INHIBITION OF T CELL DIFFERENTIATION AND SENESCENCE BY OVEREXPRESSION OF TRANSCRIPTION FACTOR C-MYB

SUMMARY (1024-CHARACTER LIMIT)
Researchers at the National Cancer Institute (NCI) have developed a method by which memory T cells can be generated from other T cell populations using overexpression of the transcription factor c-Myb. Importantly, these reprogrammed memory T cells show increased proliferative and survival capacity. This strategy could also potentially generate anti-tumor T cells with improved viability and therapeutic efficacy for adoptive ACT. Researchers at the NCI seek licensing and/or co-development research collaborations for this invention.

NIH REFERENCE NUMBER
E-232-2015

PRODUCT TYPE
• Therapeutics

KEYWORDS
• Stem Cell, T Cell, Immunotherapy, Cancer, Infectious Disease, T Cell Receptor, TCR, Adoptive Cell Transfer, ACT, Chimeric Antigen Receptor, CAR, Gattinoni

COLLABORATION OPPORTUNITY
This invention is available for licensing and co-development.

CONTACT
• John D. Hewes
  NCI - National Cancer Institute

  240-276-5515

  John.Hewes@nih.gov

STATUS
Active

DESCRIPTION OF TECHNOLOGY
Adoptive Cell Therapy (ACT) is a promising technique that uses a patient's own T cells to treat cancer. The process requires removing and engineering a patient's T cells to express a chimeric antigen receptor (CAR) or T cell receptor (TCR) that targets a specific cancer antigen. When the modified T cells are reintroduced into the patient, the T cells attack and kill cancer cells that express the antigen, thereby
treating the patient. Although ACT holds a great deal of promise, there are still technical drawbacks to be overcome, such as loss of anti-tumor activity due to T cell senescence.

This invention addresses this technical drawback by using T cells that express the transcription factor c-Myb (or a functional variant thereof) at elevated levels as the host for transduction with CARs or TCRs. T cells that exhibit elevated expression of c-Myb display inhibited differentiation, allowing the cells to survive, proliferate and serve in a therapeutic capacity for a longer duration. Since it is believed that these characteristics can increase the effectiveness of ACT, T cells with elevated levels of c-Myb expression are strong candidates for use in ACT.

POTENTIAL COMMERCIAL APPLICATIONS
- Adoptive Cell Therapy (ACT) using chimeric antigen receptors (CARs), or engineered T cell receptors (TCRs)
- Treatment of cancers that express specific cell surface proteins

COMPETITIVE ADVANTAGES
- Elevated expression of c-Myb in T cells allows them to resist differentiation, thus cells survive and proliferate in greater numbers
- Increased survival and proliferation of T cells allows for a prolonged therapeutic effect

INVENTOR(S)
Luca Gattinoni M.D. (NCI), Yun Ji Ph.D. (NCI), Sanjivan Gautam Ph.D. (NCI)

DEVELOPMENT STAGE
- Pre-clinical (in vivo)

PATENT STATUS

THERAPEUTIC AREA
- Cancer/Neoplasm