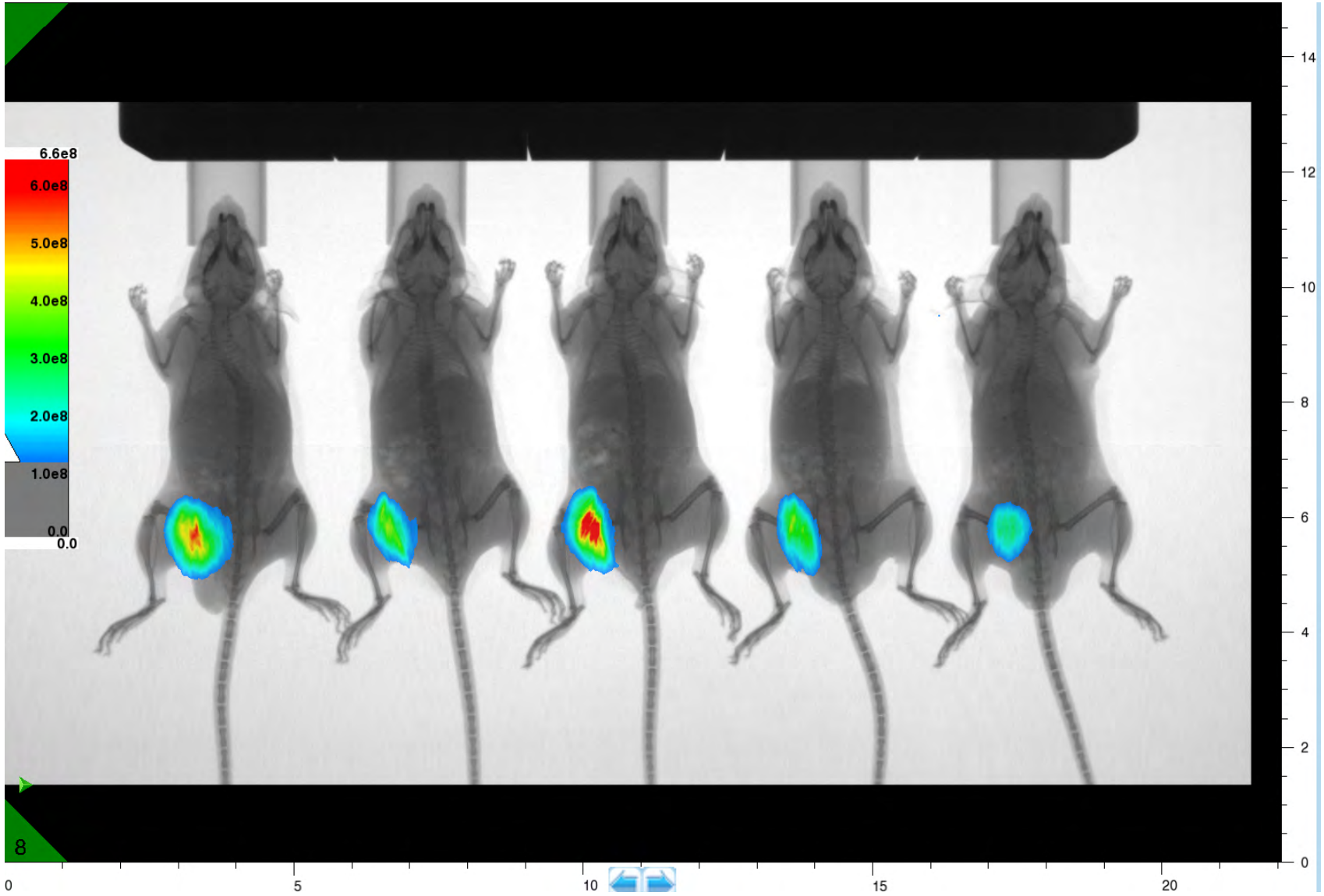
Ami HTX Optical Imaging System

Location: NB3.205

Specifications

- Bioluminescent imaging
- Fluorescent imaging
- X-ray
- High throughput
- Pure LED illumination (patented)
- 100X light intensity on specimen
- 10 LED wavelengths from 430 nm to 745 nm
- 10 filters included from 530 nm to 790 nm
- Selection of 20 filters available
- Custom emission filters for plant imaging
- Solid state cooled CCD camera (–90C), no leaks
- High-performance imager
- CCD camera with back illumination
- Ultra-wide category-leading 25 cm x 17 cm optical FOV
- X-ray FOV is 25 x 15 cm
- Up to 40kV maximum X-ray energy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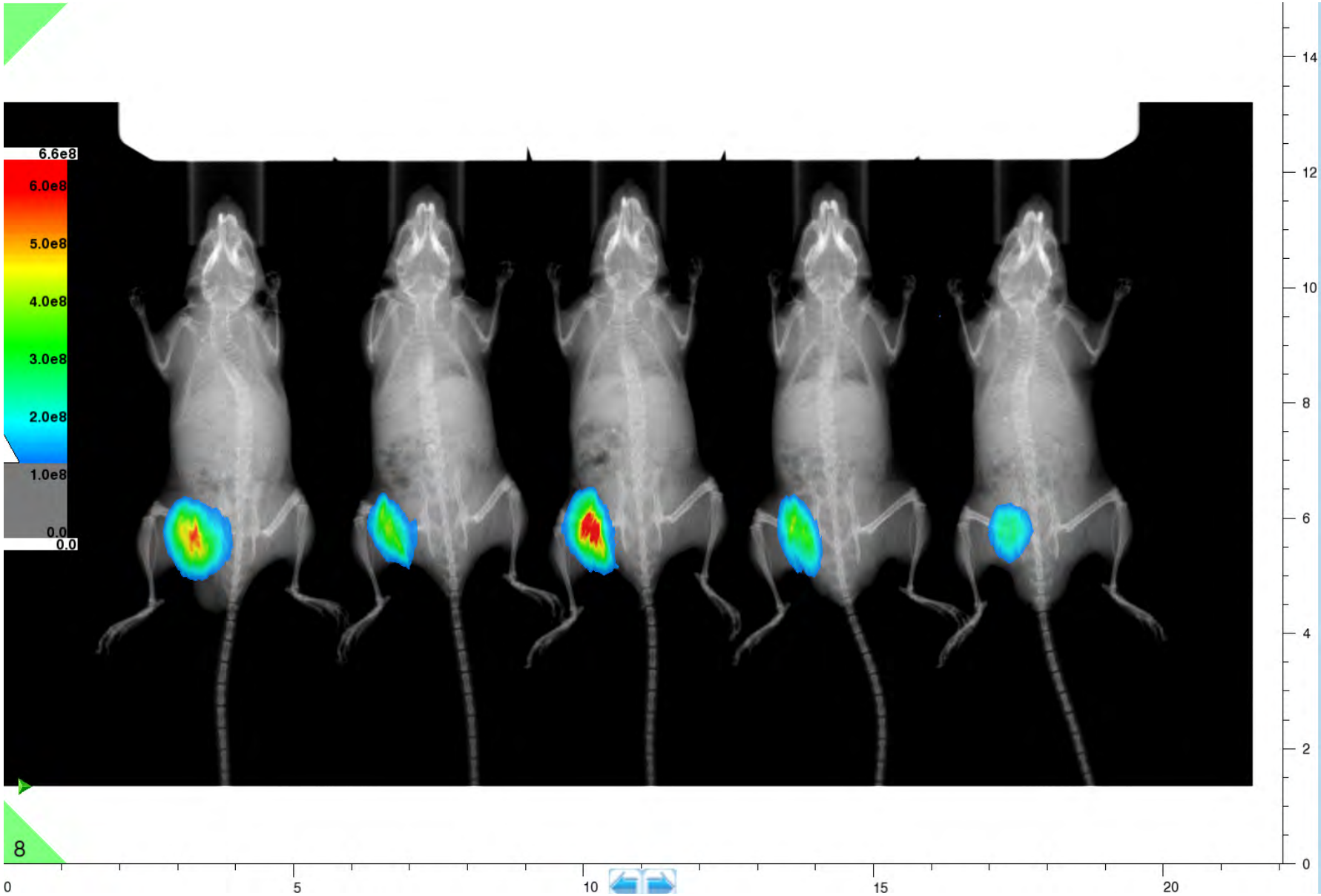
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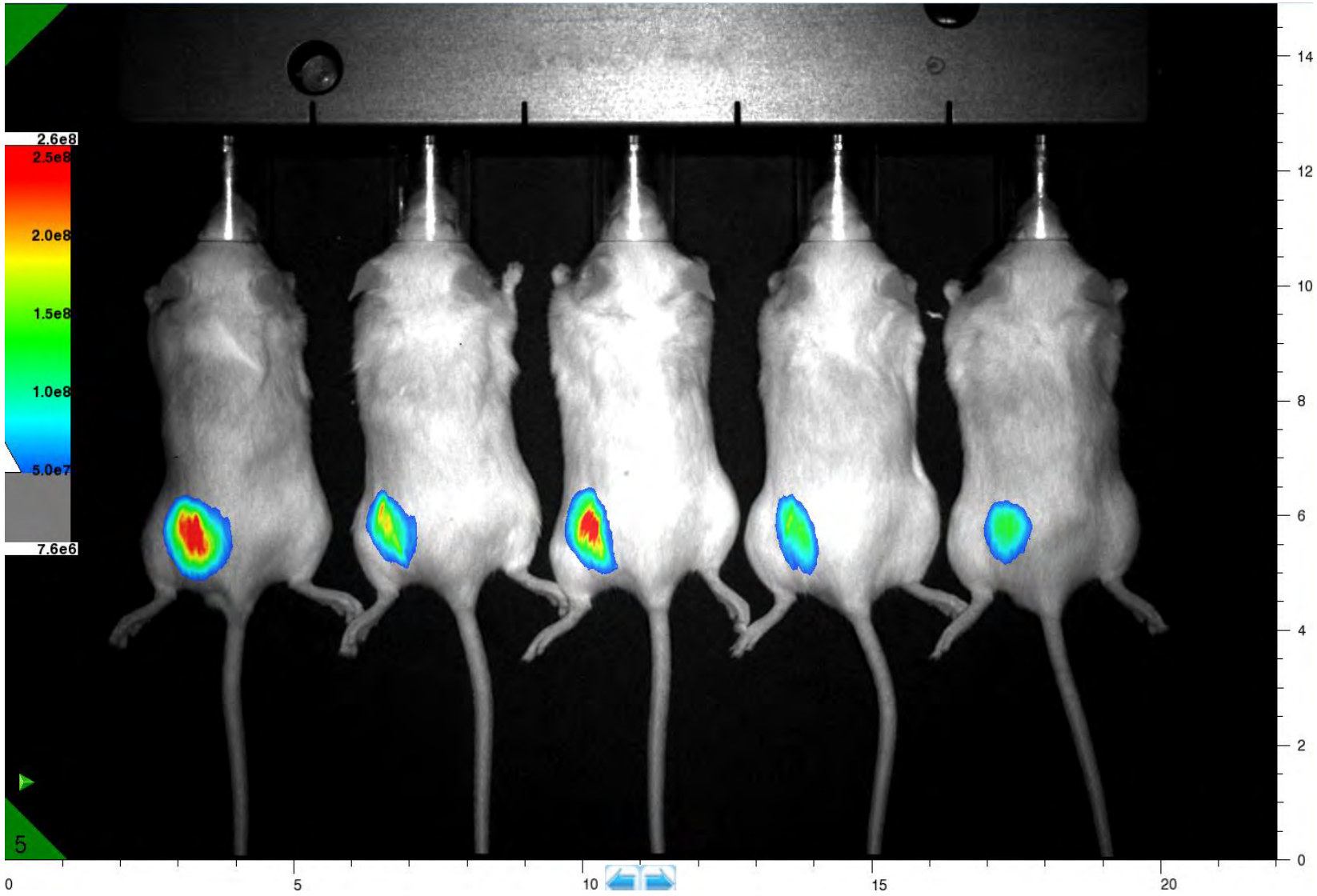
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MAGNET MRS 3017 3T MRI System

