

## Iagaru Receives First Sam Gambhir Trailblazer Award

**A**ndrei Iagaru, MD, a professor of radiology and chief of the Division of Nuclear Medicine and Molecular Imaging at Stanford University (CA), was presented with the inaugural Sam Gambhir Trailblazer Award on June 14 at the SNMMI Annual Meeting in Vancouver, Canada. Intended for midcareer professionals, the award recognizes outstanding achievement and excellence in transformative research (basic, translational, or clinical science) and exceptional mentorship. The prestigious annual award, announced in 2021 and sponsored by the Education and Research Foundation, honors the memory of Sanjiv Sam Gambhir, MD, PhD, who died at 57 in 2020. Gambhir was an internationally recognized pioneer in molecular imaging and the Virginia and D.K. Ludwig Professor for Clinical Investigations in Cancer Research and chair of the Department of Radiology at Stanford University, where he was also director of the Canary Center at Stanford for Cancer Early Detection, the Precision Health and Integrated Diagnostics Center, and the Molecular Imaging Program. He dedicated his career to developing methods of early disease detection, ushering in a new era of molecular imaging to identify signs of disease in its earliest stages. Within radiology, he was known for development of PET reporter genes and other paradigm-changing discoveries and applications. He was a vocal and highly effective advocate for clinical integration and approval of new molecular imaging techniques and was among the pioneers of the concept of precision medicine.

Iagaru, a colleague of Gambhir at Stanford, completed medical school at Carol Davila University of Medicine and Pharmacy (Bucharest, Romania) and an internship in medicine at Drexel University College of Medicine (Philadelphia, PA). He completed his residency in radiology and a PET/CT fellowship at Stanford. His research interests include PET/MRI and PET/CT for early cancer detection, clinical translation of novel PET radiopharmaceuticals, and targeted radionuclide therapy. He has published more than 200 peer-reviewed articles and been recognized with numerous other honors, including the SNM 2009 Image of the Year Award; the 2009, 2014, and 2015 Western Regional Society of Nuclear Medicine Scientist Award and 2021 Sanjiv Sam Gambhir Distinguished Scientist Award; a 2015 Department of Defense Impact Award; and numerous distinctions at Stanford.



Andrei Iagaru, MD

Iagaru coauthored *The Journal of Nuclear Medicine* in memoriam for Gambhir, writing “We lost a beloved colleague, a mentor and friend, a wonderful human being, and an incredible scientist. Humanity lost a giant who had so much more to contribute toward a better world. For so many of us, Sam was the reason we chose this field.”

## SNMMI Honors New Fellows for 2022

**F**ourteen new SNMMI fellows were recognized on June 13 as part of a special plenary session during the society’s 2022 Annual Meeting in Vancouver, Canada. SNMMI fellowship was established in 2016 to recognize distinguished service to the society as well as exceptional achievement in the field of nuclear medicine and molecular imaging. It is among the most prestigious formal recognitions available to longtime SNMMI members. Recognized as new fellows were: Abass Alavi, MD (Hospital of the University of Pennsylvania/University of Pennsylvania; Philadelphia); Johannes Czernin, MD (David Geffen School of Medicine/University of California at Los Angeles); Farrokh Dehdashti, MD (Mallinckrodt Institute of Radiology/Washington University School of Medicine in St. Louis; MO); Yuni Dewaraja, PhD (University of Michigan Medical School; Ann Arbor); Cameron Foster, MD (University of California Davis Health; Sacramento); Warren Janowitz, MD, JD (Radiology Associates of South Florida/Baptist Health; Miami, FL); Neeta Pandit-Taskar, MD (Memorial Sloan

Kettering Cancer Center/Weill Cornell Medical College; New York, NY); Daniel Pryma, MD (Hospital of the University of Pennsylvania/University of Pennsylvania; Philadelphia); Lalitha Shankar, MD, PhD (National Cancer Institute; Bethesda, MD); John Sunderland, PhD (University of Iowa/University of Iowa Carver College of Medicine; Iowa City); Jerold Wallis, MD (Mallinckrodt Institute of Radiology/Washington University School of Medicine in St. Louis; MO); Dean Wong, MD, PhD (Mallinckrodt Institute of Radiology/Washington University School of Medicine in St. Louis; MO); Anna Wu, PhD (Beckman Research Institute of the City of Hope, Duarte, California); and Katherine Zukotynski, MD, PhD, PEng (McMaster University; Hamilton, Canada).

Selection of SNMMI Fellows is based on documented excellence in both volunteer service to the society and at least 1 of 3 areas: scientific discovery and innovation, educational efforts in nuclear medicine and molecular imaging, or clinical practice of nuclear medicine and molecular imaging. Fellows are entitled to use the FSNMMI designation.

# SNMMI Image of the Year 2022: PET/CT Biomarker Predicts Post-MI Cardiac Remodeling

**S**NMMI announced on June 13 at its Annual Meeting in Vancouver, Canada, the 2022 Henry N. Wagner, Jr., Image of the Year, chosen from more than 1,280 submitted scientific abstracts and voted on by reviewers and society leadership. As part of the presentation “Predicting remodeling and outcome from molecular imaging of fibroblast activation in patients after acute myocardial infarction,” the image from Diekmann et al. from the Hannover Medical School (Germany) contrasted  $^{68}\text{Ga}$ -fibroblast-activation protein-46 ( $^{68}\text{Ga}$ -FAP-46) PET/CT,  $^{99\text{m}}\text{Tc}$ -tetrofosmin perfusion SPECT, and cardiac MR images acquired in patients within 11 days after acute myocardial infarction.

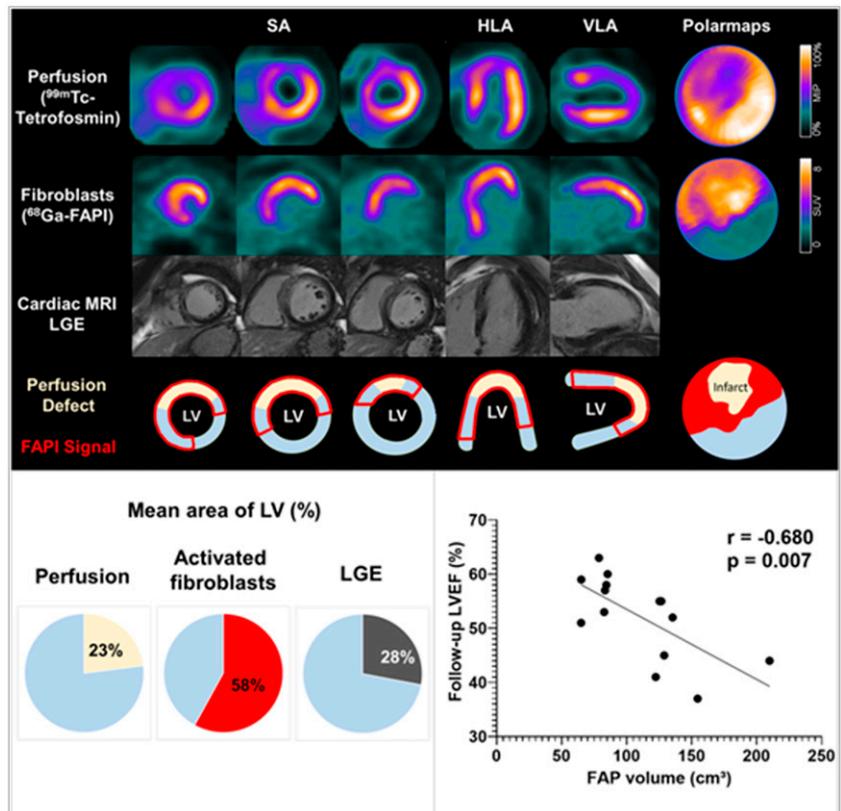
“Molecular PET imaging of the fibroblast activation protein has recently been evaluated in patients after acute myocardial infarction,” stated Johanna Diekmann, MD, lead author of the presentation. “In our study, we sought to obtain further insights by correlating FAP-targeted PET imaging with tissue characteristics from cardiac MRI, as well as functional outcome.”

