Guest Talk

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Host-microbiome interaction in health and disease: a quantitative approach

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- Lecture Hall or videoconference, using Google Chrome: https://call.lifesizecloud.com/15070818

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Abstract:

The gut microbiota is an integral component of human health, playing roles that range from expanding digestive capacity to modulating the immune system and promoting resistance to pathogenic intruders. The sequencing-based dissection of the gut microbiota has enabled linking alterations in faecal microbial community diversity, composition, and functional potential with a wide range of diseases, spanning from obesity and cardiovascular disease to neuropsychiatric disorders. The latter has garnered significant attention in efforts to decode the microbiota-gut-brain axis, promote healthy ageing, and identify new therapeutic avenues. Understanding the role of the gut microbiome in disease requires a fundamental understanding of natural ecological variation of the human gut microbiota within the boundaries of health. Using population-level microbiome surveys, we unveiled a sketch of the primary drivers of gut microbiome variation in health. This led to a refined definition of microbiome deviations beyond health (dysbiosis), and the development of approaches to quantify their contribution to disease mechanisms. Revisiting clinical and population cohorts revealed the disrupted host-microbiome symbiosis not only contributes to pathomechanisms, but decreases perception of quality of life in healthy individuals. We have now reached a stage where we explore how microbiome composition affects therapeutic outcomes and how machine learning approaches can harness this information for personalised medicine.