News Briefs

DOE Bestows Fermi Award upon Nuclear Medicine Pioneer Robley Evans

The Department of Energy (DOE) presented its 1990 Enrico Fermi Award to Robley D. Evans, PhD, Professor of Physics Emeritus, Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, in honor of his lifetime contributions to radiation science. As the DOE's highest scientific honorarium, the Fermi Award "recognizes exceptional and altogether outstanding scientific and technical achievement in the development, use, or control of atomic energy" and includes a presidential citation, a gold medal, and a $100,000 endowment. DOE Secretary James D. Watkins was to present the Award during a ceremony held January 28 at the DOE's Forrestal Auditorium, in Washington, DC.

In their citation, the DOE emphasized that Dr. Evans "occupies a special place in the history of radiation physics and biology and the development of our understanding of radiation effects today" and is commemorated "for pioneering work in nuclear medicine, in measurements of body burdens of radioactivity and their effects on human health, and in the use of radioactive isotopes for medical purposes."

Dr. Evans, who studied the effects of radiation — primarily bone cancer — on the health of radium dial painters in the watch industry in the 1930s, is credited as one of the founders of nuclear medicine. "Based on those early research studies on radium, he established the internationally accepted standards for the maximum permissible body burden of harmful radioactive substances," says C. Craig Harris, MS, associate professor of radiology, Duke University Medical Center, Durham, North Carolina.

Another of Dr. Evans' landmark studies focused on the examination of thyroid function with radiotracers, which he conducted in the then nascent nuclear medicine program at Massachusetts General Hospital in the 1930s, using iodine-128 with a 25-minute half-life — the sole radioisotope of iodine available at the time. This work led to the application of radioiodine in thyroid diagnostic therapy. Mr. Harris notes, "He pioneered the diagnostic use of radioiodine isotopes for human thyroid studies, taught the first course in nuclear physics at MIT, and was instrumental in establishing MIT's Markle Cyclotron Laboratory in 1938, which became one of the world's first cyclotrons to be applied to medicine."

Dr. Evans' achievements in medical physics include a method to preserve human whole blood, for which he designed a unique double tracer method using iron-55 and iron-59 to label blood samples from different donors.

"Dr. Evans was not only an excellent researcher but a great teacher as well," says Edward W. Webster, PhD, director of radiological sciences and technology, Massachusetts General Hospital. "His 1955 text on nuclear physics — *The Atomic Nucleus* — introduced entire generations to this new field, and it still remains the 'bible' of the discipline." Comments William R. Hendee, PhD, vice president of science and technology for the American Medical Association, "That is a singular and pivotal text. A countless number of contemporary medical physicists cut their teeth on it."

Dr. Hendee adds that "Dr. Evans' contributions in nuclear science and radiobiology formed much of the foundation of nuclear medicine. But, perhaps his most lasting legacy will be his role as the primary investigator of the carcinogenic effects of bone-seeking radioisotopes."

The Fermi Award, established in 1954, honors the memory of Enrico Fermi, the Italian physicist who completed the first self-sustained, controlled nuclear reaction. Previous recipients of the prestigious honor include such scientific luminaries as J. Robert Oppenheimer, PhD, Hyman G. Rickover, PhD, and Edward Teller, PhD. ■

Canadian Program Trains Chemists in Radiochemistry and Radiopharmacy Techniques

The Institute for the Education of Radiochemists continues to be the only program in North America that offers postgraduate pharmacists and chemists the opportunity to learn techniques of radiopharmaceutical chemistry and oversee the synthesis of routine radiopharmaceuticals. Sponsored by the department of chemistry, Simon Fraser University (SFU), in Burnaby, Canada and the Tri-University Meson Facility (TRIUMF) nuclear research site, in Vancouver, the Institute was initiated in 1989 in order to introduce postgraduate chemists to the techniques used in radiochemistry and radiopharmaceutical chemistry and to provide the training that would enable them to get involved with the rapidly growing field of positron emission tomography (PET).

