# SNM 2000 Annual Meeting: Fusion Is the Theme as Nuclear Medicine Enters the New Century

Fusion was the theme featured in presentations, meetings, and exhibits at the 2000 annual meeting of the Society of Nuclear Medicine (SNM), held in St. Louis, MO, June 3–7. Attendees at this overwhelmingly successful meeting of members, industry, affiliated scientists, and world press saw nuclear medicine modalities fused to create new windows on diagnostic and therapeutic possibilities. They saw the results of interdisciplinary fusion, with presentations on the impact of nuclear medicine in cutting-edge research fields such as genetics, pharmacology, and microbiology. They experienced the synergism of organizations that have pooled their energies and resources to work together for common goals in the coming year. SNM Executive Director William Bertera said, "Excellent scientific and educational programming, as always at the SNM annual meeting, was the primary draw in St. Louis. We set near-record numbers, with attendees from all over the world. In only a few days, these attendees experienced a year's collective labor by hundreds of staff, volunteers, and contractors. Our challenge for next year in Toronto is to do better still. We are already at work doing just that."

Image of the Year Fuses Techniques

Scientific papers and presentations were the centers of interest for most attendees. This year, as last, the Image of the Year featured a fusion of nuclear medicine techniques. At a news conference on June 5, D. Bruce Sodee, MD (Cleveland, OH), reported on the techniques that he and Zhenghong Lee, PhD (Cleveland, OH), used in developing the winning image. Lee, Sodee, and their colleagues at University Hospitals of Cleveland/Case Western Reserve University combined CT with SPECT to produce a single, rotating 3-dimensional image of prostate cancer. (A static version of the image is produced on this page; for the fully animated image, dubbed "the dancing pelvis" by attendees, visit www.snm.org/nuclear/am_press. html.) Building on a previous 3-dimensional registration scheme between CT and SPECT (*J Nucl Med.* 1999;40:347–351), the team also reported on an automatic registration method between MRI and SPECT that maximizes mutual information (MI). The MI-based method was found to be more robust for intermodality registration compared with other automatic methods. The result was a significantly clearer and more useful image of the size and exact
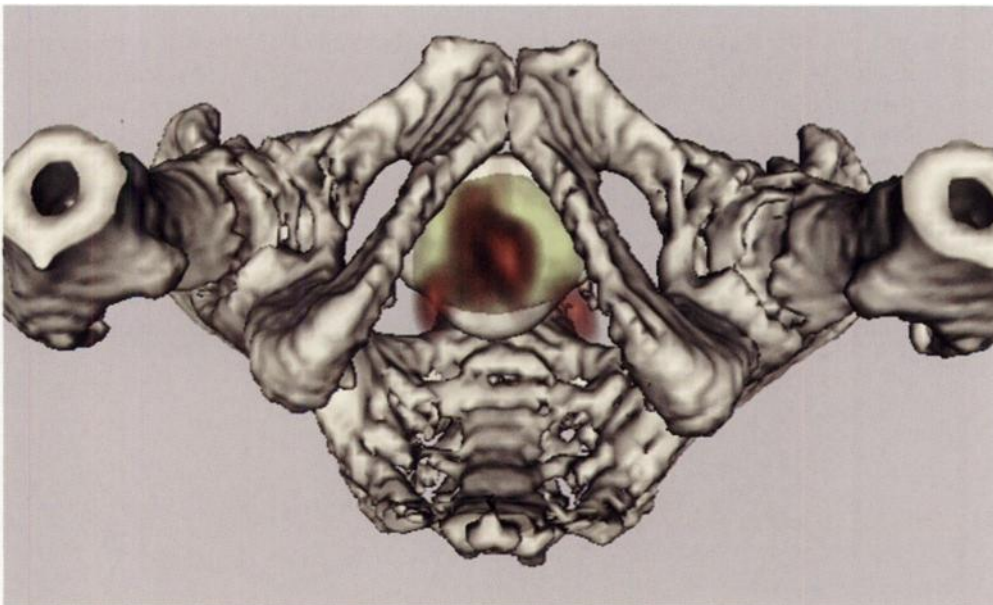
SNM Image of the Year. Fused image showing location of cancer of the prostate (red), using CT and SPECT. Courtesy of D. Bruce Sodee, MD, and Zhenghong Lee, PhD.

location of the tumor. Sodee told the press that although the reconstructed SPECT images used in studying and reporting on this method were from newly diagnosed, postprostatectomy and post-therapy patients, the technique holds the most promise in more accurate staging and treatment planning. Sharing the spotlight with the authors at the meeting was Cytogen (Princeton, NJ), manufacturer of ProstaScint ([¹¹¹In] MoAb 7E 11.C5), the monoclonal antibody used in the studies. Henry N. Wagner, Jr., MD (Baltimore, MD), a past president of SNM, commented that coregistration of information from 2 or more modalities is no longer the wave of the future. With efforts like those of Lee and Sodee and with technologies already on the market and under development by medical manufacturers, "that future has already arrived," Wagner said.

