

## **InvenioIP - Technology Details**

**Institution:** University of Maryland, Baltimore

**Docket:** SS-2009-030

**Title:** Blocking B-cell Associated CD137 for the Treatment of Rheumatic Diseases and Cancer

**Summary:** Co-stimulatory molecules provide secondary signals which help regulate various aspects of the complex immune response. CD137 is one such inducible co-stimulatory molecule, a glycoprotein located on the surface of immune cells which helps regulate antigen stimulated T cells and NK cells. Stimulation of CD137 by its natural ligand, CD137L, or by agonistic antibodies promotes T cell activation and proliferation and promotes immune cell survival. In mouse models of arthritis and lupus, stimulation of CD137 ameliorates disease onset and progression. However, the UMB inventors have discovered an important difference between mice and humans - that activated human B lymphocytes express CD137 and mouse cells do not, making the mouse an uncertain model of human clinical response. The UMB research shows that CD137-mediated co-stimulation results in the survival and proliferation of B cells and promotes cytokine production. B cells play a key role in the pathogenesis of diseases such as rheumatoid arthritis, and early UMB data shows that CD137-mediated B cell stimulation may be implicated in this disease. A potentially important application of this discovery is that blockade of CD137 may be effective for the treatment of human autoimmune disorders and cancers that are associated with aberrant B lymphocytes and/or CD137 expression.

**Applications:**

- Treatment for cancers, including to enhance the effects of chemotherapy
- Treatment for autoimmune disorders
- Biomarker for disease diagnosis or prognosis or for monitoring therapeutic progress

Autoimmune disorders encompass a broad range of diseases that are characterized by a common pathogenic process in which the body's immune system attacks its own cells. The most common of these disorders are rheumatoid arthritis, systemic lupus erythematosus, multiple sclerosis, inflammatory bowel disease, and psoriasis. An estimated 8.5 million Americans suffer from autoimmune diseases, with over 300,000 new cases diagnosed each year, and it's estimated that healthcare costs for these diseases in the U.S. each year amounts to \$87 billion. Contributing to the high treatment costs is the use of combination therapies and the need to treat patients chronically. Current treatment options do not fully address the healthcare needs of patients suffering from these diseases.

**Advantages:** This technology presents a novel clinical target for developing treatments for certain autoimmune disorders and cancers and as a disease biomarker.

**State of Development:** The UMB researchers found that CD137 is expressed in vitro on anti-Ig-stimulated peripheral blood B cells and in vivo on tonsillar B cells with an activated phenotype. Studies are ongoing at UMB to evaluate disease associated CD137 expression and function on B cells from patients with rheumatoid arthritis and systemic lupus erythematosus. In addition, in vivo studies are planned using xenograft models.

**R and D Required:** Further pre-clinical validation for treatment of specific disease.

**Licensing Potential:** UMB seeks partners for licensing, clinical development, and/or sponsored research to advance this technology into the healthcare field.

**Patent Status:** U.S. Provisional Patent Application

**Related Publications:** "CD137 promotes proliferation and survival of human B cells." Zhang X, Voskens CJ, Sallin M, Maniar A, Montes CL, Zhang Y, Lin W, Li G, Burch E, Tan M, Hertzano R, Chapoval AI, Tamada K, Gastman BR, Schulze DH, Strome SE. J Immunol. 2010 Jan 15;184(2):787-95.

**Files:**  [Zhang et al., 2010. J. Immunol.](#)

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