CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
DP150094

Project Title:
Genetic engineering of T cells as an “off-the-shelf” therapy for leukemias and lymphomas

Award Mechanism:
Bridging the Gap: Early Translational Research Awards

Principal Investigator:
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Entity:
The University of Texas M.D. Anderson Cancer Center

Lay Summary:

T cells are a part of the immune system responsible for attacking and destroying tumor cells. Patient-specific cells can be manipulated in the laboratory to redefine specificity and improve potency. This is achieved by combining gene therapy with immunotherapy. However, these laboratory procedures take time during which the patient’s underlying medical condition can deteriorate robbing them of the chance to receive immunotherapy. Therefore, we developed an approach whereby gene therapy can be used to manipulate T cells before a patient needs them. These T cells can then be frozen in banks and thawed and infused when the patient requires, rather than when the cells are available. This CPRIT application readies this T-cell technology for commercialization by undertaking studies to demonstrate that gene therapy can be used to insert a receptor that redirects T-cell specificity for leukemia and lymphoma. The introduced immunoreceptor will be paired with expression of a “suicide gene” rendering the T cells capable of being destroyed after infusion so that toxicities, should they arise, can be controlled by destruction of the administered T cells. The same gene therapy platform used to introduce genes will be used to eliminate expression of the naturally occurring “T-cell receptor”. This is needed so a (healthy) person’s T cells can be safely infused into any recipient with leukemia and lymphoma and without the concern that the T cells will recognize and destroy healthy tissues. In addition to the genetic modification of T cells, we develop an approach to culturing using specialized “nurse” cells to grow large numbers (banks) of the T cells without robbing their ability to persist after infusion. The approach to gene therapy and culturing will be repeated and refined to generate the data and procedures that we can use to obtain regulatory approval to undertake a future clinical trial infusing “off-the-shelf” T cells with support from commercialization of the technology.