



Application of Animal Digital PET in Preclinical Research

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Techniques of Molecular Imaging

Anatomic

Physiologic

Metabolic

Molecular

x-ray CT

PET/SPECT

MRI

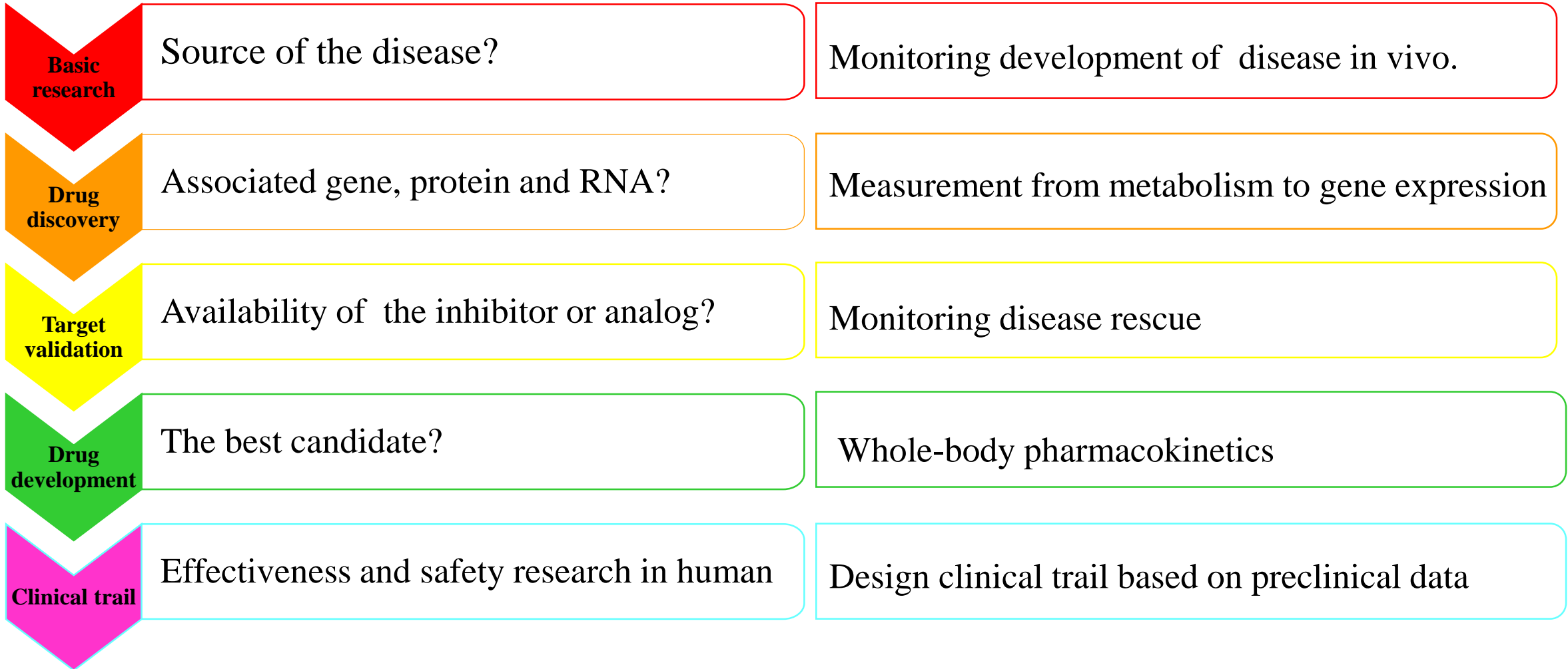
MR Spectroscopy

fMRI

ultrasound

optical imaging

Preclinical Molecular Imaging

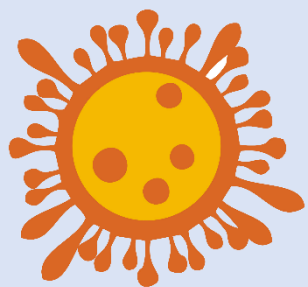




PET: Functional Imaging Application

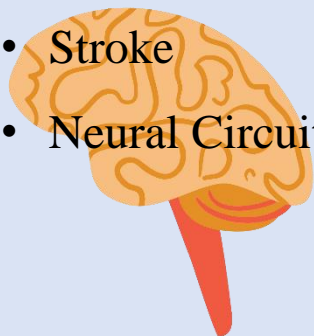
Oncology

- Primary Cancer
- Metastatic cancer
- Subcutaneous Cancer



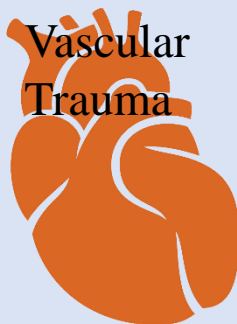
Neuroscience

- Neurodegenerative diseases
- Psychiatric Disorders
- Pain
- Inflammation
- Stroke
- Neural Circuit