Location: NB3.205

Specifications

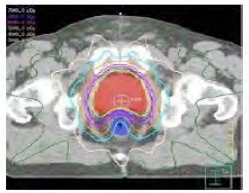
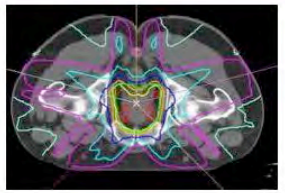
- 3.0 Tesla cryogen-free superconducting magnet
- 170 mm clear bore diameter
- 70 mm x 100 mm FOV
- Integral R.F. shield
- Integral cryo-cooler with compressor
- Magnet size 88 cm long x 77 cm diameter
- Magnet stand
- Magnet power supply and control unit
- Homogeneity: over 30 mm +/- 0.1 ppm, over 70 mm DSV +/- 1 ppm
- Stray field center to: 60 cm radially x 80 cm axially (from magnet centre)
- Magnet stability: <0.05 ppm/hour (intrinsically stable)

SARRP XSTRAHL Irradiation System

Location: NB3.205

Adapting Clinical Practice in the Pre-Clinic

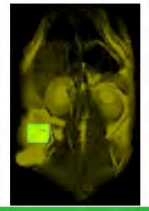
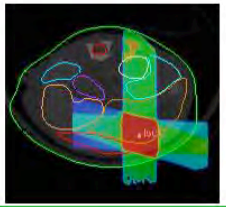
strahl LIFE SCIENCES


Clinical Radiotherapy

CT Simulation → Target Localization & ROIs → Treatment Planning → Treatment Delivery

Preclinical Radiotherapy


XRAD 320

Location: NG2.310

XRAD 225Cx

Location: NE3

3T High Resolution

Powerscan 3T (MRS-3017)

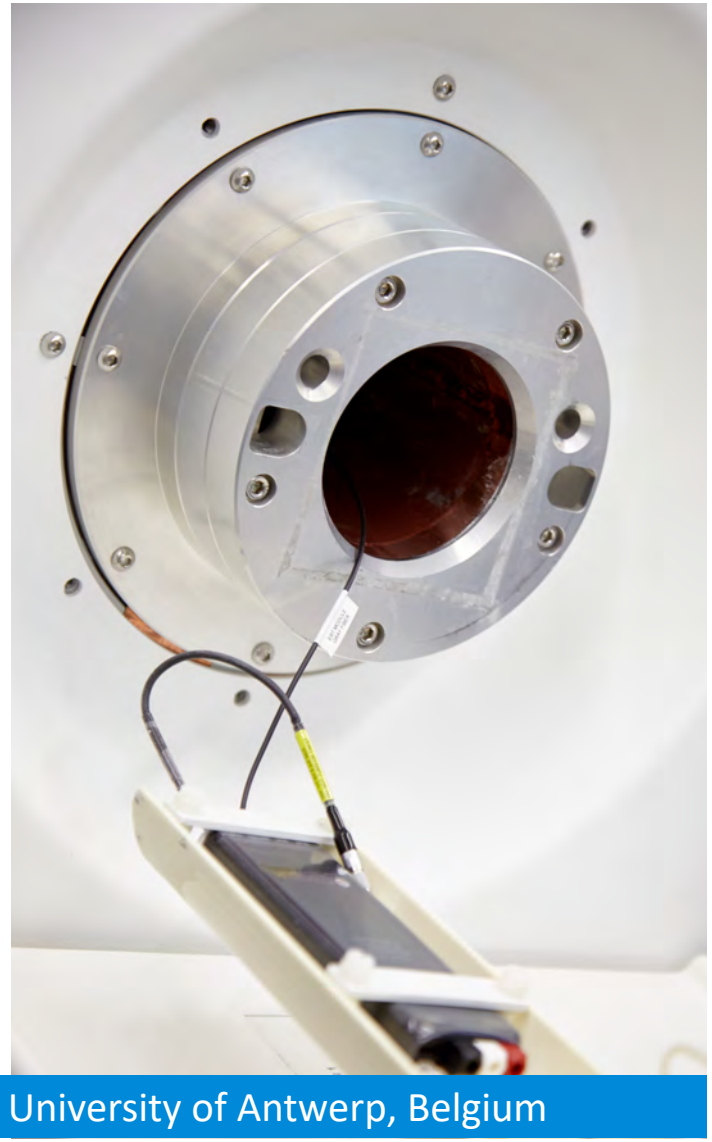
Rat Brain

High Resolution
78µm x
80µm x
75µm

Parameters:

- Sequence FSE T1W
- TR 4800 ms
- TE 68 ms
- Average 16
- FOV 40 x 40
- Fr x Ph 512 x 496

