Finding the Balance: Modulating cAMP Levels to Treat Th2/Th17-mediated Immunopathologies - 2013-282

Tech ID: 25176 / UC Case 2011-208-0

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OTHER INFORMATION

KEYWORDS

cAMP, dendritic cell, Th2, Th-2, Th17, Th-17, immunopathologies, immunopathology, Gas, Gal, agonists, agonism, antagonist, antagonism, inflammatory, inflammation, asthma, rhinitis, dermatitis, allergy, allergies, Crohn's disease, multiple sclerosis, MS, C

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Medical**
  - Disease: Respiratory and Pulmonary System

RELATED CASES

2011-208-0, 2013-282-0, 2014-282-0, 2013-334-0, 2014-084-0

BACKGROUND

In normal immunologic function, the body appropriately balances cAMP-regulated pathways. However, UC investigators have found that when cAMP levels in dendritic cells are too low or too high, there is a bias, respectively, toward either Th2 or Th17 response and the immunopathologies associated with each pathway.

TECHNOLOGY DESCRIPTION

Studies in cAMP-deficient mice (GNASCD11c KO mice) have led to an understanding of how drugs under development (i.e., Gαs and Gαi agonists and antagonist) may be used for the treatment of inflammatory diseases. GNAI2CD11c KO mice will be available by early 2016.

APPLICATIONS

Based on the finding that cAMP levels in dendritic cells maintain the balance between Th2 and Th17 activation:

- Increasing levels of cAMP (via Gai antagonists or Gas agonists) may be useful to treat Th2-mediated diseases, including asthma, rhinitis, dermatitis and food allergies
- Decreasing levels of cAMP (via Gαi agonists or Gαs antagonists) may be useful to treat Th17-mediated diseases, including Crohn's disease, multiple sclerosis and COPD

ADVANTAGES

Application and development of this over-arching model of how Th2 and Th17 are regulated may clarify cellular and the molecular mechanisms which toggle between appropriate and inappropriate Th2 and Th17 responses thereby enabling the development of novel therapeutics for patients.

STATE OF DEVELOPMENT

In vitro and *in vivo* studies have identified the relevant cells and the pathway by which low cAMP levels in dendritic cells provokes an excessive Th2 immune responses and allergic eosinophilic bronchial asthma whereas high cAMP levels in dendritic cells provokes excessive Th17 responses and neutrophilic asthma.

INTELLECTUAL PROPERTY INFO

US rights available for licensure. See "Patent Status", below.

RELATED MATERIALS

- E. Raz (2013) A Novel Approach to Explore Th2-Biased Immunity: Implications for Asthma and Allergic Diseases, Manuscript in preparation (available under confidentiality)
- Lee J, et al., Cyclic AMP concentrations in dendritic cells induce and regulate Th2 immunity and allergic asthma, Proc Natl Acad Sci U S A. 2015, 3;112(5):1529-34.
- Li, X., et al., Divergent requirement for Gas and cAMP in the differentiation and inflammatory
- Kim HY, et al., The many paths to asthma: phenotype shaped by innate and adaptive immunity. Nat Immunol, 2010, 11: 577-84
- Pulendran B, et al., Programming dendritic cells to induce T(H)2 and tolerogenic responses. Nat Immunol, 2010, 11: 647-55

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2014059147	04/17/2014	2011-208

RELATED TECHNOLOGIES

- Novel Murine Model of Asthma Identifies Methods to Antagonize Th2 Response, Asthma and Allergic Disease

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