LIVE IMAGING OF CORNEAL LYMPHATIC VESSELS

Tech ID: 21887 / UC Case 2012-012-0

BRIEF DESCRIPTION

Lymphatic research is an explosive field of new discovery in recent years. Lymphatic dysfunction has been found in a wide array of disorders which include but are not limited to cancers and tumors, inflammation, infection, autoimmune diseases, dry eye, chemical burn, and tissue or organ transplant rejection, etc. The cornea provides an optimal site for lymphatic research due to its accessible location, transparent nature, and lymphatic-free but inducible features. Because there are no pre-existing vessels to consider in this unique tissue, it is exceptionally straightforward and accurate to assess lymphatic events (from formation to maturation and regression) in the cornea. Since lymphatic vessels are not easily visible as blood vessels, previous studies using the cornea have relied on traditional immunohistochemistry assays with dead tissues. Currently, there are no means of direct and harmless visualization of lymphatic vessels within live cornea.

Investigators at University of California at Berkeley have addressed this challenge by developing the first live imaging of corneal lymphatic vessels. Lymphatic specific dye is injected into the subconjunctival space to visualize lymphatic vessels at various stages in the cornea under a fluorescence stereo, confocal, or two-photon microscope. Moreover, lymphatic vessels can be visualized in different colors to produce two, three, and four-dimensional images or live videos at a molecular level. The investigators have demonstrated a proof of principle in live mouse cornea. The technique allows time course tracking of dynamic lymphatic processes within the same tissue or subject over a short or long period of time, and can be ideally used to assess the progression of disease development and the effect of drug treatment. Live imaging of corneal lymphatic vessels allows visualization of lymphatic vessels in their natural morphology, state, and interactions with the local environment. This noninvasive method of live imaging of corneal lymphatic vessels is readily applicable to patient examination and the lymphatic dye of dextran is bio-degradable and harmless to human health.

ADVANTAGES

- Identifies lymphatic vessels in live and intact corneas, which can be induced by a variety of pathological stimulations, such as inflammation, cancers and tumors, infection, trauma, transplantation, or chemical burn
- Lymphatic vessels can be labeled in different colors
- Provides live molecular level videos and detailed 2-4 dimensional lymphatic vessels pictures
- Over-the-course longitudinal observation of dynamic lymphatic processes (from formation to maturation and regression) in the same tissue and subject
- Detects lymphatic interaction with other components in the local environments, such as cells, blood vessels, and nerves
- Non-invasive local method; dye is bio-degradable and harmless to human health
- Readily applicable to patient setting

APPLICATIONS

- Research systems and apparatus for use with a broad spectrum of molecular and cellular mechanisms underlying lymphatic processes from formation to maturation and regression in laboratory and in clinics
- Research systems and apparatus to assess and diagnose lymphatic vessels of the cornea in diseases, and provide guidelines for therapeutic intervention of lymphatic processes, whether at the early, middle, or late stages, or before and after a pharmaceutical intervention.

CONTACT

Laleh Shayesteh
lalehs@berkeley.edu
tel: 510-642-4537.

INVENTORS

- Chen, Lu

OTHER INFORMATION

CATEGORIZED AS

- **Agriculture & Animal Science**
  - Animal Science
- **Biotechnology**
  - Health
- **Imaging**
  - Medical
- **Medical**
  - Delivery Systems
  - Devices
  - Diagnostics
  - Disease: Blood and Lymphatic System
  - Disease: Ophthalmology and Optometry
  - Imaging
  - Research Tools
  - Screening
- **Research Tools**
  - Screening Assays
- **Sensors & Instrumentation**

» Lymphatic specific drug delivery tool

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,724,035	08/08/2017	2012-012

RELATED MATERIALS

» Live Imaging of Newly Formed Lymphatic Vessels in the Cornea - 11/15/2011

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Modulation of Sc Function To Treat Glaucoma

▶ Modulation Of Wnt5a To Treat Glaucoma

» Medical

» Scientific/Research

» **Veterinary**

» Diagnostics

RELATED CASES

2012-012-0

University of California, Berkeley Office of Technology Licensing

2150 Shattuck Avenue, Suite 510, Berkeley,CA 94704

Tel: 510.643.7201 | Fax: 510.642.4566

https://ipira.berkeley.edu/ | otl-feedback@lists.berkeley.edu