Molecular Imaging Researches at Okayama Medical Innovation Center (OMIC)

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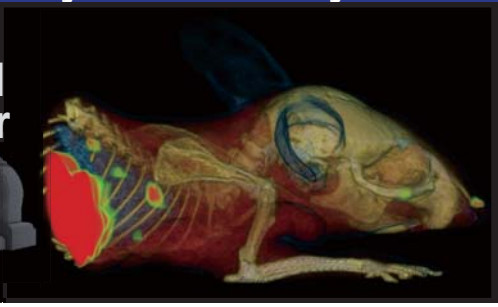
OMIC Okayama Medical Innovation Center

Supporting of drug discovery and medical device development in the frontier molecular imaging technology



OMIC promotes open innovation by offering supports in drug development researches

Molecular Imaging Facilities

Cyclotron

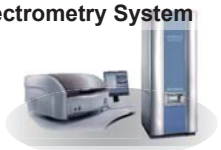
(HM-12S, Sumitomo Heavy Industries, Ltd.)

PET camera

For small animals (Clairvivo PET,Shimadzu Corp.)

For middle-sized animal (Eminence STARGATE, Shimadzu Corp.)

Mass Imaging Spectrometry System



(CHIP-1000, and AXIMA Performance、Shimadzu Corp.)

Optical Imaging System

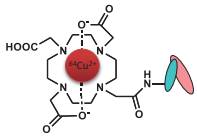
(IVISSpectrum, Xenogen Corp.)

Our Focus

- OMIC is focusing on the production and application of positron emitters with long half-life, such as ***Cu-64 and Zr-89***.
- One can perceive the pharmacokinetics of large molecular-sized drugs such as antibody drugs in the long term.

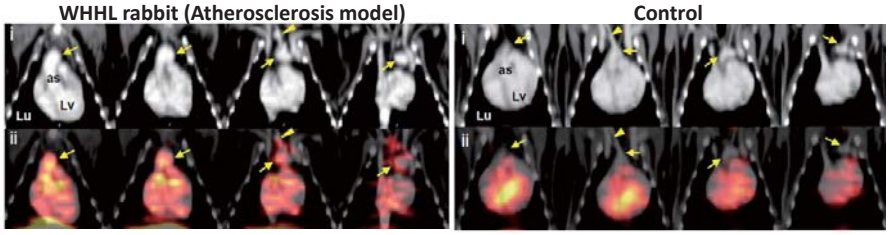
Case 1. Development of antibody PET probe for atherosclerosis

A

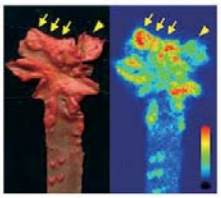


^{64}Cu-DOTA-conjugated small sized antibody (single chain Fv)

B



C

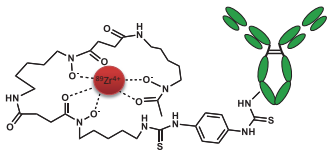


(A) DOTA conjugated small sized antibody (single chain Fv, 25 kDa) against to oxLDL/β_2GPI complexes was labeled with ^{64}Cu (half life time: 12.7 hr).
(B) Coronal PET/CT images of chest in WHHL (atherosclerosis model) and control rabbits at 24 hours after probe injection. Upper panels showed CT (i) and lower panels were PET/CT (ii) fusion images. Coronal Images included ascending aorta (as), aortic arch (yellow arrow) until thoracic aorta and brachiocephalic artery (yellow arrow head).
(C) *Ex vivo* studies (by Sudan IV staining and Autoradiograph) revealed that ^{64}Cu-scFv has targeted on atherosclerotic plaques in aortas.

Modified from "Autoimmunity Reviews 16 (2017) 159–167"

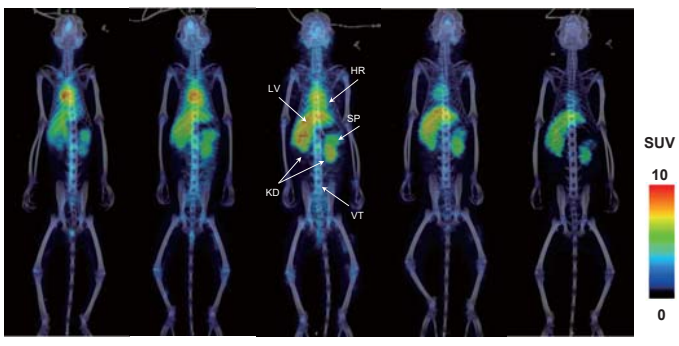
Case 2. Whole body distribution of radiolabeled antibody by using PET imaging in non human primate

A



^{89}Zr-DFO-conjugated Antibody

B



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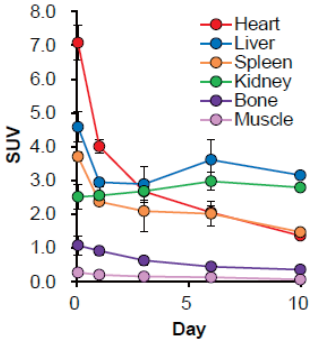

(A) IgG was conjugated to deferoxamine (DFO) with DFO-Bn-NCS, and labeled with ^{89}Zr (half life time: 78.4 hr).
(B) Healthy cynomolgus macaques were injected with 9-16 MBq of ^{89}Zr-IgG, and PET/CT images were acquired at 0, 1, 3, 6, and 10 days after the i.v. injection of IgG. HR; Heart, LV; Liver, SP; Spleen, KD; Kidney, VT; Vertebral body (bone).
(C) Time activity curves on organs. Data were represented as the mean ± SE.

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