

**SNM: Advancing Molecular Imaging and Therapy**

**SNM 56<sup>th</sup> Annual Meeting  
Press Conference**

**June 15, 2009**

**Toronto**

**Robert W. Atcher,  
Ph.D., M.B.A.**

**SNM President**

## SNM Isotope Survey Results

- **Has or is your practice/facility impacted by the current molybdenum shortage?**  
**Yes – 90.53%**
- **Do you have access to an alternative technetium source?**  
**No – 65%**
- **Please indicate any and all changes that were made regarding patient care**  
**Postponement: 60%**  
**Cancelled: 32%**  
**Change in procedure: 44%**

# Frederic H. Fahey, D.Sc.

Chair, SNM Scientific Program Committee

# 2009 Image of the Year

**Henry Wagner, M.D.**

## **This Meeting Provided: A New Look at the Cure for Cancer**

- **The cure for cancer “has a long way to go.” (NY Times, April 24, 2009).**
- **The death rate from cancer in the U.S. has fallen only 5% over the past half century.**
- **This meeting has provided evidence that radionuclide therapy can cure cancer. Perhaps health care reform will be the tipping point that will make this widely known by the public and politicians.**

- **Today if a patient's cancer cannot be removed completely by surgery or successfully treated by external radiation therapy, chemotherapy is now the treatment of choice.**
- **Chemotherapeutic agents slow tumor progression, and can prolong life, but not all cancer cells are killed.**
- **Radionuclide therapy can often kill all the tumor cells because of the so-called bystander effect that results from emitted radiation extending beyond the radiolabeled molecules. This is a key advantage of radioactive drugs.**

## Creating Smarter Health Care

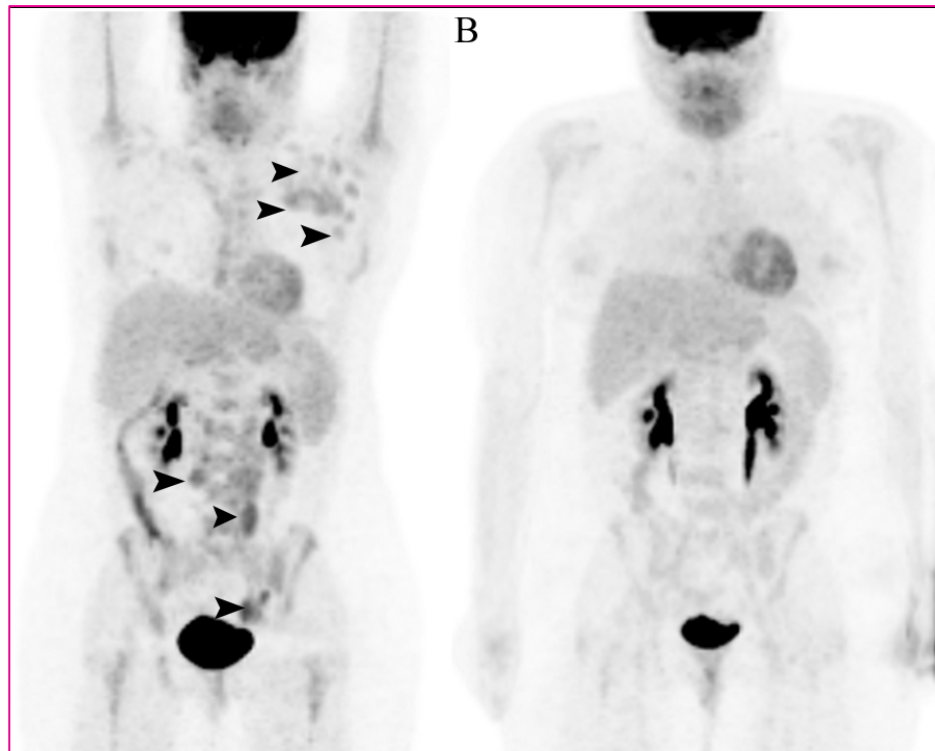
- The Image of the Year 2009 shows how molecular radiotherapy can cure non-Hodgkin lymphoma (NHL).

### **131I-Tositumomab (Bexxar®) vs. 90Y-Ibritumomab (Zevalin®) Therapy of Non-Hodgkin Lymphoma**

**Iagaru A, Mittra ES, Ganjoo K, Knox SJ, Goris ML  
Molecular Imaging Program at Stanford**

## Image of the Year 2009

FDG-PET  
Before Rx



After Rx

A 36-year-old woman with NHL had a complete response after Y-90 Zevalin<sup>®</sup> treatment.

