

Applying immune and metabolomic approaches to the study of gut inflammation



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Host: Dr Deepak Choudhury

Seminar Abstract

Inflammatory bowel disease (IBD) is the prototypical complex disease driven by genetic and environmental factors to trigger an inflammatory immune response towards the gut microbiota. We investigated the immunological and metabolic aspects of IBD.

Immunologically, we show in a genetic model that T cells utilize two mechanisms to drive colitis – (1) STAT1 signalling to maintain sufficient levels of MHC-I to evade killing by NK cells and (2) IL-1R signalling. In the latter, administration of an IL-1R antagonist ameliorated symptoms in patients harbouring similar mutations as the model.

Metabolically, metabolic profiling on colonic tissues from IBD patients revealed that inflammation state was the primary driver of metabolic variation. Inflamed tissues displayed reduced levels of NAD⁺ and the accumulation of the by-products NAM and ADP-ribose, suggesting enhanced activities of NAD degrading enzymes.

About the Speaker

Yu Hui received his PhD in immunology from Harvard University in 2019. During his PhD, he was mentored by Dr Scott Snapper where he investigated the immunological mechanisms driving IBD in mice and paediatric patients, with a particular focus on IL-10/IL-10R signalling. In 2019-2021, he joined the laboratories of Dr Marcia Haigis and Dr Snapper as a postdoctoral fellow where he utilized mass spectrometry to investigate metabolic changes in human IBD. After a brief stint in SigN, he joined the AS&T (Metabolomics) group at BTI with an interest in applying metabolomics for immunological applications such as cell therapy.