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MHC Class II Molecules with Enhanced Co-receptor Affinity

Technology No. 20180109

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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

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