

**Cancer Therapeutic Based On T Cell Receptors Designed To Regiospecifically Release Interleukin-12**

**Reference No.:** E-170-2009

**Keywords:** Immunotherapeutics, Cancer

**Background:**

The National Cancer Institute's Surgery Branch is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize a potential cancer therapeutic based on T cells genetically engineered to express the human interleukin 12 (IL-12) cytokine only in the tumor environment.

**Technology:**

Adoptive immunotherapy is a promising new approach to cancer treatment that engineers an individual's innate and adaptive immune system to fight against specific diseases, including cancer with fewer side-effects and more specific anti-tumor activity in individual patients. T cell receptors (TCRs) are proteins that recognize antigens in the context of infected or transformed cells and activate T cells to mediate an immune response to destroy abnormal cells. When a TCR is stimulated by a tumor antigen, some signaling pathways activated in the cell lead to the production of cytokines, which mediate the immune response.

Scientists at the National Cancer Institute (NCI) have developed T cells genetically engineered to express the human interleukin 12 (IL-12) cytokine only in the tumor environment. Thus, IL-12 is only released at the cancer site and only after the activation of the T cell. This technology makes it possible to control the expression of IL-12 to enhance T cell cytolytic activity while also reducing or eliminating the IL-12 toxicity observed with other IL-12 related therapies. Infusing these IL-12 expressing T cells into patients via adoptive immunotherapy could prove to be powerful new tools for attacking tumors.

**Potential Commercial Applications/Possible Markets Identified:**

- Immunotherapeutics to treat and/or prevent the recurrence of a variety of human cancers by adoptively transferring the gene-modified T cells into patients.
- A drug component of a combination immunotherapy regimen aimed at targeting the specific tumor-associated antigens expressed by cancer cells within individual patients

**Key Advantages of Technology/Invention:**

- The combination of enhanced T cell activity with reduced IL-12 toxicity: IL-12 has shown remarkable properties as an anti-tumor agent, but its clinical development has been hindered by its toxicity. This current technology delivers IL-12 only when and where it is needed – at the tumor site.

**R&D Status:** Pre-clinical studies on mouse models have been conducted

**Further R&D Needed:** Testing of function at scale-up levels required for clinical trials

**IP Status:** U.S. Provisional Application No. 61/174,046 filed 30 Apr 2009

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Reviewed 6/29/2009