The study included 35 patients, in whom infarct size was determined from SPECT, cardiac FAP volume was calculated from  $^{68}\text{Ga}$ -FAP-46 PET/CT uptake values and polar mapping analyses, and MRI provided information on functional parameters, area of injury, and tissue characteristics. Cardiac function in a subgroup of 14 patients was followed up by echocardiography or cardiac MRI at a median of 139.5 days.

In all patients the area of FAP upregulation was significantly larger than that in either SPECT perfusion defect size or infarct area as defined by late gadolinium-enhanced MRI. FAP volume on PET/CT was significantly correlated at baseline with multiple cardiac parameters, including infarct area, left ventricular (LV) mass, and end-systolic and -diastolic volumes. PET/CT segmental analysis showed FAP upregulation in 308 of 496 (62%) myocardial segments. MRI late gadolinium enhancement was found in only 56% of FAP-positive segments, elevated T1 in 74%, and elevated T2 in 68%. Fourteen percent (44/308) of FAP-positive segments showed neither prolonged T1 or T2 nor significant late gadolinium enhancement, with a weak correlation between myocardial FAP volume and LV ejection fraction (LVEF) at baseline. Early myocardial PET values showed a stronger correlation with LVEF at follow-up, suggesting a relationship between

the extent of fibroblast activation and more severe adverse ventricular remodeling. The authors concluded that because a higher extent of myocardial FAP upregulation was predictive of subsequent LV dysfunction and exceeded infarct area as defined by other modalities, fibroblast activation in noninfarcted myocardial areas may contribute to adverse outcomes. FAP imaging with PET/CT may be a complementary biomarker with applications in establishing treatment strategies to mitigate profibrotic activity outside of the primary infarct region to prevent adverse remodeling.

“Myocardial infarction is an important contributor to the development of heart failure, but the early molecular processes involved in the transition from initial injury to heart failure are undertreated,” said Diekmann. “New antifibrotic therapies (such as CAR-T cell therapies) could significantly change future therapy of heart failure. Using FAP PET to select patients suitable for therapy would open a new major application for PET in fibrosis and cardiac diseases.”



**SNMMI 2022 Image of the Year.** Top: Representative case with acute anterior wall myocardial infarction.  $^{99\text{m}}\text{Tc}$ -tetrofosmin perfusion SPECT,  $^{68}\text{Ga}$ -fibroblast-activation protein-46 ( $^{68}\text{Ga}$ -FAP-46) PET/CT, and late gadolinium-enhanced (LGE) cardiac MR images were compared in patients within 11 days after acute myocardial infarction. Bottom: Areas of myocardial FAP upregulation on PET/CT were significantly greater than those with either SPECT or MRI and were predictive of subsequent left ventricular (LV) dysfunction. Global myocardial FAP volume early after acute myocardial infarction inversely correlated with left ventricular ejection fraction (LVEF) at follow-up in the chronic stage. The findings suggest promise for  $^{68}\text{Ga}$ -FAP-46 PET/CT as a complementary biomarker in predicting adverse cardiac remodeling.

## New Officers for SNMMI and SNMMI-TS

**D**uring the 2022 SNMMI Annual Meeting, from June 11 to 14, both the SNMMI and SNMMI Technologist Section (SNMMI-TS) welcomed new officers. Elected by the members of the 2 organizations, the new officers will serve in these positions through June 2023.

### SNMMI President

Munir Ghesani, MD, associate professor of radiology at Mount Sinai Hospital and chief of nuclear medicine and molecular imaging at Mount Sinai Health System (New York, NY), assumed the office of SNMMI President. He reported that his goals in this position include continuing to increase consumer outreach and medical community awareness of the benefits of nuclear medicine, molecular imaging, and radionuclide therapy; expanding efforts to provide educational offerings to referring and specialty physicians; working closely with U.S. regulators to streamline the approval of promising new diagnostic and therapeutic radiopharmaceuticals; maintaining reliable access to radiopharmaceuticals, particularly new and cutting-edge therapies; and ensuring that SNMMI remains a leading global nuclear medicine organization through its publications, clinical guidelines, quality initiatives, and international representation.



Munir Ghesani, MD

Ghesani earned his medical degree from Gujarat University, NHL Medical College (Ahmedabad, India), in 1984. He completed a diagnostic radiology residency in 1988 at the KM School of Postgraduate Medicine and Research, followed by a diagnostic ultrasound fellowship in 1989 at LG Hospital and KM School of Postgraduate Medicine and Research, also in Ahmedabad. In 1993, he completed an internal medicine residency at Jersey City Medical Center (NJ) and, in 1996, a nuclear medicine residency and fellowship at St. Luke's-Roosevelt Hospital Center (New York, NY), where he also went on to radiology residency. He has held academic appointments at the New York University School of Medicine, the Icahn School of Medicine at Mount Sinai, and Columbia University (all in New York, NY).

Within SNMMI, Ghesani has been an active member of the society's governance, with a strong focus on advocacy. He has served as chair of the Government Relations Committee and the SNMMI/U.S. Food and Drug Administration Task Force, as well as Advocacy Domain chair for the SNMMI Value Initiative. He was a cochair of the SNMMI Membership Task Force and a member of the SNMMI Board of Directors. He has also held multiple leadership positions in the Greater New York Chapter of SNMMI, most recently as president.

In the larger nuclear medicine community, Ghesani has served as chair and director of the American Board of

Nuclear Medicine (ABNM) and as president of the American College of Nuclear Medicine (ACNM). He has published more than 80 peer-reviewed journal articles and a text, *Nuclear Medicine: A Case-Based Approach*. Ghesani is certified by the American Board of Radiology, ABNM, and the American Board of Internal Medicine.

"SNMMI is a unique organization that brings together diverse nuclear medicine and molecular imaging professionals," said Ghesani. "It is my pleasure to work on behalf of each of the SNMMI members to improve our field. I look forward to collaborating with the society's dedicated leadership, volunteers, and staff over the next year in our mission to improve patient care."

### SNMMI President-Elect

Helen Nadel, MD, director of pediatric nuclear medicine at Lucile Packard Children's Hospital at Stanford (CA) and clinical professor of radiology at the Stanford School of Medicine, was named as SNMMI president-elect. She has set goals for her tenure that reflect lessons learned from the collective nuclear medicine COVID-19 experience. To accomplish these goals, Nadel proposes



Helen Nadel, MD

creation of an ongoing working group to address preparedness issues, education of members on potential risks, and development of rapid global communication and mobilization plans. She encourages SNMMI's continued cooperation with government and industry to develop and quickly approve diagnostic and theranostic molecular agents, as well as associated technologies. She also supports SNMMI's diversity initiatives to ensure an inclusive working environment and deliver quality health care to all patients regardless of ethnicity or gender.