	I-131 Bexxar®	Y-90 Zevalin®
<i>Complete response</i>	11/31 <u>35.5%</u>	15/36 <u>41.7%</u>
<i>Disease progression</i>	4/31 12.9%	4/36 11.1%

We need to educate physicians, political leaders, and the public about the use of radioimmunotherapy as a ***first-line treatment***, not just in patients who relapse after chemotherapy.

- **Most patients with NHL are first treated with chemotherapy, usually R-CHOP, a combination of the monoclonal antibody rituximab, and the drugs cyclophosphamide, hydroxydaunorubicin, vincristine, and prednisolone.**
- **90Y-Zevalin or 131I-Bexxar (Z/B) are now given only in the case of relapse after many courses (6 or more) of R-CHOP therapy.**
- **The cost of R-CHOP treatment is \$33,000/cycle (the total cost including nursing is \$40,000/cycle). Therefore, a 6 cycle R-CHOP treatment costs \$240,000.**
- **Radioimmunotherapy with Z/B costs \$135,000, half the cost of R-CHOP therapy.**
- **Radioimmunotherapy may eventually follow the model of nuclear cardiology.**

# Comparative Effectiveness Research (CER)

**Anti-CD20 immunotherapy compared to pretargeted anti-CD20 radioimmunotherapy in patients with non-Hodgkin lymphoma (NHL)**

**DM Goldenberg, H Karacay, C-H Chang, EA Rossi, WJ McBride, RM Sharkey**

Garden State Cancer Center at the  
Center for Molecular Medicine and Immunology, Belleville, NJ;  
Immunomedics, Inc., Morris Plains, NJ;  
IBC Pharmaceuticals, Morris Plains, NJ

## Pretargeted radioimmunotherapy (RAIT) improved therapeutic response and reduced hematopoietic toxicity compared to immunotherapy alone.

### Bispecific Antibody:

Anti-HSG Fab plus  
Anti-CD20 Fab

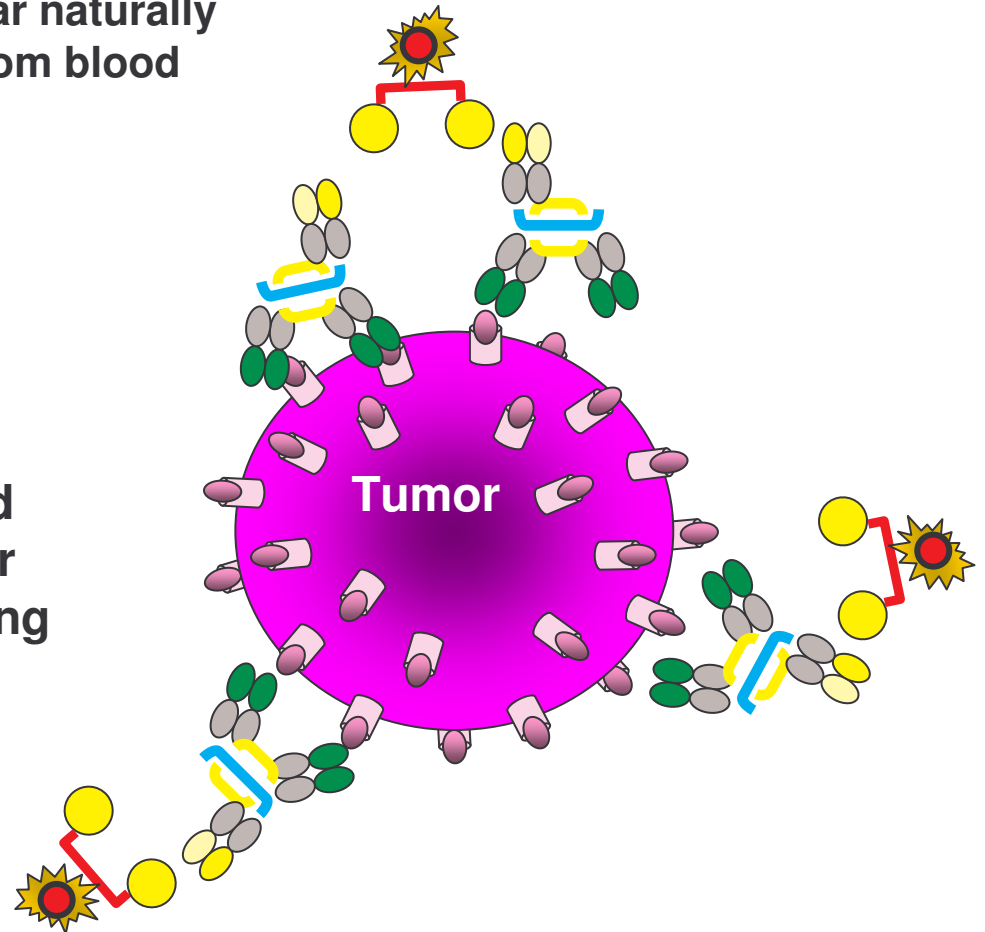
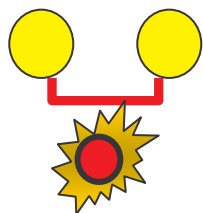
Tumor  
targeting

