Training Future Nuclear Medicine Physicians

Satoshi Minoshima, MD, PhD, SNMMI President

The future of nuclear medicine and molecular imaging hinges in large part on the education and training of the next generation of practitioners. Our field is moving forward quickly, with new technologies—such as theranostics and novel tracers—being incorporated into our practice. More and more, our physicians and scientists must broaden their knowledge and skills with crossover training in other fields, such as oncology.

To meet future needs, we must make changes now in our training programs. At a special session during the SNMMI Annual Meeting in Philadelphia, PA, SNMMI brought together 5 experts to present diverse perspectives on ways to advance our education efforts for future nuclear medicine/molecular imaging physicians (CE13: Training Future Nuclear Medicine Physicians—Strategy; Saturday, June 23; available at the online Virtual Meeting). The experts were Richard L. Wahl, MD; M. Elizabeth Oates, MD; Don Yoo, MD; Andrew Scott, MD; and George Segall, MD.

Many junior and senior SNMMI members attended, and the discussion focused on training requirements for the future and challenges in current and past U.S. and international training pathways. Dr. Scott, president of the World Federation of Nuclear Medicine and Biology, pointed out that the United States has lower training time requirements than other countries. The International Atomic Energy Agency has established new guidelines that set the benchmark for minimum training requirements. Of course, demonstrated competency, not only hours of training, is essential. All the presenters emphasized the need for nuclear medicine/molecular imaging practitioners to have more training in other specialties, with opportunities for more than 1 fellowship and more electives, as well as more rotations as trainees. The value of fellowship training in another country was also recognized.

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The job market for radiologists with nuclear medicine training is actually quite strong, showing the need for more depth of knowledge. Dr. Oates has been spearheading efforts through the American Board of Radiology (ABR) to open up more opportunities for radiology-based trainees to be specialized by making nuclear medicine/molecular imaging training more flexible. This effort is resulting in more radiology trainees moving into nuclear medicine/molecular imaging training pathways nationally. For a sustainable and versatile workforce with broad skills and expertise, she envisions integrated residency training pathways combining diagnostic radiology, nuclear radiology, nuclear medicine, and molecular imaging. Multimodal opportunities are also attractive to trainees.

Dr. Yoo noted that institutions are looking for well-rounded imaging professionals who are not only proficient in nuclear medicine. He used the example of 5-year diagnostic radiology/nuclear medicine programs as an innovative approach. He also highlighted the ABR 16-month pathway that was redesigned in 2017, which accommodates any diagnostic radiology program and has the option of another fellowship in a fifth year.

Dr. Wahl asked, "Where will science and innovation come from, and who will coordinate patient care?" He emphasized, "We need to train people to be critical thinkers—to continue to innovate on the diagnostic and therapeutic side." In addition, he pointed out the need for understanding advances in other fields and advocated for a longer training pathway with additional research and training time that allows for combined training, for example in oncology, nuclear radiology, and nuclear medicine.

Dr. Segall, executive director of the American Board of Nuclear Medicine (ABNM), said that the board supports having as many training pathways as possible. Recognizing the importance of research, the board also has a new research pathway that combines training in research with training in clinical internal medicine and its subspecialties. In addition, a new ABNM subspecialty in molecular imaging and therapy is under consideration. With the growth of theranostics, the

Attendees at a special session on training the next generation of nuclear medicine physicians, held on June 23 at the SNMMI Annual Meeting.

nature of nuclear medicine/molecular imaging practice is changing, requiring new knowledge and more interaction with patients.

Although we face challenges ahead, including economic factors, all the speakers are extremely passionate about growing the field and optimistic that, working together, we can enhance our education and training for future nuclear medicine physicians in the United States and around the world. Through our Value Initiative, we will continue to strengthen our pipeline and outreach to medical students and residents, demonstrating the value and exciting opportunities in our field. A diverse, broadly trained new generation of nuclear medicine physicians, scientists, and academics is essential to ongoing innovation and advancements that will improve patients' lives.

NEWSBRIEFS

Srivastava Receives ACS Seaborg Award

Brookhaven National Laboratory (BNL; Upton, NY), released on July 23 an article about Suresh Srivastava, PhD, senior medical scientist emeritus in the Collider-Accelerator Department and Medical Isotope Research & Production Program at BNL, who earlier in the year was awarded the American Chemical Society (ACS) Glenn T. Seaborg Award for Nuclear Chemistry. Presented by the ACS Division of Nuclear Chemistry and Technology, the Seaborg Award recognizes and encourages research in nuclear and radiochemistry or their applications. Srivastava was honored for his "outstanding accomplishments in the production and development of many radioisotopes and radiopharmaceuticals that have and continue to provide medical benefit to patients worldwide." The award was presented at the ACS 255th national meeting.

"Conceiving, developing, and promoting radioisotopes to diagnose disease and treat patients helped create new ways to fight disease and help humanity," said Srivastava in the BNL release. "It feels very good to receive this Seaborg Award. I am grateful for all the support and encouragement I have received from managers, coworkers, colleagues, family, and friends over the years. And I am not done yet." In the photo, Seaborg (left) and Srivastava posed with the first ^{99m}Tc generator at a history session at the 1996 SNM meeting.

The BNL profile focused on Srivastava's achievements in advancing theranostic radioisotope applications and on his long history (almost half a century) with the laboratory, citing, among other innovations, his development of chemistry for "shake and bake" radiopharmaceutical kits. These kits made clinically feasible many of the ^{99m}Tc procedures used around the world today. "More than 40 million nuclear medicine procedures are done each year. ^{99m}Tc—which was developed at BNL and is used to diagnose heart disease and other ailments—accounts for about 80% of those procedures, according to the World Nuclear Association," Srivastava said. "Looking back, it makes me feel so good that I had the opportunity to do this research, to help treat people who are sick and help save their lives."

Scientists from BNL who have also received the Seaborg Award include National Medal of Science awardee Joanna Fowler, PhD; Nobel Laureate Raymond Davis, PhD; Gerhart Friedlander, PhD; Richard Hahn, PhD; and Alfred Wolf, PhD, whose discoveries were instrumental in developing PET.

Brookhaven National Laboratory

FDA Approves Magnetic Device System for SLN Biopsy

The U.S. Food and Drug Administration (FDA) on July 24 approved a magnetic device system for guiding lymph node biopsies in patients with breast cancer undergoing mastectomy. The Magtrace and Sentimag Magnetic Localization System (Sentimag System; Endomagnetics, Inc., Austin, TX) uses magnetic detection during sentinel lymph node (SLN) biopsy procedures to identify specific nodes for surgical removal. "SLN biopsies are crucial for determining whether a patient's breast cancer has spread and helping the provider determine the most appropriate course of treatment," said Binita Ashar, MD, director of the Division of Surgical Devices in the FDA's Center for Devices and Radiological Health. "Currently, an SLN biopsy is performed after injection of radioactive materials and/or blue dye. This magnetic system we're approving today will offer patients undergoing mastectomy an option for their SLN biopsy procedure that does not require the injection of radioactive materials."

The Sentimag System uses magnetic materials to guide the SLN biopsy procedure. The system includes a magnetic sensing probe and base unit designed to detect small amounts of Magtrace, the tracer drug that is injected into breast tissue. The Magtrace particles travel to