Nadel earned her medical degree from the University of Manitoba in Winnipeg (Canada) in 1977. She completed a diagnostic radiology residency in 1982 at the University of Toronto (Canada), followed by a fellowship in pediatric radiology at the Hospital for Sick Children at the University of Toronto. She then completed a nuclear medicine residency in 1989 at the University of British Columbia (Vancouver, Canada). She held multiple academic appointments at the University of British Columbia between 1983 and 2018 and was head of the Division of Nuclear Medicine and Department of Radiology at British Columbia Children's Hospital before taking on her current roles at Stanford.

An active SNMMI member for more than 30 years, Nadel has served as a member of the House of Delegates, as president and member of the board of directors of the Pediatric Imaging Council, and as member of the PET Center of Excellence board of directors, Scientific Program Committee,

Membership Committee, and *The Journal of Nuclear Medicine* editorial board, among other posts. She was president of the SNMMI Pacific Northwest Chapter for many years and currently plays an active role in the Northern California chapter. In the greater nuclear medicine community, she has served in multiple positions for the ACNM, the ABNM, and the Children's Oncology Group. In 2019, Nadel received the Lifetime Achievement Award from the European Society of Pediatric Nuclear Medicine for ongoing contributions to pediatric nuclear medicine. She has published more than 60 peer-reviewed journal articles and 24 text chapters and has been an invited speaker for 180 presentations.

**SNMMI Vice President-Elect**

Cathy Sue Cutler, PhD, Director of the Medical Isotope Research and Production Program (MIRP) at the Brookhaven National Laboratory (BNL; Upton, NY), was named as the 2022 SNMMI Vice-President Elect. A high-priority goal during her term will be to work with SNMMI on efforts to secure appropriate funding for nuclear medicine services and providers. This goal also includes securing adequate funding for



Cathy Cutler, PhD

researchers developing life-saving radiopharmaceuticals. She will work with SNMMI to encourage the U.S. Congress to pass the FIND Act to guarantee access to high-value radiopharmaceuticals. A third goal is to generate training and education opportunities in theranostics for personalized medicine.

Cutler began her career as a research associate at the Mallinckrodt Institute of Radiology/Washington University at St. Louis (MO), and as a research scientist at the Missouri University Research Reactor (MURR; Columbia) at the University of Missouri. At the University of Missouri she also served as an adjunct faculty member in the Nuclear Engineering Program and a Joint Faculty Member in the Nuclear Sciences and Engineering Institute. She became a Research Professor at MURR in 2010. In 2015 she accepted her current position at BNL, where she was named a Tenured Scientist in 2018. In 2019 she received the BNL 33rd Annual Women's Recognition Award for Achievements in Science.

For more than 20 years Dr. Cutler has actively participated and served in leadership positions on SNMMI councils, committees, and task forces, including those of the Radiopharmaceutical Council, the Committee on Radiopharmaceuticals (as chair), the Center for Molecular Imaging Innovation and Translation (as president), the Committee on Ethics, the Women in Nuclear Medicine Committee, the Committee on Education, the Committee on Government Relations (chair), the SNMMI Advocacy Domain-Value Initiative (chair), and others. She has published more than 100 peer-reviewed journal articles and participated in national and international radiopharmaceutical leadership activities.

**SNMMI-TS President**

Krystle W. Glasgow, MIS, CNMT, NMTCB(CT), NMAA, instructor and clinical coordinator at the University of Alabama at Birmingham, became the 2022–2023 SNMMI-TS president. Her focus as president will continue to be on SNMMI-TS membership. Her goals include engaging young nuclear medicine technologists (both students and early career professionals) and strengthening support for all nuclear medicine technologists. Other goals include making SNMMI a 1-stop shop for nuclear medicine needs, enhancing communication between the society and its members, increasing and diversifying educational offerings, and promoting advocacy endeavors.



Krystle W. Glasgow, MIS, CNMT, NMTCB(CT), NMAA

Glasgow received her bachelor of science degree in nuclear medicine technology with a concentration in CT in 2010 from the University of Alabama at Birmingham. She completed a master's degree in imaging sciences and was certified as a Nuclear Medicine Advanced Associate at the University of Arkansas for Medical Sciences (Little Rock). She is pursuing a doctoral degree in health services administration with a concentration in health informatics at the University of Alabama at Birmingham.

**SNMMI-TS President-Elect**

Dmitry Beyder, CNMT, MPA, was named as SNMMI-TS President-Elect. His goals for his time in office include guiding technologists and the professional organization as a whole out of the COVID-19 pandemic, strengthening the nuclear medicine technologist workforce and professional pipeline, and growing the nuclear medicine technologist's role in theranostic practice.



Dmitry Beyder, CNMT, MPA

Beyder received his bachelor of science degree in nuclear medicine technology from the State University of New York at Buffalo and a master of public administration in health policy, management, and international healthcare from the Robert F. Wagner Graduate School of Public Service at New York University (NY). He began his career as a nuclear medicine technology at Memorial Sloan Kettering Cancer Center (New York, NY), followed by 6 years as clinical supervisor of nuclear medicine and PET at Oregon Health and Science University (Portland). He assumed the position of Radiology Program Manager of Nuclear Medicine, PET, CT, and Patient Transport at Barnes-Jewish Hospital/Mallinckrodt Institute of Radiology (St. Louis, MO) in 2014. He has served in numerous SNMMI-TS leadership roles, including as chair of the Scope of Practice Task Force, cochair of the Advocacy Committee, member of the Executive Board, and others.

# Recognition of the ABNM by the NRC

George Segall, MD, American Board of Nuclear Medicine Executive Director

Certification by the American Board of Nuclear Medicine (ABNM) is recognized by the U.S. Nuclear Regulatory Commission (NRC) as meeting the training and experience requirements to be an authorized user of byproduct material for medical use. The last time the ABNM's certification process was reviewed by the NRC was in 2005, following publication of the final rule 10 CFR Part 35, "Medical Use of Byproduct Material Recognition of Specialty Boards," defining the criteria such boards must meet before they could be recognized by the NRC or Agreement States (*Fed Reg.* 2005;70:16335). On January 11, 2021, the NRC Office of Nuclear Medicine Safety and Safeguards published Office Procedure 70-03, "Procedures for Recognizing, Monitoring, and Terminating Certification Process of Specialty Boards," Section 3.1, "Monitoring Continued Satisfaction of Recognition Requirements." The purpose was to provide "increased clarity" for the NRC on monitoring for continued satisfaction of the recognition criteria, guidance for determining whether NRC recognition should be terminated, and guidance for maintaining NRC-recognized board certifications on the NRC public website.

The ABNM received a letter on March 15, 2022, asking for confirmation that the ABNM continues to satisfy the recognition criteria for specialty board certification processes. The letter explained that the NRC was contacting all its recognized specialty boards per the procedure published in the preceding year. As part of the review, the NRC staff was evaluating the board's publicly available website for changes that could affect recognition of the board's certification process. The letter also noted that subsequent reviews will be performed on a 5-year basis.

The NRC review of the ABNM website is still underway. The ABNM has responded with proposed changes clarifying the training and work experience required for certification that conform to NRC rules to be an authorized user uses of byproduct material under 10 CFR 35.190 Training for uptake, dilution, and excretion studies; 10 CFR 35.290 Training for imaging and localization studies; and 10 CFR 35.390 Training for use of unsealed byproduct material for which a written directive is required.

