Ex-vivo Production of Regulatory B-Cells for Use in Auto-immune Diseases

Summary (1024-character limit)
Regulatory B-cells (Breg) play an important role in reducing autoimmunity and reduced levels of these cells are implicated in etiology of several auto-inflammatory diseases. Despite their impact in many diseases, their physiological inducers are unknown. The National Eye Institute seeks parties interested in licensing or collaborative research to co-develop a process for the production of regulatory B-Cells for use in auto-immune indications.

NIH Reference Number
E-036-2012

Product Type
- Therapeutics

Keywords
- B-Cell
- eye
- multiple sclerosis
- sarcoidosis
- colitis
- arthritis

Collaboration Opportunity
This invention is available for licensing and co-development.

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Description of Technology

Regulatory B-cells (Breg) play an important role in reducing autoimmunity and reduced levels of these cells are implicated in etiology of several auto-inflammatory diseases. Despite their impact in many diseases, their physiological inducers are unknown. Given that Bregs are a very rare B-cell, identifying factors that promote their development would allow in vivo modulation of Breg levels and ex-vivo production of large amounts of antigen-specific Bregs to use in immunotherapy for auto-inflammatory

diseases.

Researchers at NEI's Molecular Immunology Section developed a method for the *ex-vivo* production of Breg. The method of production involves treating isolated primary B-cells or B-cell lines with IL-35 to induce their conversion into IL-10, producing Breg. Using this method, B-regulatory cells can be produced in large quantity and used in a Breg-based therapy against autoimmune diseases including, but not limited to, uveitis and sarcoidosis. *In vivo* animal data are available.

Potential Commercial Applications

- *In vivo* modulation of Breg levels
- Supplement the low population of Breg in a patient suffering from an autoimmune disease where it is known that B-regulatory cell populations are severely reduced (i.e. uveitis)
- Use in immunotherapy for the treatment of other autoimmune diseases such as multiple sclerosis, sarcoidosis, colitis, and arthritis.

Competitive Advantages

- There is no known biological or chemical agent that can induce Bregs *ex-vivo*
- This method produces large quantities of Bregs and can therefore aid in Breg-based therapy
- Pre-clinical mouse model data available that uses the Bregs to treat experimental autoimmune uveitis (EAU)

Inventor(s)

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Development Stage

- Pre-clinical (in vivo)

Publications

N. Carter et al. Mice lacking endogenous IL-10-producing regulatory B cells develop exacerbated disease and present with an increased frequency of Th1/Th17 but a decrease in regulatory T cells. [PMID 21464089]

Q. Ding et al. Regulatory B cells are identified by expression of TIM-1 and can be induced through TIM-1 ligation to promote tolerance in mice. [PMID 21821911]

Patent Status

- **U.S. Patent Issued:** U.S. Patent Number 9,962,897, Filed 25 Apr 2012, Issued 17 Apr 2017

Therapeutic Area

- Immune System and Inflammation