Clear naturally  
from blood

di-hapten-  
peptide

Rapid  
tumor  
targeting

Urinary  
excretion



SNM 2009 Annual Meeting

**Scientific Research  
Highlights**

**Peter S. Conti, M.D., Ph.D.**

# **PET Scans Improve Accuracy of Dementia Diagnosis Early in Disease Onset**

**K. Frey, J. Burke, G. Giodani, R. Koeppe, R. Albin, Division of  
Nuclear Medicine, the University of Michigan, Ann Arbor**

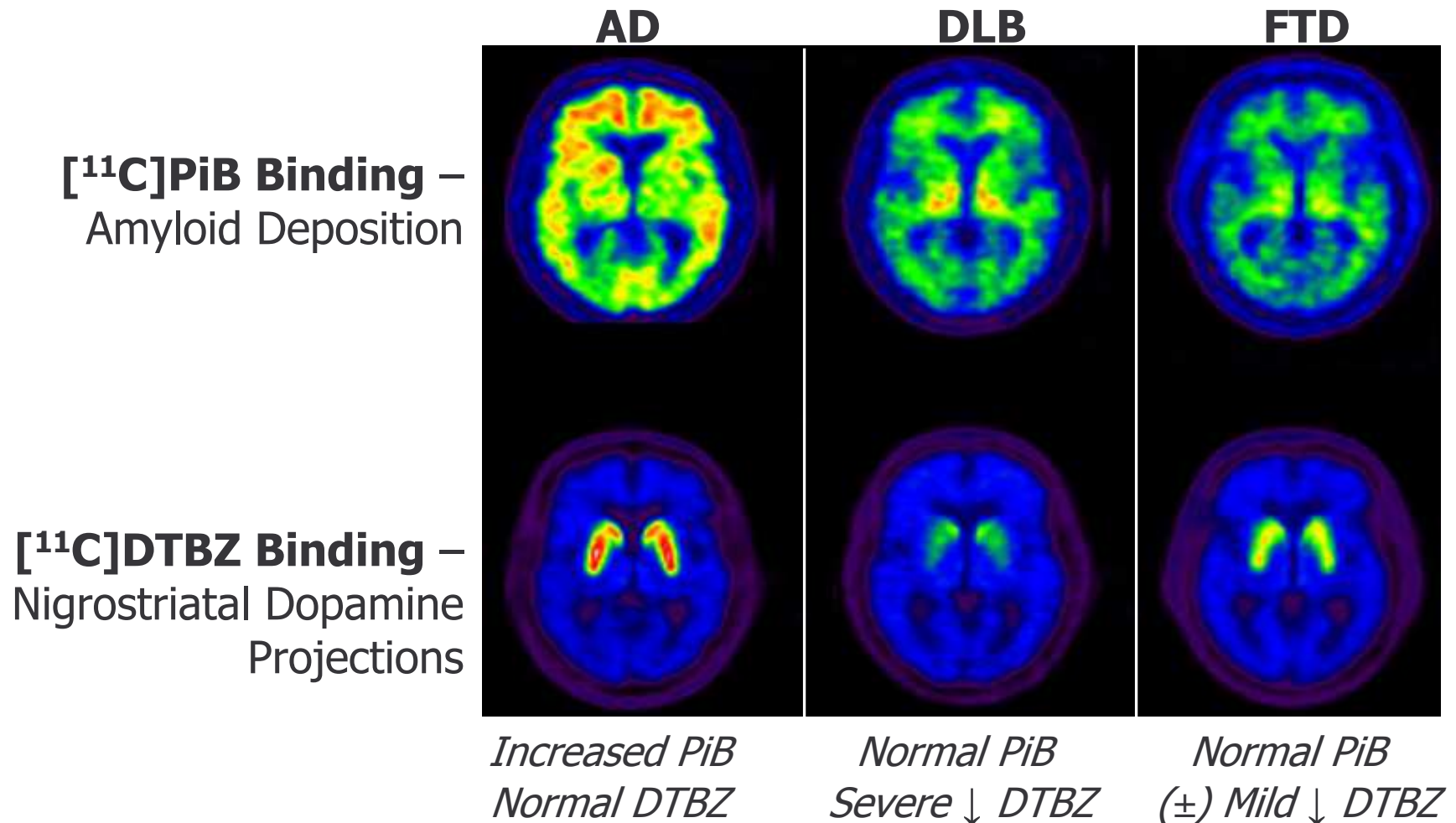
Scientific Paper 251: “PET Neurochemical vs. Clinical Phenotypes in Mild-Early Dementia.”

