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Mining the gut microbiota for next-generation probiotic candidates in metabolic diseases and beyond

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Conference Room Orio Zanetto, Alfa Building

The gut microbiota is increasingly recognized as a modulator of host physiology and a contributor to cardiometabolic health. Alterations in gut microbiota composition and function, including reduced abundance of butyrate-producing bacteria, are consistently observed in individuals with prediabetes and type 2 diabetes. Beyond cross-sectional associations, growing interest has focused on the potential of the gut microbiota to act as a dynamic indicator of metabolic health and disease trajectories. In this lecture, I will discuss conceptual and methodological approaches used to identify gut microbial features linked to metabolic resilience and disease progression, with an emphasis on longitudinal human studies. I

will highlight how microbiome configurations can reflect host metabolic states over time, the challenges of distinguishing causality from correlation, and the importance of integrating microbiome data with clinical and metabolic phenotyping. Finally, I will discuss the emerging concept that gut microbial taxa associated with metabolic health often reflect broader features of host homeostasis. These taxa are linked not only to metabolic resilience, but also to healthy ageing and the general absence of chronic disease. This perspective supports the view that certain microbiota configurations may represent core signatures of human health, rather than disease-specific markers.