Coil: Rat head coil

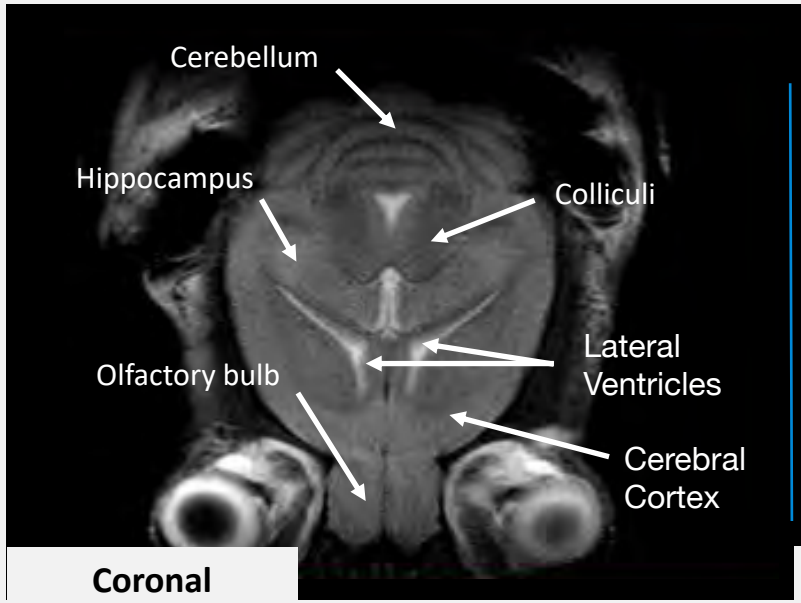


Bio-Imaging Lab, University of Antwerp, Belgium

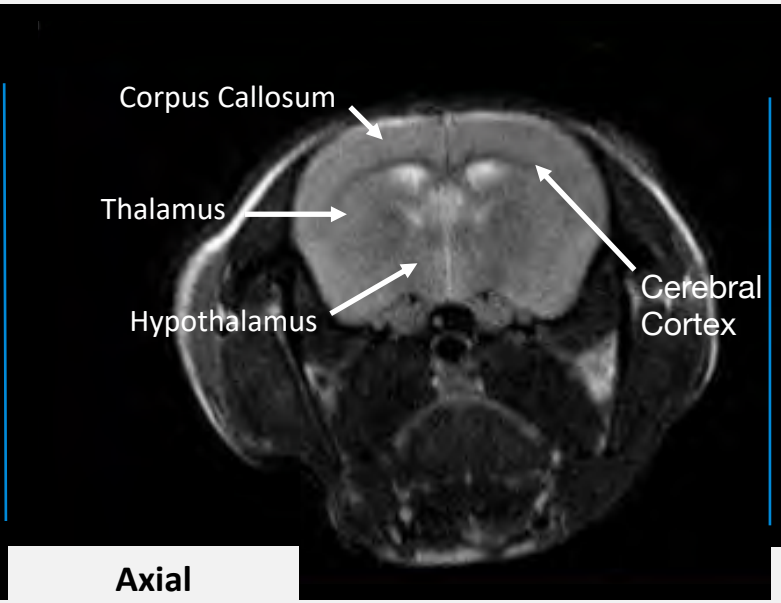
Brain Resolution 3T

Flexiscan 3T (MRS-3017)

