

found that specially treated activated carbon increases the iridium-191m elution yield to about 20% with a breakthrough of $1 \times 10^{-4}\%$ per bolus, extending the generator's life from several days to two or three weeks, he added.

The ORNL group has submitted a patent disclosure to the DOE for the generator, now in clinical use at the Cyclotron Center in Liège and in Bonn. Collaboration with investigators at the Massachusetts General Hospital (Dr. Strauss) on the use of this new generator for the evaluation of regional coronary perfusion and perfusion of other organs under continuous elution conditions is in progress. "These studies should result in the submission of an application to the Food and Drug Administration

(FDA) for approval for human use of this new generator system in the United States," said Dr. Knapp. (The DOE allows ORNL to request patent waivers for newly developed products, whereby the government waives its rights and sells the patent to private industry.)

An earlier iridium-191m generator was developed for clinical use by Salvador Treves, MD, of Children's Hospital in Boston, MA. That institution is now evaluating iridium-191m, which "has been shown to be well suited for radionuclide angiography to detect left-to-right shunts in infants," said Dr. Knapp.

The federal laboratory at Oak Ridge offers unique resources to nuclear medicine research, noted Dr. Knapp. The High Flux Isotope Reac-

tor (HFIR) irradiates highly enriched stable isotopes to produce substantial quantities of a range of radionuclides, including osmium-191, platinum-195m, and tin-117m. ORNL is also equipped with many "hot-cells," enclosed lead-lined rooms and associated equipment for the safe handling of large quantities of radioactive materials.

"The Nuclear Medicine Group program was built upon the unique capabilities of the Oak Ridge National Laboratory for reactor and cyclotron production of radionuclides," said Dr. Knapp, "and has evolved from over 40 years of ORNL research in the processing of radionuclides of biomedical interest and the development of new radiopharmaceuticals."

Linda E. Ketchum

NUCLEAR MEDICINE MILESTONES AT OAK RIDGE

Oak Ridge National Laboratory (ORNL) played an important role in the birth of nuclear medicine. The historic Atomic Energy Act of 1946 gave the US Atomic Energy Commission (now the US Department of Energy) and ORNL an opportunity to explore a much wider application of atomic energy for industrial and medical uses.

The first medical radionuclide was produced at ORNL in 1946, when a mCi of carbon-14 (as barium carbonate) was shipped on August 2, 1946, to Barnard Free Skin and Cancer Hospital, St. Louis, MO. The field lay dormant with no significant historical developments in this area until 1955 when J.E. Francis, Persa R. Bell, ScD, and C. Craig Harris published their classic paper on scintillation spectrometry (*1*). Soon afterward, the Isotope Division, directed by Paul C. Aebersold, PhD, was formed in 1956. Potassium-43 was developed in 1968 for the evaluation of heart disease with the subsequent development of gallium-67, first produced at ORNL in 1969 for tumor localization studies. A study of methods for reactor production and purification of a rare earth element, gadolinium-153, at ORNL began almost at the same time when interest arose in its use for dual-photon absorptiometry to evaluate bone mineral content.

The sequence of these milestone events at ORNL, and the wide application of radioactive tracers in medical diagnosis, treatment, and biomedical research testified to the wisdom of the Atomic Energy Act, which stimu-

lated continuous contributions to health care delivery and biomedical research in the United States.

In April 1974, a special Nuclear Medicine Committee was commissioned by ORNL to review the nuclear medicine program and make recommendations to strengthen it. The committee, chaired by Henry N. Wagner, MD, consisted of some outstanding experts (S. James Adelstein, MD, Robert N. Beck, MD, Floro D. Miraldi, MD, ScD, and Manuel Tubis, PhD), representing a diversity of technical interests within the broad field of nuclear medicine. In September of 1974, the committee recommended to Chester R. Richmond, PhD, associate director of ORNL, that the strengths and resources of ORNL be used to develop a center of excellence with particular emphasis in the areas of: radionuclide research and development, synthesis of radiopharmaceuticals, elucidation of biologic mechanisms of pharmaceutical distribution in the body, radiation dosimetry to body organs from radiopharmaceuticals, and development of instrumentation for nuclear medicine applications. As a result, the Nuclear Medicine Group was formed in 1975.

Prem C. Srivastava, PhD
ORNL Nuclear Medicine Group

References

1. Francis JE, Bell PR, Harris CC: Medical scintillation spectrometry. *Nucleonics* 13:82-88, 1955