



Memorial Sloan Kettering
Cancer Center.



Centro de Investigación Biomédica en Red
Enfermedades Respiratorias



TECHNOLOGY OFFER:

BIMODAL LIPOSOMES FOR PET AND OPTICAL IMAGING OF TUMORS

SUMMARY OF INVENTION

Liposomal drug delivery is an established nanomedicine platform and has gained significant clinical acceptance. However, there is high unmet need to monitor such drug delivery, release, and efficacy. This invention was developed to provide a solution for such monitoring by labeling liposomes with ^{89}Zr for PET imaging and a near-infrared (NIR) fluorophore for optical imaging.

These bimodal labeled liposomes enable simultaneous PET and intraoperative optical imaging to non-invasively visualize the biodistribution and disease targeting of liposomal therapeutics. They match the long circulation time of liposomal therapeutics with high stability, and demonstrate an outstanding ability to target xenografts and orthotopic mouse models of breast cancer in vivo.

Moreover, these nanoparticles accumulate in areas with leaky vasculature through the enhanced permeability and retention (EPR) effect, and they can be used to detect and delineate malignant growth, inflammation, and infection in diverse disease contexts.

ADVANTAGES

- Combined advantages of PET imaging (excellent tissue penetration and high sensitivity) and optical techniques (high spatial resolution)
- Powerful intraoperative imaging tool with wide applications in cancer, cardiovascular, and other diseases.

- Can be used as a companion imaging agent to evaluate the safety and efficacy of nanotherapeutics in preclinical and clinical settings

MARKET OPPORTUNITIES

The global nanomedicine market was valued at over US\$70 billion in 2011 and is expected to reach US\$130 billion by 2016. There are more than 30 liposomal nanomedicines approved for clinical use and/or being tested in clinical trials in treating cancers, cardiovascular diseases, infections, and inflammations. This invention is of high value as a theranostic platform to enable visualization of the liposomal drug delivery and provide physicians with information for risk-benefit analysis of a given nanotherapeutic on a personalized basis.

AREAS OF APPLICATION

Imaging Tool, Diagnostic

STAGE OF DEVELOPMENT

in vivo

PATENT INFORMATION

Patent application filed, No. 62/008,999
PCT/US2015/032556 27/5/15

KEY PUBLICATION

Pérez-Medina C et al. A Modular Labeling Strategy for In Vivo PET and Near-Infrared Fluorescence Imaging of Nanoparticle Tumor Targeting. *J Nucl Med.* 2014;55:1706-1711

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