# **PET Scans Improve Accuracy of Dementia Diagnosis Early in Disease Onset**

## **Research Findings**

- **PET neurochemical phenotyping for mild, early dementia produces significantly different results than the best clinical expert phenotyping. In the study, the accuracy of diagnoses using PET scans was improved in more than one out of four patients.**
- **Amyloid and presynaptic dopamine imaging can identify subtypes of dementia, a disease that takes many forms and has different causes but similar symptoms, making accurate diagnoses difficult.**
- **PET scans provide images of important signals for disease that other examinations missed, such as deposits of amyloid plaque, which are a common indicator of Alzheimer's disease, and damage to dopamine nerves in Lewy body dementia.**

## PET Neurochemical Classification: Alzheimer Disease (AD) / Dementia with Lewy Bodies (DLB) / Frontotemporal Dementia (FTD)



# Clinical Consensus vs. PET Diagnosis

## PET Imaging Diagnosis

		PET Imaging Diagnosis			total
		AD	DLB	FTD	
Clinical Diagnosis	AD	33	2	1	36
	DLB	1	6	1	8
	FTD	10	0	9	19
	total	44	8	11	63

# **PET Scans Improve Accuracy of Dementia Diagnosis Early in Disease Onset**

## **Broader Implications of the Study**

- **More than 5 million people each year are newly diagnosed with dementia; early, accurate diagnoses are critical to providing appropriate treatments and therapies in the beginning stages, when treatment can be most effective.**
- **Identifying underlying causes of different types of dementia may one day enable more targeted, individualized therapies and treatments.**
- **In addition, knowledge of underlying causes of dementia may advance research on identifying those at risk of developing different types and strategies for delaying onset of illness.**

# **New Effective Approach for Treating Prostate Cancer**

**D. Wild, M. Frischknecht, A. Morgenstern, F. Bruchertseifer, J. Boisclair, A. Provencher-Bolliger, H. Maecke, Division of Radiological Chemistry, University Hospital Basel, Basel Switzerland, Novartis Pharma, SP&A/Investigative and Regulatory Pathology, Basel, Switzerland, and the Institute of Transuranium Elements, Karlsruhe, Germany.**

Scientific Paper 38: “An Alpha-Particle Emitting Radiopeptide ( $^{213}\text{Bi}$ -DOTA PESIN) for Therapy of Prostate Cancer.”

# New Effective Approach for Treating Prostate Cancer

## Research Findings

- **Seventy percent of prostate-cancer bearing mice that received the maximum tolerated dose of the alpha-particle emitting radiopeptide  $^{213}\text{Bi}$ -DOTA-PESIN showed a complete response to the treatment.**
- **The study showed that alpha therapy with  $^{213}\text{Bi}$ -DOTA-PESIN was significantly more effective than beta therapy in the prostate cancer animal model.**
- **The study also showed that the mice experienced minimal toxicity in the kidneys.**



before treatment



14 days after treatment



# **New Effective Approach for Treating Prostate Cancer**

## **Broader Implications of the Study:**

- **This new form of radiotherapy could revolutionize treatment for the more than 30,000 men each year who experience recurrence of prostate cancer after prostate removal.**
- **The new treatment could also be applied to other types of cancer, such as breast cancer, in which cells have an overabundance of gastrin-releasing peptide receptors.**
- **Alpha-particle emitting radiopeptides could treat cancers more effectively with fewer side effects than beta treatments.**

