POTASSIUM HYDROXY CITRATE PROMOTES LONGEVITY AND EFFICACY OF ANTI-TUMOR T CELLS FOR ADOPTIVE CELL THERAPY (ACT)

SUMMARY (1024-CHARACTER LIMIT)

Adoptive cell therapy (ACT) using tumor-specific T cells leads to complete tumor regression in some cancer patients. However, limiting the efficacy of this therapy is that T cells become functionally exhausted and have short half-lives after adoptive transfer. Researchers at the National Cancer Institute (NCI) have discovered a novel method to generate long-lived memory tumor-specific T cells with enhanced tumor clearance and persistence upon in vivo transfer. NCI is seeking parties interested in licensing and/or co-developing potassium hydroxy citrate to promote longevity and efficacy of tumor-specific T cells.

NIH REFERENCE NUMBER

E-094-2018

PRODUCT TYPE

- Therapeutics

KEYWORDS

- Potassium Hydroxy Citrate, Adoptive Cell Therapy, ACT, Memory T Cells, Vodnala, Restifo

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) using tumor-specific T cells can produce positive clinical responses in some cancer patients. Nevertheless, several obstacles to the successful use of ACT for the treatment of cancer and other conditions remain. For example, one or more of the in vivo persistence, survival, and antitumor activity of tumor-specific T cells can, in some cases, decrease following adoptive transfer. Accordingly,

there is a need for methods of obtaining a robust population of tumor-specific T cells for ACT.

Researchers at the National Cancer Institute (NCI) have discovered a novel method to generate long-lived memory tumor-specific T cells with enhanced anti-tumor activity for ACT using potassium hydroxy citrate. Tumor-specific murine T cells grown ex vivo in potassium hydroxy citrate demonstrate enhanced tumor clearance and persistence upon transfer to tumor-bearing mice. Mechanistically, potassium hydroxy citrate treatment leads to reduced glycolysis and cytoplasmic acetyl-CoA levels and activates autophagy in tumor-specific T cells. Furthermore, potassium hydroxy citrate-treated T cells express enhanced levels of markers consistent with long-lived memory anti-tumor T cells.

The NCI, Surgery Branch, is seeking statements of capability or interest from parties interested in licensing this invention and/or collaborative research to further develop, evaluate, or commercialize potassium hydroxy citrate to enhance the anti-tumor activity of tumor-specific T cells for ACT.

POTENTIAL COMMERCIAL APPLICATIONS

- Improved in vivo effector function and longevity of adoptively transferred T cells

COMPETITIVE ADVANTAGES

- Potassium hydroxy citrate-containing media can be readily incorporated into existing T cell therapy manufacturing processes
- Potassium hydroxy citrate activates autophagy in tumor-specific T cells which is critical for survival and memory formation

INVENTOR(S)

Suman Vadnala (NCI), Nicholas P Restifo (NCI), Rigel J Kishton (NCI), Robert L Eil (NCI)

DEVELOPMENT STAGE

- Pre-clinical (in vivo)

PATENT STATUS

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/661,941 , Filed 24 Apr 2018

RELATED TECHNOLOGIES

- E-002-2018
- E-084-2016

THERAPEUTIC AREA

- Cancer/Neoplasm