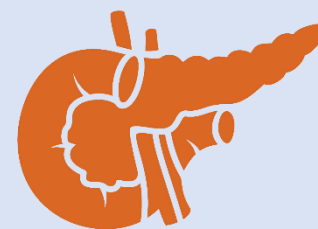
Cardiology

- Atherosclerosis
- Cardiac Infarction
- Myocardial Metabolism
- Perfusion
- Vascular Trauma



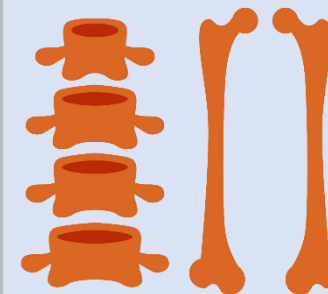
Metabolism

- Hepatic Adiposis
- Diabetes
- Lipometabolism



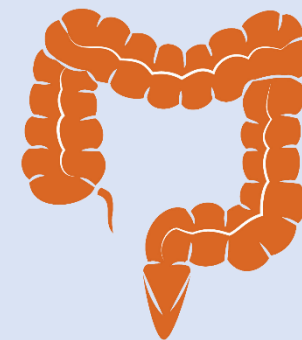
Bone

- Bone Metabolism
- Arthritis



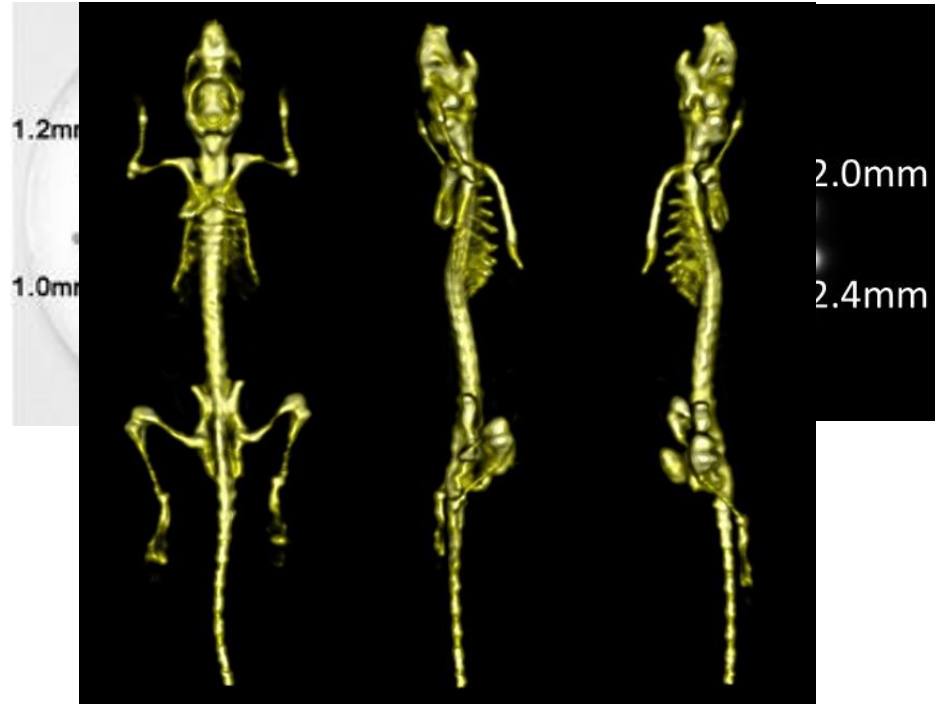
Others

- Inflammatory Bowel Disease
- Pharmacodynamics
- Pharmacokinetics



Product of Animal Digital-PET

Trans-PET[®] BioCaliburn[®] system



- ✓ Sensitivity: 2.04 %
(FOV center, 350 KeV~650 KeV)
- ✓ Spatial Resolution: ~1 mm

- Luyao Wang, et al., Physics in medicine and biology, 2014.
- Jun Zhu, et al., Nuclear Instruments & Methods in Physics Research, 2015.


