

Immunology Seminar

Functional specialization of regulatory T cell-mediated immune regulation in health and disease

Professor Li-Fan Lu

Dept. Molecular Biology, School of Biological Sciences,
University of California San Diego, U.S.A

Date: December 9 (Mon), 2024 Time: 16:00–17:30 (Talk; 1h, Q&A; 30min)

Venue: Seminar Room 104, 1st floor, No.2 Bldg., LiMe Inst. (Bldg. 33)

(医研2号館(構内マップ33番);104室 (変更の可能性もあります))

The seminar will be held on site only

In the last two decades, regulatory T (Treg) cells have been extensively studied for their role in maintaining immunological tolerance, revealing significant heterogeneity that allows them to regulate various immune responses. However, the specific mechanisms by which different Treg cell populations exert their effects remain unclear. Here, we examined various tissue-specific Treg cell subsets during active autoimmune inflammation, uncovering key molecular mechanisms of immune regulation. We also developed a novel mouse line for temporally controlled depletion of a chosen Treg subset, facilitating the investigation of the cellular role of distinct Treg cell subsets in controlling different immune responses. Collectively, our work establishes a powerful model to explore the effector mechanisms of Treg cells and supports the development of strategies to manipulate their function, potentially leading to new therapeutic approaches for a range of human diseases.

1. Mast cells as essential intermediaries in regulatory T cell tolerance. **Lu LF.**, Lind EF., Gondek DC., Bennett KA., Gleeson MW., Noelle RJ. 2006 *Nature* 442 (7106):997-1002.
2. Foxp3-dependent microRNA155 confers competitive fitness to regulatory T cells through targeting SOCS1 protein. **Lu LF.** et al., 2009 *Immunity* 30(1):80-91.
3. Function of miR-146a in controlling Treg cell-mediated regulation of Th1 responses. **Lu LF.**, et al. 2010 *Cell* 142(6): 914-29.
4. A single miRNA-mRNA interaction affects the immune response in a context- and cell-type-specific manner. 2015 *Immunity* 43(1):52-64.
5. MiR-23~27~24-mediated control of humoral immunity reveals a TOX-driven regulatory circuit in follicular helper T cell differentiation. 2019 *Sci Adv* 5(12): eaaw1715
6. Gut epithelial IL-27 confers intestinal immunity through the induction of intraepithelial lymphocytes. 2021 *J Exp Med.* 218(11):e20210021
7. MiR-155 promote Treg cell differentiation by safeguarding medullary thymic epithelial cell maturation. 2021 *J Exp Med.* 218(2):e20192423
8. MiR-15/16 clusters restrict effector Treg cell differentiation and function. 2023 *J Exp Med.* 220(10):e20230321
9. Selective IL-27 production by intestinal regulatory T cells permits gut-specific regulation of Th17 immunity. 2023 *Nat Immunol.* 24(12):2108-20.

