



Infectious
Diseases Labs

A*STAR IDL



Prof Sumaira Hasnain

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Thursday 4th Dec 2025

11:00 AM to 12:00 PM (SGT)

Venue: Codon A & B, Matrix Level 5

Unlocking Cellular Stress Modulation: A New Frontier in Treating Metabolic Disease

Obesity and diabetes affect 1 in 5 individuals worldwide and impose a substantial burden on healthcare systems. Current therapies often fail to reverse chronic complications such as Metabolic Associated Fatty Liver Disease (MAFLD), now the leading cause of liver disease in Australia, and associated conditions including chronic kidney and cardiovascular disease. A subset of MAFLD patients develop metabolic steatohepatitis, characterised by hepatocyte injury and inflammation, which significantly increases health costs and disease burden.

Our previous work demonstrated that IL-22 therapy can restore glucose tolerance and specifically target cellular and tissue inflammation, which are key drivers of metabolic complications. Building on these findings, we aim to develop IL-22 as a targeted therapeutic to modulate cellular stress responses, delivering it precisely to the pancreas, liver, kidney, and heart to prevent or reverse tissue damage. To address adverse effects observed in early clinical trials—such as decreased MHC II expression on epithelial cells, which can suppress immune responses, and skin and gut hyperplasia—we are developing novel IL-22 biologics fused with tissue-specific targeting agents. These biologics are protected by patents and will be evaluated throughout this programme.

This approach has the potential to unlock cellular stress modulation as a transformative strategy for treating hyperglycaemia-related complications, offering new hope for disease modification in metabolic disease.

Professor Sumaira Hasnain earned her PhD in December 2010 from The University of Manchester, UK. She leads the Immunopathology Group at Mater Research Institute-University of Queensland. Professor Hasnain was the first globally to demonstrate that immunity can modulate protein production in secretory cells during infection and chronic disease, a breakthrough that has driven much of her research trajectory. Her long-term goal is to characterise these novel immune factors and develop therapeutic strategies using pre-clinical models of immune-driven pathologies. She holds several patents for targeted immunotherapy in metabolic disease, which have facilitated the formation of the spin-off company Jetra Therapeutics and attracted venture capital funding. Her prolific research output includes numerous high-impact publications in journals such as Nature Medicine, Nature Communications, Oncogene, and Gastroenterology. With over \$9 million in competitive funding, 21 awards, and recognition as a National Health and Medical Research Council Investigator (L1), Professor Hasnain's research influence is rapidly rising. Beyond her scientific achievements, she is a passionate advocate for Equity, Diversity, and Inclusion (EDI) in STEMM. She serves on the Australian STEMM Equity Advocacy Team, the EDI Committee at Mater Research, and as Chair of the EDI Committee for the Australia and New Zealand Society for Immunology, actively working to foster an inclusive environment for future generations of scientists.

Hosted by: Dr Stefan Oehlers

Seminar is open to all. No registration required.

Questions? Contact us at seminars@idlabs.a-star.edu.sg

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