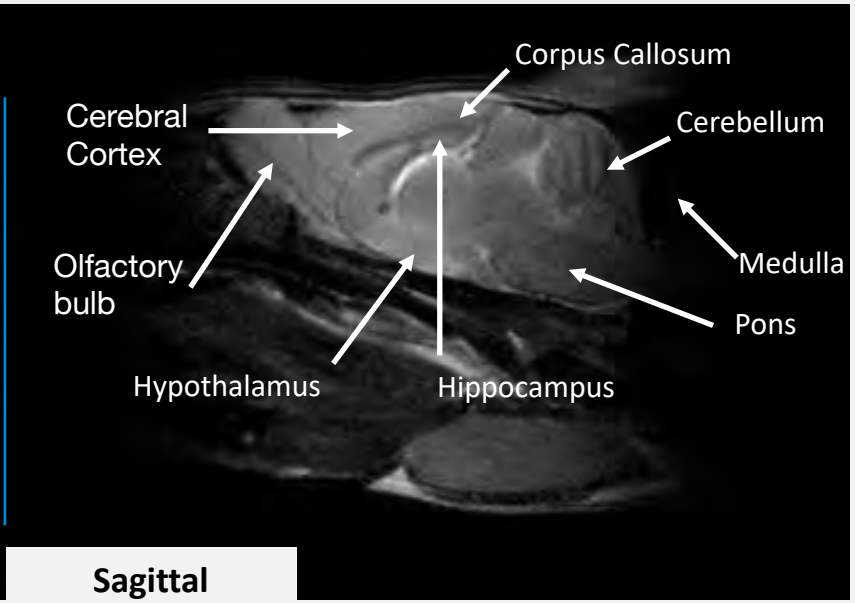
Mouse Brain: FSE T2W



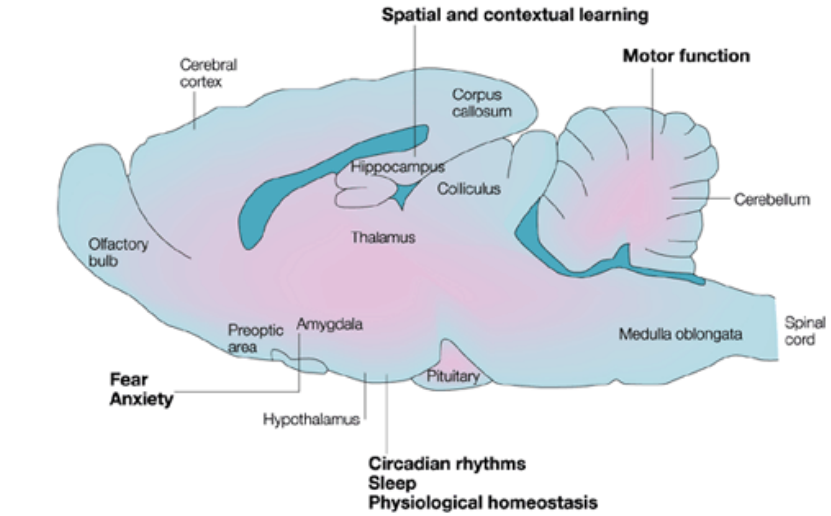
Coronal



Axial

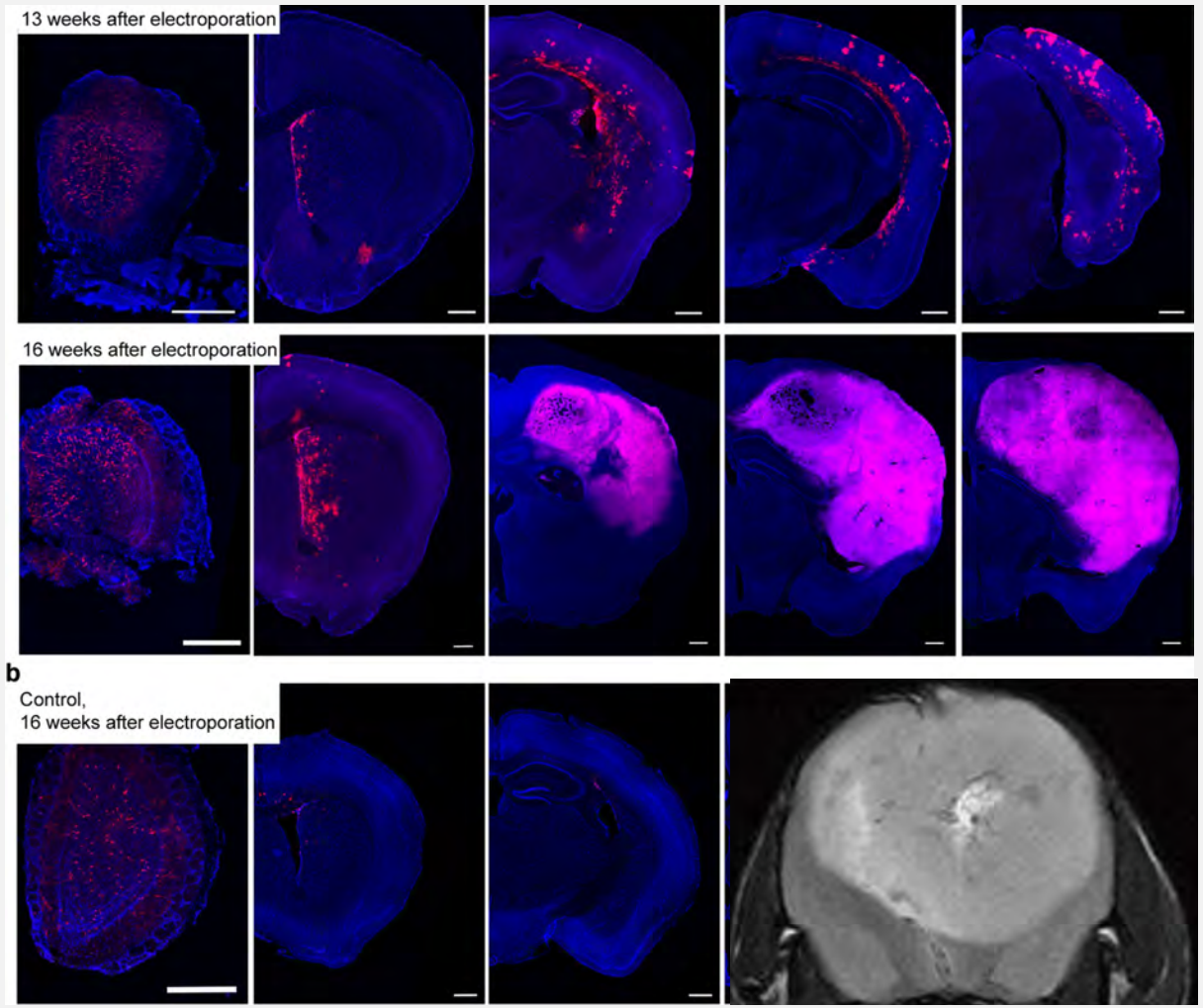


Sagittal



Universitätsklinikum Düsseldorf, Germany

Glioblastoma



Powerscan MR 3T (MRS-3017)

Publication in Nature

LETTER

https://doi.org/10.1038/s41586-018-0389-3

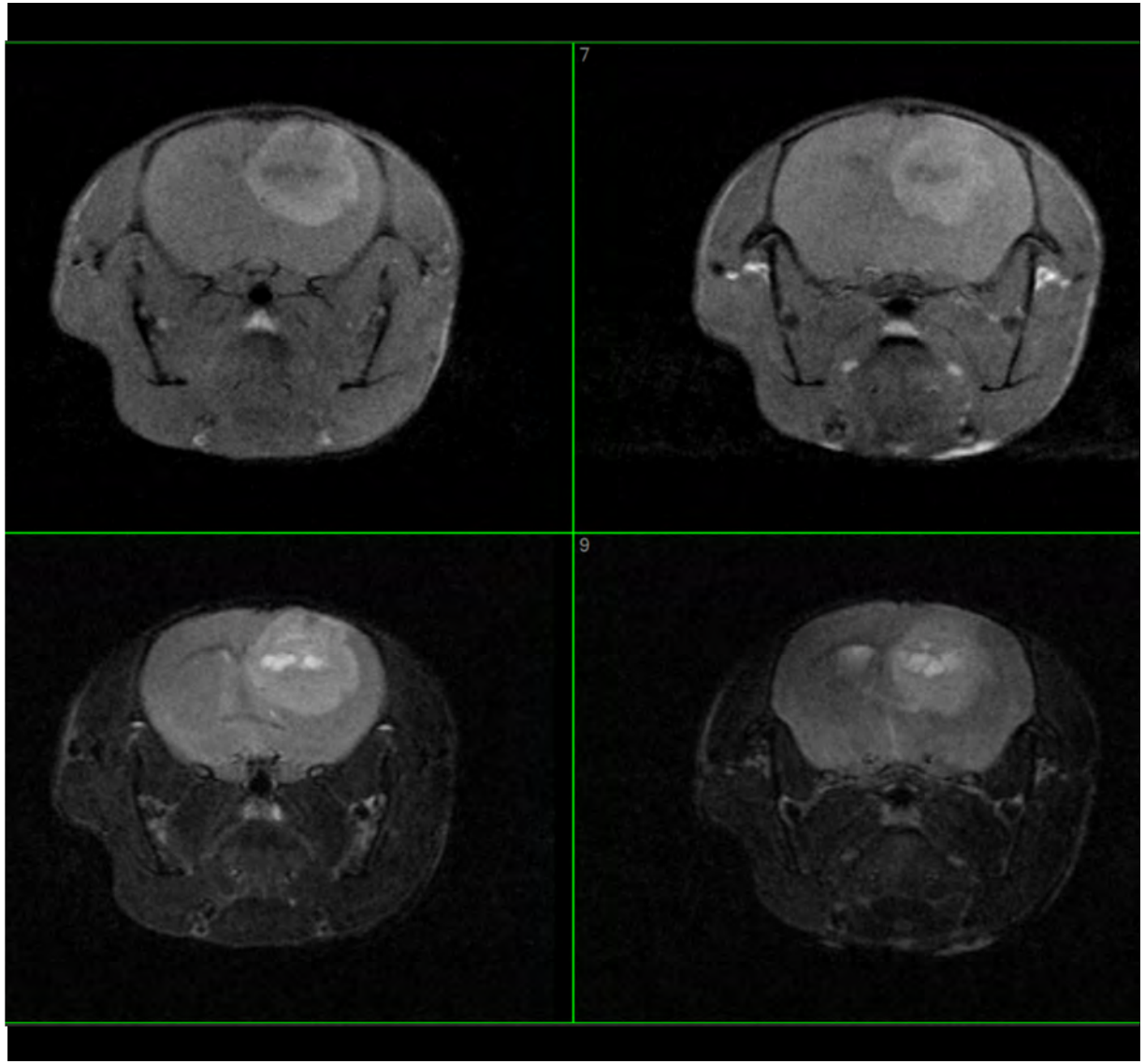
Human glioblastoma arises from subventricular zone cells with low-level driver mutations

Joo Ho Lee[1,8], Jeong Eun Lee[1,2,8], Jee Ye Kahng[1,3], Se Hoon Kim[4], Jun Sung Park[1], Seon Jin Yoon[5], Ji-Yong Um[6], Woo Kyeong Kim[1], June-Koo Lee[1], Junseong Park[5], Eui Hyun Kim[5], Ji-Hyun Lee[5], Joon-Hyuk Lee[1], Won-Suk Chung[1], Young Seok Ju[1], Sung-Hong Park[3,6], Jong Hee Chang[5], Seok-Gu Kang[5,9]* & Jeong Ho Lee[1,7,9]*

Korea Advanced Institute of Science and Technology

- MRS3017 scanner; birdcage mouse head coil
- T1-weighted + Spin Echo (SE) images for anatomical conditions
- T2-weighted + Fast Spin Echo (FSE) images pathological conditions
- Scan parameters:
  - 2 echo time = 550/11 ms (SE) and 3,000/68 ms (FSE)
  - Field of view = 22 × 22 mm; matrix size = 256 × 256 (SE) and 256 × 248 (FSE)
  - Slice thickness = 1 mm
  - Number of slices = 19
  - Scan time = 9 min 23 s (SE) and 9 min 18 s (FSE)

Brain Tumour 3T



Flexiscan 3T (MRS-3017)

Mouse brain: Fast Spin Echo T1W / T2W

Parameters (Coronal):

- Sequence: FSET1W
- Slice thickness: 1.0 mm
- 15 slices
- TR 850 ms/TE 11 ms
- FOV 25 x 25
- Fr x Ph 256 x 240
- Averages: 3
- Acquisition time: **4.02 min**

Parameters (Axial):

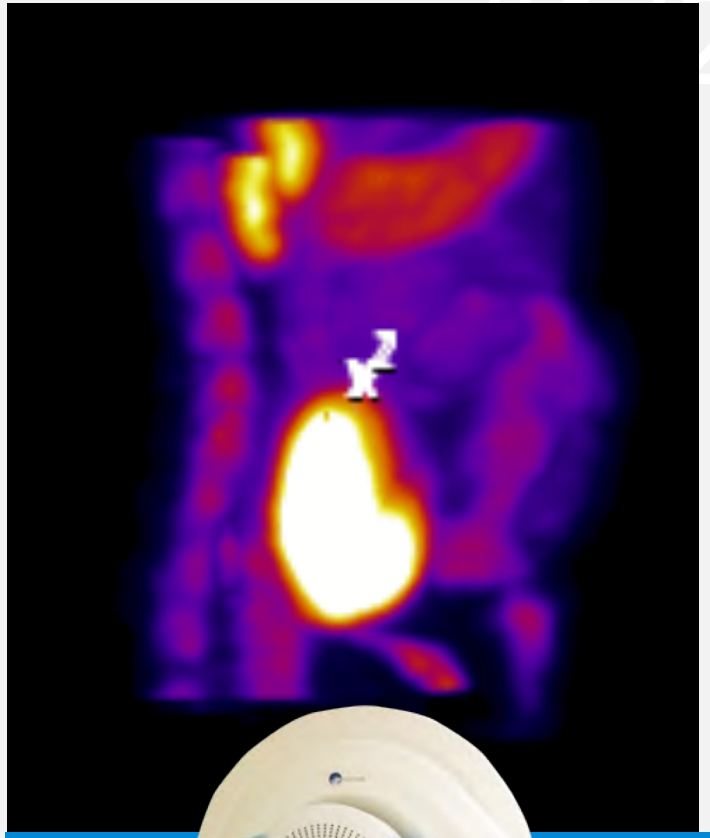
- Sequence: FSE T2W
- Slice thickness: 1.00 mm
- 15 slices
- TR 3000 ms /TE 68 ms
- FOV 25x25
- Fr x Ph 256x240
- Averages: 3
- Acquisition time: **6:32 min**

