Multiple Efforts Focus on Domestic Radioisotope Production

In response to concerns about the reliability and continuity of medical isotope supplies after a series of unexpected international reactor shutdowns and production delays, 3 separate groups in January announced planned initiatives to develop new production facilities within the United States.

MURR ^{99}Mo Plans Detailed

On January 9, representatives of the Missouri University Research Reactor (MURR; Columbia) released a statement of intentions to become "the first domestic producer of ^{99}Mo," which is used in 70%−80% of nuclear medicine procedures and is an essential part of the ^{99m}Tc production chain. "We're shooting for supplying half of the U.S. need," said David Robertson, PhD, associate director of research and education at MURR. The proposal would create a new facility to process the material and also create jobs.

MURR staff successfully completed its first demonstration to create the radioisotope in October 2008. "These are test runs for us to help understand what it would take to scale up to be a real producer," Robertson said. A MURR press release cited the dependence of the United States on foreign reactors for supplies of ^{99}Mo and the unexpected closings and shutdowns of reactors in 2007 and 2008 as motivators in pursuing domestic production "We've already experienced 2 shortages of ^{99}Mo in this country in the last 2 y, and when that happens there are people who aren't able to get their nuclear medicines scans as planned," Robertson said. "What's been going on is they [physicians] have been prioritizing who gets the scans."

MURR plans to build a processing center to handle the new production. The center was originally budgeted at $40 million, but officials are now working with staff from a reactor in Argentina to fine-tune that estimate. The proposal is still in the earliest stages, and construction and production processes must be approved by the Nuclear Regulatory Commission (NRC). MURR is also actively seeking partners, such as pharmaceutical companies, to work with the reactor in creating ^{99}Mo. Such a partnership would likely be helpful in securing timely NRC and U.S. Food and Drug Administration approval. "I think the good news is that a number of organizations, both private and public, are talking to us and are excited about the possibility of using MURR," Robertson said.

The ^{99}Mo production effort could prove lucrative for the reactor and its programs. At the same time, the processing of uranium in ^{99}Mo production would facilitate the production of research radioisotopes. "It's not just an income-generating project," Robertson said. "It would generate income, but it would also open the door for us to do other research."

AMIC Pursues Compact-Systems Technology

Advanced Medical Isotope Corporation (AMIC; Kennewick, WA), a company already engaged in the production and distribution of medical isotopes, announced on January 22 that it will partner with the U.S Department of Energy (DOE) through the Pacific Northwest National Laboratory (Richland, WA) on a 2-y project with the Kharkov Institute of Physics and Technology (KIPT) in Ukraine to develop and bring to market an innovative compact-systems technology for producing critically needed medical isotopes. The Global Initiatives for Proliferation Prevention program under DOE's National Nuclear Security Administration (NNSA) and AMIC will each contribute $760,000 to the project.

Compact systems are expected to reduce the overall cost and increase the flexibility needed to produce smaller amounts of research and commercial isotopes for applications in diagnostic and therapeutic nuclear medicine when compared with costs associated with large reactors and accelerators. The new production method funded by this project is based on the Alternative Method for Producing Medical Isotopes (AMPMI) technology being developed at KIPT. The AMPMI method generates an intense neutron beam at a high fluence rate under controlled conditions, with an advanced target design for efficient production of neutron-rich medical isotopes.

"The AMPMI neutron technology complements our current proton LINAC at our first production facility in Kennewick, WA," said Jim Katzaroff, CEO at AMIC. "We anticipate that the AMPMI neutron technology will provide the opportunity to produce a wide variety of medical isotopes on a smaller scale, closer to the point of use, than isotope production in nuclear reactors." Participants in this effort see the compact electronic systems for neutron generation as versatile and cost-effective solutions to current challenges in domestic isotope production. "Politicians talk about the need to improve access to health care in this country," said Katzaroff. "I respectfully submit that, unless we develop the means to produce these critical medical isotopes on our own soil, then the U.S. health care industry will continue to find itself in the very same dangerous predicament as the energy industry with its dependence on foreign sources of oil."

