# MHC Class II Molecules with Enhanced Co-receptor Affinity

### MHC class II molecules with enhanced co-receptor affinity

**IP Status:** US Patent Issued; Patent No. 12,187,781

## Applications

- New generation of peptide:MHCII tetramer products
- T cell detection in flow cytometry
- Reagents
- Research tool

### Key Benefits & Differentiators

- **Improved capture of antigen specific CD4 T cells:** Enhanced binding to the CD4 co-receptor developed through a directed evolution process
- **Benefit:** Features that provide the benefit

### Better binding affinity for co-receptor CD4

Current methods for detecting and understanding specific types of T cells are imperfect. A CD4 T cell uses its unique T-cell receptor (TCR) molecules to bind to a foreign peptide embedded in an MHCII molecule on host cells. At the same time, the T cell's CD4 molecules bind to the stalk of the MHCII molecules and cooperate with the TCR to activate the T cell. Peptide:MHCII tetramer-based flow cytometry is a preferred method for the study of CD4 T cells specific for MHCII-bound peptides from microbes, cancers, and autoantigens. Unfortunately, peptide:MHCII tetramers do not bind to CD4 molecules and therefore fail to detect CD4 T cells with low affinity TCRs.

### Higher affinity than wild-type MHCII molecules

Researchers at the University of Minnesota have developed enhanced-affinity MHCII molecules as an improved research tools for the study of CD4 T cells during cancer, infection, and autoimmune disease. A novel process uses directed evolution to create modified MHCII molecules with better binding affinity than their wild-type counterparts for the co-receptor CD4 found on T cell surfaces. This new technology creates a new generation of modified MHCII molecules evolved to bind CD4 with stronger affinity than wild-type MHCII molecules. Tetramers formed with peptide-bound CD4 affinity-enhanced MHCII tetramers detect T cells that are missed by peptide-bound wild-type MHCII tetramers. This technology allows researchers to detect more relevant T cells than currently possible.

### Phase of Development

**TRL: Platform technology: 3-4, Select individual tetramers: 5**

### Desired Partnerships

This technology is now available for:

**Technology ID**
20180109

**Category**
All Technologies
Life Sciences/Biologics
Life Sciences/Human Health
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools
Life Sciences/Therapeutics
Agriculture &
Veterinary/Veterinary Medicine

**View online**

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

### Researchers

- **Marc Jenkins, PhD** Professor, Department of Microbiology & Immunology
- **Thamotharampillai Dileepan, PhD** Assistant Professor, Department of Microbiology and Immunology

### References

1. Thamotharampillai Dileepan, Deepali Malhotra, Dmitri I. Kotov, Elizabeth M. Kolawole, Peter D. Krueger, Brian D. Evavold, Marc K. Jenkins(2021) , https://www.nature.com/articles/s41587-021-00893-9, https://www.nature.com/nbt/
2. Shawn Mahmud , Thamotharampillai Dileepan , Kathryn Pape , Marc Jenkins(2024) , https://academic.oup.com/jimmunol/article-abstract/212/1_Supplement/1519_5551/7996119?redirectedFrom=fulltext, https://academic.oup.com/jimmunol
3. Haeree P. Lang, Kevin C. Osum, Steven G. Friedenberg(2024) , https://www.sciencedirect.com/science/article/pii/S0165242724001028?via%3Dihub, https://www.sciencedirect.com/journal/veterinary-immunology-and-immunopathology
4. Shawn Mahmud, Thamotharampillai Dileepan, Bryce Binstadt and Marc Jenkins(2022) , https://acrabstracts.org/abstract/novel-human-class-ii-mhc-tetramers-detect-rare-self-reactive-cd4-t-cells-relevant-to-mixed-connective-tissue-disease/, Arthritis Rheumatol

Explore other available products test at Technology Commercialization