Singapore Immunology Network
SIgN

SIgN SEMINAR

Hosted by Prof Lam Kong Peng

Dr Chen Xin

Postdoctoral Scholar
Institute for Immunity, Transplantation and Infection
Stanford University School of Medicine

Deciphering Autoimmune Regulation Through Immune Organoids

It has recently emerged that a small subset of CD8+ T cells in humans or mice plays a key role in controlling autoimmunity. However, how these cells function compared to the much better-known CD4+ regulatory T cells is not well understood. Here we analyzed the relative contributions of CD4+ regulatory T cells expressing Forkhead box protein P3 (FOXP3) and CD8+ regulatory T cells expressing killer cell immunoglobulin-like receptors to the control of autoreactive T and B lymphocytes in human tonsil-derived immune organoids. FOXP3 and GZMB respectively encode proteins FOXP3 and granzyme B, which are critical to the suppressive functions of CD4+ and CD8+ regulatory T cells. Using CRISPR–Cas9 gene editing, we were able to achieve a reduction of ~90–95% in the expression of these genes. FOXP3 knockout in tonsil T cells led to production of antibodies against a variety of autoantigens and increased the affinity of influenza-specific antibodies. By contrast, GZMB knockout resulted in an increase in follicular helper T cells, consistent with the ablation of CD8+ regulatory T cells observed in mouse models, and a marked expansion of autoreactive CD8+ and CD4+ T cells. These findings highlight the distinct yet complementary roles of CD8+ and CD4+ regulatory T cells in regulating cellular and humoral responses to prevent autoimmunity

2 April 2025 (Wednesday)
10 AM – 11 AM (Singapore Time)
SIgN Seminar Room
8A Biomedical Grove, Immunos, #04-06
Singapore 138648

Seminar is open for all to attend.

Registration is not required.