



ABSTRACT

Intrinsic and Extrinsic factors influencing the gut microbiome

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The gut microbiome comprises a complex and dynamic consortium of microorganisms, including bacteria, archaea, viruses, and fungi, that inhabit the gastrointestinal tract and contributes to host physiology. It has been implicated in multiple diseases. To understand its role in health and disease we need to have insight in the complexity of the gut microbiome and understand the factors that influence its composition and functionality.

In this presentation, the focus will be on the intrinsic and extrinsic factors that shape gut microbial composition and function, and how these determinants influence interindividual variability and disease susceptibility. Data derived from the Lifelines Dutch Microbiome Project will be used to illustrate the different topics and provide population-based insights.

Host-intrinsic factors will be presented, including genetic background where the interaction between host genotype and microbial ecology will be discussed. Extrinsic influences will be addressed as major drivers of microbial diversity and community structure. The effect on the gut microbiome of dietary patterns will be discussed as well as the impact of pharmacological agents, most notably antibiotics, but also proton pump inhibitors, metformin, and other commonly prescribed drugs. Furthermore the concept of a “healthy microbiome” will be addressed.

The association between the gut microbiome and human health and disease will be summarized, including links to metabolic diseases, immune-mediated conditions such as inflammatory bowel disease, and malignancies. Finally, the role of the gut microbiome as a biomarker in clinical practice will be outlined, with particular emphasis on inflammatory bowel disease and cancer treatment using immune checkpoint inhibition. Collectively, this session will provide an overview of the determinants shaping the gut microbiome and their relevance for disease risk, therapeutic response, and future clinical applications.