Harry Perkins Institute of Medical Research, Perth, Australia

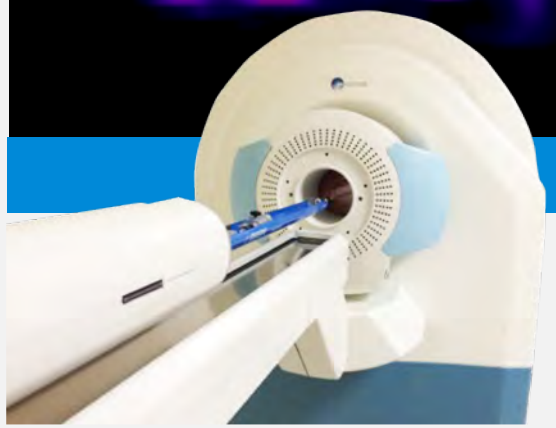
Breast Tumour

PET CLIP-ON / MR 3T

Sequential PET/MR FSE



Subcutaneous Tumour



Centre George Francois Leclerc, CGFL, France

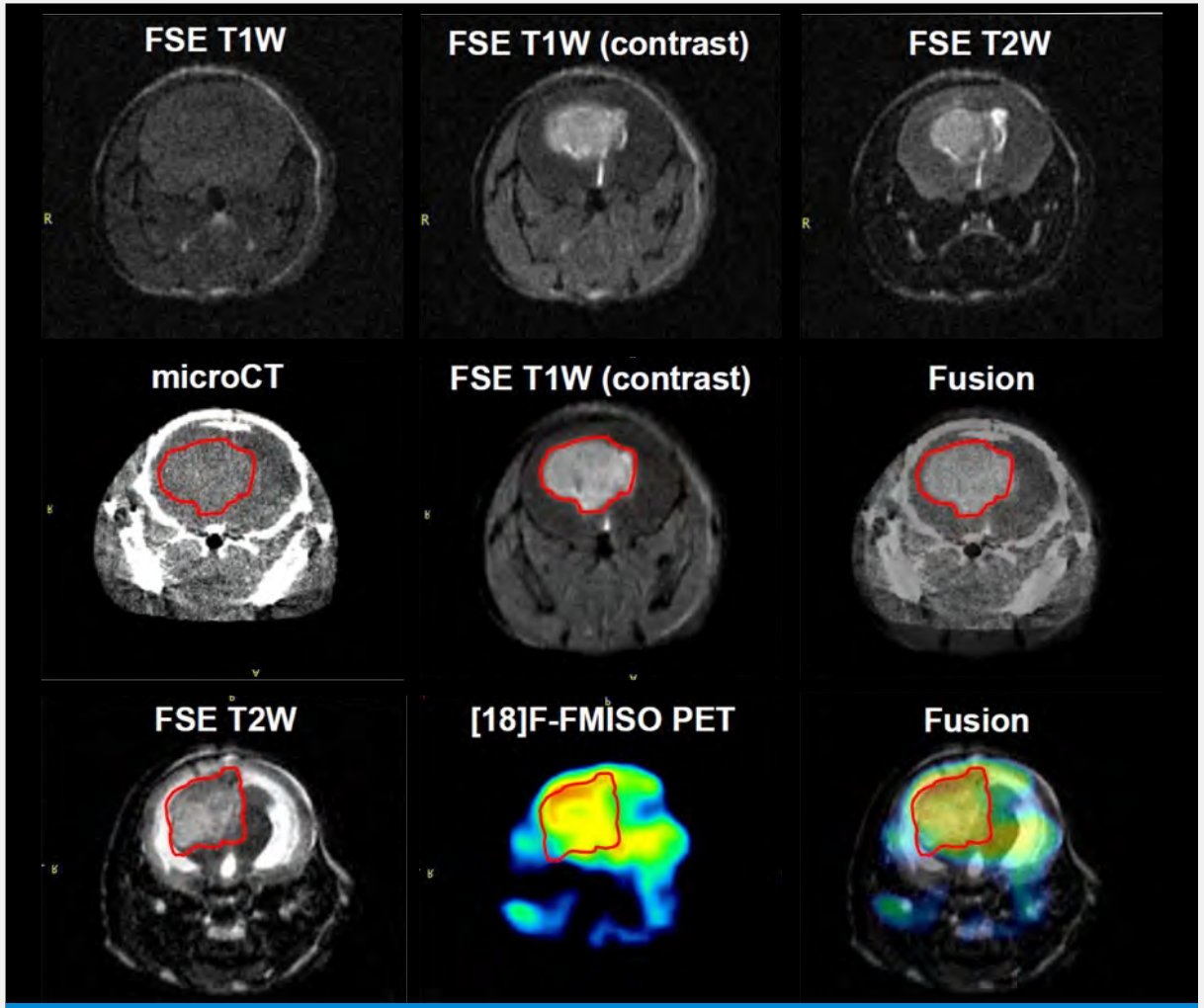
PET-CO-801
List mode|45 minutes

Tracer: FDG | Dose: 23.01MBq|621µCi
Uptake: 30min | Animal under anaesthesia
1 Bed Position | FOV ax 50.40mm
Recon: 3D OSEM Static Rebinning | Voxels 0.28|81 subsets | 100-750KeV | CRT 20ns

