Joint SNM/RSNA Molecular Imaging Summit Statement

The SNM and the Radiological Society of North America (RSNA) organized a 2-day Molecular Imaging Summit in April in Oak Brook, IL, that brought together physicians, scientists, and staff from 16 societies to begin long-term collaboration in areas of mutual interest. The following joint statement, issued by summit co-chairs Brian C. Lentle, MD, and Mathew L. Thakur, MD, is being published by both The Journal of Nuclear Medicine and the official scientific journal of the RSNA, Radiology. The statement was prepared for publication by the staff of Radiology and is reproduced here in without change.

Report of a Summit on Molecular Imaging*

By Mathew L. Thakur, PhD, and Brian C. Lentle, MD

Medicine will change more in the next twenty years than it has in the past two thousand.

L. Turnberg (1)

The Radiological Society of North America (RSNA) and the Society of Nuclear Medicine (SNM) jointly convened a workshop on molecular imaging (MI) in April 2005. The purpose was to anticipate the changes in the imaging sciences that might result as molecular biology, nanotechnology, genomics, and proteomics increasingly impact upon everyday medical practice in general and upon imaging in particular (2–4).

The meeting was attended by physicians, scientists, and staff representing the Academy of Molecular Imaging (AMI), the American Association of Physicists in Medicine (AAPM), the American Board of Nuclear Medicine (ABNM), the American Board of Radiology (ABR), the American College of Radiology (ACR), the American Roentgen Ray Society (ARRS), the American Society of Nuclear Cardiology (ASNC), the Canadian Association of Radiologists (CAR), the Canadian Association/Society of Nuclear Medicine (CASNM), the European Congress of Radiology (ECR), the Federación Mexicana de Radiología e Imagen (FMRI), the International Society for Magnetic Resonance in Medicine (ISMRM), the RSNA, the Society for Molecular Imaging (SMI), the SNM, and the Society of Radiopharmaceutical Sciences (SRC).

MI is not new. Many speakers reflected that the one context in which the concept has already reached the bedside is the use of fluorine 18 fluoro-deoxyglucose (FDG) positron emission tomography (PET), principally in cancer diagnosis. Nevertheless, on the horizon and in the laboratory are diagnostic and therapeutic techniques that will change medical practice and that represent a potentially important future for imaging scientists and physicians.

The focus of the meeting was to consider how to prepare the imaging community at large for that future and to begin to examine some of the implications of MI in terms of education and intersociety relations.

Round Table

To begin, speakers from each organization briefly reviewed the status quo in the body they represented. The specialty societies represented had all, in some way, moved to address what they saw as their future. This involved some or all of the following educational or developmental tools: (a) educational programs in the elements of MI; (b) plenary lectures at major meetings on related topics; (c) symposia or workshops addressing molecular biology, genomics, et cetera; (d) providing grant support to investigators addressing research questions relevant to the field of MI; (e) creation of “paper” institutes addressing MI within the structure of individual societies; and (f) participation in U.S. national initiatives to map and promote imaging research in general and MI research in particular.

Society representatives were able to briefly review and illustrate, based on their laboratory and clinical perspective, the status of MI both in animal research and in clinical applications. Discussion ranged over small-animal imaging devices for computed tomography (CT), magnetic resonance (MR) imaging, and optical imaging, as well as human-scale devices employing FDG PET, PET with other MI probes, MR spectroscopy and, perhaps, optical imaging.

Dr Tom Miller, representing the ABNM, emphasized that the future involves not just MI but molecular and anatomic correlation. This reality will have implications for the education not only of nuclear physicians, but also of radiologists. The former will need to learn cross-sectional anatomy; the latter, the concepts of tracer techniques and functional imaging.

Entities such as the SNM Center of Excellence in Molecular Imaging represent potential foci around which broadly based programs might develop. Equally, the AMI has four institutes focused on clinical MI, MI technology, and imaging in drug development, as well as an industry forum for promoting MI technology.

Of the known hallmarks of cancer, molecular probes already have the potential to interrogate, for example, hypoxia (misonidazole), angiogenesis (AVβ3 integrin), glucose metabolism (labeled FDG), amino acid metabolism (labeled tyrosine, methionine), tumor cell proliferation (labeled thymidine), and others. Other potential applications will arise in the context of an improved understanding of genomics. In MI, combined technologies such as PET/MR imaging and MR imaging/ultrasound are likely to follow where PET/CT has led.

The applicability of MI is not also limited to cancer and its treatment. It already promises to change the diagnosis and understanding of Alzheimer disease, to cite but one example.

Importantly, MI is likely to lead to a further blurring of the distinction between diagnosis and treatment and to a paradigm shift to early diagnosis that leads to image-guided, individualized molecular therapy. Further, when in therapy, biomarkers will be able to be imaged and quantified to provide early evidence of the efficacy of the treatment.

The ubiquitous interest in MI was reflected in the presence of representatives from the ASNC and international imaging societies. The representatives from ASNC reported that their meetings have already featured symposia on MI. The ISMRM representatives reported the creation of a Study Group on Molecular and Cellular Imaging; the organization of an ISMRM workshop on MI in 2003, in addition to the fast growing attention to MI at the ISMRM annual meeting; and other ISMRM symposia.

The SNM had articulated a goal “to harness the power of MI and molecular therapeutics in search of better and more effective means to manage diseases and improve the quality of life for patients.”

Of note, the ECR had emphasized MI in its courses over the most recent 2 years, while recognizing it as unlikely that European centers would enjoy the financial support available, at least until now, in the United States. The response in Europe is to foster networks that link existing groups of physicians and physician-scientists instead of relying on “monolithic” advanced centers.

A Definition

A number of concise and elegant definitions of MI have been developed, notably by Weissleder and colleagues (5,6), Massoud and Gambhir (7), and Herschmann (8). Nevertheless, the group believed it should go beyond these.

A traditional distinction has been made between anatomic—or structural—imaging and functional—or physiologic—imaging. Simplistically, that distinction had, historically, been made between techniques such as CT and nuclear medicine methods as being, respectively, anatomic and functional. However, that simple distinction has increasingly become blurred by CT, MR imaging, and other techniques that provide both functional and structural information, while fusion techniques such as PET/CT represent a hybridization of diagnostic methods.

Most of functional imaging is also MI, but not all. BOLD (blood oxygen level-dependent) and diffusion-tensor sequences in MR and magnetoencephalography are some—far from exclusive—examples of functional imaging that do not address biologic events on the molecular scale. Given these considerations, the group developed the following definition of MI, successfully testing it against the existing variety of imaging tools available in humans and in animal experimental contexts:

MI techniques directly or indirectly monitor and record the spatiotemporal distribution of molecular or cellular processes for biochemical, biologic, diagnostic, or therapeutic applications.

Education

There was a broad consensus that no one single educational program would fit the range of scientists and clinicians involved in MI. Traditionally, the graduate student–postdoctoral stream addresses its educational needs on a point-of-need basis. The inherent diversity of research and development in MI makes this appropriate. There might be merit in making an inventory of institutes involved in MI, along with the core MI activities within each, to facilitate graduate and undergraduate studies. While basic science research is inherently self-sustaining in terms of intellectual content, there are disturbing signs of declining financial support for MI investigations as the United States realigns its research priorities.
Some of the skill sets involved in MI include appropriate elements of physics, chemistry, molecular biology, genomics, statistics, mathematical modeling, et cetera. Any attempt at development of a standardized curriculum might only be usefully directed to clinical imagers, in recognition of the diversity of the disciplines involved.

A further educational challenge consists in awareness raising among potential referring physicians and, not least, the public at large.

For the clinical application of MI, 1-year fellowships are desirable, with MI being promoted as a translational research tool. In the longer term, the basic science components of education in the radiologic sciences may need to be diversified beyond medical physics, radiopharmacology, and radiobiology. Above all, the present communication chasm between basic scientists and clinicians must be overcome for MI to realize its potential to reinvent radiologic science.

As clinical practice evolves, MI is inherently directed to disease processes (cancer, genetic disorders, neurodegenerative disease, etc) and does not readily align with the current paradigms of organ-based or machine-based imaging services. In the longer term, the radiologic sciences may need to evolve away from organ-based to disease-based subspecialization.

The group was of the opinion that it is not yet the time for board recognition of MI, even if that were practical or desirable. Nevertheless, to build toward the future, it is not too early for education in radiology and nuclear medicine to include content in molecular biology, genomics, and gene therapy, et cetera.

The realization is that radiochemists are becoming an endangered species. The United States has for decades been a net importer of chemists. However, in the post 9/11 world, abundant external sources of talent might no longer be available.

Goals to Be Met in Advancing MI

1. Educate imaging scientists and practitioners who may be involved, along with potential referring physicians and the public.
2. Identify key components of a noncertified fellowship in MI, possibly as a precursor to formal consideration of MI by the boards involved.
3. Assure the viability of MI through the development of techniques that meet a clinical need and that are reimbursable.
4. Collaborate across societies to develop a long-range plan for raising awareness of MI in the public arena.
5. Anticipate needs through (a) the funding of fellowships, grants, and travel awards to develop a cadre of appropriately educated individuals; (b) targeted support of translational research; and (c) creation of a multidisciplinary network to provide the infrastructure for multisite clinical trials.
6. Reach out to nonimaging specialists, since a lesson from achieving FDG PET reimbursement has been the support of the referral physician base.
7. Continue and expand MI research.
8. Advocate for replacing the Response Evaluation Criteria in Solid Tumors (RECIST) on the basis of existing evidence to apply MI techniques (FDG PET, at this time) as primary and not secondary markers of treatment response.
9. Develop a common listserv of those practically involved in MI to facilitate exchanges of information, such as announcements of funding opportunities.
10. Identify resources to initiate or expand MI programs.
11. Engage industry in the development of MI.
12. Identify and address key regulatory issues that might serve as roadblocks to MI, and, in particular, (a) restructure the Radioactive Drug Research Committee (RDRC); (b) lobby the Food and Drug Administration to rationalize the requirements for the testing of diagnostic, as compared with therapeutic, agents; and (c) seek ways to revisit or to update the RECIST criteria used in oncology trials on the basis of modern evidence to the effect that MI methods are used as primary and not secondary markers of treatment response.

