IL7Rα-Specific Antibody for Treating Acute Lymphoblastic Leukemia (ALL)

Summary (1024-character limit)
The National Cancer Institute seeks licensing and/or co-development research collaborations for further development of antibodies that selectively target IL-7Rα, a major driver of T-cell derived ALL (T-ALL) and an important therapeutic target for a range of diseases.

NIH Reference Number
E-247-2015

Product Type
• Therapeutics

Keywords
• Cancer, Therapy, Personalized Medicine, Targeted Therapy, Antibody, Antibody-Dependent Cellular Cytotoxicity (ADCC), Acute lymphoblastic leukemia (ALL), Autoimmunity, Diabetes, Multiple Sclerosis, Transplantation, Interleukin-7 receptor-α (IL-7Rα), Durum

Collaboration Opportunity
This invention is available for licensing and co-development.

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Description of Technology
Acute lymphoblastic leukemia (ALL) is the most common cancer in children with approximately 3,250 new cases occurring per year in the United States. About 20% of cases are refractory to current treatment protocols and there is a desperate need for targeted therapies that do not result in adverse side effects such as cognitive impairment.

The Interleukin-7 receptor-α (IL-7Rα) was identified as a major pathway driving T-cell derived ALL (T-ALL). Researchers at the National Cancer Institute (NCI) developed antibodies selectively targeting IL-7Rα. Two lead antibody candidates, designated 4A10 and 2B8, selectively bind IL-7Rα with nanomolar affinity. Each lead antibody mediates leukemic cell killing by antibody-dependent cellular cytotoxicity (ADCC) and causes a significant reduction in T-ALL cell burden when administered in a xenograft mouse model harboring patient derived leukemia. Tumor reduction occurred despite the absence of ADCC.
immune effector cells in the xenograft mouse model. Furthermore, a synergistic effect occurred when combining the IL-7Rα antibody with AMD3100, a commercially available CXCR4 antagonist approved as a therapeutic in humans. The combination treatment resulted in a significant improvement in clearance of T-ALL cell burden in a xenograft mouse model.

The National Cancer Institute (NCI) seeks licensing and/or co-development research collaborations for the further development of these IL-7Rα-selective antibodies as targeted therapies for a range of indications including oncology and autoimmune disorders. Examples include cell acute lymphoblastic leukemia (T-ALL), B-cell acute lymphoblastic leukemia (B-ALL), several autoimmune disorders (Type 1 diabetes and multiple sclerosis) and organ transplant rejection.

**Potential Commercial Applications**
- Targeted therapy for various cancers including T-cell acute lymphoblastic leukemia (T-ALL) and B-cell acute lymphoblastic leukemia (B-ALL)
- Targeted therapy for several autoimmune disorders (Type 1 diabetes and multiple sclerosis), organ transplant rejection, Type 1 diabetes, and multiple sclerosis

**Competitive Advantages**
- Selectively bind IL-7Rα with high (nanomolar) affinity
- Mediates cancer cell killing through antibody-dependent cellular cytotoxicity (ADCC)
- Targeted therapy with potential for fewer and less severe adverse events
- Well-established regulatory path
- Numerous approved products using same approach (e.g., Rituximab, and Cetuximab)

**Inventor(s)**
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**Development Stage**
- Pre-clinical (in vivo)

**Patent Status**

**Therapeutic Area**
- Cancer/Neoplasm