

CD4-Cre and Lck-Cre Mouse Models for Studying T Cell Epigenetics

Biomaterial – Mouse

Biomaterial Description

Researchers in Professor Christopher Wilson's laboratory have developed and characterized two conditional knockout mouse models—CD4-Cre and Lck-Cre—to investigate the role of Dnmt1-mediated DNA methylation in T cell development, function, and survival. These models enable T cell-specific deletion of Dnmt1, a key DNA methyltransferase, at different stages of T cell maturation. The Lck-Cre line induces deletion at the double-negative stage, while CD4-Cre targets the double-positive stage of thymocyte development.

These mice provide a powerful system for dissecting the epigenetic regulation of T cell lineage commitment, homeostasis, and immune response, and are valuable for studying autoimmune disease mechanisms and T cell malignancies.

Applications

- Investigation of epigenetic regulation in T cell development and differentiation
- Study of T cell survival, proliferation, and apoptosis
- Modeling of autoimmune diseases and T cell lymphomas
- Functional analysis of Dnmt1 and DNA methylation in immune cell programming
- Evaluation of gene-environment interactions in immune responses

Advantages

- Stage-specific gene deletion in T cells using Cre-loxP system
- Precise control over timing of Dnmt1 deletion (Lck-Cre: early; CD4-Cre: later)
- in vivo relevance for studying immune system development and disease
- Non-invasive genetic manipulation without the need for viral vectors
- Enables study of DNA methylation-dependent gene regulation in a physiological context

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Technology ID

INV 44298

Category

Research Tools/Biological
Materials/Mouse

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