Predictors of Alzheimer's Disease Focus Worldwide Attention

The story from the SNM meeting that received the most press interest around the globe involved presentations on the use of PET in identifying regional cerebral metabolic decline decades before clinical onset of Alzheimer's disease (AD). Daniel H.S. Silverman, MD (Los Angeles, CA), and colleagues at the University of California Los Angeles (UCLA) School of Medicine investigated a medical enigma and suggested a surprising solution. Although a number of reports have suggested that the length of formal education is inversely correlated with the age-adjusted risk for being diagnosed with AD, explanations have been inconsistent. Silverman's team reasoned that the explanation might lie not in the effects of education on later cognitive reserve but in actual physiological differences that could be detected much earlier in life. The group studied 60 individuals (age range 51–86 y) who had undergone PET for complaints of mild memory loss. Participants were divided into those with >16 y of formal education and those with less. The investigators found significant differences between the 2 groups in calculated regional brain activity,

particularly in the cingulate cortex, the portion of the brain believed to undergo the earliest metabolic decline in AD. This difference was also greater in the presence of apolipoprotein E type-4 allele, the strongest genetic risk factor yet identified for development of AD in elderly patients. "The current study, though not conclusive, suggests that neuronal decline may begin many decades prior to the clinical onset of dementia, early enough to affect educational level," said Silverman. In related studies, Silverman and colleagues reported on the ability of PET to predict cognitive decline and the progression of dementia and on the use of PET to determine noninvasively the precise cause of a patient's dementia. Presentations of their innovative work focused much media attention on the Silverman team and highlighted the degree to which nuclear medicine has gone beyond static diagnosis to become an integral and essential element in learning more about the evolution of diseases and the development of treatment and prevention approaches.

Applications of PET Continue to Expand

For the many nuclear medicine specialists who have faced local and institutional challenges to bringing PET into their facilities, the extraordinary number of innovative applications of this technology presented at the SNM meeting was especially welcome. More than 40% of the 1300+ presentations at the meeting were based on PET studies. These reports made it clear that PET continues to make solid inroads from a research modality into clinical practice, with a growing number of applications in diagnosis and patient management. Among the presentations featured in SNM press releases and picked up by the public and scientific media were the following:

Successful identification of infection with PET: Abass Alavi, MD (Philadelphia, PA), and colleagues at the Hospital of the University of Pennsylvania and the University of Leuven Hospital (Leuven, Belgium) reported on FDG PET in assessing 109 patients with a variety of suspected infections. The investigators

compared the imaging results with patient out-comes and final diagnoses and found that PET accurately detected infection in 94 of 109 stud-ies (96%). "PET's critical role in the management of patients with infection and inflammation imaging appears to be opening the next new application for FDG and PET," said Alavi.

PET findings change treatment for variety of cancers: Johannes Czernin, MD (Los Angeles, CA), and colleagues at the UCLA Medical Center and the North California PET Imaging Center (Sacramento, CA) reported on analysis of PET test results from a group of patients with breast cancer and subsequent changes in treatment strategies by referring physicians. The researchers found that, as a result of data supplied from the PET studies, 33% of patients had their cancers restaged, with 21% receiving stage upgrades and 12% receiving stage downgrades. "What is signifi-cant," said Czernin, "is that PET was instru-mental in altering treatment in more than 20% of patients."

In a separate study, Mark A. Seltzer, MD, and colleagues from the UCLA Medical Center evaluated referring-physician response and the role PET played in the management of 1532 consecutive patients with lung, colorectal, breast, ovarian, and other cancers, including melanoma. Referring physicians were asked whether PET results had altered clinical decision making on treatment planning. Major treatment changes were reported in 43% of patients, minor changes in 17%, and no change in 35%. The most sig-nificant changes in treatment decisions were among patients initially scheduled for surgical removal of tumors or radiation therapy who were assigned other treatment protocols after PET (17%) and among patients who were initially scheduled for medical or no treatment but who were reassigned for radiation therapy or surgery on the basis of PET results (14%).

PET maximizes survival, reduces treat-ment cost in lung and colorectal cancers: Three papers presented at the meeting reported on the use of PET to determine long-term prog-noses in patients with lung cancer. Studies from West Virginia University (Morgantown, WV), UCLA Medical Center, and the Peter MacCullum Cancer Institute (East Melbourne, Australia) demonstrated both the diagnostic accuracy and cost effectiveness of PET in lung cancer.

Similar results were reported by Jose Zubeldia, MD, and colleagues at the State University of New York (Buffalo, NY) in a study comparing the cost effectiveness of PET and CT in preoperative assessment of liver metas-tases in patients with colorectal cancer. Although palliative therapy costs were the same with results from the 2 methods, the average surgical cost per patient evaluated with PET was $16,276, compared with $21,547 for CT. The investigators noted that PET was able to achieve this substantial cost savings because of its ability to identify those patients with malignancies outside the liver.

PET and assessment of tumor recurrence: Karoline Spaepen, MD (Leuven, Belgium), and colleagues at the University Hospital of Leuven compared PET with CT in the detection of the presence of residual tumors in patients with non-Hodgkin's lymphoma. In results presented at the meeting, the researchers reported that PET was more useful in assessing remission status, because it identified residual tumors more accurately than CT.

Coming in August Newsline...

Henry N. Wagner's annual Highlights lecture, which analyzes trends and forecasts in nuclear medicine.

A Web cast of Dr. Wagner's speech can be accessed on the SNM Web site at www. conference-cast.com/snm/highlights/.