

Methods for Producing Stem Cell-Like Memory T Cells for Use in T Cell-Based Immunotherapies

Summary (1024-character limit)

Researchers at the National Cancer Institute (NCI) seek research & co-development and/or licensees for a novel, ex vivo method by which stem cell-like memory T cells (Tscm) can be generated by stimulating naïve T cells in the presence of inhibitors of GSK-3beta, which are capable of activating the Wnt pathway. These Tscm cells, generated using GSK-3beta inhibitors, display enhanced survival and proliferation upon transfer, have multipotent capacity to generate all memory and effector T cell subsets, and show increased anti-tumor activity in a humanized mouse tumor model.

NIH Reference Number

E-174-2012

Product Type

- Therapeutics

Keywords

- Stem Cell, T Cell, Immunotherapy, Cancer, Infection, Wnt, GSK-3beta, anti-tumor activity, Gattinoni

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

T cells currently employed for T cell-based immunotherapies are often senescent, terminally differentiated cells with poor proliferative and survival capacity. Recently, however, scientists at the National Cancer Institute (NCI) identified and characterized a new human memory T cell population with stem cell-like properties. Since these T cells have limited quantities in vivo, the scientists have developed methods by which high numbers of these cells can be generated ex vivo for use in T cell-based immunotherapies. Specifically, this invention describes a method for generating the stem cell-like memory T cells by stimulating naive T cells in the presence of GSK-3beta inhibitors. The invention also provides methodology for obtaining the stem cell-like memory T cells by sorting T cell lymphocytes using

flow cytometry. These stem cell-like memory T cells display enhanced proliferation and survival upon transfer, have the multipotent capacity to generate all memory and effector T cell subsets, and show increased anti-tumor activity in a humanized mouse tumor model. Consequently, the coupling of T cell receptor or chimeric receptor gene transfer with this method will enable the generation of a large number of memory stem cells with the desired specificity to effectively treat patients with cancer and chronic infectious diseases.

Potential Commercial Applications

- Ex vivo generation of stem cell-like memory T cells for T cell-based immunotherapy
- Treatment for patients with cancer and chronic infectious diseases

Competitive Advantages

- Enhanced proliferation and survival upon transfer
- Multipotent capacity to generate all memory and effector T cell subsets
- Increased anti-tumor activity

Inventor(s)

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Development Stage

- Pre-clinical (in vivo)

Publications

Gattinoni L, et al., A human memory T cell subset with stem cell-like properties. [[PMID 21926977](#)]

Gattinoni L, et al., Wnt signaling arrests effector T cell differentiation and generates CD8+ memory stem cells. [[PMID 19525962](#)]

Lugli E, et al., Identification, isolation and in vitro expansion of human and nonhuman primate T stem cell memory cells. [[PMID 23222456](#)]

Patent Status

- **U.S. Patent Filed:** U.S. Patent Application Number PCT/US2012/053947 , Filed 06 Sep 2012
- **U.S. Patent Filed:** U.S. Patent Application Number 14/425,713 , Filed 04 Mar 2015

Therapeutic Area

- Cancer/Neoplasm
- Infectious Diseases