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Chimeric Fc receptor to augment antibody-based cell therapies

A chimeric Fc receptor that combines high-affinity antibody binding with robust signaling to enhance the efficacy of cell-mediated immunotherapies.

IP Status:

- US Divisional Patent Pending; Application No. 18/474,781
- Japanese Patent Pending; Application No. 2024-174612
- EPO Patent Pending; Application No. 18870037.1
- Chinese Patent Pending; Application No. 2018800844834

Applications

- Adoptive cell immunotherapy (e.g. NK cells, T cells)
- Enhancing monoclonal antibody cancer therapies
- Improving treatments for infectious or chronic disease
- Pre-complexing therapeutic antibodies to effector cells

Key Benefits & Differentiators

- **High-affinity binding:** The CD64 extracellular domain binds IgG antibodies with high affinity, improving target cell recognition and engagement
- **Robust signaling:** The CD16a transmembrane and cytoplasmic regions transduce potent intracellular signals to activate powerful immune effector functions like ADCC
- **Resists down-regulation:** Lacks the proteolytic cleavage site found in native CD16a, preventing ectodomain shedding and ensuring sustained receptor expression on the cell surface

Technology Overview

Monoclonal antibody therapies are a cornerstone of modern medicine, particularly in oncology, but their effectiveness is often limited by patient resistance or non-responsiveness. Many of these therapies rely on antibody-dependent cell-mediated cytotoxicity (ADCC), a process initiated when an antibody-coated target cell is recognized by an immune cell's Fc gamma receptor (FcγR). Efforts to improve therapeutic outcomes by augmenting these FcγR interactions are an active area of investigation, as suboptimal engagement can significantly reduce the potency of antibody-based treatments.

Researchers at the University of Minnesota have developed a novel chimeric Fc receptor (hCD64/16a) to significantly enhance the therapeutic potential of immune cells. This engineered receptor fuses theextracellular domain of the CD64, the only high-affinity IgG Fc receptor, with the potent signal-transducing transmembrane and cytoplasmic domains of the CD16a receptor. This unique construct enables engineered immune cells, such as NK cells or T-cells, to bind to antibody-coated targets with high affinity and initiate a more robust cytotoxic response. Furthermore, due to its high-affinity state, therapeutic antibodies can be precomplexed to immune cells expressing hCD64/16a prior to their administration into patients. The chimeric receptor is also designed to resist the natural down-regulation process that limits the activity of

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Category
All Technologies
Life Sciences/Biologics
Life Sciences/Human Health
Life Sciences/Research Tools
Life Sciences/Therapeutics

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native CD16a, allowing for sustained anti-tumor activity.

Phase of Development

TRL: 3-4

The cDNA construct has been generated and successfully expressed in NK cell lines and iPSC-derived NK cells and T cells.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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

Researchers

- **Jianming Wu, DVM, PhD** Professor, Department of Veterinary and Biomedical Sciences
- **Bruce Walcheck, PhD** Professor, Department of Veterinary and Biomedical Sciences

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