MHC Class II Molecules with Enhanced Coreceptor Affinity

IP Status: PCT Patent Application Filed; Application #: PCT/US2019/044605

Better binding affinity for co-receptor CD4

New enhanced-affinity MHCII molecules could improve current research tools for the study of CD4 T cells during cancer, infections, 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.

Higher affinity than wild-type MHCII molecules

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. 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

• Proof of concept.

Benefits

• Improved reagents more effectively identify and study antigen-specific CD4 T cells

Features

- Enhanced binding to the CD4 co-receptor
- Directed evolution process

Applications

- Reagents
- New generation of peptide:MHCII tetramer products
- Detecting T cells in flow cytometry applications
- Research tool

Researchers

Marc Jenkins, PhD

Technology ID

20180109

Category

Life Sciences/Human Health
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools
Life Sciences/Therapeutics
Agriculture &
Veterinary/Veterinary Medicine

View online



Regents and Distinguished McKnight University Professor, Department of Microbiology and Immunology

External Link (www.med.umn.edu)

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact us to share your business needs and licensing and technical interests in this technology.