Pre-clinical Applications

5 Installation bases

- Union Hospital in Wuhan (China)
- Turku PET center (Finland)
- Mediterranean Neurological Institute (Italy)
- University of Illinois at Chicago (USA)
- University of Wisconsin-Madison (USA)

More than 5000 animal experiments

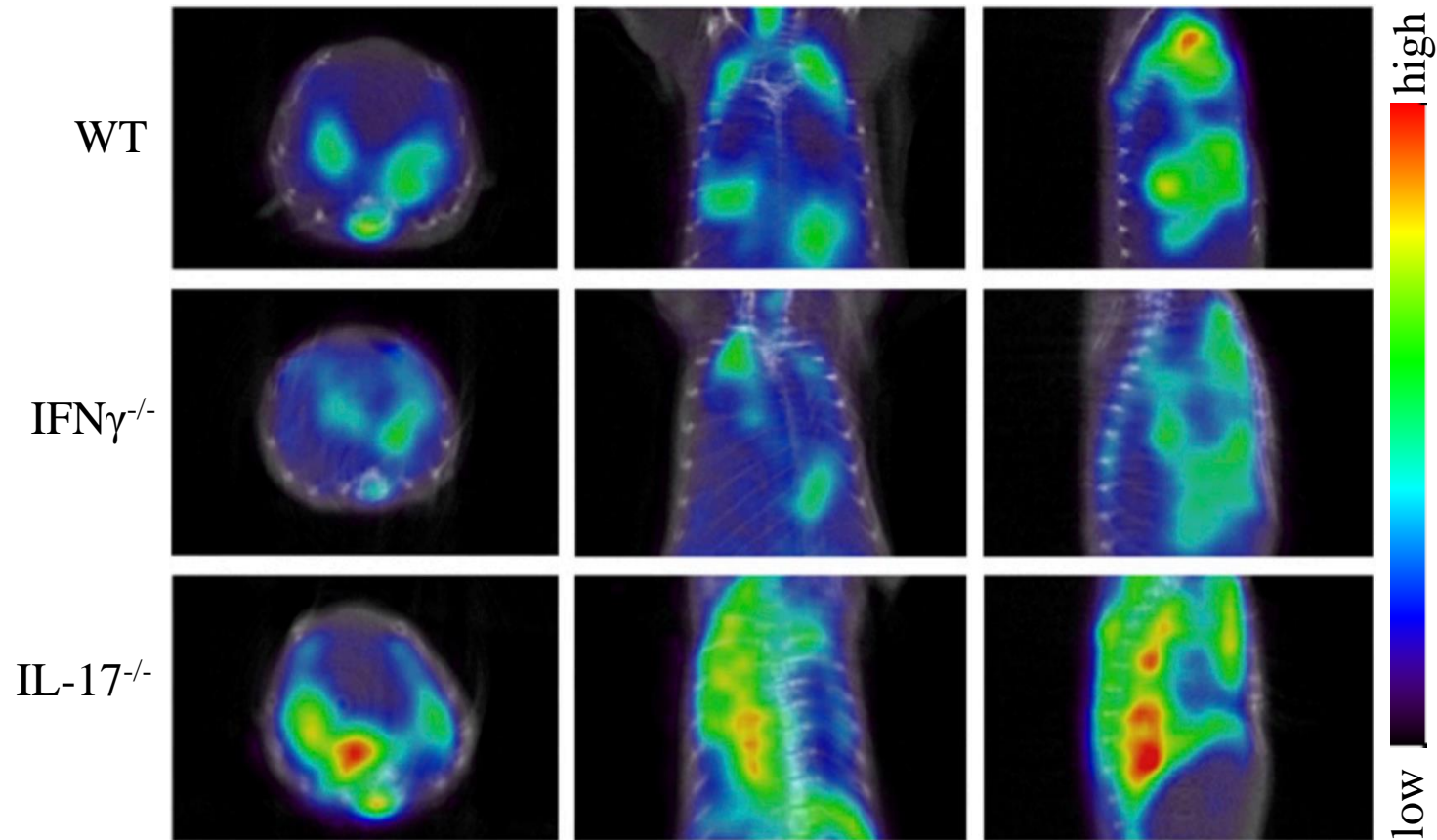
- Cancer
- Neurological diseases
- Cardiovascular diseases
- Metabolic diseases
- Etc

