

## NuPET™ MR-Compatible Preclinical PETScanner

A revolutionary MR-compatible PET scanner for PET/MR imaging, allowing simultaneous measurement of molecular and functional processes *in vivo*.

- Simultaneous whole-body mouse and rat-brain imaging while inside your MRI
- Supports a wide range of MRI systems, including high-field models, and the use of small-animal gradients
- Available standalone PET operation
- Automatic PET/MRI co-registration



### Discover links between molecular mechanisms & functional response

Cubresa's NuPET™ is a revolutionary in-bore PET scanner that inserts into existing MRI instruments to create a powerful and flexible hybrid preclinical imaging platform that combines the superior anatomical, structural, and functional information of MRI with the molecular sensitivity of PET.

Researchers using simultaneous PET/MRI imaging can measure multiple physiological processes concurrently with exceptional tissue contrast, quantitative accuracy and study throughput. Sequential PET/MRI scanning captures data at different times, making it difficult to analyze important functional relationships when animal physiology can change within minutes. With NuPET's simultaneous scanning, MRI and PET work in unison to capture time-synchronized and highly complementary information previously unattainable – so you can trailblaze a path to a new discovery.

### Preclinical Studies with Simultaneous PET/MRI

Rat cranial views with <sup>18</sup>F-FDG and FISP MRI sequence

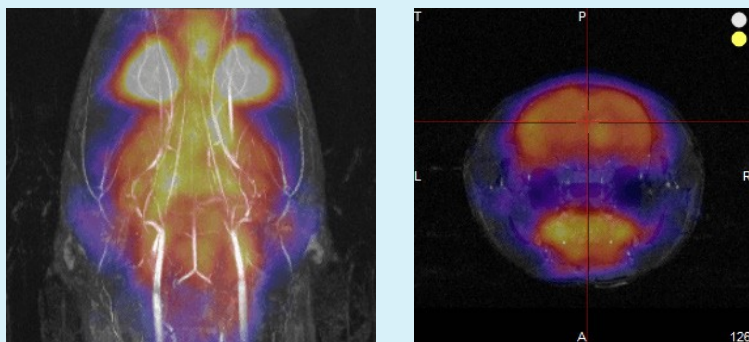


Figure 1. Left: MIP view of a rat (230g) injected with 21.4 MBq of <sup>18</sup>F-FDG and scanned simultaneously with PET and a FISP MRI sequence using a Cubresa NuPET™ MR-compatible PET Scanner inside a 7T MRI. Right: Coronal view. Images courtesy of the University of Manitoba.

Vascular permeability with <sup>18</sup>F-FDG PET and DCE MRI

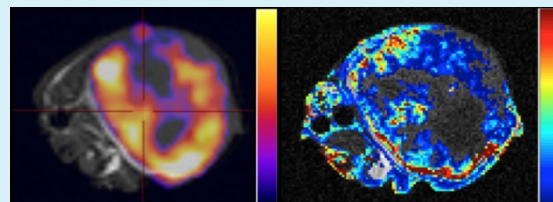


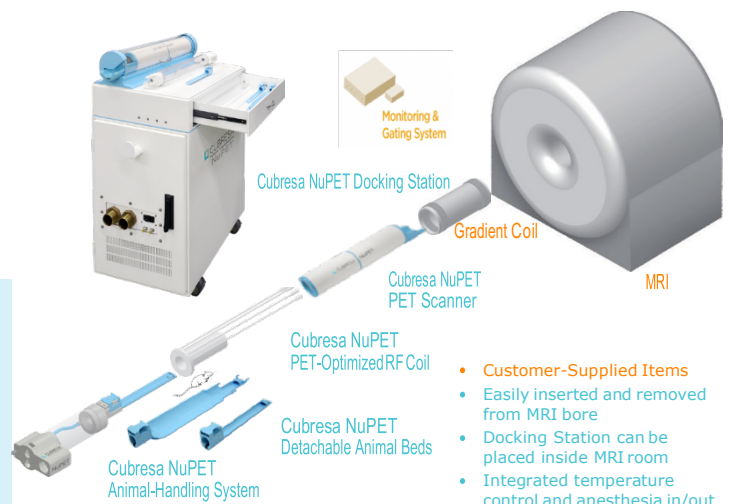
Figure 2. A mixture of <sup>18</sup>F-FDG PET agent and MultiHance® MRI agent was injected IV into a flank tumor model of human A549 lung cancer. The large tumor and a small portion of the mouse body are shown in this axial image orientation. Left: Average <sup>18</sup>F-FDG PET signal overlaid on an anatomical MR image shows relative glucose uptake. Right: Dynamic Contrast Enhancement (DCE) MRI was used to construct a map of relative vascular permeability. Images courtesy of University of Arizona.

**Quantify with new confidence**

Exceptionally precise PET/MRI co-registration and paired PET and MRI data points unleash advances like MRI-based motion and partial volume corrections that increase PET quantification accuracy. With MRI’s high soft-tissue contrast, VOIs can be accurately drawn using anatomical data with no guesswork. Shorter anesthesia duration helps minimize animal stress and the risk of inducing physiological changes that can affect study quality.

**Applications**

- Neuroscience—cause-and-effect, receptor activity, functional pharmacology
- Oncology—tumor characterization and therapy-response assessment
- Cardiology—multi-parametric functional and metabolic assessment
- Probe development—‘smart’ contrast agents



- **Customer-Supplied Items**
- Easily inserted and removed from MRI bore
- Docking Station can be placed inside MRI room
- Integrated temperature control and anesthesia in/out

**Imaging Performance**

Figure 3. High-resolution imaging performance shown with a PSF-MLEM reconstruction in a micro Derenzo phantom with 0.7–1.2mm diameter rods.

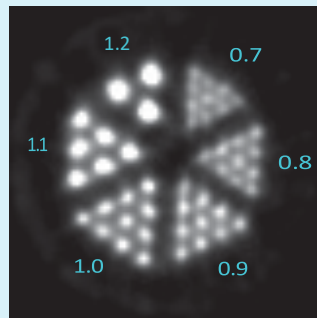


Figure 4. The NuPET in-bore scanner is installed into your existing MRI. PET-optimized RF coils are inserted into the scanner, as well as the animal-handling system with integrated anesthesia delivery and animal warming. The mobile Cubresa NuPET MR-compatible Docking Station allows standalone PET imaging using the NuPET scanner.

**Specifications**

Axial Field of View	67 mm
Trans-axial Field of View	59 mm
NEMA NU-4 2008 Sensitivity – out of MR bore	> 5.5 %
NEMA NU-4 2008 Sensitivity – out of MR bore with MR coil in place	> 5 %
NEMA NU-4 2008 Spatial Resolution – Filtered Backprojection	1.3mm
Spatial Resolution – PSF (2it8ss)	0.9mm
Reconstruction Speed	Filtered Back Projection – 3 minutes
	OSMAPOS (8 iterations, 8ss) – 5 minutes
	PSF (3 iterations, 8 subsets) – 5 minutes



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