Conclusions

A sense of common purpose among those attending emerged, together with the sense that the meeting was a timely one in historical terms. These considerations emboldened the group to move to a series of proactive recommendations, as follows:

1. That this position paper be developed by the RSNA and SNM conveners, be circulated for ratification, and be published in appropriate venues.
2. That each organization appoint, by means of a process appropriate to that organization, a representative volunteer and staff person to a committee charged with prioritizing, promoting, and advancing this MI agenda.

(Continued on page 42N)
New SNM/SNMTS Officers Recognized at Toronto Meeting

At their annual meeting, held June 18–22 in Toronto, Canada, the SNM and SNMTS announced new officers for 2005–2006.

SNM Officers

Peter S. Conti, MD, PhD, a pioneer in clinical applications of both PET and PET/CT, will serve as SNM president through June 2006. He is a professor of radiology at the University of Southern California (USC) Keck School of Medicine, of clinical pharmacy at the USC School of Pharmacy, and of biomedical engineering at the USC School of Engineering. Since 1991, he has served as director of the PET Imaging Science Center at the Keck School of Medicine.

Conti received his medical degree from Cornell University Medical College and his doctorate in biophysics from Cornell University Graduate School of Medical Sciences, Sloan–Kettering Division, both in 1985. He completed his residency in diagnostic radiology and fellowship in nuclear medicine at Johns Hopkins University and interned in the department of surgery at St. Luke’s Hospital in New York.

Conti holds hospital appointments at USC University Hospital, the Kenneth J. Norris Comprehensive Cancer Center, and the Los Angeles County/USC General Hospital. He is a fellow of both the American College of Radiology and the American College of Nuclear Physicians (ACNP) and is board certified in both diagnostic radiology and nuclear medicine.

In assuming the SNM presidency Conti said, “Molecular and nuclear imaging play an essential role in patient care, and SNM, the largest scientific organization dedicated to nuclear medicine, functions as the critical voice for physicians, technologists, and physicists. Our members are the innovators and implementers of some of history’s most significant scientific advances in diagnosing, treating, and curing diseases. Research funding in molecular imaging is growing, and PET reimbursement is expanding. The use of PET/CT has the potential to place the trained nuclear medicine specialist as a final arbiter of in vivo diagnosis.”

Martin P. Sandler, MD, was named SNM president-elect. He is chair of the department of radiology and radiological sciences at Vanderbilt University School of Medicine (Nashville, TN) and is the Carol D. and Henry P. Pendergrass Professor of Radiology and Radiological Sciences at Vanderbilt.

Sandler received his medical training at the Groote Schuur Hospital and the University of Cape Town, South Africa. He was a resident physician at the Groote Schuur and Johannesburg General Hospitals, training in internal medicine and endocrinology. After serving as a consultant physician in the department of medicine at the University of Witwatersrand, he completed fellowship training in the division of endocrinology and metabolism and the division of nuclear medicine at Vanderbilt.

A member of SNM since 1979, he has served in numerous society positions: SNM president-elect, 2004–2005; SNM vice president-elect, 2003–2004; member of the board of directors, 1998–2004; chair of the Government Relations Subcommittee on PET, 2002–2003; scientific program chair, 1998–2001; and member of the House of Delegates, 1997–2004. He is the current chair of the PET Center of Excellence Task Force and is a member of the SNM Radiopharmaceutical Sciences Council, the SNM/ACNP Government Relations Committee, and the SNM Coding and Reimbursement Committee. A recipient of the SNM President’s Distinguished Service Award in 2001, he has published more than 200 journal articles, abstracts, and symposia papers and was the co-editor of the recently published book, PET/CT: A Case-Based Approach.

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Outgoing SNM President Mathew Thakur clips the “-Elect” from Peter Conti’s ribbon, officially changing his designation from president-elect to president of the SNM.

Sandler noted on assuming his new SNM office that, “The society must continue to provide significant educational opportunities for its members,” and added that emphasis should be placed on continuing education for practicing physicians, especially in the interpretation of CT scans, and for the international nuclear medicine community.

Alexander J.B. (Sandy) McEwan, MD, who was elected SNM vice president-elect, is the director of oncologic imaging at Cross Cancer Institute, Edmonton, Alberta, Canada, and a professor and director of the division of oncologic imaging in the department of oncology, Faculty of Medicine, University of Alberta. He holds bachelor’s and master’s degrees from the University of London and served as a medical officer with the United Kingdom Royal Navy from 1977 to 1982. He completed a residency in nuclear medicine at the Royal Naval Hospital in Haslar, UK; a residency in radiation oncology at the University of Auckland, New Zealand; and a residency in nuclear medicine at the University of Southampton, UK. He is a past president of the Canadian Society of Nuclear Medicine. A member of SNM since 1987, McEwan has held numerous chapter and national positions on committees and councils and has been active in the Society’s Molecular Imaging and Radionuclide Therapy Trials group.

At the Annual Meeting the SNM House of Delegates (HOD) elected Warren R. Janowitz, MD, JD, and the SNMTS National Council of Representatives elected Author (Art) J. Hall, CNMT, FSNMTS, and Frances K. Keech, MBA, RT(N), FSNMTS, to the SNM Board of Directors as directors-at-large. The HOD also elected the following members to the Committee on Nominations: Helena R. Balon, MD; Michael D. Devous, Sr., PhD; Art Hall; Lalitha Ramanna, MD; Nancy M. Swanston, CNMT, RT(N); and Alan D. Waxman, MD. The Committee on Nominations will be chaired by past SNM President Henry Royal, MD.

SNMTS Officers

Valerie R. Cronin, CNMT, FSNMTS, will serve as SNMTS president for 2005–2006. She is a director of imaging services for the Catholic Health System of Western New York in Buffalo. She oversees imaging services at 5 locations with an annual volume of more than 200,000 procedures and has worked as a nuclear medicine technologist, a research technologist, and an educator.

Cronin has held a variety of leadership positions within SNMTS at the regional and national levels and has been active in SNMTS government relations programs. She was elected a fellow of SNMTS in June 2002 and is a member of the SNM Eastern Great Lakes Chapter. She holds a bachelor’s degree in biology and is currently pursuing a master’s degree in health services administration.

In addressing the challenges of her new position, Cronin said, “We must continue to actively promote state licensure for molecular imaging/nuclear medicine technologists.” She has worked for passage of the Consumer Assurance of Radiologic Excellence (CARE) bill at the national level and also organized a network of state health policy liaisons to work for passage of the bill and to encourage individual states to license nuclear medicine and other radiologic technologists. She is especially concerned about issues facing nuclear medicine technologists with the advent of hybrid imaging. “Hybrid units (such as PET/CT or SPECT/CT) are becoming more and more popular, and the challenge is to have the trained nuclear medicine technologist recognized as operators of fusion imaging equipment,” she said.

D. Scott Holbrook, BS, CNMT, RT(N), PET, FSNMTS, was elected SNMTS president-elect. He will serve as president-elect through June 2006 and as president
Barbara Croft, PhD, seated, represented the National Cancer Institute’s Cancer Imaging Program in the exhibit hall.

Xuping Zhu, PhD, received the first place poster award from the Young Professionals Committee, presented by Heather Jacene, MD, and Richard Lucas, MD.

Past and future SNM and SNMTS presidents against the Toronto skyline, from left: Nanci A. Burchell, RN, outgoing SNMTS president; Peter S. Conti, MD, PhD, incoming SNM president; Valerie R. Cronin, CNMT, incoming SNMTS president; and Matthew L. Thakur, PhD, outgoing SNM president.

Sanjiv Sam Gambhir, MD, PhD, presented the Henry Wagner Lectureship on “The Next Generation of Imaging Strategies” at the opening plenary session.

The Cassen Lectureship was presented by Angelika Bischof-Oduluye, MD, shown here after the lecture with general program chair Peter Kirchner, MD, left; featured speaker Michael Devous, Sr., PhD; and Mathew Thakur.

Michael J. Welch, PhD, received the Presidential Distinguished Service Award from Mathew Thakur for service to the Society of Nuclear Medicine.
George Mills, MD, of the Federal Drug Administration, received a President’s Award from Mathew Thakur in recognition of actions contributing to the advancement of nuclear medicine and molecular imaging.

Mathew Thakur honored outgoing Scientific Program Committee Chair Tom R. Miller, MD, PhD, with the Presidential Distinguished Educator Award.

Brian C. Lentle, MD, was honored with a President’s Award from Mathew Thakur in appreciation of his support of the Society of Nuclear Medicine and promotion of the nuclear medicine profession.

