



## Effective and Robust Method of T Cell Expansion and Activation

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for efficiently expanding and activating T cell populations for genetic engineering and adoptive T cell immunotherapies.

The new method is based in part on the researchers' discovery of the role of BAFF (B cell activating factor) and its receptor BAFF-R/BR3 in T cell suppression, and removes a significant bottleneck in the production/manufacture of T cells.

### Overview

*Ex vivo* expansion and activation of T cells are prerequisites for any form of genetically engineered T cell immunotherapy. Several expansion and activation methodologies have been developed. However, widespread utilization of T cell immunotherapies has been hindered by the lack of rapid, cost-effective and efficient methods for selecting and expanding clinical-grade, therapeutic T cell products that proliferate and persist *in vivo*.

There remains a need for more robust methodologies for expanding T cell populations having clinical therapeutic potential.

### The Invention

UW-Madison researchers have shown for the first time that the addition of inhibitors which block the binding of BAFF to its receptor BAFF-R/BR3 activates both CD4+ and CD8+ cytolytic T cells such that the killing of target human tumor cell lines is significantly augmented.

Specifically, the researchers demonstrated *in vitro* that a neutralization antibody to the BAFF receptor, BR3, significantly increased CRTAM+ CD4+ and CD8+ T cell proliferation and their anti-tumor cytotoxic activity via increases in granzyme B. This was shown for even aggressive melanoma cell lines such as A375 whereby a four day co-culture with BR3 neutralized T cells almost completely eradicated the tumor cells from culture. This innovation removes a significant roadblock in the industrial production/manufacture of T cells *ex vivo* for T cell and chimeric antigen receptor (CAR) T cell immunotherapy, which is currently one of the most exciting new cancer therapies.

### Applications

- Expansion and activation of T cell populations for genetic engineering and adoptive T cell immunotherapies

### Key Benefits

- Potential for effective, efficient and robust results
- Based on a novel UW-Madison discovery

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### Stage of Development

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*In vitro* data support the researchers' hypothesis that BAFF, when bound to its receptor BR3, mediates T cell suppression. When peripheral blood lymphocytes are stimulated with T cell stimulatory antibodies anti-CD3 and anti-CD28, both CD4+ and CD8+ T cell proliferation is induced. Addition of antibodies that specifically neutralize the BAFF receptor BR3 further expands proliferation of both cytotoxic CD4+ and CD8+ T cells significantly.

The researchers also detected extreme increases in IFN- $\gamma$  production as well as increases in the production and/or secretion of the CD8+ T cell toxin granzyme B. These data strongly suggest that BR3 is one of the essential suppressors of CD4+ and CD8+ cytotoxic T cell activation and proliferation. These new data demonstrate that BAFF blockade can actively and significantly increase a T cell-mediated immune response.

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

## Additional Information

### For More Information About the Inventors

- [Peiman Hematti](#)

### Tech Fields

- [Therapeutics & Vaccines : Oncology](#)

For current licensing status, please contact Andy DeTienne at [adetienne@warf.org](mailto:adetienne@warf.org) or 608-960-9857

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