Under 10 CFR 35.390, training and experience must include a minimum of 700 hours, all of which are applicable to the medical use of unsealed byproduct material requiring a written directive, including a minimum of 200 hours of classroom and laboratory training in accordance with 10 CFR 35.390(b), and supervised work experience. The 200 hours of classroom and laboratory training must include:

- Radiation physics and instrumentation;
- Radiation protection;
- Mathematics pertaining to the use and measurement of radioactivity;
- Chemistry of byproduct material for medical use; and
- Radiation biology.

Classroom and laboratory training may be obtained using a variety of instructional methods (including online training) as

long as the specific clock hour requirements are met and the subject matter relates to radiation safety and safe handling of byproduct material for the uses for which authorization is being requested. Reviewing case histories or interpreting scans should not be counted toward the minimum 200 hours of required classroom and laboratory training in radiation safety and safe handling of byproduct material.

Supervised work experience must include:

- Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;
- Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters;
- Calculating, measuring, and safely preparing patient or human research subject dosages;
- Using administrative controls to prevent a medical event involving the use of unsealed byproduct material;
- Using procedures to contain spilled byproduct material safely and proper decontamination procedures; and
- Administering dosages of radioactive drugs to patients or human research subjects involving a minimum of 3 cases in each of the following categories:
  - Oral administration of  $\leq 1.22$  GBq (33 mCi) of sodium iodide  $^{131}\text{I}$ , for which a written directive is required;
  - Oral administration of  $>1.22$  GBq (33 mCi) of sodium iodide  $^{131}\text{I}$ ; and
  - Parenteral administration of any radioactive drug that contains a radionuclide that is primarily used for its electron emission,  $\beta$  radiation characteristics,  $\alpha$  radiation characteristics, or photon energy  $<150$  keV, for which a written directive is required.

Physicians in training may not dedicate all of their supervised work experience time specifically to these subject areas and will be attending to other clinical matters involving the medical use of the material under the supervision of an authorized user (e.g., reviewing case histories or interpreting scans). This type of supervised work experience may be counted toward the supervised work experience to obtain the required 700 total hours of training.

For 10 CFR 35.290, *additional* work experience is required for eluting generator systems appropriate for preparation of radioactive drugs for imaging and localization studies, measuring and testing the eluate for radionuclidic purity, and processing the eluate with reagent kits to prepare labeled radioactive drugs.

The training and experience described here also meet the requirements of 10 CFR 35.190.

Experience for 10 CFR 35.190, 10 CFR 35.290, and 10 CFR 35.390 must be obtained under the supervision of an authorized user for the same type of procedures.

The ABNM will update its website with this information to ensure that the NRC continues to recognize its certification process.

# Opportunities for Growth in Nuclear Medicine and Molecular Imaging

Munir Ghesani, MD, SNMMI President

The discipline of nuclear medicine is stronger than ever, and its future is brighter than ever. Radiopharmaceutical therapies—such as  $^{177}\text{Lu}$ -PSMA-617, approved a few months ago, and  $^{177}\text{Lu}$ -DOTATATE, approved a few years ago—are propelling theranostics to the forefront of the field. Techniques such as dynamic imaging of an extended field of view now provide an extraordinary photon sensitivity with very low levels of radioactivity. Artificial intelligence and machine learning are reshaping the research and development of nuclear medicine and molecular imaging.

While these advances are driving the science of the field forward, we must also ensure that patients benefit from them. As I begin my term as SNMMI president, I plan to address several issues that will help the field grow while focusing on optimal patient care and quality and the safety of our diagnostic and therapeutic procedures as top priorities. By concentrating on public awareness, patient engagement, and regulatory approvals, we can make great strides to benefit our patients.

Nuclear medicine is not a common household phrase. To educate the public about what nuclear medicine is and what it can accomplish, SNMMI launched an awareness campaign last year. Targeting consumer broadcast media (print and digital news publications, radio, TV), SNMMI has reached a very broad audience, including patients, caregivers, referring physicians, legislators, regulators, and payers. In its first 6 months the campaign reached more than 1 billion consumers. We will continue this important consumer outreach in the coming year. By exposing the public to multiple “stories” about nuclear medicine over an extended period of time, we can enhance their recall and strengthen their understanding.

We must also continue our efforts to ensure that patients and the medical community recognize the value of nuclear medicine, molecular imaging, and radionuclide therapy. SNMMI’s 14-member Patient Advocacy Advisory Board will remain a driving force in advising the society on development of patient education materials and public policy regarding nuclear medicine and molecular imaging. The society will also continue its education of referring physicians during session presentations and symposia at several events, including the Pediatric Endocrine Society, American Society for Radiation Oncology, Large Urology Group Practice Association, American Urological Association, and San Antonio Breast Cancer Symposium.

Access to nuclear medicine and molecular imaging is another key issue for SNMMI. The society will work closely with U.S. regulators to streamline the approval of promising new diagnostic and therapeutic radiopharmaceuticals. Reimbursement of nuclear medicine and molecular imaging procedures also remains a critical issue. SNMMI cosponsors the Facilitating Innovative Nuclear Diagnostics (FIND) Act, which, if passed, would direct the Department of Health and Human Services to pay separately for all outpatient diagnostic radiopharmaceuticals rather than packaging them with other medical supplies. In promoting the FIND Act, SNMMI hopes to help patients achieve greater access to a wide range of diagnostic radiopharmaceuticals.

Radiopharmaceutical access also depends on manufacturers, as we saw in the recent halt in production of Lutathera and Pluvicto. SNMMI members and the patients we serve need a reliable supply chain for innovative radiopharmaceutical therapies to be used regularly and widely. SNMMI is dedicated to contributing to the radiopharmaceutical therapy space to help our field continue to grow.

I feel strongly that SNMMI is the leading global nuclear medicine organization and plan to increase the recognition of the society and its initiatives during my term as president. Our Mid-Winter and Annual Meetings are premier nuclear medicine and molecular imaging events and are attended by thousands of professionals from around the world. *The Journal of Nuclear Medicine* publishes cutting-edge research and enjoys its highest impact factor ever, ranking third among all medical imaging journals worldwide. We lead the way in developing clinical guidelines and promoting quality among the profession. As SNMMI continues its impactful work, we will make sure that the organization and its members are recognized for their contributions to the field.

SNMMI is a unique organization that brings together diverse nuclear medicine and molecular imaging professionals—physicians, scientists, pharmacists, technologists, and lab professionals. It is my pleasure to work on behalf of each of the SNMMI members to improve our field. I look forward to collaborating with the society’s dedicated leadership, volunteers, and staff over the next year in our mission to improve patient care.



Munir Ghesani, MD

## Biogen Reassesses Plans for Aduhelm in AD

In a series of press releases and statements in late April and early May, Biogen Inc. (Cambridge, MA), the maker of the Alzheimer disease–targeted treatment Aduhelm (aducanumab), announced new plans following a series of approval setbacks. The drug, a monoclonal antibody directed against  $\beta$ -amyloid, had been given conditional U.S. Food and Drug Administration (FDA) approval on June 7, 2021. Subsequent controversy over the initial proposed cost of the drug (\$56,000/y, later reduced to \$28,000/y) data on effectiveness, and potential side effects was the focus of both public and professional medical commentary. On January 11 the U.S. Centers for Medicare & Medicaid Services (CMS) released a proposed National Coverage Determination (NCD) decision memorandum that would allow only coverage with evidence development (CED), effectively restricting Medicare reimbursement to individuals enrolled in qualifying clinical trials. On April 7, the proposed NCD was finalized.

