Novel Non-Immunogenic Positron Emission Tomography Gene Reporter

Tech ID: 30321 / UC Case 2007-474-0

SUMMARY

UCLA researchers in the Department of Pharmacology and Department of Microbiology, Immunology, & Molecular Genetics have developed a novel positron emission tomography reporter gene to preferentially trap radiolabeled deoxycytidine analogs.

BACKGROUND

Positron Emission Tomography (PET) is a non-invasive imaging tool that is used to monitor the metabolic activity of tissues within a patient's body. PET scanners detect positron emitting isotopes or probes that are taken up by biologically active cells. This technique has been modified as a reporter system for cellular imaging. In a PET reporter gene system, a reporter gene is introduced to cells of interest that encodes either an enzyme or a receptor that functions to induce the accumulation of PET probes into or onto a cell surface. Once the cells are labeled by the presence of the PET probes, they can be detected within the body by a PET scanner, thus allowing downstream image analysis of cells of interest.

INNOVATION

UCLA researchers have developed a novel gene that encodes an enhanced version of deoxycytidine kinase (EdCK) to function as a PET reporter. EdCK preferentially traps radiolabeled analogs of deoxycytidine, a novel field of probes. This EdCK has been modified to achieve high levels of expression and reporter activity within cells, making it a robust system for labeling cells of interest. Furthermore, EdCK is a human gene and therefore would not cause an immunogenic response in human subjects, making it a potential tool for labeling cells for cell transplantation therapy.

APPLICATIONS

- Targeted cell labeling in vitro and in vivo

ADVANTAGES

- Utilizes novel fluorinated deoxycytidine analogs (which may have improved pharmacokinetics and signal-to-noise ratios compared to currently used probes)
- Non-immunogenic

STATE OF DEVELOPMENT

Testing in cell culture to determine the efficacy of EdCK compared to dCK as a PET reporter.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Nucleic Acid Tetramers For High Efficiency Multiplexed Cell Sorting
- Mouse Model Deficient for the Proton Sensing Gpcr T-cell Death-associated Gene 8 (tdag)
- Anti-Human Deoxycytidine Kinase (dCK) Monoclonal Antibody
- Targeted Mass Spectrometry Approaches To Detect Kinase Pathways For Personalized Medicine
- G2A GPCR Deficient Mouse Model and G2A Monoclonal Antibody
- Proton-sensing G Protein-coupled Receptor 4 Knockout

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OTHER INFORMATION

KEYWORDS

Positron emission tomography, PET, PET probe, reporter system, cell targeting, gene reporter, imaging, non-immunogenic, deoxycytidine, deoxycytidine kinase

CATEGORIZED AS

- **Imaging**
  - Medical
  - Molecular
- **Medical**
  - Imaging
  - Research Tools
- **Research Tools**
  - Expression System

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