Washington University in St. Louis
Office of Technology Management

TISSUE-PENETRATING PET RADIOTRACER FOR NON-INVASIVE DETECTION OF ROS AND INFLAMMATION

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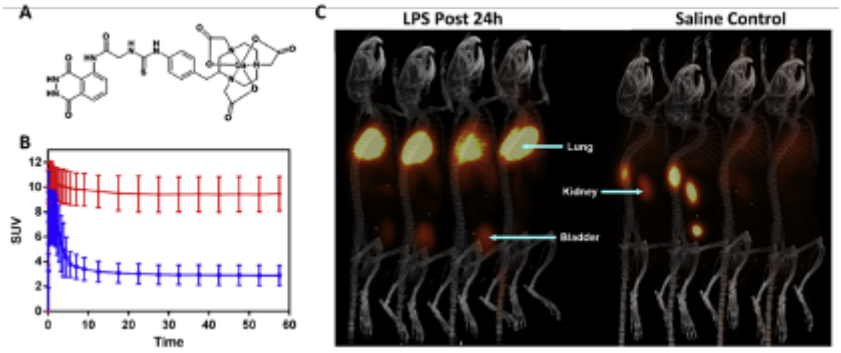
T-019479 Tissue-penetrating PET radiotracer for non-invasive detection of ROS and inflammation.

Technology Description

^{18}F-fluorodeoxyglucose (^{18}F-FDG) has long been used for the diagnosis of neoplasms, and recently Alzheimer's disease. However, ^{18}F-FDG signals are often not correlated with oxidative stress. Moreover, previously developed ROS-specific radiotracers have poor tissue penetration and/or low signal-to-noise ratio. To address these problems, investigators at Washington University have designed a new class of PET radiotracers with high sensitivity for ROS. The lead candidate, called ^{68}Ga-Galuminox, efficiently accumulates in a variety of tissues, such as lungs and kidneys, that are undergoing high oxidative or inflammatory stress.



A. Structure of ^{68}Ga-Galuminox. **B.** PET signals over time in mice treated with lipopolysaccharide (red) or saline (blue) 24-hr prior to imaging. **C.** Representative PET images of mice injected with ^{68}Ga-Galuminox, with or without LPS treatment. There's approximately 4-fold higher uptake and retention in the lungs of LPS-treated mice and PET signals strongly correlated with acute lung injury.

Stage of Research

The PET radiotracer has been tested in several disease models.

Applications

- Non-invasive imaging of both acute and chronic inflammatory states such as acute

respiratory distress syndrome and nephrotic syndrome.

Key Advantages

- Compared to other non-metal radionuclides, Gallium-68 is affordable to produce on-demand by healthcare facilities as well as by laboratories.
- Synthesis has been optimized with high yield of the final product.

Patents: US Non-provisional application

Publication:

Sivapackiam, Jothilingam, et al. "Galuminox: Preclinical validation of a novel PET tracer for non-invasive imaging of oxidative stress in vivo." Redox Biology 37 (2020): 101690.