

EX-VIVO PRODUCTION OF REGULATORY B-CELLS (BREG) FOR USE IN AUTO-IMMUNE INDICATIONS

SUMMARY

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.

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)

[Charles E. Egwuagu](#), Ren-Xi, Wang, Cheng-Rong Yu (all of NEI)

DEVELOPMENT STAGE

- Pre-clinical (in vivo)

PUBLICATIONS

1. Carter NA, 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. *J Immunol*. 2011 May 15;186(10):5569-79. [[PMID 21464089](#)]
2. Ding Q, 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. *J Clin Invest*. 2011 Sep;121(9):3645-56. [[PMID 21821911](#)]

PATENT STATUS

- **U.S. Filed:** U.S. Patent Application No. 61/637,915 filed 25 Apr 2012
- **Not Patented**

THERAPEUTIC AREA

- Immune System and Inflammation