Poster exhibits provided detailed information on the latest research.
S teven M. Larson, MD, chief of the nuclear medicine service at Memorial Sloan–Kettering Institute (New York, NY) was awarded the 2005 SNM Georg Charles de Hevesy Nuclear Pioneer Award for his distinguished contributions to nuclear medicine. The award was presented on June 19 in Toronto, Canada, during the 52nd annual meeting of the Society. Larson, a noted authority on targeted radiotherapy and molecular imaging, is a coleader of the Memorial Sloan–Kettering Institute Imaging and Radiation Sciences Bridge Program and Animal Imaging Core Facility. Larson, who is director of radiology research in the department of radiology and director of the PET Center at the Memorial Sloan–Kettering Cancer Center (MSKCC), is also a professor of radiology at Cornell University’s Weill Medical College.

Each year, SNM presents the de Hevesy Award to an individual or individuals for outstanding contributions to the field of nuclear medicine. de Hevesy, widely recognized as one of the originators of the field of nuclear medicine, was the author of seminal books and papers on radiochemistry and the recipient of the 1943 Nobel Prize in chemistry for his investigation of the absorption, distribution, metabolism, and elimination of radioactive compounds in the human body. This research laid the foundation for nuclear medicine in diagnosis and therapy.

“Dr. Larson’s research, which spans 3 decades, has resulted in many novel findings, especially in understanding cancer,” said 2004–2005 SNM President Mathew L. Thakur, PhD. “As an expert on translational aspects of nuclear medicine, this distinguished scientist has made significant contributions to the advancement of PET. While conducting cutting-edge research in targeted therapy and related molecular imaging, Dr. Larson continues to be heavily involved in teaching, administration and clinical care. It is fitting that the 2005 Georg Charles de Hevesy Nuclear Pioneer Award be added to Dr. Larson’s impressive list of accomplishments and honors.”

Larson’s clinical interests focus on the use of PET for diagnostic and molecular imaging and on radiotargeted therapy, particularly for thyroid cancer. His research in the detection of colorectal cancer has been successfully applied in the treatment of patients with advanced tumors, and he has tackled the problems of antibody production, radiolabeling, humanization of the antibody, minimizing host immune response, and developing methodologies to quantify response. Using 14C-labeled media and a sensitive radiodetector system, he was able to rapidly identify bacterial and cell growth, a technology that is used widely today for detecting mycobacterium tuberculosis, including assessing drug sensitivities.

He was recruited to the National Institutes of Health (NIH) in 1983, in part to establish a state-of-the-art PET center for NIH researchers. His success in this endeavor led in 1987 to an NIH Directors Medal, which he shared with project colleagues. Larson, who received his medical degree from the University of Washington School of Medicine and served his residency at Virginia Mason Hospital (Seattle), is the recipient of a number of research grants from the U.S. Department of Energy (DOE), the U.S. Army, and the National Cancer Institute. He was awarded the Wylie medal of the U.S. Food and Drug Administration (FDA) for his contributions to the development of radiopharmaceutical regulations. Other awards include the Louise and Lionel Berman Foundation award for accomplishments in the field of nuclear medicine involving the peaceful use of atomic energy, the Ralph G. Robinson Lecture Award of the American College of Nuclear Physicians, the Berson–Yalow Award from the SNM, the G.V. de Hevesy Lecture/Medal of the European Society of Nuclear Medicine, the Pendergrass Award of the Radiological Society of North America (RSNA), the Henry Wagner Award from the SNM, the Sabarhai Memorial Lecture/Medal of the Indian Society of Nuclear Medicine, honorary fellowship in the Brazilian Society of Radiology, and the Elis Berven Lecture/Medal of the Swedish Society of Medical Oncology. Larson was also named Radiology Researcher of the Year by the RSNA in 2004.

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Larson has authored or coauthored 430 manuscripts in major peer-reviewed journals, including Science, Nature Medicine, Nature Biotechnology, Radiology, the New England Journal of Medicine, and The Journal of Nuclear Medicine. He has also served on several governmental advisory committees and study sections at the NIH, the DOE, and FDA. He currently serves on the Biologic, Environmental Research Advisory Committee (BERAC) of the DOE and the Advisory Committee of the Department of Life Sciences for Brookhaven National Laboratory.

“I am deeply honored by this awesome recognition and to be identified with the giants in nuclear medicine who have received this award before me,” said Larson, who expressed his appreciation to friends, colleagues, collaborators, and family members. “The current nuclear medicine trainees at MSKCC, both residents and fellows, provide enthusiasm and energy that continuously regenerate a creative clinical and research environment. I have no doubt that one day, some of these fine scientists will make their indelible marks on our field.”

Aebersold Award Presented to Goldenberg

David M. Goldenberg, ScD, MD, founder and president of the Garden State Cancer Center and the Center for Molecular Medicine and Immunology (Belleville, NJ), received the 2005 Paul C. Aebersold Award for outstanding achievement in basic science applied to nuclear medicine on June 19 at the 52nd Annual Meeting of the SNM, held in Toronto, Canada.

The Aebersold Award is named for Paul C. Aebersold, a pioneer in the biologic and medical application of radioactive materials and the first director of the Atomic Energy Commission’s Division of Isotope Development at Oak Ridge, Tenn. The first Aebersold Award was given by SNM in 1973. “I am humbled to be among these giants of nuclear medicine,” said Goldenberg. “I am especially grateful to the society for recognizing me, a nonnuclear physician, for my contributions to basic science applied to nuclear medicine. Science often takes us down unpredictable paths, and I certainly did not plan to conduct nuclear medicine research when I embarked on cancer biology, pathology, immunology, and genetics.”

Goldenberg pioneered the development of radiolabeled antibodies for various applications in the detection, diagnosis, and therapy of cancer. Under his leadership, scientists and clinicians at the Garden State Cancer Center have developed antibodies for the diagnosis, detection, and treatment of solid tumors such as colorectal, pancreatic, lung, breast, and ovarian cancers, as well as hematologic cancers such as lymphoma and multiple myeloma. He has overseen the in-house clinic as well as clinical outreach at affiliated institutions in the United States and Europe for treatment of cancer patients with radiolabeled antibodies. He also helped develop 2 diagnostic radiopharmaceuticals marketed by Immunomedics Inc., which he established in 1982. He is also the president and chief executive officer of CMMI, a not-for-profit, independent, specialized research center that focuses on the development of biological strategies to detect and treat cancer and immunological diseases.

Over the past 30 years, Goldenberg has been a major contributor to knowledge of the basic principles of the preparation and utilization of radioimmunoconjugates in medical diagnosis, including functional imaging and guided radionuclide therapy. He has published more than 500 articles in peer-reviewed journals and is currently exploring the use of PET tracers in immunodiagnosis and therapy, especially by pretargeting methods he and his colleagues are developing, and the use of new humanized antibodies for the treatment of lymphomas and autoimmune diseases. He has edited 2 books on radiolabeled antibodies and 10 journal supplements to Cancer, Cancer Research, and Clinical Cancer Research.

He has received numerous professional awards and recognition by scientific bodies, including McGill University, the Indian Society of Nuclear Medicine (Sarabhai Memorial Oration), the Swedish Oncology and Radiology Societies (Elis Bervin Lecture/Medal), the International (Continued on page 26N)
Society for Oncodevelopmental Biology and Medicine (Abbott Award), the German Cancer Fund, the National Institutes of Health (NIH; twice Outstanding Investigator Grant awardee), Tel Aviv University, the British Radiology Society (3M Mayneord Memorial Award), and the Clinical Ligand Assay Society (Distinguished Scientist Award).

Goldenberg received an SB degree from the University of Chicago in 1958, an ScD from the Faculty of Natural Sciences of the University of Erlangen–Nuremberg in 1965, and his MD from the University of Heidelberg’s School of Medicine in 1966. He has faculty appointments in pathology at the University of Pittsburgh, Temple University, and the University of Kentucky and adjunct professorships in medicine, surgery, and microbiology/immunology at the University of Medicine and Dentistry of New Jersey and New York Medical College. He is currently an editorial board member of several journals, including *The Journal of Nuclear Medicine*, the *International Journal of Tumor Markers*, the *Quarterly Journal of Nuclear Medicine and Molecular Imaging*, *Current Medical Imaging Reviews*, *Current Cancer Therapy Reviews*, and *Cancer Biotherapy and Radiopharmaceuticals*. He has also served as chair of the merit review board in oncology for the Veterans Administration and a member of the Experimental Immunology Study Section of NIH.

Robertson Receives Loevinger–Berman Award

A t a ceremony on June 19 preceding the second session of the Medical Internal Radiation Dose (MIRD) Committee Continuing Medical Education course on Advances in Patient-Specific Dosimetry at the SNM Annual Meeting in Toronto, Canada, Stephen R. Thomas, PhD, vice chair of the MIRD Committee, presented James S. Robertson, MD, PhD, with the 2005 Loevinger–Berman Award for Excellence in Internal Dosimetry.

The award was established in 1999 in honor of Robert Loevinger and Mones Berman, who formulated the MIRD schema for internal dose calculations. The award is given in recognition of excellence pertaining to the field of internal dosimetry as it relates to nuclear medicine through research and/or development, significant publication contributions, or advancement of the understanding of internal dosimetry in relationship to risk and therapeutic efficacy. Previous award winners have included Roger J. Cloutier (1999), Dandamudi V. Rao (2000), Keith F. Eckerman (2001), Sven-Erik Strand (2002), John W. Poston, Sr. (2003), and Roger W. Howell (2004).