- 
- ◆ Mice
 - ◆ Rats
 - ◆ Rabbits
 - ◆ Monkeys
 - ◆ Pigs

Dozens of publications

- Nature Medicine
- Nature Communications
- Am J Resp Crit Care Med
- Eur J Nucl Med Mol I
- Experimental Neurology
- CNS Neurosci Ther
- Frontiers in Pharmacology
- Etc

Application Cases in Oncology

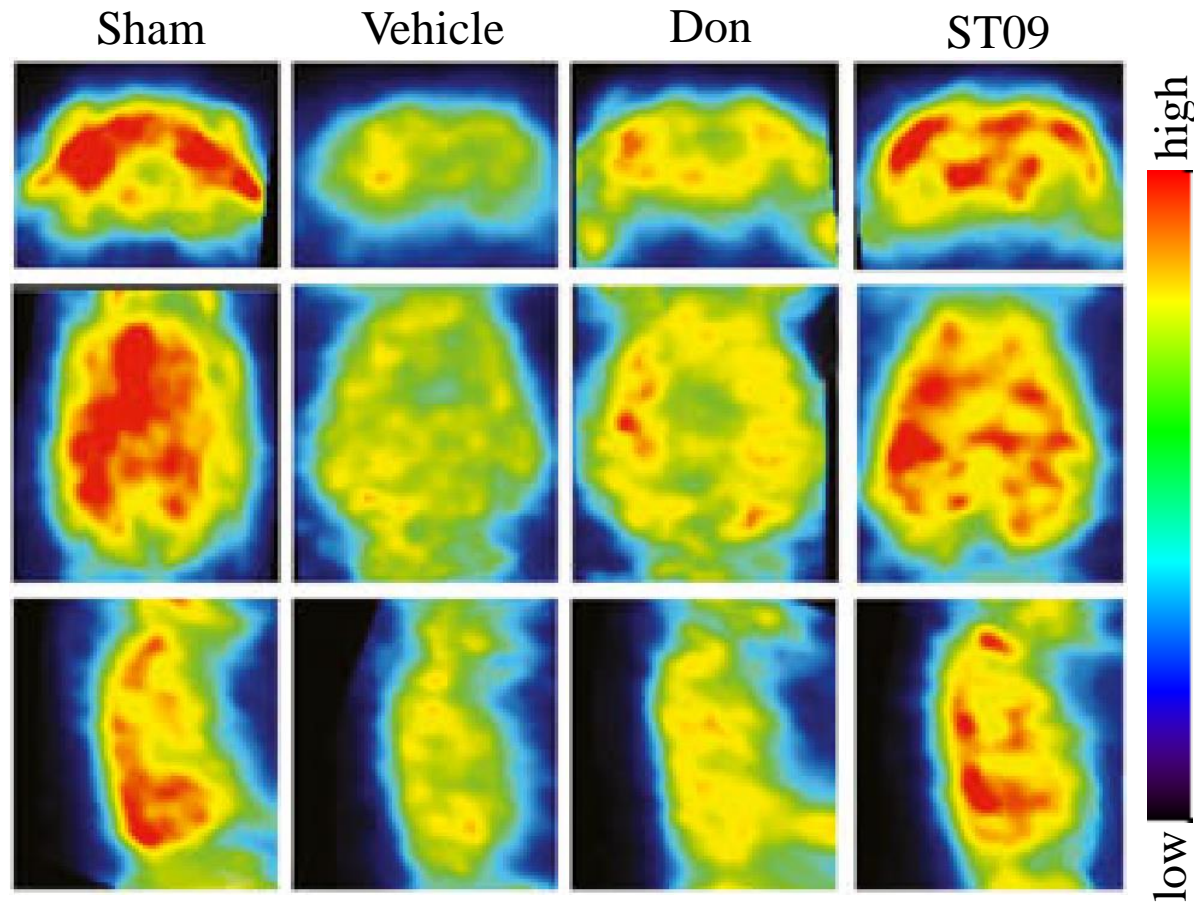


Model: C57BL/6 mice with lung cancer.

Method: ^{18}F -FDG-PET/CT, Static scan.