Animal
Mouse / Strain CD1 / Gender: female
Age >6 months / Weight 25g

MRS-3017:
Orientation Coronal / Axial
FSE T1/T2

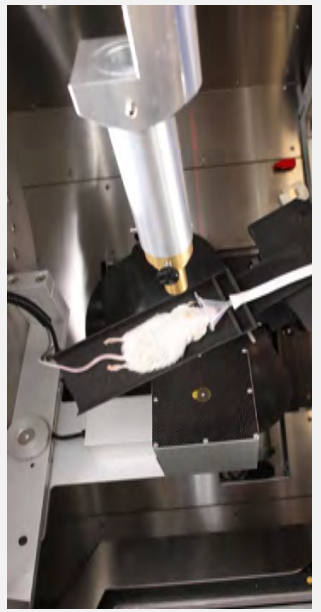
RT-PET-CT-MRI



Department of Radiation Oncology, Beaumont Health System, Royal Oak, Michigan

CBCT-RT + 3T MRI

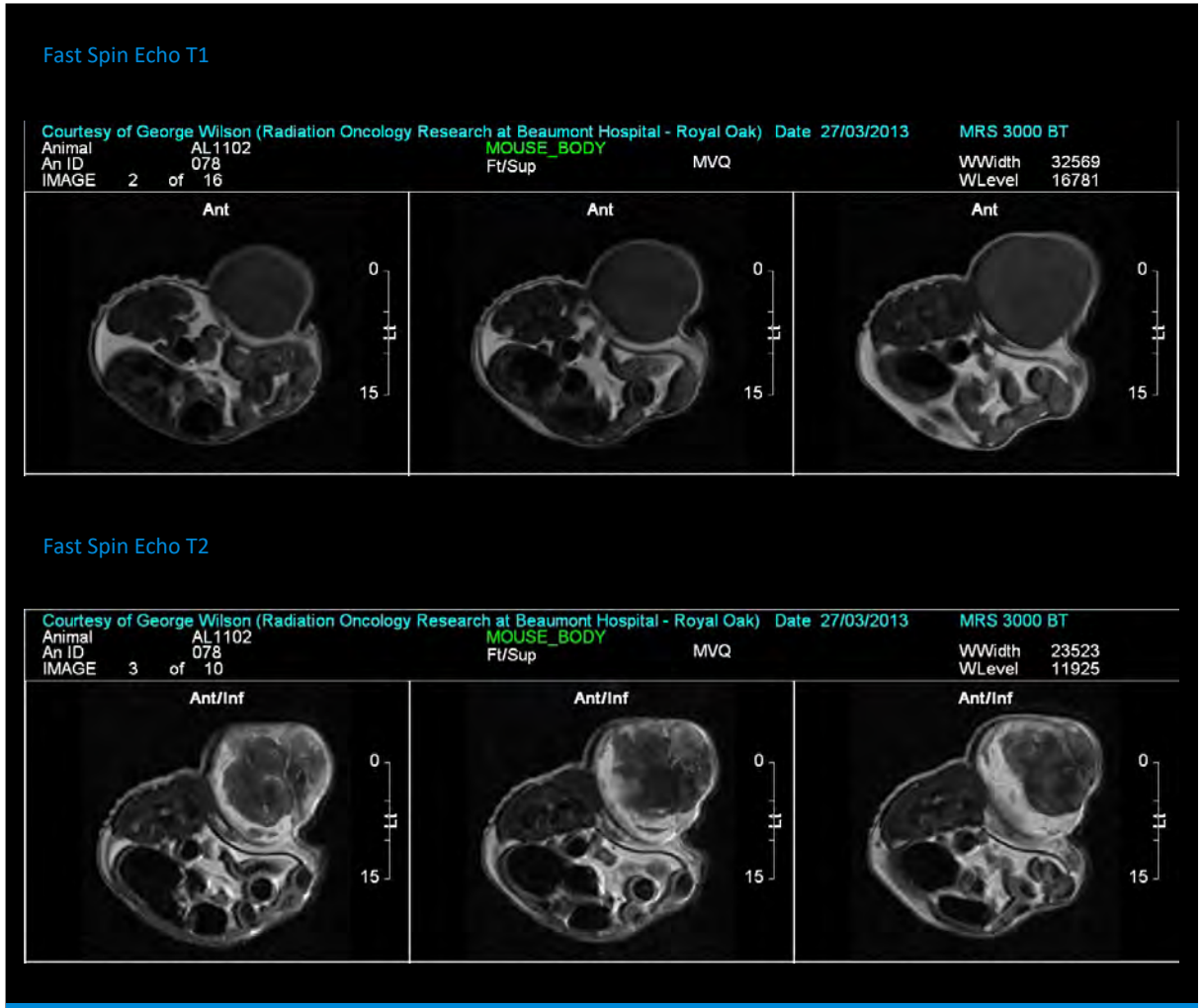
PET: 18F-Fmiso / MR FSET1T2



- Typical small animal radiation research platform (SARRP) system (right)
- Fast spin echo (FSE) magnetic resonance (MR) images with either T1-weighting, contrast-enhanced T1-weighting or T2-weighting (upper)
- MicroCT with contrast enhancement to delineate the tumor (middle, left). Area of contrast enhancement is difficult to see in some mouse brain tumors. Contrast-enhanced FSE T1-weighted MRI of the same animal (middle, center)
- The tumor can be clearly delineated. Co-registration of the CT and MR images (middle, right)
- Both bone and soft tissue can be recognized, which is a good option for difficult-to-visualize brain tumors for SARRP treatment planning
- MRI FSE T2-weighted image co-registered to [18]F-FMISO PET (bottom rows). The tumor is delineated in all images.

J. T. Dilworth, S. A. Krueger, G. D. Wilson, and B. Marples, **"Preclinical models for translational research should maintain pace with modern clinical practice.,"** International Journal of Radiation Oncology*Biology*Physics , vol. 88, no. 3, pp. 540–544, Mar. 2014.

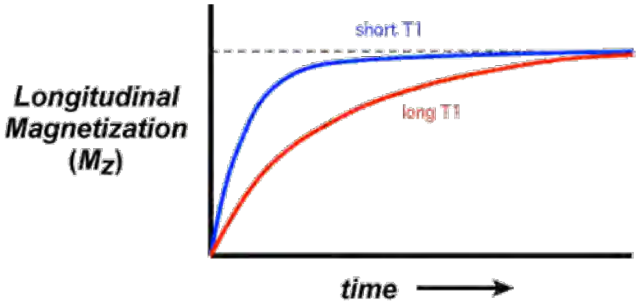
Oncology T1 vs T2



Department of Radiation Oncology, Beaumont Health System, Royal Oak, Michigan

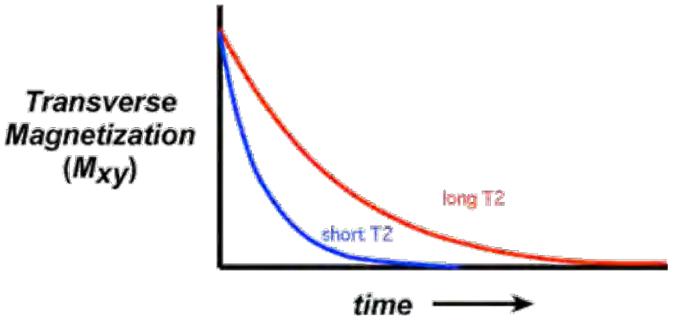
Flexiscan MR 3T (3017)

Mouse Subcutaneous tumour



Parameters T1:
Sequence: FSET1W
FOV 40 x 50
Fr x Ph 256 x 252

Acquisition time: 3.07 mn



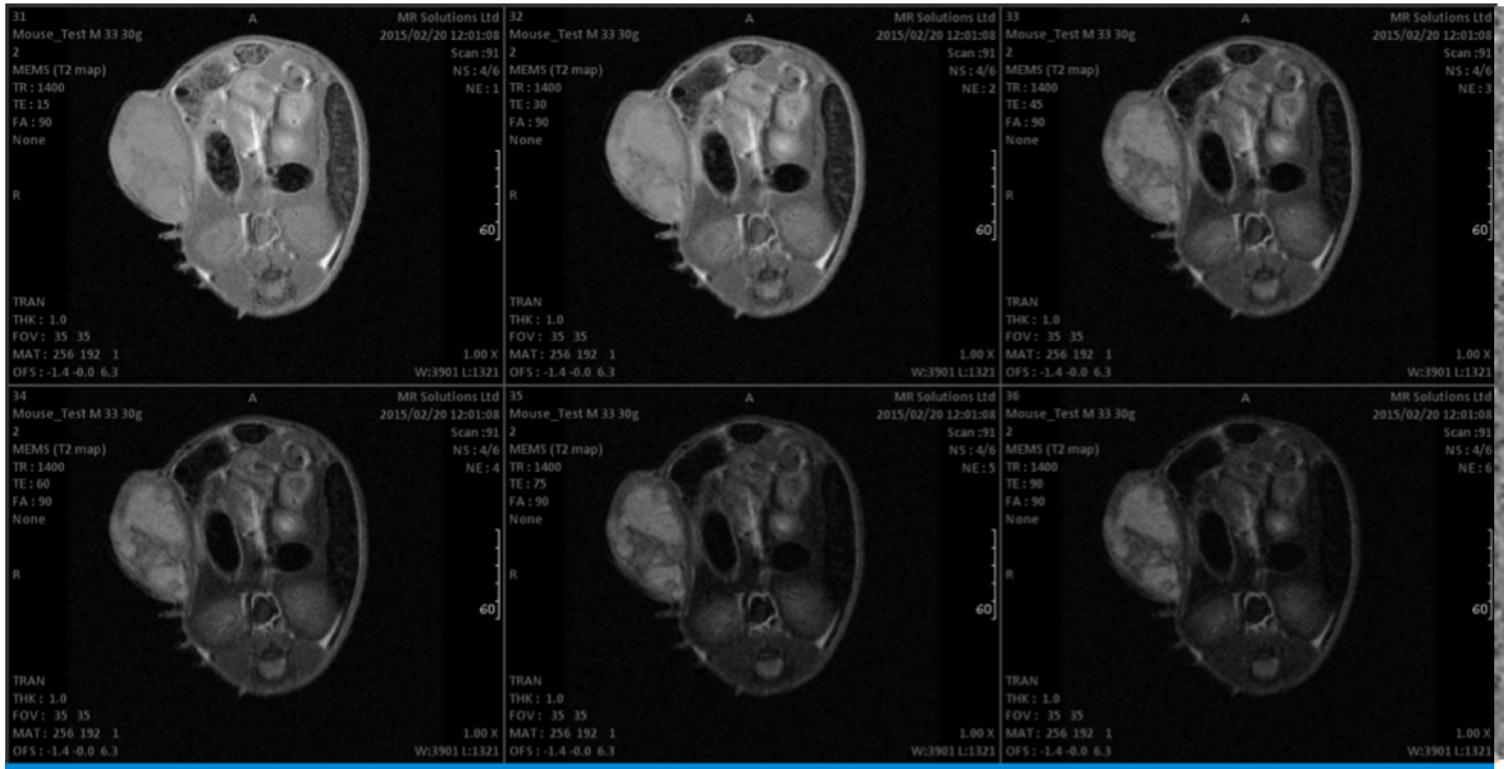
Parameters T2:
Sequence: FSET2W
FOV 40 x 50
Fr x Ph 256 x 252

