PET Inserts For Small Animal Research MRI Systems

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Technology

State of the Art

- Several imaging modalities have been used to gather functional and anatomical information
- The imaging modalities rarely provide redundant information.
- This limited data redundancy has pushed product development toward dual imaging systems.
- Dual positron emission tomography (PET)-computed tomography (CT) systems providing functional and anatomical information are currently in the market.
- The two major drawbacks of the PET-CT systems are: imaging must be done sequentially and repeated CT radiation exposure precludes longitudinal studies.
- A dual PET-MRI system can provide simultaneous functional and high resolution anatomic information, eliminating the drawbacks of combined PET-CT systems.

Market Need

An affordable compact PET scanner that can be adapted for use in existing MRI systems.

Product

An MRI-compatible PET insert for PET-MRI imaging of small animals.

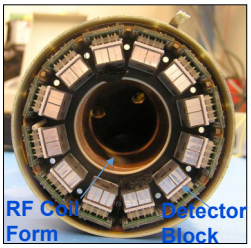

Figure 1: Depicts the view of the assembled 12-detector PET array with coil insert without the end-plate

Market

Product Applications

The complementary dual information obtained will be invaluable in studies such as:

- Therapeutic drug evaluation
- Development of treatment strategies for diseases such as cancer
- To obtain temporal correlation between hemodynamic responses and uptake of PET tracers

Competitive Advantage

The PET insert:

- Extremely compact and modular
  - Can be configured into limited space in existing MRI scanners.
  - Can be scaled up and reconfigured for different applications.
- Minimal performance degradation from interference
  - Allows simultaneous acquisition of high-quality image and spectroscopy data.
- Forms a part of a self-contained unit
  - Without disabling or interfering with the stand-alone use of the MRI system.
  - A series of animals can be imaged in a single day.

Beneficiaries

- Researchers
  - Great research tool that extends range of studies currently done with the MRI systems
- Manufacturers of small animal MRI systems
  - Valuable add-on to existing and future MRI machines sold

Key Product Features

Designed for easy and efficient animal set-up.

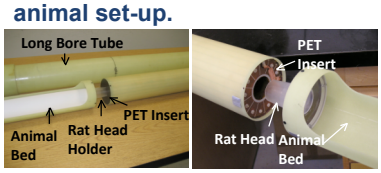

Figure 2: Self containment concept A- Positioning tube with animal bed and transport system B- Shows how the animal head is precisely positioned into the PET/MRI coil array assembly.

Provides a completely integrated solution for animal positioning, physiological monitoring, sedation and radiotracer delivery.

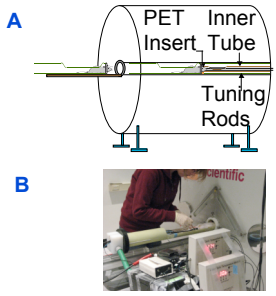

Figure 3: A - Schematic of 9.4 Tesla magnet system demonstrating operation of the bore tube insert. **B -** The actual set-up of an anesthetized rat at the start of a study. Radiotracers are introduced via peritoneal or arterial line injection after the setup is complete.

Provides high quality without compromising the performance of either imaging modality.

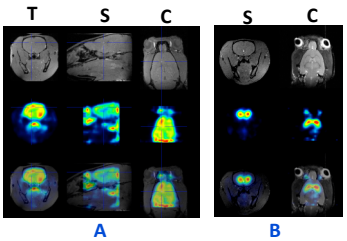

Figure 4: Simultaneous PET-MRI of the Rat Brain **A** – Isotropic 3D FLASH MRI images co-registered to PET images with18F FDG radiotracer **B** – Multi Slice RARE MRI images co-registered to PET images with Raclopride as the radiotracer

Commercial Readiness

Intellectual Property

The product is covered by two issued U.S. Patents:

Compact Conscious Animal Positron Emission Tomography Scanner (US 7,126,126)

and

Combined PET/MRI Scanner (US 7,286,867).

Time Frame

Deliverables	Time Frame (Days)*
Complete Engineering Drawings	180
Schematics and Specification Sheets for all components	365
Draft Technical Manuals	365
Basic Operating Software	365

Figure 5: Time Frame for further product development

Contact Information for Licensing

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Acknowledgment: Work at Brookhaven was supported by the U.S. Department of Energy, Office of Basic Energy Science, under Contract No. DE-AC02-98CH10886