The Human Microbiome: A New Vista on Childhood Biology

APS State of the Art Plenary
Sunday, May 4 / 3:30pm–5:30pm
Vancouver Convention Centre ~ East 8

The human microbiome, comprised of the multitudes of microbes that reside in and on our bodies, has captivated the attention of medical scientists worldwide in the past decade. Classic medical thinking held that these microbial communities were biologically inert, injured their hosts only when an anatomic breach occurred, and had no beneficial effect on the people who harbor these organisms. However, a multitude of data, derived from elegant experimental models and intensive and extensive analyses of human cohorts, strongly suggests that this biomass is a major determinant of human health and disease. The human microbiome is of particular interest to child health researchers: children are born sterile (or nearly so), and a rapid in-migration of bacteria soon ensues, these microbes are in considerable flux until several years of age, by which time life-long communities might be established. Many human phenotypes, including predisposition to disease or degree of disease expression, are associated with our microbial populations, and many of these disorders have their onset in childhood. For all of these reasons, it is critical that pediatricians understand this biomass, and lead the research in this field.

We could have devoted our entire meeting of the Pediatric Academic Societies to the human microbiome, because of the excitement this field is generating, and the broad influences our microbiota exert over many different organ systems. Life-long immunity, allergy, inflammatory bowel diseases, sepsis, necrotizing enterocolitis, depression, anxiety, obesity, metabolic syndrome, infection resistance, atopy, eczema, and kwashiorkor are a few of the disorders in which the microbiome appears to play a central precipitating, exacerbating, and mitigating roles. These findings are not only fascinating, they are especially exciting, because microbial populations are theoretically amenable to manipulation, which could be used to treat otherwise very frustrating human diseases. One needs only to consider successful fecal microbiota transplants in recurrent Clostridium difficile infections in adults to begin to grasp the potential therapeutic power of microbial populations.

We are particularly pleased to have assembled three of the world’s leaders in microbiome science to talk a State of the Art Plenary Session (session 2815 at 3:30 PM on Sunday, May 4), entitled The Human Microbiome: A New Vista on Childhood Biology, chaired by Drs. Joesph Neu and Phillip Tarr. These speakers are Dr. Martin Blaser (New York University School of Medicine), who will present his exceptionally provocative data on the role of antibiotics in childhood populations in his talk, “Our Microbial Populations: Proceed with Caution.” Dr. Blaser is a pioneer in the field of microbial population effects, and the unintended negative consequences of antibiotics on child growth. He will be followed by Dr. Alessio Fasano (Massachusetts General Hospital for Children and Harvard Medical School), whose presentation “Et tu, Celiac? The Role of Microbes in Gluten Sensitive Enteropathy” will include data that the gut microbiota can alter the expression of disease phenotype among individuals genetically susceptible to celiac disease. His findings might explain why the majority of genetically susceptible hosts do not get celiac disease, and why there is a spectrum of severity among those we diagnose with celiac disease, and might also offer insights into disease modulation beyond gluten avoidance. Dr. Brett Finlay (University of British Columbia) will share his fascinating work on specific infection susceptibility to bacterial enteric pathogens, based on the ambient microbial bacterial population, in the final address “The Host Microbiome, and Infection Resistance and Susceptibility.” Pediatricians have long recognized that all individuals exposed to the same pathogen do not become ill, and among those who do, there a broad range of disease severity. The pre-existing microbiota could clearly influence such divergent outcomes, and after we determine these drivers, we will be able to develop novel preventive and therapeutic strategies.

We are very early in our appreciation of the power of the human microbiome. In our careers, it is quite likely we will apply this burgeoning knowledge to patients with diseases where current therapy is suboptimal. We are pleased to bring this science to the PAS, and look forward to many more years and many more presentations on this fascinating new area of human biology.
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Time: 3:30pm - 5:30pm
Location: Vancouver Convention Centre - East 8

Description: The human microbiome has emerged in the past decade as a major area of inquiry in human biology. A variety of technologic advances and biologic discoveries show that this biomass is a major determinant of growth, development, well-being and disease. Microbial populations are a vibrant driver of a variety of host processes, and their role in pediatrics, as in all of clinical medicine, had been overlooked until the past decade. These organisms are critical determinants of host pathophysiology. Several examples of the role of this biomass in human disease include growth and development, celiac disease, severe acute malnutrition, necrotizing enterocolitis, sepsis, infection resistance, and inflammatory bowel disease. Moreover, lifelong structure of these populations might be ordained in childhood. There are few areas of human biology that will be untouched by the emerging understanding of the power of microbial populations.

Objectives:
- Convey an appreciation for the biologic power of the microbial consortia in and on the human host
- Offer provocative examples of high impact childhood diseases where the human microbiome plays critical roles
- Propose interventions to harness this biomass for the benefit of children and populations

Co-chairs: Josef Neu, University of Florida, Gainesville, FL
Phillip Tarr, Washington University School of Medicine, St. Louis, MO

3:30pm – 3:40pm The Childhood Microbiome: Our Newly Recognized Partners in Health Disease
Phillip Tarr, Washington University School of Medicine, St. Louis, MO

3:40pm – 4:15pm Our Microbial Populations: Proceed with Caution
Martin Blaser, NYU School of Medicine, New York, NY

4:15pm – 4:50pm Et tu Celiac? The Role of Microbes in Gluten Sensitive Enteropathy
Alessio Fasano, Center for Celiac Research, Yawkey Ctr for Outpatient Care, Boston, MA

4:50pm – 5:15pm The Host Microbiome, and Infection Resistance and Susceptibility
B. Brett Finlay, The University of British Columbia, Vancouver, BC

5:15pm – 5:30pm Discussion