Beneficial Effects of Novel Inhibitors of Soluble Epoxide Hydrolase as Adjuvant Treatment for Cardiac Cell-Based Therapy

Tech ID: 24317 / UC Case 2014-956-0

CONTACT

Amir J. Kallas

ajkallas@ucdavis.edu

tel: .

INVENTORS

- Chiamvimonvat, Nipavan
- Hammock, Bruce D.

OTHER INFORMATION

KEYWORDS

adjuvant, arrhythmia, cardiac, cell therapy, epoxide hydrolase, failure, fibrosis, hypertrophy, inhibitor

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Materials & Chemicals**
  - Biological
- **Medical**
  - Disease: Cardiovascular and Circulatory System
  - New Chemical Entities, Drug Leads

ABSTRACT

Researchers at the University of California, Davis have identified several novel inhibitors of soluble epoxide hydrolase that may serve as adjuvant treatment for cardiac cell-based therapy. In addition to preventing the development of hypertrophy, fibrosis, and arrhythmias in models of cardiac hypertrophy and failure, soluble epoxide hydrolase inhibitors may be used as adjuvant treatment in cardiac cell-based therapy by increasing stem cell survival and integration within the host cardiac cells.

FULL DESCRIPTION

Cardiac hypertrophy is a type of heart disease which eventually results in cardiac failure. The disease is not reversible and aside from heart transplantation, current treatment is limited to therapy for amelioration of symptoms. As a result, alternative therapies are currently under investigation, and cardiac cell-based therapy may potentially replace cardiac transplantation in the future. However, one barrier to cell-based regenerative therapy is promoting stem cell survival and integration within injured tissue that is undergoing remodeling, and exhibits robust inflammatory responses.

Researchers at the University of California, Davis have discovered novel inhibitors of soluble epoxide hydrolases (sEHIs) that suppress pro-inflammatory cytokines and chemokines at the injury site. Using a mouse model of myocardial infarction, human induced pluripotent stem cell derived cardiomyocytes (hiPSC-CMs) were transplanted into mouse myocardium treated with these novel sEHIs. Following treatment with sEHIs, animals experienced decreases in infarct size and prevention of cardiac dilatation post-MI. In addition, sEHI treatment resulted in a decrease in apoptotic cardiomyocytes and non-myocytes, a decrease in reactive oxygen species production in tissue, and the suppression of cytokine-mediated inflammation in tissue. Furthermore, it has been shown that sEHIs can be easily administered and have few side effects. When combined, these data demonstrate improved cardiac function, prevention of adverse cardiac remodeling and enhanced engraftment of hiPSC-CMs in the injured myocardium with sEHI treatment. Thus, the suppression of inflammation and resolution of pre-existing fibrosis using sEHIs may become an adjuvant to cell-based therapy for cardiac hypertrophy and failure.

APPLICATIONS

- Adjuvant treatment in cardiac cell-based therapy.
- Reduce the development of cardiac fibrosis, hypertrophy, failure, and arrhythmias.

FEATURES/BENEFITS

- Promotes stem cell survival and integration with host cardiac cells.
- Suppresses pro-inflammatory cytokines and chemokines in tissue.
- Reduces cardiac fibroblast proliferation.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,690,837	07/04/2023	2014-956
United States Of America	Issued Patent	10,369,141	08/06/2019	2014-956

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Method of Preventing Bone Loss and Periodontal Disease
- Multi-Target Inhibitors for Pain Treatment

- Therapeutics

RELATED CASES

2014-956-0

- Improved Dioxin Detection and Measurement
- Detection System for Small Molecules
- Small Molecule sEH Inhibitors to Treat Alpha-Synuclein Neurodegenerative Disorders
- Soluble Epoxide Hydrolase-Conditioned Stem Cells for Cardiac Cell-Based Therapy
- Antibodies: Bacillus Delta Endotoxin PAbs
- Antibodies: Bromacil Herbicide PAbs
- Novel Neuropathy Treatment Using Soluble Epoxide Inhibitors
- Novel and Specific Inhibitors of p21
- Antibodies for Pseudomonas (P.) aeruginosa
- Antibodies: Urea Herbicide Pabs
- Bioavailable Dual sEH/PDE4 Inhibitor for Inflammatory Pain
- Engineered Biomaterial to Prevent Endothelial Inflammation
- Chemical Synthesis of Lipid Mediator 22-HDoHE and Structural Analogs
- Antibodies: Triazine Herbicide Pabs
- Optimized Non-Addictive Biologics Targeting Sodium Channels Involved In Pain Signaling
- Soluble Epoxide Hydrolase Inhibitors For The Treatment Of Arrhythmogenic Cardiomyopathy And Related Diseases
- A New Pharmaceutical Therapy Target for Depression and Other Central Nervous System Diseases

University of California, Davis
Technology Transfer Office
1 Shields Avenue, Mrak Hall 4th Floor,
Davis,CA 95616

Tel:
530.754.8649
techtransfer@ucdavis.edu
https://research.ucdavis.edu/technology-transfer/
Fax:
530.754.7620