randomized Controlled Trial

Eosinophils, probiotics, and the microbiome.

A Combined Intervention of Zinc, Multiple Micronutrients, and Albendazole Does Not Ameliorate Environmental Enteric Dysfunction or Stunting in Rural Malawian Children in a Double-Blind Randomized Controlled Trial

Gut Health Diagnostics & Research

Engineering bacterial thiosulfate and tetrathionate sensors for detecting gut inflammation.

Engineered Regulatory Systems Modulate Gene Expression of Human Commensals in the Gut

MicrobiomeAnalyst: a web-based tool for comprehensive statistical, visual and meta-analysis of microbiome data.
Honeybee gut microbiota promotes host weight gain via bacterial metabolism and hormonal signaling.

Leading microbiome-based therapeutic falters in Phase II trial

Faecal microbiota transplantation—A clinical view.

Optimization of metabolomics of defined in vitro gut microbial ecosystems

Community dynamics drive punctuated engraftment of the fecal microbiome following transplantation using freeze-dried, encapsulated fecal microbiota.

Challenges of metabolomics in human gut microbiota research

The Role of the Immune System in Metabolic Health and Disease

Optimization of metabolomics of defined in vitro gut microbial ecosystems.

An Intestinal Organ Culture System Uncovers a Role for the Nervous System in Microbe-Immune Crosstalks.

Droplet digital PCR quantifies host inflammatory transcripts in feces reliably and reproducibly.

Gut-Brain Cross-Talk in Metabolic Control

Dynamics of the human microbiome in inflammatory bowel disease

The human gut microbiome as source of innovation for health: Which physiological and therapeutic outcomes could we expect?

Tryptophan: A gut microbiota-derived metabolites regulating inflammation

Dynamics and Trends in Fecal Biomarkers of Gut Function in Children from 1-24 Months in the MAL-ED Study.

Fecal Markers of Environmental Enteropathy and Subsequent Growth in Bangladeshi Children.

Etiology of Diarrhea, Nutritional Outcomes and Novel Intestinal Biomarkers in Tanzanian Infants: A Preliminary Study.

Co-culture of Living Microbiome with Microengineered Human Intestinal Villi in a Gut-on-a-Chip Microfluidic Device.

MiniBioReactor Arrays (MBRAs) as a Tool for Studying C. difficile Physiology in the Presence of a Complex Community.

Reverse Engineering Human Pathophysiology with Organs-on-Chips.

Human Microbiota-Associated Mice: A Model with Challenges
Contributions of microbiome and mechanical deformation to intestinal bacterial overgrowth and inflammation in a human gut-on-a-chip.

Optimization of Quantitative PCR Methods for Enteropathogen Detection

Use of quantitative molecular diagnostic methods to identify causes of diarrhoea in children: a reanalysis of the GEMS case-control study

Diagnostics: Filling in the missing pieces

Natural history of the infant gut microbiome and impact of antibiotic treatment on bacterial strain diversity and stability

Gut check

Population-level analysis of gut microbiome variation

Childhood undernutrition, the gut microbiota, and microbiota-directed therapeutics

Environmental Enteric Dysfunction is Associated with Poor Linear Growth and Can be Identified by Host Fecal mRNAs

Commendation for Exposing Key Advantage of Organ Chip Approach

Biomarkers of Environmental Enteropathy are Positively Associated with Immune Responses to an Oral Cholera Vaccine in Bangladeshi Children

Shifts in Lachnospira and Clostridium sp. in the 3-month stool microbiome are associated with preschool age asthma

Other Gut Infections/Health

Chemical and pathogen-induced inflammation disrupt the murine intestinal microbiome.

Transient activation of mucosal effector immune responses by resident intestinal bacteria in normal hosts is regulated by interleukin-10 signalling.

Zinc Transporter SLC39A7/ZIP7 Promotes Intestinal Epithelial Self-Renewal by Resolving ER Stress.

Regulation of intestinal permeability: the role of proteases.

Foxp3 Reprograms T Cell Metabolism to Function in Low-Glucose, High-Lactate Environments

Bap180/Baf180 is required to maintain homeostasis of intestinal innate immune response in Drosophila and mice
Age-Associated Microbial Dysbiosis Promotes Intestinal Permeability, Systemic Inflammation, and Macrophage Dysfunction

Mice with infectious colitis exhibit linear growth failure and subsequent catch-up growth related to systemic inflammation and IGF-1.

Molecular insight into Evolution of Symbiosis between Breast-Fed Infants and a Member of the Human Gut Microbiome Bifidobacterium longum

An insider’s perspective: Bacteroides as a window into the microbiome

Antibiotics, Pediatric Dysbiosis, and Disease

Linking Gut Microbiota and Inflammation to Obesity and Insulin Resistance.

Host cell attachment elicits posttranscriptional regulation in infecting enteropathogenic bacteria.

Microbial Respiration and Formate Oxidation as Metabolic Signatures of Inflammation-Associated Dysbiosis.

A prominent glycyl radical enzyme in human gut microbiomes metabolizes trans-4-hydroxy-L-proline.

The Bactericidal Lectin RegIIIβ Prolongs Gut Colonization and Enteropathy in the Streptomycin Mouse Model for Salmonella Diarrhea.

Mining the Human Gut Microbiota for Immunomodulatory Organisms.