"We seek to answer the growing demand for coupling radiochemistry with organic chemistry," says program co-director John M. D'Auria, PhD, professor of chemistry, SFU. "There is a need to train chemists to oversee the synthesis of routine radiopharmaceuticals and to handle radiotracer activity in the synthesis and development

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of new radiopharmaceuticals." Dr. D'Auria adds that while there are excellent undergraduate radiochemistry programs in the United States, there are no programs that combine radiochemistry with organic chemistry. "These are two very different disciplines, but, with the advent of PET, organic chemists increasingly require training in radiochemical techniques. We want to supplement their knowledge and experience."

According to Dr. D'Auria, the program is open to individuals with a postgraduate degree in organic chemistry who wish to work in the radiopharmaceutical field, for example, at one of the new PET centers being established in the U.S. or in the pharmaceutical industry, where radiotracers are used in research and development.

Structured in week-long individual "modules," the six-week program will be held May-June 1991 at SFU. "The participants can select modular topics they feel suited to or they can take the entire six-week program," says Dr. D'Auria. The majority of each module, Dr. D'Auria adds, will concentrate on lab activities to delineate the basic principles of nuclear science, with examples related to generators, the growth and decay of isotopes, and the use of various counting equipment as well as rapid synthesis and purification, quality control, and the determination of specific activity. "While most of the lab work will demonstrate standard synthesis of radiopharmaceuticals," says Dr. D'Auria, "the final week will offer a series of options, including the syntheses of PET radiopharmaceuticals and monoclonal antibodies." These sessions will also include field trips to PET centers and clinical nuclear medicine laboratories and special lectures by invited speakers.

"Such programs are useful if the students already have a solid background in radiopharmacy, because a month-long program can only provide a veneer of good training," says Walter Wolf, PhD, professor, division of biomedical chemistry, School of Pharmacy, University of Southern California, Los Angeles, California. "But there should be more programs like this, and they should be expanded, especially in the United States." Dr. Wolf comments that "a serious shortage of trained radiochemists currently exists in both academia and industry . . . there has to be put forth a concerted national effort in order to adequately resolve the shortage we face."

The two-year old Institute is currently seeking applicants for its 1991 summer program. The program costs approximately $860 (U.S.) per module or $4,730 (U.S.) for all six modules. This expenditure includes tuition, materials, room, board, and transportation. Prospective participants should confirm attendance — with 10% deposit — by March 15, 1991. For further information contact: Thomas J. Ruth, PhD, TRIUMF, University of British Columbia Campus, 4004 Wesbrook Mall, Vancouver, BC, Canada, V6T 2A3, (604) 222-1047 or: John M. D'Auria, PhD, department of chemistry, SFU, Burnaby, BC, Canada, V5A 1S6, (604) 291-4607. ■

Radiation Workers

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(SMR) analysis to compare the cohort's mortality with that of the control group, which was comprised of the general white male U.S. population during the 30-year study period. The SMR for all causes of death was 1.11, an 11% higher mortality than the control group. Some of the workers studied were employed by coal mining companies, the chemical industry, and other heavy industries prior to their Oak Ridge employment, which might be a contributing factor to the cohort's higher mortality due to respiratory diseases.

Dr. Cragle cautioned that because many variables in this study could not be precisley tracked, results from the study should not be treated as definitive and may be subject to change when the researchers complete further, more rigorous studies based on data from later years. Dr. Cragle and her colleagues at the ORAU Center for Epidemiological Research are currently conducting another study on workers at the same three Oak Ridge plants. They will study personnel who wore film badges so the radiation doses they received will be known. They will use data from the late 1940s through 1984 and expect to publish their results in 1992. The researchers will use a refined version of the Poisson regression analysis model that they developed during the earlier study. They will also employ the model in an ORAU study of workers at the Savannah River nuclear plant in South Carolina, the Fernald nuclear facility in Ohio, and other selected nuclear plants.

The World War II nuclear workers study thus provides a starting point for ongoing analysis of the health and mortality of radiation workers. The ORAU researchers conclude that "the importance of the study lies in clearly showing that future studies, which will have more complete [radiation] exposure data, should not ignore the very strong socioeconomic status effects for most causes of death."

Joan Hiam

Reference

1. Frome EL, Cragle DL, McClain RM. Poisson regression analysis of the mortality among a cohort of World War II nuclear industry workers. *Radiation Research* 1990;123:138–152.