Drug Discovery & Development

Novel Methods for In Vivo Cell Tracking

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The Wisconsin Alumni Research Foundation is seeking commercial partners interested in developing a novel cell radiolabeling technology that involves chemical modifications of surface glycans for in vivo cell tracking.

Overview

Cell therapy is a novel and promising approach to treating diseases such as rheumatoid arthritis, atherosclerosis, acute ischemia, myocardial infarction, diabetes, graft versus host disease and cancer. In cell therapy, genetically engineered leukocytes are administered to the patient and can restore the immune system balance, actively fighting the disease.

The ability to track cell dynamics *in vivo* is a key component in developing cell therapies. Positron emission tomography (PET) imaging offers a powerful tool for cell tracking, but radiolabeling methods with high yields are needed. Current radiolabeling methods, such as metabolic uptake (18F-FDG), passive diffusion (111In/ 89 Zr-oxine) and phagocytosis of 18F-labelled nanoparticles, are non-specific and have low yield. Now, UW-Madison researchers have designed a novel radiolabeling technique with better yield that could significantly enhance the development capabilities for accurate, efficacious and safe cell therapies.

The Invention

Researchers at UW-Madison have developed a novel cell radiolabeling technology that tracks the in vivo fate of cells using PET imaging. Chemical modification of ubiquitous surface glycans on cells results in unprecedented high radiolabeling yields, making *in vivo* tracking simpler and more powerful.

This novel labeling technology increases the *in vivo* stability of radiolabeled cells and the sensitivity of PET to detect relatively small numbers of injected cells, due to the increased labeling yield. Therefore, it sheds light on the biodistribution of systemically administered radiolabeled cells, a vital component of cell therapy development. By facilitating accurate and precise preclinical and clinical studies, this technology may accelerate the translation of cell therapies to humans.

Applications

- Development of noninvasive imaging technologies for cell therapies
- Impacts cell therapies regarding patient selection, target tissues homing assessment, treatment response prediction and life-threatening toxicities evaluation
- Quality control for manufacturing cell therapies

Key Benefits

- Significantly advances preclinical and clinical development of cell therapies such as stem cell-based, chimeric antigen receptor (CAR)-based and other novel cell therapies
- Uses mild instead of harsh conditions for radiolabeling

- Cells labeled with this method have 75-fold higher molar activity as compared to cells labeled with existing non-specific labeling methods.
- Enables higher spatial-temporal resolution in tracking studies
- Enables tracking of smaller numbers of labeled cells in tracking studies

Additional Information

For More Information About the Inventors

- Reinier Hernandez

Tech Fields

- Drug Discovery & Development : Other drug discovery & development
- Medical Imaging : Other diagnostic imaging

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847