Non-Immunogenic Positron Emission Tomography Gene Reporter Systems
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SUMMARY
UCLA researchers in the Department of Pharmacology and Department of Microbiology, Immunology, & Molecular Genetics have developed a novel dual gene positron emission tomography reporter system for the enhanced labeling of cells in vitro and in vivo.

BACKGROUND
Positron Emission Tomography (PET) is a non-invasive imaging tool that has been used in the clinic for imaging metabolic processes within a patient’s body. Positron emitting isotopes or probes are injected into patients and are then taken up by biologically active molecules which are detected by a PET scanner. This system has been modified to be used as an imaging tool for research as well. Cells of interest can be targeted to express a gene that results in the preferential accumulation of PET probes, thus tagging these cells for imaging. These genes typically encode either an enzyme, which catalyzes the PET probe to intracellularly trap it, or a receptor, which binds to a positron-emitting ligand. Signals from the probe can then be detected by a PET scanner for further downstream image analysis.

INNOVATION
UCLA researchers have developed a novel dual gene PET reporter system that utilizes two genes to drive the accumulation of PET probes into target cells. One of the genes encodes a transporter, which allows for selective internalization of the probe into cells, and the other encodes a downstream kinase that catalyzes the probe to intracellularly trap it. By using these two reporter genes, this invention exhibits greater specificity and avidity compared to other single gene PET reporter systems. Furthermore, this system is designed to use human genes that 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
- Dual gene system results in improved specificity in vivo labeling and accumulation of PET probes in target cells
- Non-immunogenic

STATE OF DEVELOPMENT
Testing in cell culture showed improved labeling of cells compared to single gene PET reporter systems.

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)
- Surfacerome Profiling Of Advanced Prostate Cancer To Identify Target Antigens For Immune-Based Therapy
- Anti-Human Deoxycytidine Kinase (dCK) Monoclonal Antibody
- A Novel Positron Emission Tomography Probe for Imaging Liver Disease and Metabolic Imbalance
- Novel Non-Immunogenic Positron Emission Tomography Gene Reporter
- 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
- Composition of NY-ESO-1-Specific T Cell Receptors Restricted on Multiple Major Histocompatibility Complex Molecules