# High-Definition PET and “Motion-Frozen” Technology Helps Heart Patients

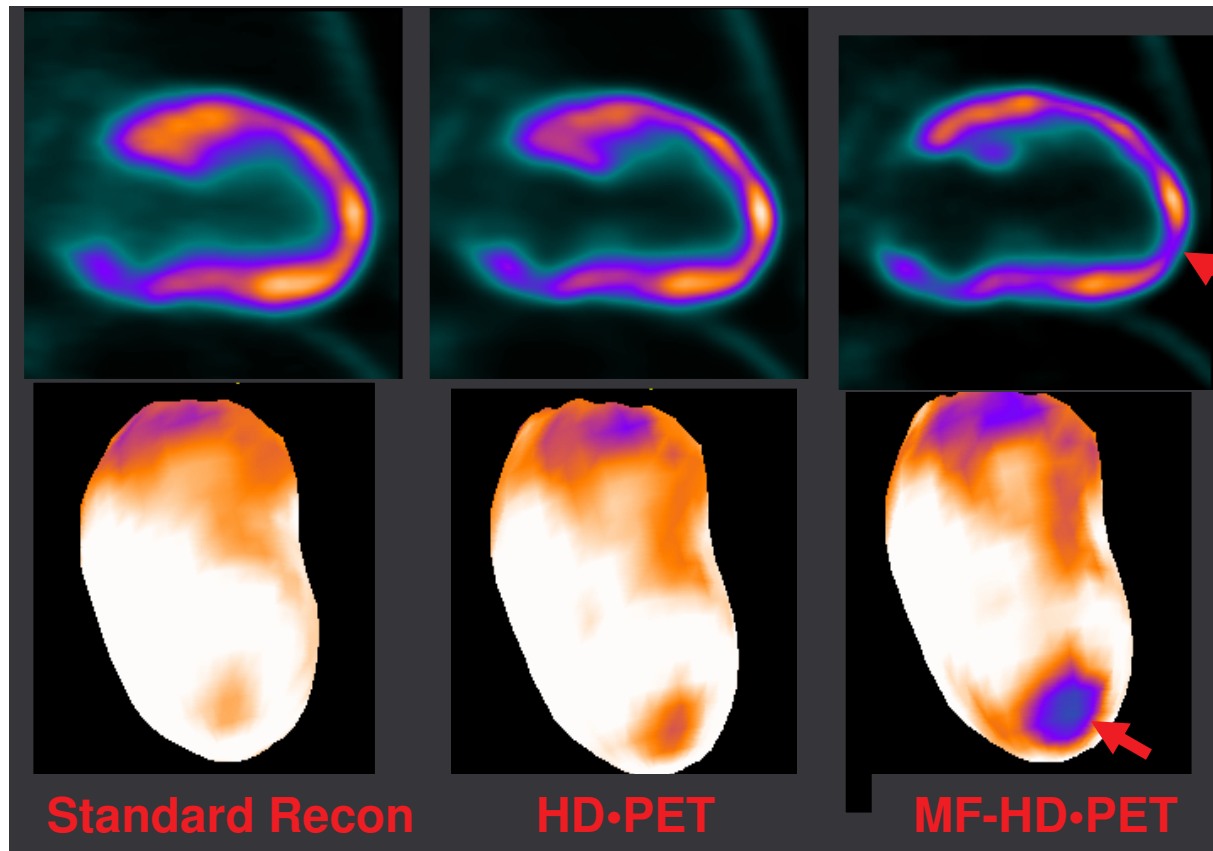
**L. Le Meunier, P. Slomka, J. Fermin, B. Huber, A. Ramesh, S. Hayes, J. Friedman, G. Germano, D. Berman, Siemens Healthcare Molecular Imaging, Hoffman Estates, Ill., and Cedars-Sinai Medical Center, Los Angeles**

Scientific Paper 479: “Motion frozen high definition FDG cardiac PET.”