Robertson received his medical degree from the University of Minnesota (Minneapolis) in 1945, followed by an internship at the U.S. Naval Hospital (Annapolis, MD). He received a doctorate from the University of California at Berkeley in 1949 after completing a thesis entitled “Lung Ventilation Patterns and Their Physiological Significance.” He then moved to the Brookhaven National Laboratory (Upton, NY), where he remained for 25 years, from 1950 to 1975. During this time he was engaged in a spectrum of nuclear medicine–related activities that included PET, neutron capture theory, radiation dosimetry, compartmental analysis, analog computers in kinetic analysis, medical computer applications, and whole-body gamma spectrometry. Much of this work was truly avant-garde for the period, as PET technology was just being introduced along with the applications of computers and data analysis in medical imaging. Of particular importance were Robertson’s investigations in the area of compartmental models and kinetic analysis. Many of his contributions to the field of dosimetry were associated with these topics.

From 1975 until 1985, Dr. Robertson was a member of the Department of Nuclear Medicine at the Mayo Clinic (Rochester, MN), where, along with his clinical...
duties, he continued basic research on the applications of radioisotopes in medical diagnosis. Some of his research activities included $^{123}$I thyroid uptake measurements, investigation of the properties of radiocerium, and $^{111}$In-labeled platelets. In 1985, he joined the U.S. Department of Energy (DOE), where he served as Director of Human Health and Assessments in the Division of the Office of Energy Research until his retirement in 1991. At the DOE, he administered grants for radioisotope production for applications in nuclear medicine.


Of special note was Dr. Robertson’s service on the SNM MIRD Committee. The historical record indicates that he was a charter member through his participation at the Brookhaven dosimetry meetings in the 1960s that led to the formation of the MIRD Committee and the first MIRD pamphlets in 1968/1969. Except for a few years, he was an active member of the committee from its inception until his last appointment in 2001. Of importance, along with his publications, was the advice, counsel, and scientific wisdom that he provided to the committee through those years. Dr. Robertson’s work and contributions truly had significant impact in the field of internal dosimetry.

Stephen R. Thomas, PhD
Professor of Radiology
Director, Medical Physics
University of Cincinnati
Cincinnati, Ohio

IN MEMORIAM

James Sydnor Robertson, MD, PhD
1920–2005

It was with profound sadness that the MIRD Committee learned of the death of James S. Robertson, MD, PhD, on July 10, 2005, after a traffic accident near his home in Gaithersburg, MD. As described in the accompanying article, written before this unfortunate event, Jim was a valued colleague who played a critical role in the original formation of the MIRD Committee and contributed significantly to its scientific mission. He was committed to advancing the applications of radioisotopes in medical diagnosis. Jim will be missed by all of us on the MIRD Committee as well as by his many professional associates and friends. His accomplishments, good-natured personality, and passion for mathematical puzzles will not be forgotten. Our deepest condolences go to his wife, Ruth, son John, daughters Marion and Kathy, 3 grandchildren (one of whom, Laura, was featured in a slide with Jim shown at the SNM award presentation), and his 3 great-grandchildren. We were very pleased that John and Marion were able to be in attendance for the happy occasion in Toronto at which Jim was presented the Loevinger–Berman Award for 2005.

Stephen R. Thomas, PhD
Michael R. Zalutsky, PhD, a professor of radiology and biomedical engineering at Duke University (Durham, NC) was the recipient of the 2005 SNM Berson–Yalow Award. This honor is given to an investigator who has submitted significant original scientific abstracts and made significant contributions to basic or clinical radioassay sciences. SNM President Mathew L. Thakur, PhD, presented the award on June 21 at the Society’s 52nd Annual Meeting in Toronto.

The award is named for Rosalyn S. Yalow, PhD, and the late Solomon A. Berson, MD, who together in the 1950s developed methods of using radioactive isotopes to investigate physiologic systems that allow detection of minute concentrations of biologic or pharmacologic substances in blood or other fluid samples. The award was established by SNM in 1977, the same year that Yalow received the Nobel Prize for physiology/medicine. In 1987, SNM’s Scientific Program Committee expanded its criteria to include all research that made use of the indicator-dilution method in the categories of neurology, oncology, cardiology, radiopharmaceuticals, and radioassay.

In presenting the award, Thakur commended Zalutsky and his colleagues for their research, “Cytotoxicity of $^{211}$At-Labeled Trastuzumab in Human Breast Cancer Cell Lines: Effects of Specific Activity and HER2 Receptor Heterogeneity.” “It’s quite an honor to be named the recipient of the Berson–Yalow Award,” said Zalutsky. “Researchers are still using the basic principles developed by Berson and Yalow every day. My work is part of an interdisciplinary collaboration, and all of us are trying to apply the concepts developed by Berson and Yalow to optimize the clinical potential of targeted radionuclide therapy.”

Zalutsky, who is also director of radiolabeling shared resources and coprogram leader of the cancer immunobiology program in the Duke University Comprehensive Cancer Center, is a recipient of a MERIT Award from the National Cancer Institute for his research in targeted radiotherapy. His primary research interests are the development of molecularly targeted radiodiagnositics and radiotherapeutics for oncologic applications. A long-term focus of his laboratory has been on the development of targeted radiopharmaceuticals labeled with the α-emitting radionuclide $^{211}$At. This work includes basic radiochemistry, evaluation of therapeutic efficacy, microdosimetry, and initiation of the first clinical trial with a $^{211}$At-labeled targeted radiotherapeutic. His research has been supported by a grant from Genentech as well as multiple grants from the National Institutes of Health (NIH) and the Department of Energy.

A nuclear chemist, Zalutsky worked with such pioneers as Arnold M. Friedman, PhD, and Paul V. Harper, MD, during his postdoctoral experience at Argonne National Laboratory. He received his master’s degree and doctorate in chemistry from Washington University. Before joining the faculty at Duke in 1985, he held academic appointments at the University of Chicago and Harvard Medical School. He has authored or coauthored more than 260 journal articles and reviews and edited 2 books. He serves on the editorial boards of 4 journals and has been a member of the medical imaging study section of the NIH.
Brooks Honored with 2005 Kuhl–Lassen Award

David James Brooks, MD, DSc, Hartnett professor of neurology with the PET Neurosciences Group, Division of Neuroscience and Psychological Medicine at Imperial College School of Medicine (London, UK), was named the recipient of the 2005 Kuhl–Lassen Award at the 52nd annual meeting of the SNM in Toronto, Canada. On June 19, he delivered the Kuhl–Lassen Award lecture on “Applications of Imaging to Movement Disorders: A View from the Frontier.”

The Kuhl–Lassen award recognizes scientists who have made significant contributions to the field of functional brain imaging using SPECT or PET. The SNM Brain Imaging Council created the annual award to honor 2 founding pioneers of functional brain imaging: David E. Kuhl, MD, and Nils Lassen, MD. “I am extremely honored to be named the recipient of the Kuhl–Lassen Award by the Society of Nuclear Medicine,” said Brooks. “Both David Kuhl’s and Nils Lassen’s work has had a great influence on my career, and I am delighted to accept an award bearing their names.”

A pioneer in the clinically informed application of PET to the field of movement disorders, Brooks has produced groundbreaking studies in Parkinson’s disease and related neurodegenerative processes using neuroimaging techniques to gain an improved understanding of the pathophysiology of those disorders. He has researched the progression of disease, primary mechanisms of onset and progression, differential diagnosis, and the role of imaging in enhancing the development of next-generation therapeutics in movement disorders.

Winn Named Outstanding SNMTS Educator

Jan Winn, MEd, RT(N), CNMT, was named recipient of the Outstanding Educator Award by the SNMTS in Toronto, Canada, at the 52nd annual meeting of the SNM. SNMTS President Nanci A. Burchell, CNMT, FSNMTS, presented the award at the Technologist Section’s June 21 business meeting. The Education and Research Foundation for the SNM provided funding for this award.

Winn has been an associate professor in the department of radiologic technology in the College of Allied Health at the University of Oklahoma Health Sciences Center (OUHSC) (Oklahoma City) since 2000. She is also the department’s vice chair, nuclear medicine program director, and Web program director. “Jan Winn is an exceptional educator whose recommendations pointed out her unique ability to easily explain complex concepts,” said Burchell in presenting the award. “She incorporates the latest information in her classes, including new radiopharmaceuticals and the most updated protocols. She constantly seeks feedback from her students and technologists to ensure that the program is preparing students to be the best health care professionals.”

An SNMTS member since 1985, Winn received her master’s degree in the historical, philosophical, and social foundations of education from the University of Oklahoma and her bachelor’s degree in radiologic technology with a focus on nuclear medicine technology from OUHSC. She is certified by the Nuclear Medicine Technology Certification Board and the American Registry of Radiologic Technologists. She serves as chair of the...
Jan Winn (left) is presented with the SNMTS Outstanding Educator Award by Nanci Burchell.

The 2003 recipient of the University of Oklahoma Presidential Professorship Award, Winn also received the 2002 OUHSC Faculty Governance Award, the Student Council Outstanding Teacher Award, the Philip E. Smith Service Award, and many other honors and awards. She has taught courses including Introduction to Clinical Nuclear Medicine Technology, Principles of Nuclear Medicine, Medical Ethics and Law, Nuclear Pharmacy, Laboratory Regulations and Accreditation in Nuclear Medicine, Advanced Clinical Nuclear Medicine Technology, and Imaging Devices in Nuclear Medicine. She is the author of 5 peer-reviewed articles and numerous abstracts, posters, presentations, and proposals. She has been a member of the Radiologic Technology editorial review board since 1998.

