

IMPROVED PERSONALIZED CANCER IMMUNOTHERAPY: RAPID SELECTION OF TUMOR-REACTIVE T CELLS BASED ON EXPRESSION OF SPECIFIC CELL SURFACE MARKERS

SUMMARY

The National Cancer Institute's Surgery Branch seeks partners interested in collaborative research to co-develop adoptive transfer of tumor infiltrating leukocytes (TIL) for cancers other than melanoma.

REFERENCE NUMBER

E-059-2013

PRODUCT TYPE

- Therapeutics

KEYWORDS

- T cells
- tumor infiltrating leukocytes (TIL)
- adoptive cell transfer (ACT)

COLLABORATION OPPORTUNITY

This invention is available for licensing.

CONTACT

Steven A. Rosenberg
NCI - National Cancer Institute
301.496.4164

sar@mail.nih.gov

DESCRIPTION OF TECHNOLOGY

Scientists at NIH have identified a process to select highly tumor-reactive T cells from a patient tumor sample based on the expression of four specific T cell surface markers: programmed cell death protein 1 (PD-1; CD279), 4-1BB (CD137), T cell Ig-and mucin-domain-containing molecule-3 (TIM-3), and/or lymphocyte activation gene 3 (LAG-3). After this enriched population of tumor fighting T cells, primarily tumor infiltrating lymphocytes (TIL), is selected and expanded to large quantities, it gets re-infused into the patient via an adoptive cell transfer (ACT) regimen. The key finding for this process is that the most tumor-reactive TIL found in a bulk population of cells obtained from a patient tumor sample reliably exhibit high expression of one or more of these four markers.

By selecting cancer attacking TIL from a patient's tumor based on these markers prior to re-infusion, in

in vitro culture time is reduced to grow up the desired T cells and a more effective anti-cancer T cell product can be produced. In comparison to previous TIL immunotherapy approaches, this new method for selecting tumor-reactive T cells/TIL from tumor samples should help TIL immunotherapy become more GMP compliant and allow greater standardized of the TIL production process to enable more widespread utilization of this personalized cancer treatment approach outside of NIH.

POTENTIAL COMMERCIAL APPLICATIONS

- Personalized ACT immunotherapy to treat human cancers using T cells obtained from a tumor sample
- Possible integration into a standard procedure for obtaining tumor-reactive T cells/TIL from a tumor as part of a GMP-compliant TIL manufacturing process that gains regulatory approval as a personalized cancer treatment option
- The immunotherapy component of a combination cancer therapy cancer regimen targeting specific tumor antigens in individual patients
- More rapid tumor-reactive T cell culturing process for laboratory testing

COMPETITIVE ADVANTAGES

- Simpler: Tumor-reactive T cells/TIL can be selected for ACT from a bulk population derived from a tumor sample using common laboratory techniques
- More rapid: Selection of T cells/TIL based on expression of specific cell surface markers will reduce the culture time for these T cells before infusion into the patient to fight the tumor
- Less screening: This selection method eliminates the need to screen T cells/TIL for autologous tumor recognition before re-infusion into the patient

INVENTOR(S)

[Steven A. Rosenberg \(NCI\)](#)

DEVELOPMENT STAGE

- Discovery (Lead Identification)

PATENT STATUS

- **U.S. Filed:** US, Application No. 61/771,247 filed 01 Mar 2013
- **Foreign Filed:** PCT Application No. PCT/US13/38799 filed 30 Apr 2013

RELATED TECHNOLOGIES

- E-085-2013
- E-273-2009
- E-275-2002

THERAPEUTIC AREA

- Cancer/Neoplasm