# High-Definition PET and “Motion-Frozen” Technology Helps Heart Patients

## Research Findings

- **Combining Siemens Health Care High Definition PET with Cedars Sinai Medical Center Motion Frozen image processing technology improves enhanced cardiac images by enhancing the performance of the PET system and removing unwanted blur that results from imaging a beating heart.**
- **Images obtained with the combined technologies reveal myocardial defects that were not visible with other imaging systems.**
- **In the study, the diagnoses of patients who underwent imaging with the combined technology were changed—sometimes drastically.**



The myocardium viability assessment scans above illustrate that while HD-PET is an improvement over standard image, motion-frozen HD-PET further improves quality by providing images free of cardiac motion. Above, MF-HD-PET detected an apical inferior defect (red arrows) not visible without the use of this image processing technique.

# High-Definition PET and “Motion-Frozen” Technology Helps Heart Patients

## Broader Implications of the Study:

- More than 550,000 new heart failure cases occur each year; the combined technologies could significantly improve the accuracy of diagnoses.
- This more precise imaging tool could reduce the number of false-positive results that arise from traditional imaging technologies.
- More accurate diagnoses of heart conditions could advance treatment and therapy for heart patients.

# **New Chemistry Technique Improves Hybrid PET/MRI Scanner Performance**

**M. Tatsumi, Department of Radiology, Osaka University  
Graduate School of Medicine and Medical Hospital,  
Osaka, Japan**

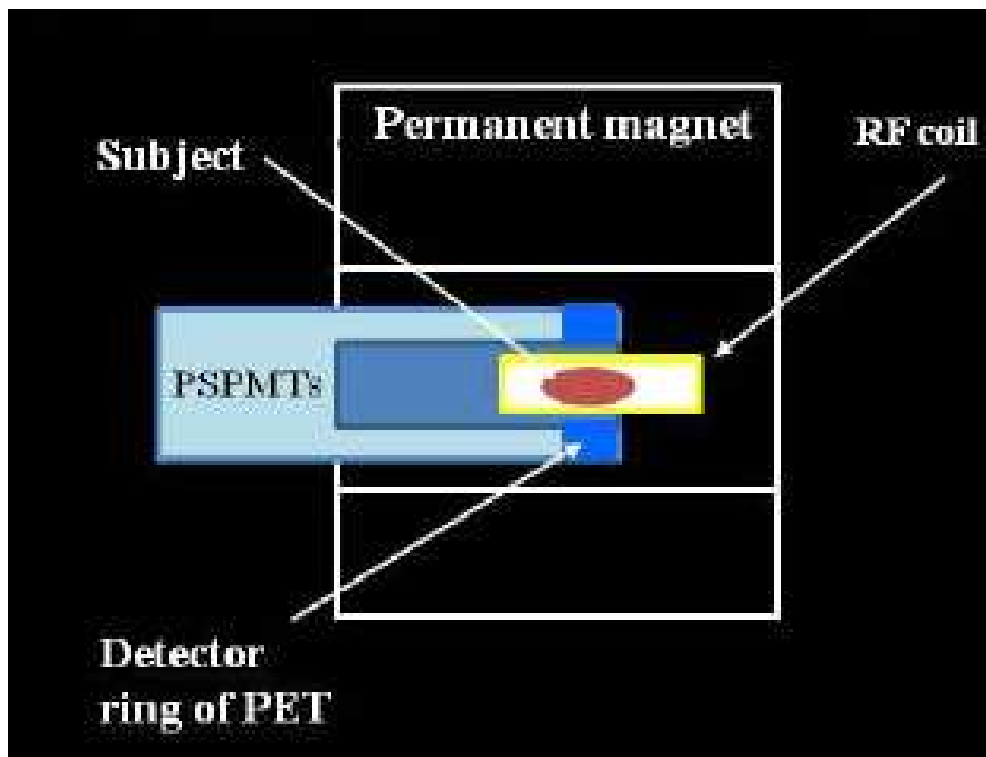
Scientific Paper 7: “Simultaneous C-11 Methionine (MET) PET and contrast enhanced (CE) MRI rat imaging with an integrated PET/MRI system.”