Biogen informed its investors on April 22 that it had notified the European Medicines Agency (EMA) of a decision to withdraw its Marketing Authorization Application (MAA) for aducanumab for treatment of the early stages of Alzheimer disease. The company withdrew its application following interactions with the EMA Committee for Medicinal Products for Human Use (CHMP) in which the committee indicated that data provided thus far would not be sufficient to support a positive opinion on EMA marketing authorization. Biogen's MAA had been under review by the CHMP in response to the company's request for a reexamination of the negative opinion issued in December 2021.

On April 28, Biogen announced that despite rollbacks of its U.S. and international marketing infrastructure for Aduhelm, all U.S. patients who began treatment on or before April 7, 2022,

would be eligible to receive the drug at no cost for the duration of their treatments or for the duration of the program. In addition, patients who were already enrolled in Biogen's Free Drug Program would automatically continue in the program and continue to receive the medicine at no cost. Biogen's program does not cover diagnostics or other potential fees associated with treatment administration and monitoring. "One of our immediate priorities following the NCD decision is to support patients on therapy who were uncertain whether they could receive their next infusion," said Alisha Alaimo, president of Biogen's U.S. Organization. "This program allows eligible patients continued access to Aduhelm and aims to help them avoid long-term interruptions in their care."

Biogen issued a follow-up to its quarterly statement on May 3 indicating that it would be "substantially eliminating commercial infrastructure" related to Aduhelm and was planning additional associated cost-cutting measures. The statement noted that U.S. Biogen expected to continue funding certain regulatory and research and development activities for Aduhelm, including continuation of the EMBARK redosing study and initiation of the phase 4 postmarketing requirement study, ENVISION. Biogen stated that "additional actions regarding Aduhelm may be informed by upcoming data readouts expected for this class of antibodies, as well as further engagement with the FDA and CMS." The company also announced that its chief executive, Michel Vounatsos, would step down when a replacement could be identified.

*Biogen Inc.*

## Underrepresentation in FDA CAR-T Cell Approval Studies

In an article published on April 20 in *JAMA Network OPEN* (2022;5[4]:e228161), Al Hadidi et al. from the University of Arkansas for Medical

Sciences (Little Rock) reported on a study looking at enrollment of Black participants in clinical trials resulting in subsequent U.S. Food and Drug Administration (FDA) approval of chimeric antigen receptor–T (CAR-T) cell therapies for hematologic malignant neoplasms. Publicly available data from 2017 to 2021 included patients with large B-cell lymphoma, follicular lymphoma, mantle cell lymphoma, acute lymphoblastic leukemia, and multiple myeloma enrolled in 7 clinical trials investigating several CAR-T products. Of the 1,057 patients enrolled in these studies, CAR-T products were administered to 746 (71%), and efficacy was reported for 729 (69%), with 96% of patients enrolled in the United States. Overall, the percentage of Black participants who received CAR-T products and had reported efficacy data varied between 2% and 5% (range, 1–12 participants). Black patients were significantly underrepresented in comparison to actual disease prevalence across all hematologic malignancies. Adjusted prevalence calculations showed the lowest participation-to-prevalence ratio of 0.2 for multiple myeloma and 0.6 for large B-cell lymphoma. The authors concluded that these findings suggest substantial disparities affecting Black patients across all approved CAR-T products used to treat hematologic malignant neoplasms, despite otherwise limited effective treatment options. They added that these findings "might aid policy discussions regarding the immediate need of regulations that enforce certain thresholds of Black patients' enrollment before granting FDA approval."

*JAMA Network OPEN*

## Contrast Media Shortage

The GE Healthcare (Boston, MA) production facility in Shiangai, China, that manufactures almost the entire U.S. supply of the Omnipaque (iohexol) contrast agent product lines was shut down in April as a result of Chinese

government restrictions related to COVID-19. Visipaque (iodixanol) was also in short supply. According to GE Healthcare, the supply impact was not related to quality, raw material supply, or supply chain issues. GE Healthcare announced that they would use a secondary manufacturing facility in Ireland to supplement U.S. Omnipaque supply. The supply interruption had an almost immediate effect on scheduling and performance of contrast-enhanced imaging in the United States, with significant related media coverage. In a May 18 letter to customers, GE referred to the situation as “fluid,” as the company worked to expand production capacity and collaborate with local Shanghai authorities to “enable increasing numbers of operators to return to the site, complying with local COVID-19 protocols.” To enable availability and continuity, GE was “balancing supply of available product globally” and, in some markets, introducing measures “to reduce order quantities but with a higher frequency of delivery, as well as optimizing production to focus on 3 main product variations.” Production output from Shanghai was expected to continue to increase and return to full production capacity “as soon as local authorities allow.” On May 23 GE released an update, indicating that the plant had increased production output from 0% of capacity when first closed to 60% capacity by May 21. Production was expected to be at 75% capacity by mid-June. Deliveries were being accelerated by changing some logistic routes from sea to air.

SNMMI addressed the shortage in mid-May, expressing hope that the supply issue would be resolved quickly but reminding practitioners that radiopharmaceuticals remain available and are an excellent alternative for some diagnostic procedures. For example, V/Q lung scanning can be considered as an alternative to cardiac CT angiography (CTA) of pulmonary arteries, and stress cardiac nuclear studies (PET or SPECT) may serve as alternatives in some patients scheduled for cardiac CTA.

The American College of Radiology Committee on Drugs and Contrast

Media has issued guidance on the contrast agent shortage and suggested strategies to conserve contrast media, including delaying elective procedures. A special report from the Radiological Society of North America suggested short-term strategies, including establishing an incident command center to direct and monitor contrast media usage, converting exams to noncontrast when possible, reducing contrast dose, and substituting other types of exams, such as MRI, ultrasound, or noncontrast PET/CT. As of June 1, the GE contrast media remained on the “backorder” FDA Shortage List.

*GE Healthcare  
SNMMI*

**Status of Lutathera and Pluvicto Production and Supply**

On May 5, Novartis (Basel, Switzerland) announced suspension of production of its agents Lutathera (<sup>177</sup>Lu-dotatate; <sup>177</sup>Lu-oxodotretotide) and Pluvicto (<sup>177</sup>Lu-PSMA-617; <sup>177</sup>Lu-vipivotide tetraxetan) at radioligand therapy production sites in Ivrea, Italy, and Milburn, NY, affecting both commercial and clinical trial supplies. The company stated that this voluntary shutdown was taken “out of an abundance of caution” as it addresses “potential quality issues identified in its manufacturing processes” and projected that these issues would be resolved within 6 wk, with production gradually resuming thereafter.

Novartis suspended delivery of Lutathera in the United States and Canada and of Pluvicto in the United States (the only approved market for Pluvicto). The statement indicated that some doses of Lutathera would be available in Europe and Asia from a Novartis production site in Zaragoza, Spain, although with potential supply delays. In addition, Novartis put a temporary hold on screening and enrollment for <sup>177</sup>Lu-PSMA-617 clinical trials globally and Lutathera clinical trials in the United States and Canada. Although the company reported “no indication of any risk to patients from doses previously produced,” treatment sites were notified

“to closely monitor” patients who had recently been injected and report any adverse events to Novartis patient safety. “Novartis takes this very seriously and the company is doing everything it can to resolve this issue and resume patient doses as quickly as possible,” said Novartis. “Health authorities have been informed and will receive additional updates as they are available.”

