PROFESSOR ELAINE HOLMES
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PRESENTATION TITLE: "Understanding Microbiome- Metabolic Axis interactions in a healthcare framework"

ABSTRACT: Man is a complex ecosystem with thousands of biochemical processes working together through time to maintain health. The gut microbiota contributes to human health and disease in the sense that the microbiome provides critical biosynthetic for the host that significantly extend host metabolic capacity but can also cause substantial disruption to host homeostasis under certain conditions. The mechanisms by which the microbiome exerts its effects remain poorly understood.

The metabolic phenotype can provide a window onto dynamic biochemical responses to physiological and pathological stimuli, including processes wholly or partially regulated by the gut microbiome. This talk will focus on the application of metabolic profiling to elucidate signatures of host-microbial co-metabolism in a range of acute and chronic conditions. The gut microbiome interacts with the mammalian system at the level of genes, proteins and metabolism and examples of urinary and/or faecal metabolites that are products of the microbiota, or microbiota-host interactions include phenols, indoles, bile acids, short chain fatty acids and choline derivatives. These compounds can be quantitatively profiled using spectroscopic technology. Here, both host and gut microbial inflammatory-mediated pathogenic mechanisms will be explored and applications from a range of diseases including inflammatory bowel disease, metabolic syndrome, neurodegenerative conditions and infectious diseases.

BIOGRAPHY: Holmes is an ARC Laureate Fellow at Murdoch University, where she runs the Centre for Computational and Systems Medicine in the Health Futures Institute. She obtained her PhD from the University of London in renal toxicology in 1992 and became a lecturer at Imperial College London in 1998 where she became Head of the Division of Computational Systems Medicine. She was awarded the RSC Interdisciplinary Prize for work at interface of medicine and chemistry in 2015 and was elected as a Fellow of the Academy of Medical Sciences in 2018. She has >500 publications with an H index of 134 with >76000 citations (google scholar).

Holmes is one of the pioneers in the development and implementation of metabolic phenotyping in translational clinical paradigms. The analytical framework conceptualised for metabolic phenotyping and biomarker discovery has been applied across several disease areas. She also co-developed the Metabolome-Wide Association Study concept and has shown that the microbial component of the metabolic profile is associated with a wide range of conditions including obesity, inflammatory bowel disease, allergies and certain cancers. She has an interest in metabolic mapping of mammalian responses to infectious diseases and has focussed recently on mapping the response to SARS-CoV-2 infection including exploration of the systems effect of long-covid.

Her work is internationally recognised as demonstrated by her membership of advisory bodies, editorial boards and research panels, extensive keynote and plenary lectures and visiting/adjunct professorial positions.