# **New Chemistry Technique Improves Hybrid PET/MRI Scanner Performance**

## **Research Findings**

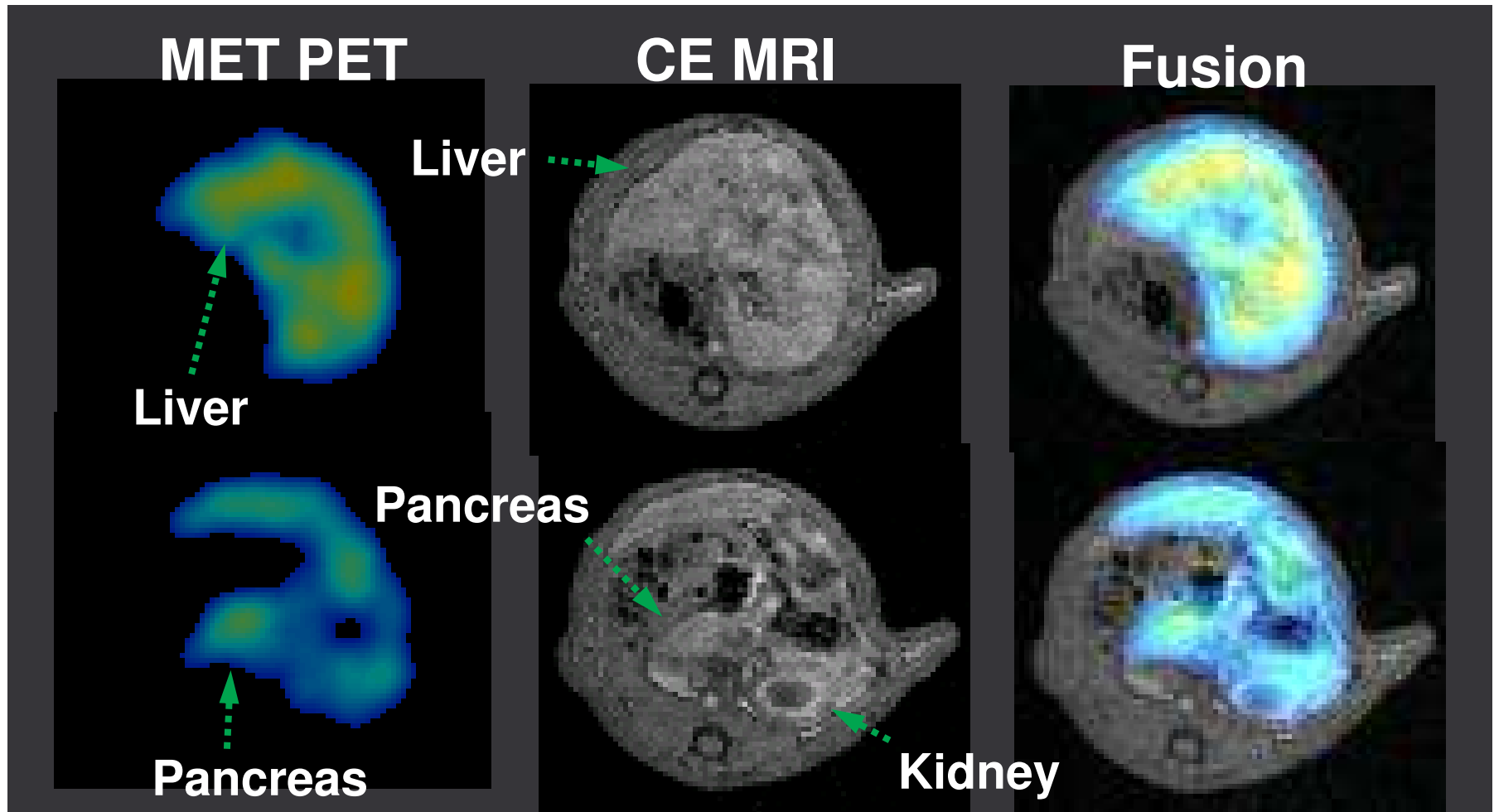
- **The simultaneous PET/MRI system provided quality whole-body images of rats in spite of the short half-life of C-11 methionine, which shows potential for other radiotracers.**
- **The images showed excellent mapping of the liver and kidneys. C-11 methionine is known to accumulate in the pancreas, but it would have been difficult to image without clear mapping MR images.**
- **The use of Gadoextate as a contrast agent improved image quality of the abdomen and enhanced the power of the integrated PET/MRI system.**

## Structure of an iPET/MRI System



**iPET/MRI: integrated PET/MRI**

## Transaxial Images of Rat Abdomen with an iPET/MRI System



CE MRI: contrast enhanced MRI (T1-w FLASH) with Gd-EOB-DTPA (hepatobiliary agent)

# New Chemistry Technique Improves Hybrid PET/MRI Scanner Performance

## Broader Implications of the Study:

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