In addition, Winn is a member of the American Society of Radiologic Technologists, Oklahoma Section of the SNM, SNM Southwestern chapter, Oklahoma Society of Radiologic Technologists, Association of Educators in Radiologic Sciences, and American Society of Nuclear Cardiology.

“It is an honor to receive the Outstanding Educator Award,” said Winn. “It’s wonderful that SNMTS leadership created this award to recognize educators in nuclear medicine technology.” She received $750 and a plaque and thanked Vesper Grantham, CNMT, her colleagues, students, and alumni who supported her nomination for this award.

(Continued from page 17N)

Scott Holbrook

from June 2006 to June 2007. Holbrook is vice president of Clinical Pharmacy Services in Gray, TN, and Cumberland Isotopes in London, KY, previously serving as market development manager for PETNET Pharmaceuticals in Knoxville, TN. He is a member of the SNM Mideastern Chapter, the Pancreatic Cancer Action Network, the Academy of Molecular Imaging, and the Lance Armstrong Foundation. Holbrook, who has held numerous SNMTS offices, is the author of 9 publications and more than 70 presentations. He received his bachelor of science degree in nuclear medicine technology from Wheeling Jesuit University.

At the Annual Meeting, the National Council of Representatives elected Mary Beth Farrell, CNMT, MS, RT(N, BD); Karen Martin, RT(N), CNMT; and Kathy E. Thompson, MS, CNMT, as members of the SNM Executive Board.

In the 2005 elections, the SNMTS membership elected April Mann, CNMT, RT(N), NCT, FSNMTS, to serve as secretary/historian, and elected David Gilmore, MS, CNMT, RT(R, N) to the Finance Committee. The following members were elected to represent the Technologist Section in the SNM House of Delegates: Kathy S. Thomas, MHA, CNMT, RT(R, CT, N), PET, FSNMTS; Danny A. Basso, CNMT, NCT, FSNMTS; Cindi Lueckett-Gilbert, BHS, CNMT, RT(N); and Mary K. Moreau, CNMT, RT(R, N). Four persons were also elected to the Nominating Committee: Mary M. Dalipaj, MRT (N), NCT; Art Hall; Alan Pan, CNMT; and Kathy E. Thompson. The Nominating Committee will be chaired by outgoing SNMTS President Nanci A. Burchell, CNMT, FSNMTS.
To come up with new creative solutions to dilemmas or anticipated problems, it’s best to think “outside the box”—to be open to new ways of seeing the world and exploring possibilities. At this year’s Annual Meeting in Toronto, members of SNM’s House of Delegates (HOD) engaged in a spirited conversation to air a number of ideas considered critical to the continued growth and development of the society, its members, and nuclear medicine.

In thinking “outside the box,” SNM’s representative body of physicians, technologists, and scientists expressed ideas to broaden the society’s perspective on how to make it more competitive and expressed a variety of options for growth, including continuing alliance and outreach activities.

**Integrate Nuclear Medicine**

HOD members agreed that society leaders should focus on ways to integrate nuclear medicine physicians and technologists with professionals in other practice fields—rather than just protecting the existing turf. Bridges must be built with leaders in radiology, cardiology, and all other medical practices, they said.

For example, a partnering relationship with radiology professionals who see nuclear medicine practitioners as competitors, is critical, said HOD members. Individuals may not enter nuclear medicine programs if radiologists resist hiring them. HOD members wondered if SNM and leaders of the American College of Radiology should hold meetings to address this issue.

**Take the Educational Lead**

In meeting future challenges of growth head on, HOD members explained that to stay viable, the importance of nuclear medicine must be stressed in the academic community. SNM must take the lead in setting the standards, policies, procedures, quality standards, and guidelines for the profession and move ahead of the curve as new methods of evaluation become evident.

For example, the society should advocate for improved training of radiology residents in nuclear medicine. Members of our Young Professionals Committee should continue working with members of the Association of University Radiologists to encourage excellence in radiological lab and clinical investigation, teaching, and clinical practice.

Technologists will need to adapt as their educational model changes, especially with the advances coming from PET and CT. We need to get those technologists currently working to get CT skills, and we also need to train future nuclear medicine technologists in CT.

**Improve Image in Patient Care**

SNM representatives said nuclear medicine professionals must become more integrated into patient care. We must continue to do outreach and promote the facts that nuclear medicine practitioners provide quality care, that we are trained experts, and that we offer superb educational programs. In doing this, we reinforce the fact that we are the go-to society for nuclear medicine and molecular imaging information.

Members of the HOD emphasized the importance of informing members of the general public, referring physicians, and individuals in other specialty areas of the positive value of nuclear medicine, its many benefits, and its role in targeted molecular biology and targeting imaging.

By looking at nuclear medicine in such an overall context and engaging in a strategic thought process, SNM representatives painted in broad strokes the possibilities for the society in the future—a future that undoubtedly will take us “outside the box.”

**Work with Industry**

In other action, SNM is participating with members of the Nuclear Medicine Industry Leadership Working Group in holding an industry molecular imaging summit next year. This first-of-its-kind summit will focus on 5 areas of molecular imaging: basic research, clinical issues, instrumentation, drug discovery, and government relations/regulatory issues.

Information gained from the summit will be presented to the board members of the Molecular Imaging Center of Excellence. Topical activities and educational programs will be developed based on the summit’s findings, and a position paper may be published in *The Journal of Nuclear Medicine.*
Energy Policy Act Report

In July, the Congressional Energy and Natural Resources Conference Committee released a report on the pending Energy Policy Act. Among the items of interest within the report include Section 630, on medical isotope production, and language within Section 170H, on the treatment of accelerator-produced radioactive material as byproduct material. The Conference Report on the Energy Policy Act was approved in the House on July 28 and in the Senate on July 29.

Most surprising to the nuclear medicine community was Section 170H, Radiation Source Protection, introduced into the Conference Report by Representative Edward J. Markey (D-MA). The language in this section appears to grant the NRC jurisdiction over accelerator-produced radioactive material. SNM issued a statement indicating that the society’s leadership is “very concerned that this language could have an unintended but highly detrimental impact on U.S. patients who need unfettered access to life saving diagnostic and therapeutic nuclear medicine procedures.” The language of the added section seems to run counter to the Agreement States regulations that have governed certain types of human-made radioactive materials, including most nuclear medicine radioisotopes, since 1959. Since the early 1960s, Agreement States, which now number 33, have had successful comprehensive radiation control programs that include, but are not limited to, regulating the use of diagnostic and therapeutic x-rays, environmental monitoring, and regulating the use of certain radioactive materials, including accelerator-produced radioactive material. In its statement, the SNM indicated concern that “transferring regulation of accelerator-produced radioactive material to the NRC—which does not have experience in this area—from the States would impede patient access to nuclear medicine.” SNM and partner associations plan to focus on working cooperatively with the NRC to ensure that upcoming regulations are written in a manner that ensures consumer access to radiopharmaceuticals essential for nuclear medicine procedures.

Section 630, Medical Isotope Production, amends Section 134 of the Atomic Energy Act of 1954 to impose requirements on the export of highly enriched uranium (HEU) for medical purposes and to ensure the safe, timely, and secure use of such material. This will help address flaws within Section 134 that have caused licensing delays as a result of a failure to distinguish the use of HEU to produce medical radioisotopes from other uses. The safe passage of this provision has been a key advocacy initiative of the Council on Radiopharmaceuticals and Radiopharmaceuticals (CORAR), an association of companies in the United States and Canada who manufacture and distribute radiopharmaceuticals, sealed sources, and radionuclides used in medicine and life science research. Molecular/nuclear medicine societies, including SNM and the American College of Nuclear Physicians, have also assisted CORAR in these efforts.

CMS Payment Update and Policy Changes

On August 1, the Centers for Medicare & Medicaid Services (CMS) outlined the contents of the 2006 proposed payment update and policy changes for Medicare physician fee schedules. The proposed rule indicates that payment rates per service for physicians would be reduced by 4.3% for 2006, a reduction required by a statutory formula that takes into account substantial growth in overall Medicare spending in 2004.

“The payment reduction shows the need for more effective ways to pay physicians that help them improve quality and avoid unnecessary costs,” said CMS Administrator Mark B. McClellan, MD, PhD. “CMS is working with members of Congress, physician organizations, and other health care stakeholders on ways to improve physician payment without adding to overall Medicare costs, if at all possible.”

The physician fee schedule specifies payment rates to physicians and other providers for more than 7,000 health care services and procedures. The fee schedule is updated on an annual basis according to a formula specified by statute. The formula requires CMS to adjust the update up or down depending on how actual expenditures compare to a target rate, the sustainable growth rate (SGR). The SGR is calculated based on medical inflation, the projected growth in the domestic economy, projected growth in the number of beneficiaries in fee-for-service Medicare, and changes in law or regulation. If actual spending exceeds the target, as it did in the past several years, then the law requires CMS to reduce the update factor.

