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.

CONTACT
- John D. Hewes
  National Cancer Institute
  240-276-5515
  John.Hewes@nih.gov

STATUS
Active

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
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)**
Scott Durum (NCI), Julie Hixon (NCI), Wenqing Li (NCI), Scott Walsh (NCI), Lila Kashi (NCI)

**DEVELOPMENT STAGE**
- Pre-clinical (in vivo)

**PATENT STATUS**
- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/238,612, Filed 07 Oct 2015

**THERAPEUTIC AREA**
- Cancer/Neoplasm