

Modulating Innate Immune Responses in Non-communicable diseases such as Diabetes

Ph.D. Topic for Aug. 2021

Laboratory of Siddharth Jhunjhunwala (BSSE)

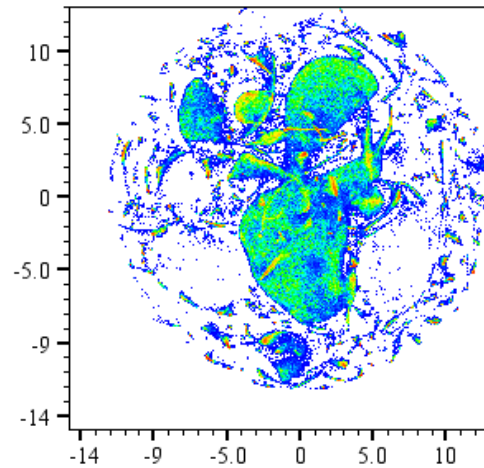
PAST WORK

Diabetic Foot Ulcers



*Captured at KIER,
Jayadeva Hospital,
Bengaluru*

Characterizing Immune Response

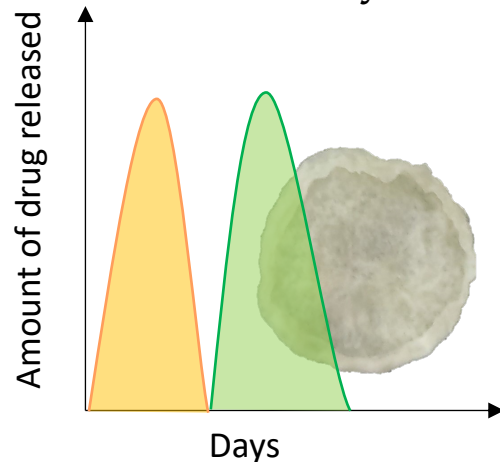


*tSNE plots of immune
phenotype (cells from
diabetic patients)*

Questions of Interest:

1. What is the effect of immuno-modulatory drugs on immune cells isolated from diabetic mice and humans
2. Developing drug delivery systems for controlled release of immuno-modulatory therapeutics
3. Assessing the efficacy of aforementioned systems in rodent models of diabetes

Scaffolds for Drug Delivery



BSSE PhD Project

Title: Modulating Innate Immune Responses in Non-communicable diseases such as Diabetes

Adviser: Siddharth Jhunjunwala (Centre for BioSystems Science and Engineering)

At the end of your PhD you are likely to become an expert in the following areas:

Immunology, Drug Delivery, Nano-technology

Background: Innate immune responses, especially the role of neutrophils, have been poorly studied in the context of non-communicable diseases. A number of recent studies suggest that monocytes and macrophages play important roles in these diseases, but much remains to be learnt about their phenotype and exact function.

Past work in our laboratories on this topic:

- Characterization of neutrophil and monocyte phenotypes in diabetic mice and humans
- Clinical collaborations that have given us access to patient samples that may be tested
- Design of scaffold based drug delivery systems that enable modulation of innate immune responses in mice
- Studies on nanoparticle formulations for enhanced delivery to specific innate immune cells

As part of the PhD work, you will learn:

- Immune cell isolation and analysis through flow cytometry and other techniques
- Clinical data collection and processing
- Drug delivery system fabrication
- to work with animal models of research