The proposed rule was to be published in the August 8 issue of the Federal Register, after Newsline press closing. However, the initial CMS announcement contained two items of special interest to the nuclear medicine community. CMS is proposing to reduce payments for “certain diagnostic imaging procedures to reflect their limited additional costs when they are performed on contiguous body parts in the same session with the patient.” The CMS state-
Physician “Pay for Performance” Bill Introduced

Less than a week after the Centers for Medicare & Medicaid Services (CMS) announcement on physician fees, U.S. House Ways and Means Health Subcommittee Chair Nancy Johnson (R-CT) introduced a bill that would cancel planned phased-in cuts. Speaking to the media on July 28, she said, “Don’t believe for a moment that if Medicare underpays long enough, access won’t be affected.” Johnson said at a news conference announcing the Medicare Value-Based Purchasing for Physicians Act of 2005. The bill would replace the current sustainable growth rate formula under which physician pay is linked to overall spending with a system that Johnson called “simple, direct, stable, and predictable.” The new formula would provide physicians with inflation-based increases each year, with slightly smaller increases for physicians who fail to meet specified quality-based targets. The criteria for measurement would be set jointly by physicians, quality organizations, and Medicare officials.

Several professional organizations, including the American Medical Association (AMA), the American Academy of Family Physicians, and the American College of Physicians, voiced their support for the bill. A survey by the AMA indicated that if CMS implements its current schedule of physician pay cuts, that 38% of physicians would cut back on the number of Medicare patients they treat.

Despite widespread support in the medical community, passage of the bill would prove costly for CMS, and some congressional observers have expressed doubts about its passage at a time when the system is already being challenged to cover the costs of new prescription drug benefits.

U. S. House of Representatives

Rate and Policy Changes for Hospital Outpatient Services

The Centers for Medicare & Medicaid Services (CMS) announced the proposed 2006 Medicare payment rates under the Outpatient Prospective Payment System (OPPS) rule on July 19, with special provisions for higher funding for facilities in rural and isolated areas. “Today’s proposed rule will help ensure that beneficiaries have access to quality services in the hospital outpatient setting no matter where they live,” said CMS Administrator Mark B. McClellan, MD, PhD.

The proposed rule would continue the gradual decline in coinsurance rates Medicare beneficiaries will pay for many hospital outpatient services. Coinsurance rates for OPPS services are being reduced gradually until the beneficiary’s share for any outpatient service will be 20% of the hospital’s total payment. Under the proposed rule, the coinsurance rate for 12 additional medical and surgical Ambulatory Payment Classifications (APCs) will decline to the 20% minimum. The proposed rule would also reduce the maximum coinsurance rate for any service to 40% of the total payment to the hospital for the APCs in 2006, down from 45% this year. Over all, average beneficiary copayments for all outpatient services are expected to fall to 30% of total payments under the proposal.

CMS is also proposing to pay for most Part B drugs, biologicals, and radiopharmaceuticals administered in hospital outpatient departments based on competitive market prices. “Paying the same competitive rates for Part B drugs, whether administered in the outpatient department or the physician’s office, reflects Medicare’s goal to pay appropriately for the drugs regardless of where they are used,” said Dr. McClellan. “And we will also pay appropriately for the pharmacy costs of using the drugs.”

As part of the “contiguous imaging” changes outlined in broader CMS initiatives, the rule proposed to change OPPS payments for some diagnostic imaging procedures to reflect “their limited additional cost when they are performed with other imaging procedures in the same session with the patient.” According to the July 19 statement, when 2 or more of these identified procedures are performed, the first procedure would be paid in full and a discount of 50% would be applied to subsequent procedures.

The proposed rule was published in the July 25th Federal Register. Comments will be accepted until September 16, and a final rule is scheduled to be published by November 1, 2005.

House Passes Limits on Malpractice Awards

On July 29 the U.S. House of Representatives approved medical malpractice legislation to limit awards in lawsuits for pain and suffering to $250,000. The Help Efficient, Accessible, Low-Cost, Timely Healthcare (HEALTH) bill is sup-
ported by the Bush administration as a measure to repair a “badly broken medical liability system.” The bill was introduced and supported by Republican House members who cited a likely cut in insurance premiums of 25%–30% with Senate passage of the measure. The bill was opposed by many Democratic House members. Another provision of the bill provides protection for pharmaceutical companies and medical device makers from paying punitive damages in such suits when their products have been approved for use by the Food and Drug Administration. The bill would also limit lawyers’ fees on a sliding scale based on the size of the award and impose a 3-year statute of limitations in most cases. Congressional observers note that this bill, like others that have preceded it, is unlikely to pass the Senate intact.

U.S. House of Representatives

**NRC to Issue New Visitor Radiation Dose Limits**

The approval of new procedures for limiting radiation to patients undergoing nuclear medicine treatment or brachytherapy to receive radiation doses above current regulatory limits if warranted by the patient’s needs. Under NRC regulations, the permissible annual radiation dose to any member of the public, including hospital visitors, is 0.1 rem. Visitors to patients who cannot be discharged under NRC regulations are permitted to receive a dose of up to 0.5 rem under certain circumstances.

According to the press release from the NRC, 2 recent cases involving exposures of visitors have shown that those limits are not sufficient to take certain patient needs into account. When a family member or friend becomes a caregiver and is actively involved in the patient’s care, a hospital licensee trying to enforce the regulatory dose limits may have to choose between risking potential NRC enforcement action by violating the regulatory limits or compromising the patient’s care to minimize the caregiver’s dose. Licensees currently may request emergency, case-specific exemptions from NRC regulations for these situations, asking NRC staff to determine an allowable dose above the regulatory limit. This approach lacks standard procedures for granting exemptions and may not always ensure appropriate control of the caregiver’s exposures.

The newly approved procedures would allow the licensee to determine a dose limit based on the conditions of a specific case and establish standard procedures for requesting and granting an expedited license exemption. Caregivers would be given instruction on ways to limit their exposure. NRC regional offices will have authority to grant expedited exemptions for limits up to 5 rem, provided the licensee submits sufficient justification. Requests for limits above 5 rem will require special justification by the licensee and additional review by the agency’s Office of Nuclear Materials Safety and Safeguards.

The NRC staff expects to issue a Regulatory Issues Summary on the new procedures, including guidance on their implementation, by mid-2006. Until then, the current procedures for requesting an exemption from the regulatory requirement remain in effect.

**Nuclear Regulatory Commission**

**National Tracking System for Radioactive Materials**

On July 20, the NRC issued a release indicating that the commission is “considering amending its regulations to implement a national tracking system for certain radioactive materials used for academic, medical, and industrial purposes.” According to the release, NRC is working with other federal agencies and states to develop the National Source Tracking System to monitor certain radioactive materials in specific quantities. During 2002 and 2003, NRC worked with other agencies and the international community to reach agreement on which radioactive materials and sources should be tracked. Those sources are detailed in the International Atomic Energy Agency (IAEA) Code of Conduct on the Safety and Security of Radioactive Sources. In a related story, the IAEA also announced in July the launch of a satellite tracking system for sensitive nuclear materials in Europe.

The proposed amendment to NRC regulations would require licensees to report information on the manufacture, transfer, receipt, or disposal of those sources of interest to an automated National Source Tracking System, to be administered by the NRC. The radioactive materials include specified amounts of $^{227}\text{Ac}$, $^{241}\text{Am}$, $^{252}\text{Cf}$, $^{60}\text{Co}$, $^{244}\text{Cm}$, $^{137}\text{Cs}$, $^{244}\text{Gd}$, $^{197}\text{Ir}$, all plutonium isotopes, $^{210}\text{Po}$, $^{147}\text{Pm}$, $^{75}\text{Se}$, $^{90}\text{Sr}$, $^{228}\text{Th}$, $^{229}\text{Th}$, $^{170}\text{Ym}$, and $^{169}\text{Yb}$. The press release and formal announcement also indicated that other isotopes might be added to this list as the system is developed. Although routine nuclear medicine practice would not be affected immediately by the new system, medical researchers should be aware of changing requirements.

Each licensee would also have to provide its initial inventory of nationally tracked sources to the National Source Tracking System and annually verify and reconcile the information in the system with the licensee’s actual inventory. In addition, the amendment would require manufacturers to assign a unique serial number to each nationally tracked source.

Written comments should be submitted by October 11, and complete details of the proposed amendments and instructions for comments are contained in a July 28 Federal Register notice (available at http://www.regulations.gov/freddocs/05-14919.htm).

**Nuclear Regulatory Commission**
Each month the editor of Newsline selects articles on diagnostic, therapeutic, research, and practice issues from a range of international publications. Most selections come from outside the standard canon of nuclear medicine and radiology journals. Note that although we have divided the articles into therapeutic and diagnostic categories, these lines are increasingly blurred as nuclear medicine capabilities rapidly expand. Many diagnostic capabilities are now enlisted in direct support of and, often, in real-time conjunction with, therapies. These briefs are offered as a monthly window on the broad arena of medical and scientific endeavor in which nuclear medicine now plays an essential role.

Mortality in Patients Treated for Hyperthyroidism

In an article published in the July 6 issue of the Journal of the American Medical Association (2005;294: 71–80), Franklyn et al. from the University of Birmingham (UK) reported on a study designed to determine whether radioiodine treatment is associated with increased mortality and to identify the effect of subsequent thyrotoxine (T4) treatment on these mortality rates. The study included 2,668 individuals (ages ≥ 40 years) who had been treated for overt hyperthyroidism with radioiodine and who were followed for almost 8 years. Deaths and causes of death were compared with expected age- and period-specific mortality. The authors found that 554 individuals died during the study period, compared with 487 expected deaths. They identified increased risks for all causes averaged and especially for circulatory deaths among those who did not require or had not yet progressed to T4 therapy. Mild hypothyroidism before therapy was also associated with an increased risk of mortality from ischemic heart disease. These increased risks were no longer present among those who underwent T4 therapy. The authors concluded that although patients treated with radioiodine for hyperthyroidism had increased mortality when compared with the general population, this increased risk was not evident during and after T4 therapy. These results indicated that “this supports treating hyperthyroidism with doses of radioiodine sufficient to induce overt hypothyroidism” and that “T4 replacement should be considered should this biochemical abnormality develop after radioiodine therapy.”