Only 6 wk before, on March 23, FDA announced approval of Pluvicto for treatment of adult patients with prostate-specific membrane antigen-positive metastatic cancer who have been treated with androgen-receptor pathway inhibition and taxane-based chemotherapy. Lutathera, the first radiopharmaceutical marketed for peptide-receptor radionuclide therapy, was approved by the European Medicines Agency in 2017 and the FDA in 2018 for treatment of somatostatin receptor-positive gastroenteropancreatic neuroendocrine tumors. As of June 1, the FDA Drug Shortage list included Lutathera as “Currently unavailable; Estimated remaining duration of Supply Shortage: 3–4 wk” because of issues “related to complying with Good Manufacturing Practices.” Pluvicto did not appear on the list.

*Novartis  
U.S. Food and Drug Administration*

**FDA Permits Marketing of AD Diagnostic Test**

The U.S. Food and Drug Administration (FDA) announced on May 4 marketing permission for the first in vitro diagnostic test for early detection of amyloid plaques associated with Alzheimer disease (AD). The Lumipulse G β-Amyloid Ratio (1-42/1-40) test (Fujirebio Diagnostics, Inc.; Malvern, PA) is intended for use in adult patients ≥55 y presenting with cognitive impairment and being evaluated for AD and other causes of cognitive decline.

The FDA evaluated the safety and effectiveness of the Lumipulse test in a clinical study of 292 cerebrospinal fluid samples from the AD Neuroimaging Initiative sample bank. The samples were tested and compared with amyloid

PET imaging results. In this clinical study, 97% of individuals with Lumipulse G  $\beta$ -amyloid Ratio (1-42/1-40)-positive results had amyloid-positive PET findings, and 84% with negative test results had negative PET findings. The FDA noted that the Lumipulse G  $\beta$ -amyloid Ratio (1-42/1-40) is not a standalone test and that other clinical evaluations or additional tests should be used for determining treatment options.

The Lumipulse G  $\beta$ -amyloid Ratio (1-42/1-40) was granted Breakthrough Device designation, a process designed to expedite the development and review of devices that may provide for more effective treatment or diagnosis of life-threatening or irreversibly debilitating diseases or conditions.

*U.S. Food and Drug Administration*

### Hearing on FIND Act Requested

On April 28, SNMMI and more than 70 organizations sent a letter to U.S. House Energy and Commerce and Ways and Means Committee leadership

requesting a hearing on the Facilitating Innovative Nuclear Diagnostics (FIND) Act. In July 2021, Reps. Scott Peters (CA), Bobby Rush (IL), Greg Murphy (NC), and Neal Dunn (FL) introduced the FIND Act (H.R. 4479), legislation that would significantly expand patient access to advanced nuclear diagnostic imaging technologies. The bill aims for a legislative fix to Centers for Medicare and Medicaid Services bundling of diagnostic radiopharmaceuticals in the hospital outpatient space after a 3-y passthrough period after U.S. Food and Drug Administration (FDA) approval. SNMMI and its coalition partners, the Medical Imaging & Technology Alliance and the Council on Radionuclides and Radiopharmaceuticals—in addition to dozens of patient advocacy organizations—praised the introduction.

The FIND Act addresses structural issues in the packaging methodology used in the Medicare outpatient hospital setting by directing the Department of Health and Human Services to pay

separately for all diagnostic radiopharmaceuticals with a cost threshold per day of \$500. If passed, this bill would give patients greater access to a wide range of diagnostic radiopharmaceuticals. This legislation would also help providers better manage costs while delivering more targeted and cost-efficient care. If passed, patients would not be responsible for the 20% drug copayment. The bill is also budget neutral. “This policy will safeguard Medicare beneficiary access to the most appropriate diagnostic radiopharmaceuticals and help spur continued innovations in nuclear imaging studies,” wrote the letter’s signatories. “To help advance this legislation, we again respectfully ask that your committees hold a hearing to consider the FIND Act and explore the potential of this policy to expand beneficiary access to care, improve health outcomes, create health care savings, and promote innovation and development in this space.”

*SNMMI*

## FROM THE LITERATURE

*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. These briefs are offered as a window on the broad arena of medical and scientific endeavor in which nuclear medicine now plays an essential role. The lines between diagnosis and therapy are sometimes blurred, as radio-labels are increasingly used as adjuncts to therapy and/or as active agents in therapeutic regimens, and these shifting lines are reflected in the briefs presented here. We have also added a small section on noteworthy reviews of the literature.*

### Preoperative PET and Long-Term Survival in Breast Cancer

Perrin et al. from CHU de Martiniq (Fort-de-France), Universitair Ziekenhuis Brussel (Belgium), Howard

University (Washington, DC), and Hackensack University Medical Center (NJ) reported on April 24 in the *World Journal of Clinical Oncology* (2022; 13[4]:287–302) on a study evaluating the predictive value of preoperative  $^{18}\text{F}$ -FDG PET for overall long-term survival in patients with breast cancer. In this retrospective study, 104 patients’ preoperative PET images were defined as positive or negative based on anatomic region-of-interest (ROI) findings for breast, axillary, sternal, and distant sites.  $\text{SUV}_{\text{max}}$  results in these ROIs were analyzed in the data from 36 of these patients. The follow-up period for the study was 15 y. PET positivity in axillary, sternal, and combined axillary/sternal nodes was predictive of poor overall survival. PET-positive axillary and combined axillary/sternal status were also predictive of poor disease-free survival. On additional analysis,  $\text{SUV}_{\text{max}}$  results for ipsilateral breast and axilla were significant covariate

predictors of long-term overall survival, with relative increases in risk of death of 25% and 54%, respectively, per  $\text{SUV}_{\text{max}}$  unit. The ratio of the ipsilateral axillary  $\text{SUV}_{\text{max}}$  to that of the contralateral axillary was the most significant predictor of overall survival, suggesting a 2-fold relative increase in mortality risk. The authors concluded that “preoperative PET is valuable for prediction of long-term survival” in patients with breast cancer, adding that “ipsilateral axillary  $\text{SUV}_{\text{max}}$  ratio over the uninvolved side represents a new prognostic finding that warrants further investigation.”

*World Journal of Clinical Oncology*

### Predictive Value of SPECT/CT in Neck Pain Treatment

In an article published on May 7 ahead of print in the *Spine Journal*, Nolan et al. from the University of Vermont Medical Center/Robert Lamer,

MD, College of Medicine (Burlington) reported on a study evaluating the utility of SPECT/CT in patients with axial neck pain for identifying specific facet joints that would benefit from steroid injections and/or medial branch block/radiofrequency ablation treatments. The retrospective study included data from 112 patients with neck pain who had undergone SPECT/CT and had no prior related treatment. All patients were treated with facet intervention by injection with steroid and local anesthetic or medial branch block with local anesthetic at sites determined by physicians based on clinical examination and image interpretation. Positive responses to the interventions were defined at both 50% and 80% thresholds for reduction in pain within 24 h and correlated with the focus of maximal uptake on SPECT/CT. Increased uptake was seen at the level of intervention in 89 patients. In the remaining 23, no uptake was seen at the level of intervention. Analysis of these results showed that intervention at a level concordant with SPECT/CT was significantly correlated with self-reported pain relief thresholds at 24 h. The authors concluded that facet interventions based on uptake on SPECT/CT were more successful in pain reduction than those that were not, suggesting “a role for SPECT/CT in diagnosing therapeutic targets for neck pain.”

