

# 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 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.

## CONTACT

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## INVENTORS

- ▶ Witte, Owen N.

## OTHER INFORMATION

### KEYWORDS

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

### CATEGORIZED AS

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

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