

# PET imaging with macro-biomolecules for Theranostics

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## OMIC Okayama Medical Innovation Center

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



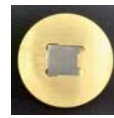
### Theranostics (Therapeutics + Diagnosis) enables personalized cancer therapy.

#### PET imaging of macromolecules

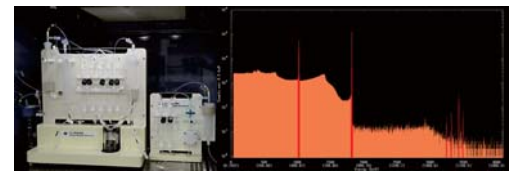
- Macro-biomolecules have a long physiological half-life.
- PET imaging with macromolecules is required for their suitable (occasionally longer) half-life.



We have developed production and purification system for  $^{89}\text{Zr}$  ( $T_{1/2} = 78.4$  hours).



$^{89}\text{Zr}$  target holder

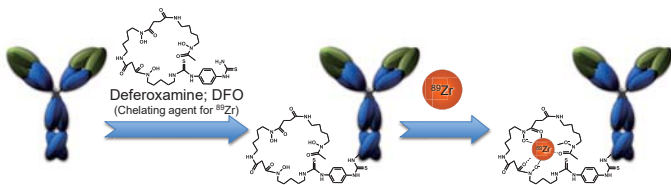


Semi-automated purification module

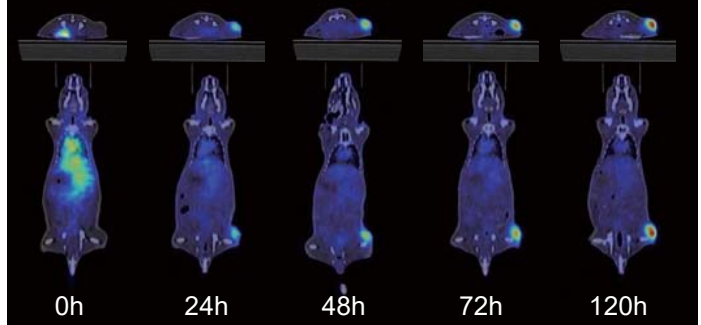
#### Immuno-PET

- Use a therapeutic antibody for companion PET diagnosis.
- Non-invasively visualize bio-distribution of antibody.
- Predict therapeutic effect without *in vitro* diagnosis.

##### $^{89}\text{Zr}$ -labeling with antibody



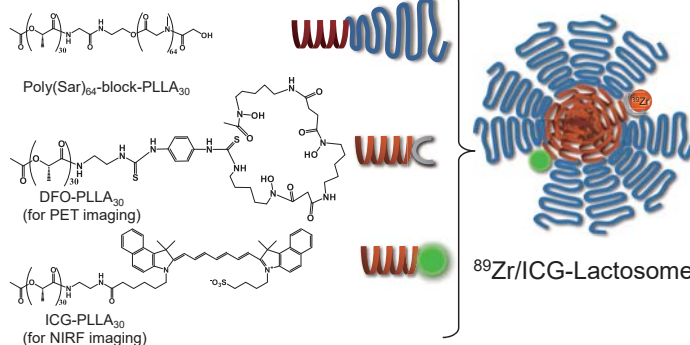
##### Example of immuno-PET (anti-HER2 antibody)



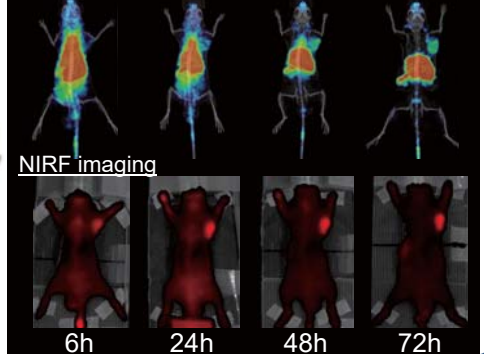
#### DDS-imaging

- Use therapeutic nanoparticles for molecular imaging.
- Visualize biodistribution by PET, before or simultaneously with treatment.
- Predict and monitor therapeutic effect.

##### Example of DDS-imaging



##### PET/CT imaging



#### Molecular Imaging Facilities



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



Clairvivo PET  
(Shimadzu Corp.)



Eminence STARGATE  
(Shimadzu Corp.)



Small Animal SPECT/CT  
(Gamma Medica-Ideas, Inc.)



Imaging Mass Spectrometry System  
(Shimadzu Corp.)



IVIS Imaging System  
(Xenogen Corp.)

OMIC promotes the external use of molecular imaging research facilities.