Acquisition time: 3.23 mn

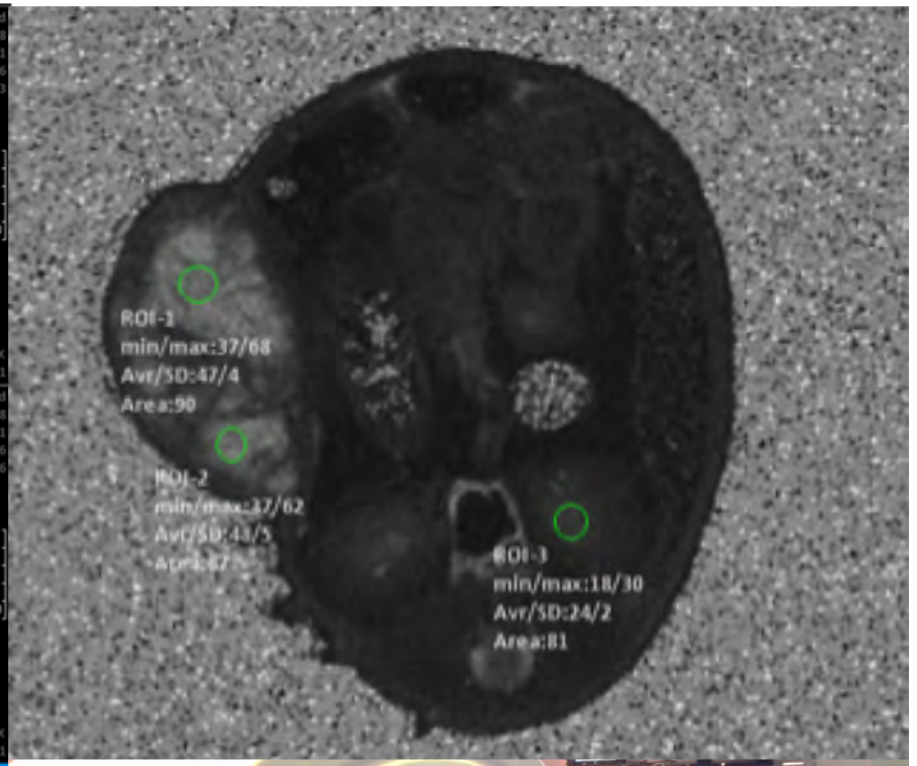
T2 Mapping

Flexiscan MR 3T (3017)

Mouse Subcutaneous Tumour



Mie University hospital, Japan



Parameters T1:
Multi-echo, multi slices
Sequence: MEMS (T2 maps)
Slice thickness: 1.0 mm

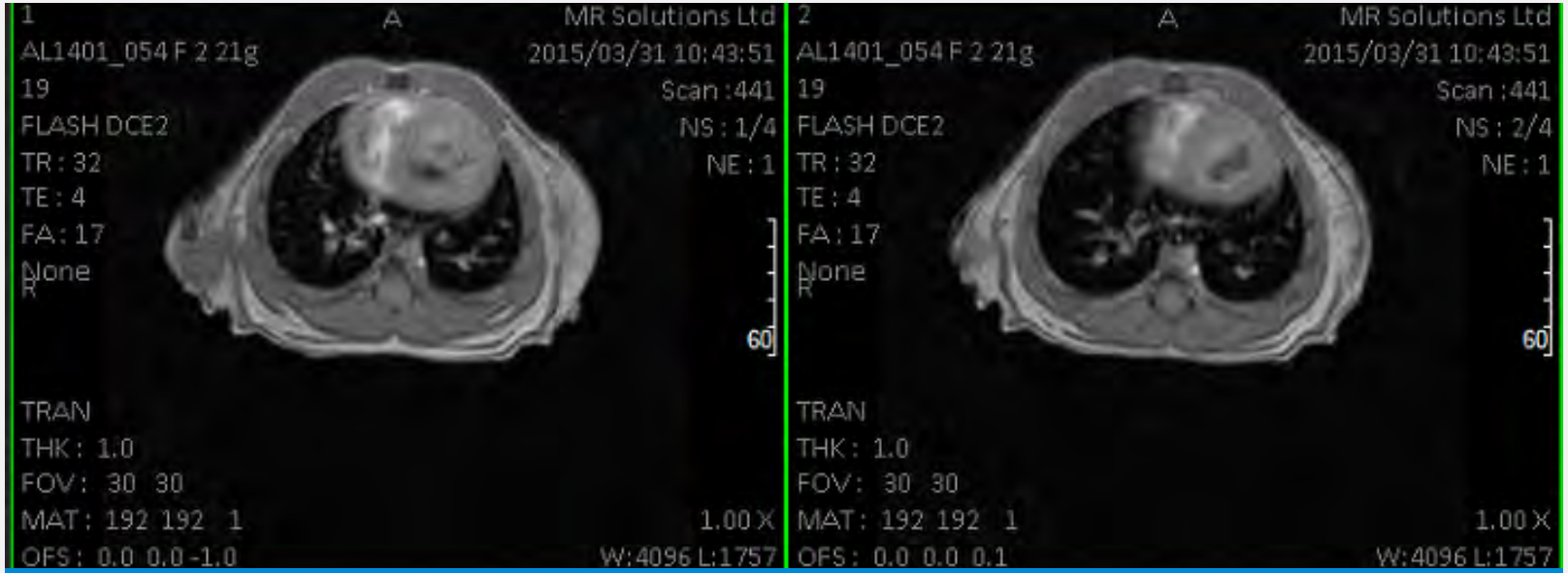
TR 1.4s / TE 15-150 ms
FOV 35
Fr x Ph 256 x 192

Acquisition time 4.43 min

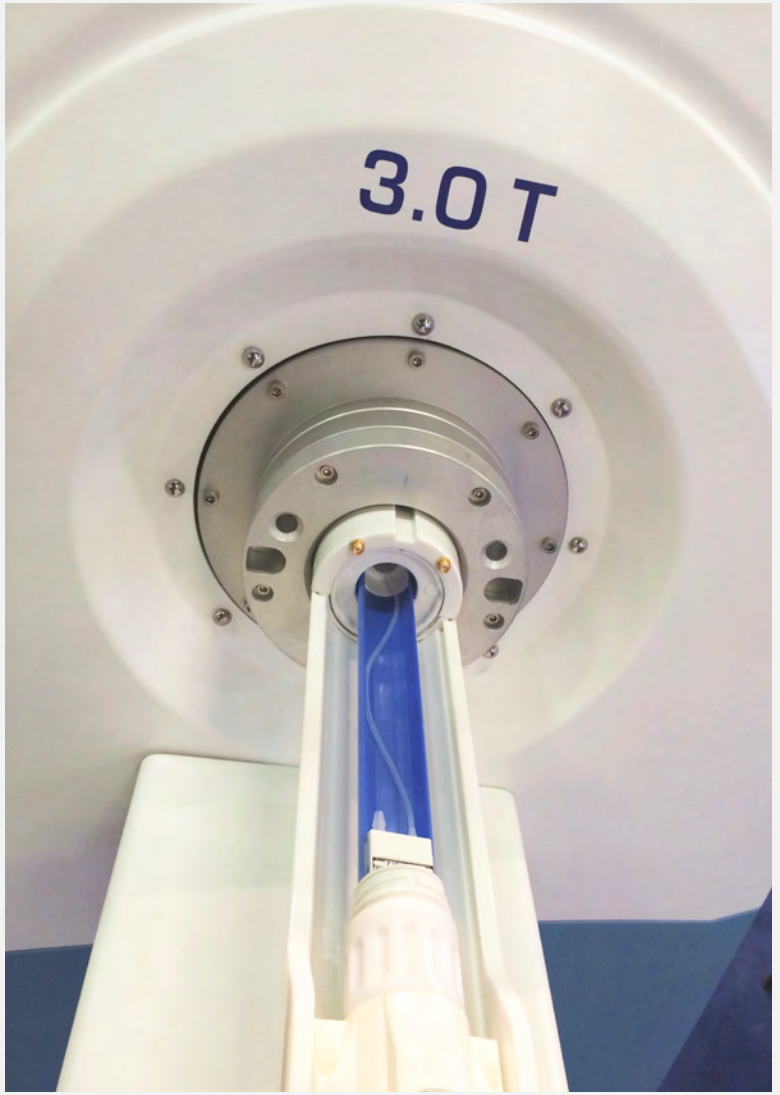
Flash Lung Tumours

Powerscan 3T (MRS-3017)