*Spine Journal*

### **<sup>125</sup>I-BMIPP SPECT/CT vs PET/CT for BAT Imaging**

Frankl et al. from the University of Texas Southwestern Medical Center (Dallas), McGovern Medical School/University of Texas Health Science Center at Houston, Central Taiwan University of Science and Technology (Taichung City), and Texas Tech Health Sciences Center (El Paso) reported on April 28 in the *International Journal of Molecular Sciences* (2022; 23[9]:4880) on a preclinical study comparing <sup>125</sup>I-β-methyl-*p*-iodophenylpentadecanoic acid (<sup>125</sup>I-BMIPP; a fatty acid analog) SPECT/CT and <sup>18</sup>F-FDG PET/CT in noninvasive evaluation of

metabolically active adipose tissue, including brown adipose tissue (BAT). Mice treated with either a BAT-stimulating drug or saline vehicle control were imaged with both <sup>125</sup>I-BMIPP SPECT/CT and <sup>18</sup>F-FDG PET/CT, and tracer uptake was assessed in interscapular BAT, inguinal white adipose tissue, and gonadal white adipose tissue. Uptake of both tracers increased in BAT and inguinal white adipose tissue after the BAT-stimulating drug, with SUV<sub>means</sub> correlating closely with the adipose tissue deposits. However, <sup>125</sup>I-BMIPP uptake in BAT and inguinal white adipose tissue more closely correlated with fold changes in metabolic rate as measured by an extracellular flux analyzer. The authors concluded that “imaging BAT with the radioiodinated fatty acid analogue BMIPP yields more physiologically relevant data than <sup>18</sup>F-FDG-PET/CT” and that its routine use “may be a pivotal tool for evaluating BAT in both mice and humans.”

*International Journal of Molecular Sciences*

### **PET/CT and Disease Extent in Kaposi Sarcoma**

Pesqué et al. from Saint Louis University Hospital/Assistance-Publique Hôpitaux de Paris, Université de Paris Cité, and Cochin University Hospital (all in Paris, France) reported on April 27 in *Cancers (Basel)* (2022;14[9]: 2189) on a study exploring the diagnostic accuracy of <sup>18</sup>F-FDG PET/CT in defining the extent of disease in patients with Kaposi sarcoma. The study included 75 patients who underwent PET/CT, for which the diagnostic accuracy for cutaneous and extracutaneous Kaposi sarcoma staging was assessed on a per lesion basis. These results were compared with conventional staging from clinical examination, standard imaging, endoscopy, and histologic analyses, as well as follow-up data. The sensitivity and specificity of PET/CT for overall detection of lesions were 71% and 98%, respectively (with corresponding percentages of 100% and 85% for lymph nodes, 87% and 98% for bone, 87% and 100% for lungs, and 100% and 100% for

muscle involvement). Sensitivity was only 17% in detecting digestive involvement. The sensitivity for diagnosing cutaneous involvement was increased from 73% to 88% when whole-body PET/CT was used. The authors concluded that these data suggest that <sup>18</sup>F-FDG could be used for staging patients with active Kaposi sarcoma.

*Cancers (Basel)*

### **Postradiation PET in Cervical Cancer Management**

In an article published on May 7 ahead of print in *Gynecologic Oncology*, Mckinnish et al. from Washington University School of Medicine in St. Louis (MO), CoxHealth (Springfield, MO), and Dartmouth Hitchcock Medical Center (Lebanon, NH) detailed the effects of postradiation <sup>18</sup>F-FDG PET in management and outcomes in cervical cancer patients. The study included 81 women who showed a partial metabolic response on initial postradiation PET imaging. Thirty of these patients underwent cervical biopsy, of whom 14 (47%) had persistent cancer, with 9 undergoing treatment (surgery, 3; chemotherapy alone, 5; and chemotherapy and radiation; 1). Progression-free and overall survival were similar regardless of treatment type and with or without treatment. A second surveillance PET examination showed a positive-predictive value of 91% and negative-predictive value of 75% for progression and identified the 19% of patients with persistent extracervical disease. The results of cervical biopsy produced a higher positive-predictive value (100%) and lower negative-predictive value (62.5%) for progression. At the end of the study period, 46 (57%) patients had died, including all 8 with paraaortic or supraclavicular involvement. The authors concluded that if partial metabolic response is identified on 3-mo <sup>18</sup>F-FDG PET after completion of radiation for cervical cancer, “repeat FDG PET and/or biopsy are indicated to detect persistence and assist in counseling” and that “partial metabolic response predicts poor outcomes, particularly for those

with positive cervical biopsies and lymphatic involvement.”

*Gynecologic Oncology*

### **<sup>68</sup>Ga-PSMA PET and Locally Ablative RT in Prostate Cancer**

Hölscher et al. from the University Hospital Carl Gustav Carus/Technische Universität Dresden, National Center for Tumor Diseases (NCT) (Dresden), German Cancer Research Center (DKFZ) (Heidelberg), Klinikum Chemnitz GmbH/Medizin-campus Chemnitz der TU Dresden (Chemnitz), University Hospital Tübingen, RKH-Kliniken Ludwigsburg/Academic Hospital of University Heidelberg (Ludwigsburg), and the Helmholtz-Zentrum Dresden-Rossendorf/Institute of Radiooncology-OncoRay (Dresden, all in Germany) reported on April 21 in *Cancers (Basel)* (2022;14[9]:2073) on the results of a prospective clinical trial to evaluate local control and patterns of tumor progression in patients receiving <sup>68</sup>Ga-prostate-specific membrane antigen (<sup>68</sup>Ga-PSMA) PET-staged metastasis-directed local ablative radiation treatment (RT) for recurrent oligometastatic prostate cancer. The study included 63 patients who received ablative RT for 89 metastases (68 lymph node, 21 bony) with either 50 Gy in 2-Gy fractions (34 metastases) or 30 Gy in 10-Gy fractions (55 metastases). Mean gross tumor and planning target volumes were 2.2 and 14.9 mL, respectively. Over a median follow-up of 40.7 mo, local progression was identified in 7 metastases, for a 3-y local control rate of 93.5%. Local progression was not associated with treatment schedule, target volumes, or lesion types. Regional progression near lymph node metastases was observed in 19 of 47 patients with at least 1 lymph node metastasis, and distant progression was seen in 33 patients (52%). The overall median time to first tumor-related clinical event was 16.6 mo, with 22.2% of participants experiencing no tumor-related clinical event at 3 y after RT ablation. Fourteen patients (22%) underwent repeat RT ablation. The authors concluded that “local ablative RT in patients with PSMA PET–

staged oligometastatic prostate cancer may achieve local control, but regional or distant progression is common,” adding that additional studies are needed to define optimal target volumes in this setting.

*Cancers (Basel)*

### **Experience with Lenvatinib for Advanced Thyroid Cancer**

Hamidi et al. from the Centre Hospitalier de l'Université de Montréal (Canada) reported on March 23 ahead of print in the *Journal of the Endocrine Society* on their institution's experience with lenvatinib in treatment of advanced radioiodine-refractory differentiated thyroid carcinomas, with a focus on adverse events of the type reported in clinical trials. The study included 27 patients, whose records were reviewed retrospectively. Twenty-four of the patient records included evaluation of tumor response during treatment. Their overall response rate was 37.0%, and the disease control rate was 85.2%. For all patients, median progression-free survival was 12 mo. Adverse events noted were hypertension (77.8%), fatigue (55.6%), and weight loss (51.9%). Twenty-five patients (92.6%) experienced at least 1 grade  $\geq 3$  adverse event, with 59.3% experiencing hypertension. Lenvatinib administration was discontinued because of adverse events in 13 patients (48.1%). One patient experienced a grade 4 posterior reversible encephalopathy syndrome, and 1 patient developed a Takotsubo cardiomyopathy. These findings, as well as survival statistics, were similar to those from clinical trials of lenvatinib. The authors concluded that “rigorous blood pressure control is essential to avoid discontinuing therapy” in this setting.

