InSyTe FLECT/CT Application Spotlight

Probe development

Journal: ACS Omega, Vol. 4, pp 5310-5316, 2019
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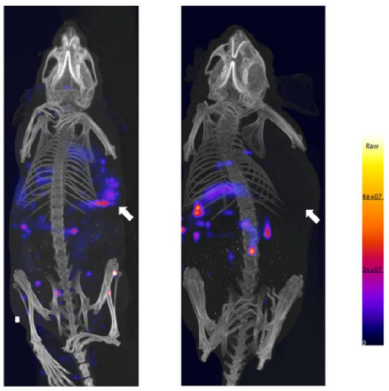
Title: ^{64}Cu-Based Pretargeted Immuno-Positron Emission Tomography and Near-Infrared Fluorescence Imaging of the Vascular Endothelial Growth Factor
Link: https://pubs.acs.org/doi/10.1021/acsomega.9b00158
Keywords: Drug delivery, Immuno-imaging, Therapeutics, Theranostics

Summary: Immuno-imaging is a novel technique that utilizes labeled antibodies or engineered antibody fragments as a means for disease diagnosis and assessment of treatment planning/monitoring. Monoclonal antibodies (mAbs) have been used to target specific lesion sites due to their high affinity and specificity to specific biomarkers. A common strategy to improve drug delivery is the use of mAbs in conjunction with multi-modality imaging, utilizing both PET/SPECT and near infrared optical imaging. This combination of nuclear and non-ionizing methodologies allows for researchers to demonstrate proof of concept using radionuclide-based modalities, and then switch to a non-ionizing optical modality to perform longitudinal studies, thereby saving on cost per experiment while still being able to investigate efficacy from a longitudinal standpoint. The use of bioorthogonal chemistry was employed to develop targeting antibodies, conjugated to an imaging agent (radionuclide or fluorophore). In this study, the researchers assessed Cyanine5-labeled Reppe anhydride (TD-Cy5) in mice pretreated with bevacizumab-tetrazine conjugates (used for VEGF-targeted therapy) in colorectal cancer tumors using multiple imaging modalities, including the InSyTe FLECT/CT.



The authors used the InSyTe FLECT/CT to assess localization of the TD-Cy5 after tetrazine-modified bevacizumab was injected in mice with VEGF-expressing colon carcinoma cell xenografts. In the figure on the left, taken 4 hours after injection, the white arrow demonstrates the InSyTe FLECT/CT capabilities of enabling 3D visualization of the TD-Cy5 accumulation in the tumor. In contrast on the right, the white arrow points to the tumor location of the control group where no TD-Cy5 had accumulated.

InSyTe FLECT Spotlight: Using the InSyTe FLECT/CT, the research team was able to visualize accumulation of the TD-Cy5 *in vivo* 4 hours post intravenous injection in pretreated bevacizumab-tetrazine mouse models. The research team also visually confirmed with the InSyTe FLECT/CT that the engineered TD-Cy5 successfully accumulated in the tumor. Furthermore, the research team was able to use FLECT to illustrate the bioorthogonal reaction between the target mAb and site-specific molecule, demonstrating that FLECT imaging can be used as a powerful tool to visualize VEGF receptor expression in tumor models.