Mouse with lung tumour



Beaumont Health System, Royal Oaks, Michigan



Parameters:
Sequence: FLASH / DCE
Slice thickness: 1.0 mm
Slices: 4
TR 32 ms / TE 4 ms

FOV 30 x 30 mm
Fr x Ph 192 x 192
Average: 32
Acquisition time 3.17 min


MOLECUBES
X-CUBE

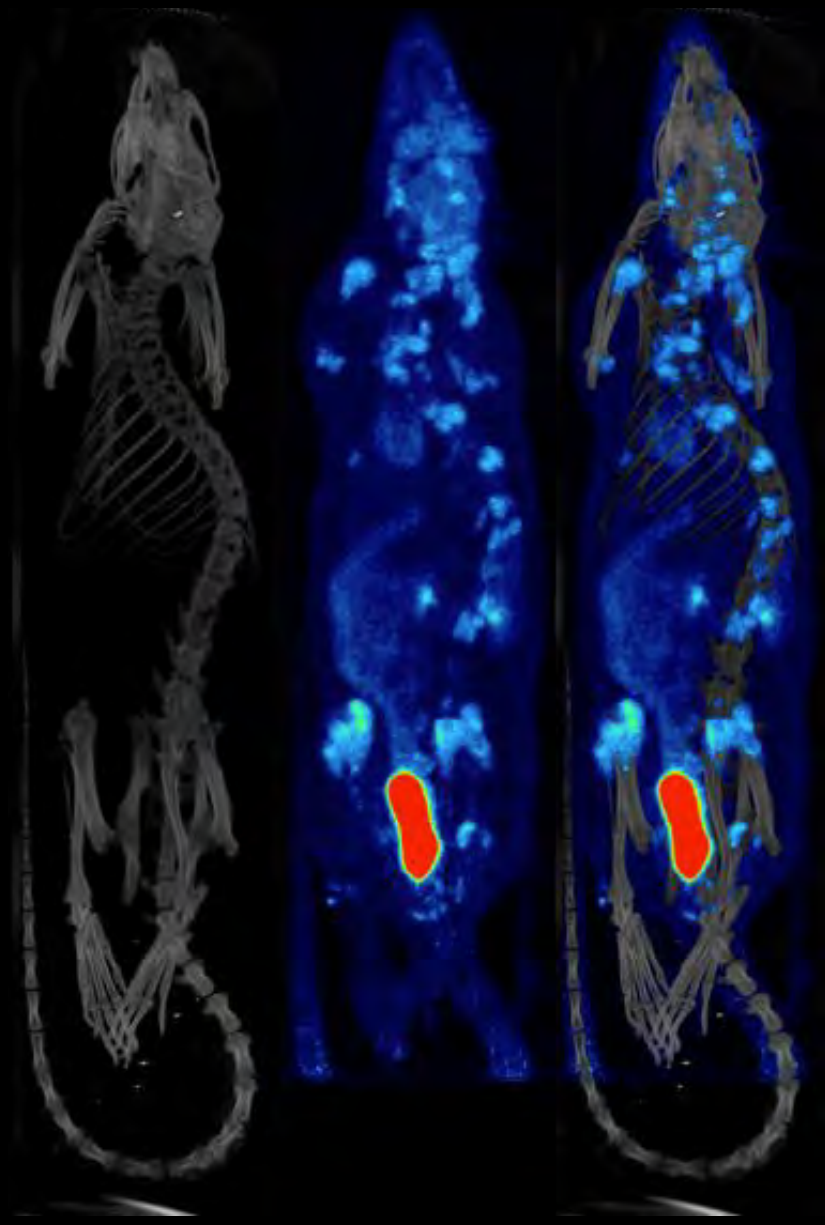

MOLECUBES
β-CUBE

[18F]FDG PET - Detection of metastases

- Development of rat model of brain metastases
- Rats were intracardially inoculated with breast cancer cells
- MDA-MB-223 I br/EGFP induces only brain metastases (according to literature)
- However, paralysis of hind legs after 5 weeks
- µCT and µPET evaluation: bone metastases throughout the body

Protocol
- full body rat (200g)
- 3 bed positions; 10 min/bed position
- 10.67 MBq (288 µCi) [18F]FDG

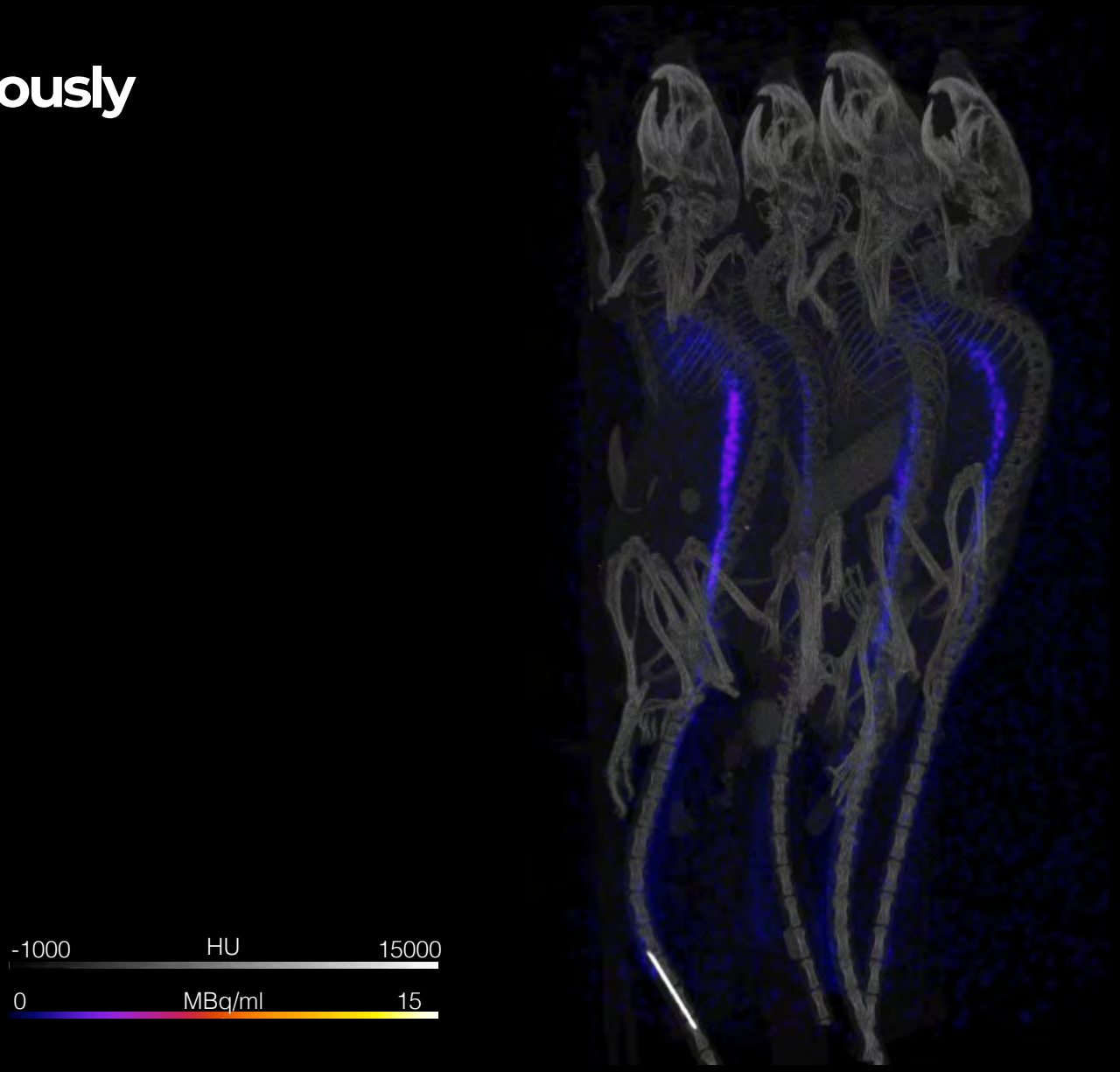
- HR spiral CT
- ISRA reconstruction - 200 µm voxel size



[18F]-FDG – 4 mice simultaneously

- 4 mice - [18F]-FDG
- ± 4 MBq in each mouse

- 60 min PET acquisition - 1 bed position
- Time frames: 4 x 15s, 4 x 60s, 11 x 300s



[11C]Raclopride - Mouse

- Mouse 23g - Dopamine D2 receptor antagonist
- 9.66 MBq (261 µCi) @ start acquisition
- Static scan

Transversal

Coronal

[11C]Raclopride - Rat
PET-MR coregistration

PET image
- average image frame 21 → 25
- Gaussian filter 1 mm x 1 mm x 1 mm