B&W and Covidien Plan LEU ^{99}Mo Project

Babcock & Wilcox Technical Services Group, Inc. (B&W TSG; Lynchburg, VA), and Covidien (St. Louis, MO) announced on January 26 the signing of an agreement to develop technology for the manufacture of ^{99}Mo. A press release accompanying the announcement indicated that the planned program has the potential to supply more than 50% of U.S. demand. Under the agreement, B&W TSG and Mallinckrodt Inc., a subsidiary of Covidien, will collaborate on the development of solution-based reactor technology for medical isotope production. The agreement

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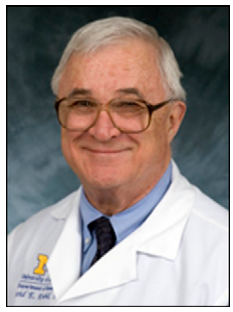
Kuhl Named Japan Prize Awardee

The Science and Technology Foundation of Japan announced on January 16 the names of the co-awardees of the prestigious 2009 Japan Prize for "original and outstanding achievements in science and technology" that have "advanced the frontiers of knowledge and served the cause of peace and prosperity for mankind." Each year the foundation designates 2 fields for consideration. For 2009, David Kuhl, MD, a professor of radiology and nuclear medicine at the University of Michigan (Ann Arbor), was the awardee in the category of "technological integration of medical science and engineering" for his contributions to the development of emission tomography. For achievements toward "a sustainable society in harmony with nature," the foundation awarded a second prize to Dennis L. Meadows, PhD, author of *The Limits of Growth*.

Among Kuhl's accomplishments cited by the awarding committee were his leadership in development of a series of SPECT devices (the Mark II, III, and IV) in the 1960s and 1970s and advances in tomographic image reconstruction and transaxial section tomography. The contributions were cited as having "an enormous impact on the development and evolution of various methods of computer tomography, including PET." Kuhl and his coworkers were also recognized for early SPECT measurement of regional cerebral blood volumes, as well as for collaborative work with researchers from the National Institutes of Health (Bethesda, MD) and the Brookhaven National Laboratory (Upton, NY) on early investigations with ^{18}F-FDG. This body of work was cited as contributing to the currently transformative and accelerating development of PET and other molecular imaging techniques. In a statement released through the University of Michigan, Kuhl said that he was grateful that the Japan Prize honored not only his contributions but the field of molecular imaging as a whole. "In molecular imaging there's a hope and expectation that these new noninvasive ways of determining how things work in small internal parts of the body will be key methods for developing new drugs and for managing patients with more individualized, personalized treatment," he said. Kuhl is an SNM member and past recipient of the society's Benedict Cassen Award and George Charles de Hevesy Nuclear Pioneer Award. The SNM Brain Imaging Council created the Kuhl–Lassen Award to honor the accomplishments of Kuhl and the late Nils Lassen, MD. Among other honors, he has been recognized with the Ernst Jung Prize for Medicine and the Charles F. Kettering Prize for the Diagnosis and Treatment of Cancer and is a member of the Institute of Medicine of the National Academy of Sciences.



David Kuhl, MD

At a presentation ceremony in Tokyo in April, Kuhl and Meadows will each receive a certificate of merit and commemorative medal. A cash award of 50 million yen is also presented to each laureate. The event is attended by the Japanese prime minister, the speaker of the House of Representatives, the president of the House of Councillors, the chief justice of the Supreme Court, foreign ambassadors to Japan, and about 1,000 other guests. During Japan Prize Week, the laureates are featured at commemorative lectures, attend academic discussion meetings, and take part in other activities.

Science and Technology Foundation of Japan

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combines Covidien's expertise in radiopharmaceutical production and global regulatory approvals with B&W's patented liquid phase nuclear technology. This reactor technology uses low enriched uranium and generates only about 1% of the radioactive waste produced by current highly enriched uranium reactor production of ^{99}Mo.

In addition to providing a reliable domestic supply of the medical isotope, the program will support the U.S. NNSA's nonproliferation efforts. "This is a significant advancement in technology that B&W is proud to lead. Working in concert with Covidien, we believe this achievement will have a great impact on the medical and nuclear industries," said S. Robert Cochran, president of B&W TSG.

Missouri University Research Reactor
Columbia, MO
Advanced Medical Isotope Corporation
Kennewick, WA
Babcock & Wilcox Technical Services Group, Inc.
Lynchburg, VA