Lin H. et al., Am J Respir Crit Care Med. 2014. (IF=13.2)

Application Cases in Neuroscience

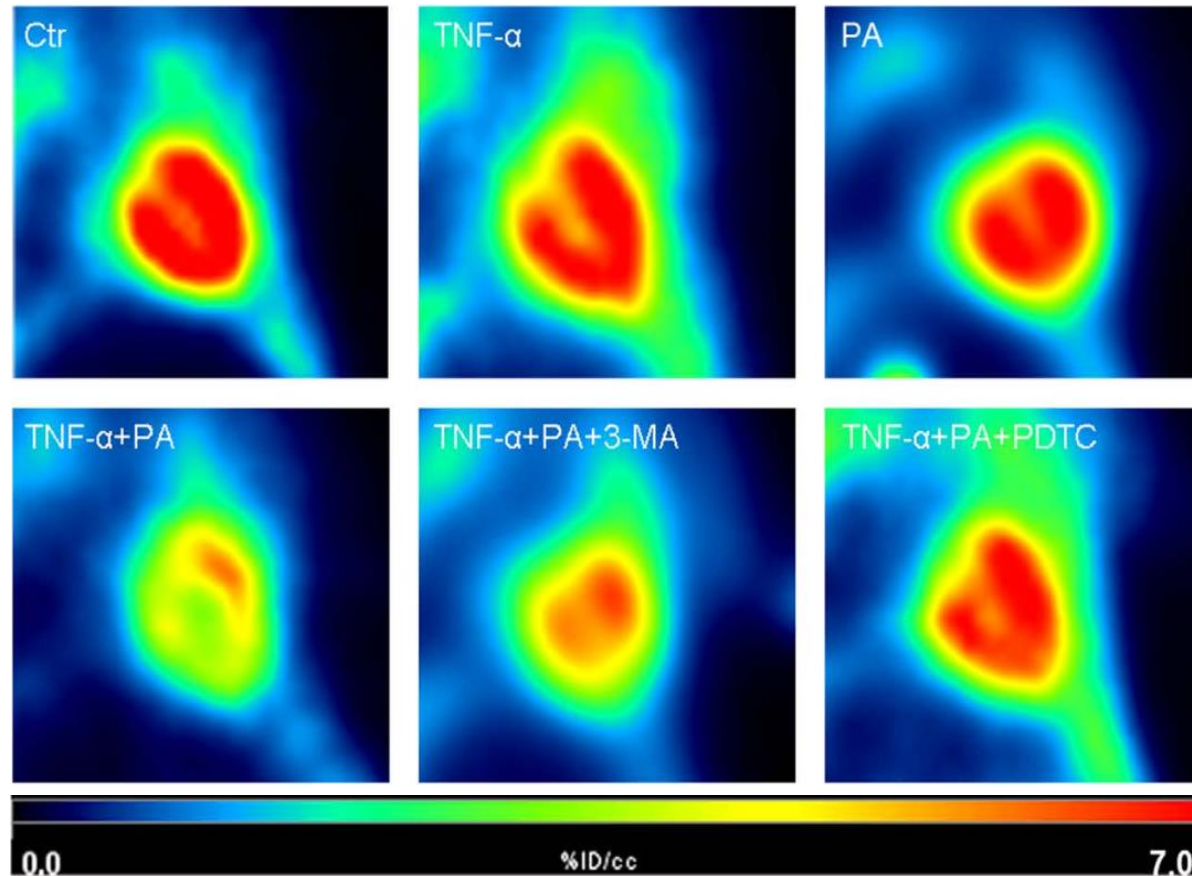


Model: Vascular dementia rat.

Method: ^{18}F -FDG-PET, Static scan.

Liu JM. et al., CNS Neurosci Ther. 2016. (IF=3.9)

