Indian Institute of Science
Centre for BioSystems Science and Engineering
BSSE Annual Work Presentation

25th February 2020 (Tuesday), 11:00 AM, MRDG Seminar Hall, 1st floor, Biological Sciences Building

Immune Responses in Diabetic Foot Ulcers: Characterization and Approaches for Modulation

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ABSTRACT

Diabetic foot ulcers (DFUs), a common complication in individuals with Type 2 diabetes, shows delayed wound healing and chronic inflammation. Wound management through frequent dressing changes, and topical application of antibiotics are the most common strategies for treatment. While this may be sufficient in some individuals, in many healing does not occur naturally eventually leading to limb amputation. The question that remains unanswered is why some diabetic ulcers heal while others fail to. We hypothesized that innate immune cells, specifically neutrophils, may be alternately activated in individuals whose ulcers do not heal. To test this hypothesis, peripheral venous blood and biopsy of the ulcer site was collected from about 60 DFU patients and few diabetic individuals with no foot ulcers. Phenotype of immune cells in blood and their functions such as phagocytosis and production of ROS were assessed. While immunephenotype analyses using linear dimensionality techniques such as PCA show no observable differences between immune cells of patient with and without foot ulcers, functional assessments of neutrophils reveal that there may be differences in their functions such as phagocytosis and production of ROS upon activation. This observation is corroborated by similar initial studies performed in lepR KO mouse which closely resembles Type II diabetes. In order to translate the findings of this study into a therapeutic strategy to aid healing of foot ulcers, we have developed a drug delivery system to release factors that may assist in healing. Pilot studies in rat model for Type 1 db show promise towards healing of wounds.