Dose-Fractionated Epratuzumab in NHL

Linden et al. from the Lund University Hospital (Sweden) reported in the July 15 issue of Clinical Cancer Research (2005;11:5215–5222) on a study conducted to establish the feasibility, safety, optimal dosing, and preliminary efficacy of fractionated doses of epratuzumab, a DOTA-conjugated 90Y-radiolabeled humanized anti-CD22 monoclonal antibody (mAb), as radioimmunotherapy (RIT) in non-Hodgkin’s lymphoma. A total of 16 patients with B-cell lymphoma received 90Y-epratuzumab with unconjugated epratuzumab once weekly for 2–4 weeks. 111In-epratuzumab was also administered at first infusion for scintigraphic imaging and dosimetry. The objective response rate was 62%. Complete responses occurred in 25% of patients and were durable (defined as event-free survival during a follow-up period of from 14 to 41 months). Two patients who received 4 infusions experienced hematologic dose-limiting toxicity, and serum levels of the mAb increased with each dose. The authors concluded that 3 weekly infusions of this RIT regimen can be administered safely with only minor toxicity. Additional evidence that therapeutic response was seen mainly in patients with unequivocal CD22 tumor expression was cited as an important factor for future studies.

Clinical Cancer Research

Phase I Trial of 131I-Labeled mAb in Colorectal Carcinoma

In the July 1 issue of Clinical Cancer Research (2005;11:4810–4817, 4818–4826), 2 articles from researchers at the Ludwig Institute for Cancer Research (Melbourne, Australia) detailed aspects of a phase 1 trial of 131I-humanized monoclonal antibody (mAb) A33 (huA33) in patients with advanced colorectal cancer. The first study, by Scott et al., identified the excellent targeting characteristics of huA33 and cited the potential for targeted therapy of metastatic colorectal cancer. The second study, by Chong et al. was a phase 1 dose escalation trial of 131I-humanized monoclonal antibody (mAb) A33 (huA33) in patients with advanced colorectal cancer. Each patient received an initial dose of the 131I-huA33 for biodistribution assessment and a second dose as therapy. To define the maximum tolerated dose (MTD), 3 patients were treated at 20 mCi/m2, 3 at 30 mCi/m2, 3 at 40 mCi/m2, and 6 at 50 mCi/m2. The MTD was determined to be 40 mCi/m2, with 2 patients experiencing grade 3 thrombocytopenia and 1 experiencing grade 4 neutropenia at 50 mCi/m2. No acute adverse events were noted. Excellent tumor-targeting of 131I-huA33 was
seen in all patients and, at restaging, 4 patients had stable disease and 11 patients had progressive disease. The authors concluded that RIT using 131I-huA33 shows promise in targeting colorectal tumors and that additional studies with this agent in combination with chemotherapy should be undertaken.

Clinical Cancer Research

Recovery of NIS Expression in Thyroid Cancer Cells

In an article e-published ahead of print in the July issue of BMC Cancer, Presta et al. from the University of Catanzaro Magna Graecia (Italy) reported on an in vitro study of the use of gene expression therapy to aid in the recovery of sodium/iodide symporter (NIS) function and facilitate radioiodine ablation and subsequent radioiodine-ablation thyroid cancer. The authors stably transected anaplastic thyroid carcinoma ARO cells with a Pax8 gene expression vector. After a quantitative reverse transcriptase-polymerase chain reaction was performed to assess thyroid-specific gene expression, the presence of NIS protein was detected by Western blot and localized by immunofluorescence in selected clones. An iodide uptake assay was also performed. The authors found that the cloned cells overexpressing Pax8 showed the reactivation of several thyroid-specific genes, including NIS, pendrin, thyroglobulin, thyroperoxidase, and thyroid transcription factor 1, with NIS protein localized in cell cytoplasm and membrane. These cells also showed a slower rate of cell growth. The authors concluded that “these findings demonstrate that induction of Pax8 expression may determine a partial redifferentiation of thyroid cancer cells, including the recovery of iodide uptake, a fundamental requisite for a radioiodine-based therapeutic approach for thyroid tumors.”

BMC Cancer

Retinoic Acid and Advanced Thyroid Cancer

In a review article published in the July issue of Current Pharmaceutical Design (2005;11:25–31), Coelho et al. from the Federal University of Rio de Janeiro (Brazil) reported on studies documenting the effects of retinoic acid in advanced thyroid cancer. Retinoic acids are natural derivatives of vitamin A and play roles in modulating growth and differentiation in many cell types. Despite combinations of surgery and radioiodine ablation and subsequent thyroid-stimulating hormone suppressive therapy, 20%–40% of patients with well-differentiated thyroid carcinomas experience recurrence. The authors point to in vitro studies that indicate that retinoic acids can induce redifferentiation of thyroid carcinoma cell lines and exert anti-proliferative actions, including inhibition of mitosis and induction of apoptosis. Clinical studies indicate that iodide uptake may be restimulated after retinoic acid administration in 20%–50% of patients with radioiodine nonresponsive thyroid carcinoma, and studies with longer follow-up periods suggest that tumor stabilization or regression may result from this well-tolerated therapeutic regimen.

Current Pharmaceutical Design

Glucocorticoids and Thyroid Function in 131I Treatment for Graves Disease

Jensen et al. from Odense University Hospital (Denmark) reported in a retrospective study to determine whether glucocorticoids administered to patients with Graves disease during 131I therapy affect thyroid function. Glucocorticoids are often administered to such patients as prophylaxis for or to treat mild ophthalmopathy during therapy. The study included 207 previously untreated patients with Graves disease undergoing 131I therapy; 96 patients who received prednisolone for mild or previous mild ophthalmopathy or the presence of risk factors for developing this complication and 111 patients who did not receive prednisolone prophylaxis. At 1-year follow-up, patients were classified as hypothyroid, euthyroid, or hyperthyroid. For those who received prednisolone, these numbers were 23, 35, and 38, respectively, whereas the corresponding numbers for those who did not receive prednisolone were 26, 40, and 45, respectively. Cure rates were almost identical between the 2 groups, as were the median time intervals until development of hypothyroidism or recurrence of hyperthyroidism. The authors concluded that, “although glucocorticoids in some contexts seem to attenuate the radiation-induced oxidative stress this had no impact on the final outcome following 131I therapy of patients with Graves disease.”

European Journal of Endocrinology

177Lu- and 67/64Cu-Labeled RIT Techniques

In the July 15 issue of Clinical Cancer Research (2005;11:5112–5120), Grunberg et al. from the Paul Scherrer Institute (Villigen, Switzerland) and University Hospital Basel (Switzerland) reported on a bioevaluation of 177Lu- and 67/64Cu-labeled recombinant fragments of antibody chCE7 for radioimmunotherapy, including assessment of PET imaging of L1-CAM-positive tumors in a mouse model. The technique shows promise for tumors in which the L1 cell adhesion protein is overexpressed, such as neuroblastomas, renal cell carcinomas, ovarian carcinomas, and endometrial carcinomas. The authors found that 177Lu- and 67/64Cu-labeled recombinant immunooconjugates showed different in vivo behaviors, with a 67/64Cu-labeled immunonojugate appearing to be the most favorable of those studied, because of superior tumor/kidney ratios.

Clinical Cancer Research
SPECT Bone Marrow Imaging in RT Planning for Gynecologic Cancers

In an article e-published ahead of print on July 15 in Radiotherapy and Oncology, Roeseke et al. from the University of Chicago (IL) reported on a case study incorporating SPECT bone marrow imaging into the treatment planning process to reduce the volume of bone marrow irradiated in patients receiving intensity-modulated whole-pelvic radiation therapy. The authors first performed planning CT imaging in a patient with early-stage endometrial cancer, followed by a 123I-iodoamphetamine SPECT scan of the pelvis. Using image fusion software, the SPECT scan was coregistered with the planning CT scan and used to delineate regions of active bone marrow. An intensity-modulated radiation therapy plan was generated to provide coverage of tumor volume and spare areas of active bone marrow and other normal pelvic structures. For doses >30 Gy, this technique reduced the dose to areas of high active bone marrow density in the lumbar vertebrae, sacrum, and medial iliac crests by 50% compared with conventional planning. Tumor radiation dose was not compromised. The authors concluded that these results suggest that SPECT bone marrow imaging is a useful adjunct to intensity-modulated whole-body radiation therapy planning in gynecologic patients.