Application Cases in Cardiology

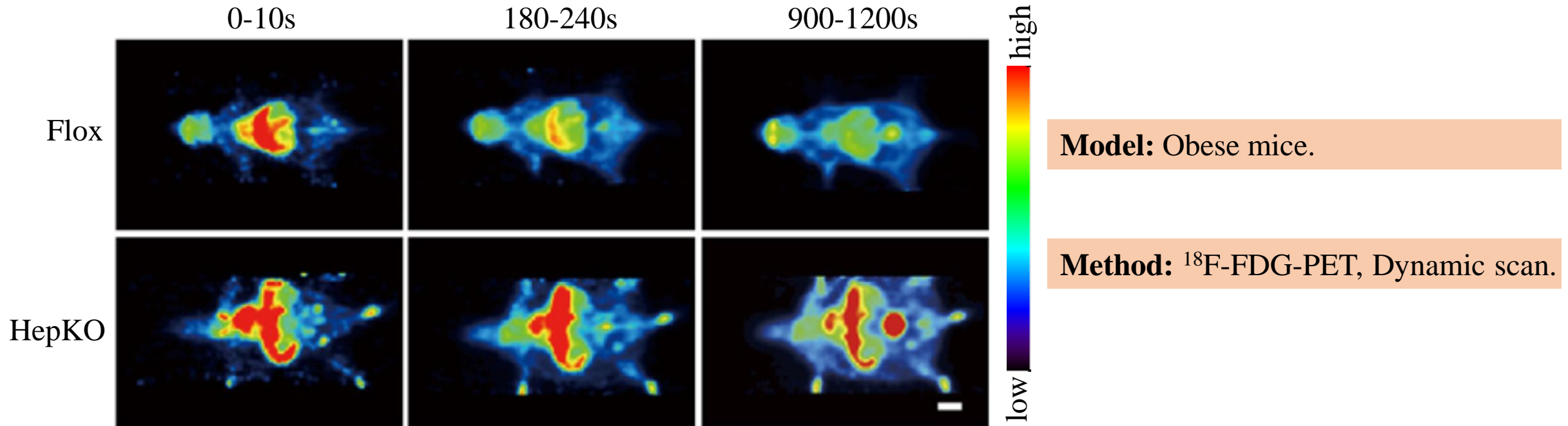


Model: Diabetic mice.

Method: ^{18}F -FDG-PET, Static scan.

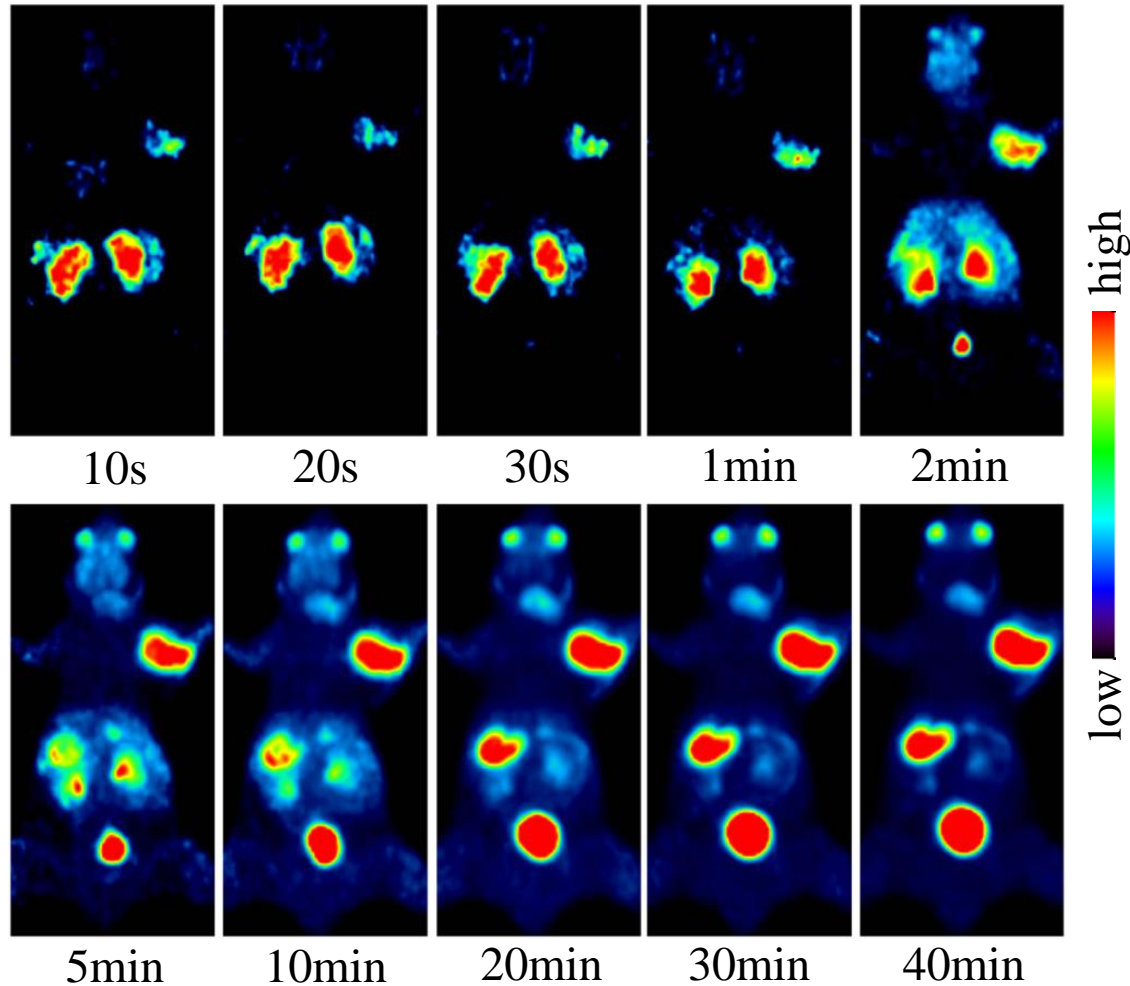
Li WJ. et al., Sci Rep. 2017. (IF=4.5)

