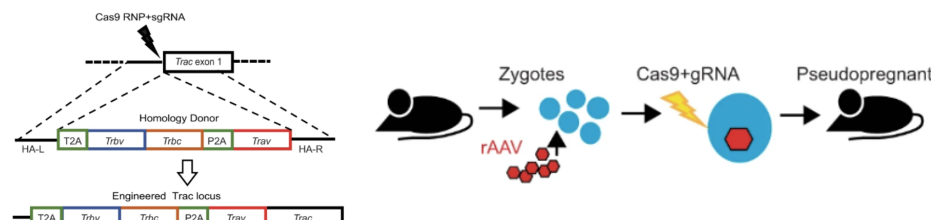# T Cell Receptor Exchange (TRex) Mice

A mouse model for studying physiological antigen-specific T cell behavior.

IP Status: US Patent Pending; Application No. 18/703,440

Applications

- Research tool

Key Benefits & Differentiators

- **Circumvented T cell tolerance:** TCRs specific to the self/tumor antigen mesothelin (Msln) are integrated into the Trac locus with concomitant Msln disruption to circumvent T cell tolerance
- **Improved functional sensitivity:** Trac targeting improves functional sensitivity of lower affinity TCRs and confers resistance to T cell functional loss
- **Increased avidity:** Trac-targeted TCRs show increased avidity compared to transgenic TCRs

Technology Overview

T cell receptor (TCR) transgenic mice represent an invaluable tool to study antigen-specific immune responses. Pre-existing TCR transgenic mouse models require substantial time to generate, have random TCR genomic integration, and use non-physiologic promoters that may alter T cell functionality and hinder direct TCR comparisons. For these reasons, new mouse models are urgently needed to study physiological antigen-specific T cell behavior.

Researchers at the University of Minnesota have developed T Cell Receptor Exchange (TRex) mice, in which TCRs, specific to the self/tumor antigen mesothelin (Msln), are integrated into the Trac locus, with concomitant Msln disruption to circumvent T cell tolerance. High affinity TRex thymocytes undergo all sequential stages of maturation, express the exogenous TCR at DN4, require MHC class I for positive selection, and undergo negative selection only when both Msln alleles are present. By comparison of TCRs with the same specificity but varying affinity, Trac targeting improves the functional sensitivity of lower affinity TCRs and confers resistance to T cell functional loss. By generating P14 TRex mice with the same specificity as the widely used LCMV-P14 TCR transgenic mouse, the researchers demonstrate the increased avidity of Trac-targeted TCRs over transgenic TCRs, while preserving physiologic T cell development. The TRex mouse model is an advanced tool for studying physiological antigen-specific T cell behavior.

Phase of Development

T Cell Receptor Exchange (TRex) mice have been generated, characterized, and published.

Technology ID
2022-002

Category
Life Sciences/Human Health
Life Sciences/Research Tools

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References

1. Meagan R. Rollins, Jackson F. Raynor, Ebony A. Miller, Jonah Z. Butler, Ellen J. Spartz, Walker S. Lahr, Yun You, Adam L. Burrack, Branden S. Moriarity, Beau R. Webber & Ingunn M. Stromnes(01 February 2023) , https://doi.org/10.1038/s41467-023-36180-1, https://www.nature.com/articles/s41467-023-36180-1, 14, 528

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