89Zr-Oxine Complex for In Vivo PET Imaging of Labelled Cells and Associated Methods

Summary (1024-character limit)
The National Cancer Institute seek parties interested in in-licensing and/or collaborative research to develop and commercialize cell labeling, cell tracking, cell trafficking, cell-based therapy, and PET imaging for cancer.

NIH Reference Number
E-080-2014

Product Type
- Diagnostics
- Research Tools

Keywords
- Zirconium-89
- 89Zr
- oxine
- cell labeling

Collaboration Opportunity
This invention is available for licensing and co-development.

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Description of Technology
This technology from the NCI Molecular Imaging Program relates to a Zirconium-89 (89Zr)-oxine complex for cell labeling, tracking of labeled cells by whole-body positron emission tomography/computed tomography (PET/CT) imaging, and associated methods. A long half-life of 89Zr (78.4 hours), high sensitivity of PET, and absence of background signal in the recipient enable tracking cells over a week using low levels of labeling radioactivity without causing cellular toxicity.

The 89Zr-oxine complex is synthesized quickly by mixing components at room temperature and produces high yields. Cell labeling is achieved by a short, room temperature incubation. The 89Zr-oxine complex is capable of labeling a wide range of cell types of therapeutic or pathogenic relevance (natural,
disease, engineered cells), independent of factors such as cell cycle or receptor expression. The label is retained during cell division. 89Zr-oxine labeled cells can also be easily cross labeled (for example, optically or magnetically) for multi-modality imaging and analysis. Labeled cell migration and kinetics can be analyzed and quantified in vivo over a week, improving research strategies and ability to develop and improve cell therapies and diagnostics.

This technology will be of interest to those engaged in cell-based therapies during which cells of various types are infused for therapeutic purposes. A broad range of cells can be labeled, tracked throughout the entire body and the method is applicable to human applications. In addition to improving the understanding of cell trafficking in general, the technology could be useful in determining whether cellular engineering improves the delivery of cells to their intended target.

This technology will also be of interest to those engaged in basic research on the behavior of cells of various types in the body under various physical or manipulated conditions.

**Potential Commercial Applications**
- Cell-based therapies during which cells of various types are infused for therapeutic purposes: A broad range of cells can be labeled, tracked throughout the entire body and the method is applicable to human applications. In addition to improving the understanding of cell trafficking in general, the technology could be useful in determining whether cellular engineering improves the delivery of cells to their intended target.
- Studying behavior of cells of various types in the body under various physical or manipulated conditions.

**Competitive Advantages**
- Simple preparation of a broadly-applicable cell label
- Provides high resolution imaging and monitoring over period of a week
- Low toxicity, easily combined with labeling technologies and cell therapies.

**Inventor(s)**
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**Development Stage**
- Pre-clinical (in vivo)

**Patent Status**
- **U.S. Patent Filed:** U.S. Patent Application Number 61/973,706, Filed 01 Apr 2014
- **Foreign Filed:** Foreign Filed - Patent Application PCT/US2015/023897, Filed 01 Apr 2015

**Therapeutic Area**
- Cancer/Neoplasm

NCI Technology Transfer Center