Application Cases in Metabolism



Wang PX. et al., Nat Med. 2017. (IF=29.9)

Application Cases in Pharmacokinetics



Model: mice with Subcutaneous melanoma.

Method: ^{18}F -5-FPN-PET, Dynamic scan.



Publications

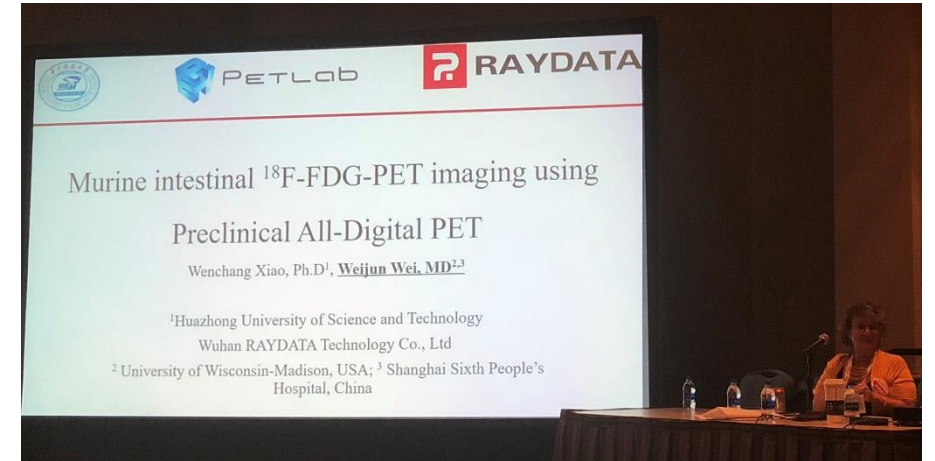


- Guang-Nian Zhao, et al., “Tmbim1 is a multivesicular body regulator that protects against non-alcoholic fatty liver disease in mice and monkeys by targeting the lysosomal degradation of Tlr4,” **Nature Medicine**, 2017 (IF=29.9)
- Pi-Xiao Wang, et al., “Targeting CASP8 and FADD-like apoptosis regulator ameliorates nonalcoholic steatohepatitis in mice and nonhuman primates,” **Nature Medicine**, 2017 (IF=29.9)
- Ying Yang, et al., “Opposite monosynaptic scaling of BLP–vCA1 inputs governs hopefulness- and helplessness-modulated spatial learning and memory,” **Nature Communications**, 2016 (IF=12.1)
- Hua Lin, et al., “Interplay of Th1 and Th17 Cells in Murine Models of Malignant Pleural Effusion,” **American Journal of Respiratory and Critical Care Medicine**, 2014 (IF=13.118)
- Hongyan Feng, et al., “Imaging malignant melanoma with 18F-5-FPN,” **European Journal of Nuclear Medicine and Molecular Imaging**, 2015 (IF= 7.3)
- Mohamed A A Ahmed, et al., “New approach for simultaneous respiratory and cardiac motion correction in cardiac PET (NAMC-CPET),” **Physics in Medicine and Biology**, 2015 (IF=2.761)
- Jian-Min Liu, et al., “ST09, a novel thioester derivative of tacrine, alleviates cognitive deficits and enhances glucose metabolism in vascular dementia rats,” **CNS Neuroscience & Therapeutics**, 2016 (IF= 4.019)

Our Group



2019.1



2018.6 Philadelphia, USA SNMMI



2018.6 Prague, Czech IUPESM

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- ...

Thank you for your attention!