Immunosuppressive Regulatory T cells to Attenuate Autoimmune Disorders, Inflammatory Disorders, and Graft-versus-Host-Diseases

Brief Technology Description
Methods to identify, produce, and elicit immune tolerance using Tₘ₁ cells

Technology Overview
Identification of the bona fide transcriptional and cellular control of Type-1 regulatory T (Tₘ₁) allows for the therapeutic utilization of these cells in diseases where excessive and aberrant immunity results in immune pathology. Dr. Geoff Hill’s group has developed a method to screen and identify Tₘ₁ cells that produce abundant IL-10 and Eomes. These FoxP3⁻ immunosuppressive Tₘ₁ cells can be used for dampening undesired and excessive immune response that causes autoimmune diseases and tissue inflammation. Additionally, these Tₘ₁ cells can also be used to elicit immune tolerance to novel alloantigen in patients receiving bone marrow transplant (BMT), hematopoietic stem cell transplantation (HSCT), organ transplant, etc. Consistent with the findings in the mouse model, high Eomes and low T-bet expressing CD4⁺ T cells can identify a population enriched for Tₘ₁ cells and can discriminate healthy donors from BMT recipients. Furthermore, this method could be used to diagnose the presence of immune tolerance in a subject.

Applications
- Immunosuppressing cell therapy for autoimmune diseases and tissue inflammation
- Cell therapy to prevent GvHD after allogenic BMT or stem cell transplantation
- Diagnosing immune tolerance level in critical patients

Potential Advantages
- Using patient’s Tₘ₁ cells can be a more effective immunosuppressing modality than Corticosteroids
- Applicable to any condition where excessive immunity needs to be suppressed

Market Overview: The global regulatory T-cells (Tregs) therapies market is expected to reach $1.1B USD by 2030, with a CAGR of 52.8% during the forecast period of 2025-2030. Currently, there are no approved marketed product for Regulatory T-cells (Tregs) therapies, and the first product in the market is expected to be launched in 2024-2025.