Feedback control of AHR signalling regulates intestinal immunity

Reinforcement of intestinal epithelial barrier by arabinoxylans in overweight and obese subjects: A randomized controlled trial: Arabinans in gut barrier.

Changes in Intestinal Motility and Gut Microbiota Composition in a Rat Stress Model

Enteric Pathogens and Their Toxin-Induced Disruption of the Intestinal Barrier through Alteration of Tight Junctions in Chickens.

Intestinal commensal bacteria mediate lunch mucosal immunity and promote resistance of newborn mice to infection.

Statoviruses, A novel taxon of RNA viruses present in the gastrointestinal tracts of diverse mammals.

Campylobacter jejuni and associated immune mechanisms: short-term effects and long-term implications for infants in low-income countries.

The Role of Fibronectin in the Adherence and Inflammatory Response Induced by Enteroaggregative Escherichia coli on Epithelial Cells.
Early-life enteric infections: relation between chronic systemic inflammation and poor cognition in children.

GEMS extend understanding of childhood diarrhoea

Infectious disease: something in the water

Genomic diversity of EPEC associated with clinical presentations of differing severity. Gene-microbiota interactions contribute to the pathogenesis of inflammatory bowel disease

Taking it Personally: Personalized Utilization of the Human Microbiome in Health and Disease

Enrichment of the lung microbiome with gut bacteria in sepsis and the acute respiratory distress syndrome

Giardia: a pathogen or commensal for children in high-prevalence settings?

Tuft Cells: New Players in Colitis.

PGE2 is a direct and robust mediator of anion/fluid secretion by human intestinal epithelial cells

Dysbiosis is not an answer

Epidemiology and Impact of Campylobacter Infection in Children in 8 Low-Resource Settings: Results From the MAL-ED Study

The microbiota and immune response during Clostridium difficile infection

Enterocyte Purge and Rapid Recovery Is a Resilience Reaction of the Gut Epithelium to Pore-Forming Toxin Attack

Microbiome & Infection

The Gut Microbiome: Connecting Spatial Organization to Function

Intestinal, extra-intestinal and systemic sequelae of Toxoplasma gondii induced acute ileitis in mice harboring a human gut microbiota.

The shape of the microbiome in early life

Dysbiosis and the immune system.

Dysbiosis in intestinal inflammation: Cause or consequence

Discovery of Reactive Microbiota-Derived Metabolites that Inhibit Host Proteases

A purified membrane protein from Akkermansia muciniphila or the pasteurized bacterium improves metabolism in obese and diabetic mice
Microbiome-Modulated metabolites at the Interface of Host Immunity

Gastrointestinal Inflammation and Repair: Role of Microbiome, Infection, and Nutrition

Formation of propionate and butyrate by the human colonic microbiota.

Xenobiotic Receptor-Mediated Regulation of Intestinal Barrier Function and Innate Immunity.

Identifying species of symbiont bacteria from the human gut that, alone, can induce intestinal Th17 cells in mice

Microbiota Diurnal Rhythmicity Programs Host Transcriptome Oscillations

Persistent microbiome alterations modulate the rate of post-dieting weight regain

Gut Microbiota Regulate Motor Deficits and Neuroinflammation in a Model of Parkinson’s Disease

Influence of early life exposure, host genetics and diet on the mouse gut microbiome and metabolome

Impact of the gut microbiota on enhancer accessibility in gut intraepithelial lymphocytes.

Universality of human microbial dynamics

Reparative inflammation takes charge of tissue regeneration

Intrinsic Defense Mechanisms of the Intestinal Epithelium

Lipocalin 2 Protects from Inflammation and Tumorigenesis Associated with Gut Microbiota Alterations

Gut Microbial Metabolites Fuel Host Antibody Responses

IFN-γ Hinders Recovery from Mucosal Inflammation during Antibiotic Therapy for Salmonella Gut Infection

Limited diversity sparks inflammation at the mucosal border

Rhythm and bugs: circadian clocks, gut microbiota, and enteric infections.

I’ll have a turkey and cheese sandwich

A microbial perspective of human developmental biology

The microbiome and innate immunity

The microbiota in adaptive immune homeostasis and disease
Interactions between the microbiota and pathogenic bacteria in the gut

Microbiome-wide association studies link dynamic microbial consortia to disease

Host-microbe interaction: Rules of the game for microbiota

The Host Shapes the Gut Microbiota via Fecal MicroRNA

Another Reason to Thank Mom: Gestational Effects of Microbiota Metabolites

Preterm infant gut microbiota affects intestinal epithelial development in a humanized microbiome gnotobiotic mouse model.

Development of the gut microbiota and mucosal IgA responses in twins and gnotobiotic mice

Host Selection of Microbiota via Differential Adhesion

Tummy Time: The Infant Microbiota–IgA Connection

Antibiotics, birth mode, and diet shape microbiome maturation during early life

Integrated multi-omics of the human gut microbiome in a case study of familial type 1 diabetes

Host-Protozoan Interactions Protect from Mucosal Infections through Activation of the Inflammasome

Adaptive immune response in symptomatic and asymptomatic enteric protozoal infection: evidence for a determining role of parasite genetic heterogeneity in host immunity to human giardiasis

The Liver at the Nexus of Host-Microbial Interactions

Modeling human enteric dysbiosis and rotavirus immunity in gnotobiotic pigs.

Linking the Human Gut Microbiome to Inflammatory Cytokine Production Capacity

Culture of previously uncultured members of the human gut microbiota by culturomics