Radiotherapy and Oncology

3D-SSP SPECT Analysis of CBF in Dementias

Mito et al. from the Asahikawa Red Cross Hospital (Hokkaido, Japan) reported in the August issue of Clinical Neurology and Neurosurgery (2005;107:396–403) on a study using 3-dimensional stereotactic surface projection (3D-SSP) SPECT analysis to compare cerebral blood flow in patients with dementia with Lewy bodies (DLB; 6 patients), Parkinson’s disease with dementia (PDD; 7 patients), Parkinson’s disease without dementia (PD; 21 patients), and Alzheimer’s disease (AD; 12 patients) and in 12 healthy individuals. All participants underwent 123I-iodoamphetamine SPECT imaging, and the results were analyzed with 3D-SSP software. The authors found that regional patterns of blood flow reduction in the brain were different among patients with DLB, PD, and AD. Greater blood flow reduction was observed in patients with DLB, although those with DLB and PDD showed similar reduction patterns. The authors concluded that these patterns “suggest different and disease-specific combinations of underlying pathological and neurochemical processes” and that imaging techniques show great promise in assisting in the clinical differentiation of these types of dementia.

Clinical Neurology and Neurosurgery

SPECT and ECG as Metrics for LVEF

Habash-Bseiso et al. from the Marshfield Clinic (WI) reported in the May issue of Clinical Medicine and Research (2005;3:75–82) on a study comparing the efficacy of 2-dimensional echocardiography and electrocardiogram-gated SPECT with that of left ventricular contrast angiography for the evaluation of left ventricular ejection fraction (LVEF). The retrospective study included 534 patients from a large, community-based clinic who underwent angiography as well as echocardiography or SPECT (all imaging within a 1 month period) for evaluation of LVEF. Noninvasive LVEF values were compared with those obtained by angiography. The authors found that the angiographic LVEFs were significantly correlated with both echocardiographic and SPECT LVEFs, but that both echocardiographic and SPECT LVEFs were somewhat lower. They noted widely fluctuating differences in some of these readings, but concluded that although lower, the noninvasive techniques appeared to accurately assess depressed LVEFs (<40% and <35%). Additional research and institution-specific assessments were recommended.

Clinical Medicine and Research

99mTc-ECD SPECT Assessment in Hydrocephalus

Navak et al. from the All India Institute of Medical Sciences (New Delhi) reported in the May–June issue of Pediatric Neurosurgery (2005; 41:117–121) on the use of 99mTc-ECD SPECT to study regional cerebral perfusion before and after ventriculoperitoneal shunt placement in children with hydrocephalus. The study included 17 children (11 boys, 6 girls; median age, 24 months) with hydrocephalus who were scheduled for ventriculoperitoneal shunt placement. In 10 children the hydrocephalus was congenital, was secondary to tumor in 5, and a result of infection in 2. 99mTc-ECD SPECT imaging was performed before and after placement, and changes in cerebral perfusion and ventricular size were compared. After surgery, 14 children (82%) showed improvement in cerebral perfusion after shunting, and 12 of these showed a decrease in ventricular size. The authors found that cerebral perfusion improved in the majority of the children after cerebrospinal fluid diversionary procedures, and that factors such as duration of hydrocephalus and decreased ventricular size did not influence this improvement. They concluded that “SPECT can therefore prove to be a valuable tool for objective assessment of improvement in cerebral perfusion in children with hydrocephalus secondary to various etiologies following surgical or medical interventions.”

Pediatric Neurosurgery

Promising Bivalent Anti-HER-2 Affibody

Steffen et al. from Uppsala University (Sweden) reported in the June issue of Cancer Biotherapy and Ra-
diopharmaceuticals (2005;20:239–248) on in vitro characterization of a bivalent anti-human epidermal growth factor receptor (HER-2) with potential for radionuclide-based diagnostic applications in breast and ovarian cancers. The authors compared mono- and bivalent ligands when radiolabeled with $^{125}$I. The bivalent molecule was retained longer in the cell and, at approximately one tenth the size of the monoclonal antibody trastuzumab, is a “promising candidate for radionuclide-based detection of HER-2 expression in tumors.” The authors noted that $^{125}$I was used in this study as a surrogate marker for the diagnostically relevant radioisotopes $^{123}$I for SPECT/gamma camera imaging and $^{124}$I for PET.

Cancer Biotherapy and Radiopharmaceuticals

$^{18}$F-FDG Biodistribution in Tumor and Infection

In an article published in the June issue of Cancer Biotherapy and Radiopharmaceuticals (2005;20:310–315), Kok et al. from Radboud University Nijmegen Medical Center (The Netherlands) used PET to compare the dynamic distribution of $^{18}$F-FDG in malignant and Escherichia coli lesions in a rat model. Dynamic $^{18}$F-FDG PET imaging was performed up to 4 hours after injection of $^{18}$F-FDG, standardized uptake values (SUVs) were calculated, and biodistribution was calculated in rats with both tumor and infection. The authors found that dynamic PET visualized both tumor and infection. $^{18}$F-FDG uptake in infection was faster and greater than in tumor lesions. $^{18}$F-FDG uptake in tumor reached an SUV of 0.8 ± 0.3 at 60 minutes and reached 1.6 ± 0.2 at 45 minutes in infectious lesions, both remaining constant until 4 hours after injection. Although differences in uptake and initial kinetics were similar, the washout rate of $^{18}$F-FDG from the lesions was similar over time. The authors cautioned that “retention of FDG in the inflammatory lesion indicated that dual time-point imaging does not necessarily resolve diagnostic pitfalls for FDG-PET in oncology in order to discriminate between malignant tumors and benign infectious lesions.”

Cancer Biotherapy and Radiopharmaceuticals

PET SUVs as Predictors in NSCLC

Cerfolio et al. from the University of Alabama at Birmingham reported in the July issue of the Journal of Thoracic and Cardiovascular Surgery (2005;130:151–159) on a study assessing whether the standard uptake value (SUV) of a pulmonary nodule is an independent predictor of biologic aggressiveness in patients with non–small cell lung cancer (NSCLC). The study included 315 patients who underwent both PET and CT imaging. Those with suspicious nodal or systemic findings underwent biopsy, and when indicated, resection with complete lymphadenectomy. The results indicated that patients with high maximum SUVs (≥10) were more likely to have poorly differentiated tumors at a more advanced stage and were less likely to have their disease completely resected. Maximum SUV was the best predictor of disease-free survival and overall survival. Patients with stage IB and stage II disease with a maximum SUV greater than the median for their respective stages had lower disease-free survival at 4 years. When results were used to divide patients into low- and high-maximum SUV groups, the actual 4-year survival for patients with stage IB NSCLC was 80% and 66%, respectively; for stage II disease was 64% and 32%, respectively; and for stage IIIA disease was 64% and 16%, respectively. The authors concluded that the maximum SUV of an NSCLC nodule on dedicated PET “is an independent predictor of stage and tumor characteristics” and is a “more powerful independent predictor than the TNM stage for recurrence and survival for patients with early-stage resected cancer.”

Journal of Thoracic and Cardiovascular Surgery

Function of Sigma Receptors in Parkinson’s Disease

Mishina et al. from the Nippon Medical School Chiba-Hokusoh Hospital (Japan) reported in the August issue of Acta Neurologica Scandinavica (2005;112:103–107) on a study using $^{11}$C-SA4503 PET to investigate the mapping of sigma receptors in Parkinson’s disease (PD) and to determine whether these receptors are involved in the damaged dopaminergic system seen in PD. The study included 6 patients with PD and 7 healthy volunteers. A dynamic series of PET imaging was performed with arterial blood sampling, followed by computation of the binding potential of $^{11}$C-SA4503. Results indicated that binding potential in patients with PD was significantly lower on the more affected than the less affected side of the anterior putamen. However, no significant difference was noted in overall binding potential in patients and controls. The authors concluded that release of dopamine is reduced asymmetrically in the putamen of patients with early PD and that $^{11}$C-SA4503 PET is a promising indicator of presynaptic dopaminergic damage in PD.

Acta Neurologica Scandinavica

New Ligands for Norepinephrine Transporter Imaging

In the July issue of the Journal of Neurochemistry (2005;94:337–351), Ding et al. from the Brookhaven National Laboratory (Upton, NY) reported on the synthesis and evaluation of several new ligands for PET imaging of the norepinephrine transporter (NET) system and on initial imaging in baboons. After investigating a series of ligands, the authors focused on analogs of methylreboxetine (MRB) and identified the superiority of (S,S)-$^{11}$C-MRB and others as potential NET ligands for PET imaging.

Journal of Neurochemistry
3. That this committee effect its business largely by means of conference call, but that it meet at least once annually face-to-face at some appropriate venue.

4. That the committee seek ways to represent to the Food and Drug Administration the urgent need to make a distinction between diagnostic and therapeutic agents with respect to the regulatory approval process.

5. That the committee seek ways to replace the RECIST criteria used in oncology trials, on the basis of modern evidence.

6. That the committee work to achieve a restructuring of RDRC.

7. That the committee facilitate the development of multidisciplinary educational programs capable of being customized and presented at suitable venues to educate and inform both imaging and referring physicians.

8. That the committee seek ways to engage industry in advancing the development of MI.

9. That the committee identify the resources necessary to initiate or expand MI programs.

10. That the committee seek to engage other potential referring physicians and their organizations in seeking support for and development of MI.

Postscript

Dr Henry Wagner, in one of his archetypical, not to say renowned, program summations of the SNM annual meetings, once remarked about nuclear medicine as it reached one of its crossroads that “it is wrong to reach a turning point and not turn” (9). That remark may now be capable of being generalized in the evolution of all of the radiologic sciences. The sense of the meeting was that it proved a timely reminder that imaging techniques as a whole are at a crossroads with respect to MI. We owe it to our successors to ensure that, at this particular turning point, we do indeed also turn.

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REFERENCES