Novel Non-Immunogenic Positron Emission Tomography Gene Reporter
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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)
▶ Surfaceome Profiling Of Advanced Prostate Cancer To Identify Target Antigens For Immune-Based Therapy
▶ Anti-Human Deoxyctydine Kinase (dCK) Monoclonal Antibody
▶ A Novel Positron Emission Tomography Probe for Imaging Liver Disease and Metabolic Imbalance
▶ Human-Derived Reporter Gene for Positron Emission Tomography Imaging
▶ 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
▶ Derivation Of A Human Neuroendocrine Prostate Cancer Cell Line With Defined Oncogenic Drivers
▶ Novel Polyclonal Antibody to Detect a Bruton's Tyrosine Kinase Phosphorylation Site
▶ Non-Immunogenic Positron Emission Tomography Gene Reporter Systems
▶ Composition of NY-ESO-1-Specific T Cell Receptors Restricted on Multiple Major Histocompatibility Complex Molecules