

Treatment of hematological cancer using adoptive cell therapy

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Keywords: Therapeutic, cancer, adoptive cell therapy, antigen, chimeric antigen receptor (CAR), CD22

Summary:

The [National Cancer Institute's Pediatric Oncology Branch](#) is seeking statements of capability or interest from parties interested in collaborative research to further co-develop adoptive cell therapies for certain leukemias and lymphomas.

Technology:

Chimeric antigen receptors (CARs) are hybrid proteins consisting of an antibody binding fragment fused to protein signaling domains that cause some T-cells to become cytotoxic. Once activated, these cytotoxic T-cells can selectively eliminate the cells which they recognize. Thus, by engineering a T-cell to express a CAR that is specific for a certain cell surface protein, it is possible to selectively target cells for destruction. This is a promising new therapeutic approach known as adoptive cell therapy.

CD22 is a cell surface protein that is expressed on a large number of B-cell lineage hematological cancers. Several promising therapies are being developed which target CD22, including therapeutic antibodies and immunotoxins. This technology concerns the use of a high affinity antibody- binding fragment to CD22 as the targeting moiety of a CAR, adding adoptive cell therapy as a new prospective treatment for certain leukemias and lymphomas.

Potential Commercial Applications:

- Treatment of diseases associated with increased or preferential expression of CD22
- Specific diseases include hematological cancers such as chronic lymphocytic leukemia, hairy cell leukemia and pediatric acute lymphoblastic leukemia

Competitive Advantages:

- Targeted therapy decreases non-specific killing of healthy, essential cells, resulting in fewer non-specific side-effects and healthier patients
- Hematological cancers are susceptible to cytotoxic T-cells for treating because they are present in the bloodstream
- Expression of CD22 only on mature cells allows the avoidance of stem cell elimination during treatment
- High affinity of the antibody binding fragment for CD22 increases the likelihood of successful targeting

Development Stage: Pre-clinical, *in vivo* and *in vitro* data available

Patent Status: US provisional application 61/549,516. Related technologies: US 7,355,012

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