*Journal of the Endocrine Society*

### **Reducing Motion-Related Inaccuracies in <sup>99m</sup>Tc-MAA SPECT/CT SIRT Planning**

In an article published on May 5 in *Physica Medica* (2002;98:98–112) Santoro et al. from the IRCCS Azienda Ospedaliero-Universitaria di Bologna

(Italy) reported on development of a data-driven solution to correct for respiratory motion in <sup>99m</sup>Tc-macroaggregated albumin (<sup>99m</sup>Tc-MAA) SPECT/CT pretreatment planning for <sup>90</sup>Y selective internal radiation therapy (SIRT) in primary and secondary hepatic lesions. The resulting tool realigns the functional centers of SPECT projection images and shifts them to derive a close registration with attenuation maps. The authors describe validation of the technique using a modified dynamic phantom with varied breathing patterns. The tool was applied and analyzed in 12 patients undergoing SIRT. Significant improvements over conventional techniques were noted. The authors concluded that “the proposed tool allowed the correction of <sup>99m</sup>Tc-MAA SPECT/CT images, improving the accuracy of the absorbed dose distribution.”

*Physica Medica*

### **Additional Value of SPECT in CCTA**

Javaid et al. from the University of Nevada Las Vegas School of Medicine, the Houston Methodist DeBakey Heart and Vascular Center (Texas), and Texas A&M College of Medicine (Bryan) reported on April 15 ahead of print in the *International Journal of Cardiology* on an exploration of the incremental prognostic role of SPECT physiologic assessment to coronary computed tomographic angiography (CCTA) in patients with suspected coronary artery disease. The study included 956 patients (mean age, 61.1  $\pm$  14.2 y; 54% men, 46% women; 89% with hypertension, 81% with diabetes, and 84% with dyslipidemia) with suspected coronary artery disease who underwent clinically indicated CCTA within 180 d of SPECT imaging. Patients were followed for major adverse cardiovascular events (all-cause death, nonfatal myocardial infarction, and percutaneous coronary intervention or coronary artery bypass grafting within 90 d after imaging). Obstructive stenosis was identified in 14% of patients, scar (fixed perfusion defect) in 17%, ischemia in 14%, and left ventricular ejection fraction <40% in 9%. Additional analyses

showed that perfusion and left ventricular function when added to a model with CCTA obstructive stenosis significantly improved risk prediction and risk reclassification on a continuous scale. The authors concluded that these data indicated that “a combined assessment of perfusion burden and left ventricular function added incremental value over and above a CCTA-based anatomic assessment in patients with suspected coronary artery disease.”

*International Journal of Cardiology*

### Optimal Radioiodine Treatment in Hyperthyroidism

In an article published on April 25 in *Thyroid Research* (2022;15[1]:8) Nilsson et al. from the Karolinska Institutet/Karolinska University Hospital (Stockholm, Sweden) reported on a study addressing appropriate activity dosages and pretherapeutic measurements required for optimal radioiodine treatment of hyperthyroidism. The retrospective study included outcomes and treatment parameters for 904 patients treated for Graves disease (prescribed absorbed dose, 120 Gy), toxic multinodular goiter (200 Gy), or solitary toxic adenoma (300 Gy) from 2016 to 2020 at a single institution. Cure rates for hyperthyroidism after a single radioiodine administration were 79% for Graves disease, 94% for toxic multinodular goiter, and 98% for solitary toxic adenoma. Thyroid mass, uptake, and effective half-life were significantly associated with cure in Graves disease but not in toxic multinodular goiter. Therapy-induced hypothyroidism occurred in 20% and 29% of patients with toxic multinodular goiter and solitary toxic adenoma, respectively. In patients with toxic nodular goiters who received individualized effective half-

life assessments, cure rates and hypothyroidism rates were not improved over patients who did not have such assessments. Poor renal function was found to be associated with what the authors termed “dubious” iodine uptake measurements but did not correlate with worse outcomes. The authors concluded that “multiple measurements of individual iodine uptake for kinetics estimation may be unnecessary” in treatment of hyperthyroidism and that a population-based value may be used instead. Patients with renal impairment were found to have outcomes similar to those of other patients, despite a higher incidence of confounding uptake measurements.

*Thyroid Research*

### Reviews

Review articles provide an important way to stay up to date on the latest topics and approaches through valuable summaries of pertinent literature. The Newsline editor recommends several general reviews accessioned into the PubMed database in April and May. Borgheresi, from the University Politecnica delle Marche (Ancona, Italy), and colleagues from a consortium of research entities in Italy published “Lymph nodes evaluation in rectal cancer: Where do we stand and future perspective” on May 5 in the *Journal of Clinical Medicine* (2022;11[9]:2599). In an article published on April 28 ahead of print in *The Oncologist*, Wirth, from Harvard Medical School/Massachusetts General Hospital (Boston), and researchers from Sapienza University of Rome (Italy), Alfred Health/Monash University (Melbourne, Australia), the University of Western Ontario (London, Canada), Rabin Medical Center/Beilinson Hospital, Tel Aviv University (Israel), Kanagawa Cancer Center (Japan), University Hospital Marburg (Germany), Univer-

sity of Pisa (Italy), Gustave-Roussy Institut (Villejuif, France), the University of Paris-Saclay (Gif-sur-Yvette, France), and the National Cancer Center Hospital East (Kashiwa, Japan) reviewed “Lenvatinib for the treatment of radioiodine-refractory differentiated thyroid cancer: Treatment optimization for maximum clinical benefit.” Huan, from the First Affiliated Hospital of Dalian Medical University (China), and researchers from the Second Affiliated Hospital of Guangzhou University of Chinese Medicine (China), the University of West London (UK), Hainan General Hospital (Haikou, China), and Rutgers University (New Brunswick, NJ) published “Brain imaging changes in patients recovered from COVID-19: A narrative review” on April 22 in *Frontiers in Neuroscience* (2022;16:855868). “New advanced imaging parameters and biomarkers: A step forward in the diagnosis and prognosis of TTR cardiomyopathy” were summarized by Rimbas and colleagues from the University and Emergency Hospital and the University of Medicine and Pharmacy Carol Davila (both in Bucharest, Romania) on April 22 in the *Journal of Clinical Medicine* (2022; 11[9]:2360). Kaliszewski et al. from Wroclaw Medical University (Poland) reported in the April 17 issue of *Cancers (Basel)* (2022;14[8]:2028) on “Advances in the diagnosis and therapeutic management of gastroenteropancreatic neuroendocrine neoplasms.” In an article published on April 22 in *Endocrine-Related Cancer* (2022;29[5]:R57–R66), Karapanou et al. from the General Military Hospital of Athens, Alexandra Hospital/Athens University School of Medicine, and Evangelismos Athens General Hospital (all in Greece) reported on “Advanced RAI-refractory thyroid cancer: An update on treatment perspectives.”