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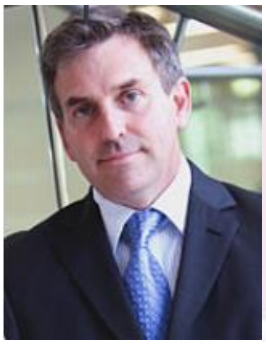
SIgN Immunology Seminar



Prof Charles Mackay

Mircobiology, Monash University, Australia

Gut microbial metabolites as new elements to understand physiology and treat human diseases

Host
Dr Ng Lai Guan
Singapore Immunology Network,

Date
Monday
16 October
2017

Time
11am – 12pm

Venue
SIgN Seminar Room
Immunos Building
Level 4
Biopolis

Gut dysbiosis might underlie the pathogenesis of numerous diseases. For instance, in mice of the non-obese diabetic (NOD) strain, we found that key features of disease correlated inversely with blood and fecal concentrations of the microbial metabolites acetate and butyrate. We therefore fed NOD mice specialized diets designed to release large amounts of acetate or butyrate after bacterial fermentation in the colon.Feeding mice a combined acetate- and butyrate-yielding diet provided complete protection. Acetate markedly decreased the frequency of autoreactive T cells in lymphoid tissues, through effects on B cells and their ability to expand populations of autoreactive T cells. A diet containing butyrate boosted the number and function of regulatory T cells, whereas acetate- and butyrate-yielding diets enhanced gut integrity and decreased serum concentration of diabetogenic cytokines such as IL-21. Similar protective effects of resistant starch diets were noted in food allergy, colitis, colon cancer, hypertension, asthma and fatty liver disease. We have identified several cellular and molecular pathways whereby metabolites provide beneficial effects, including signalling through 'metabolite sensing' GPCRs, and inhibition of HDACs. Medicinal foods or metabolites might represent an effective and natural approach for countering the numerous immunological defects that contribute to human diseases.