

Accelerator Physics to Treat Cancer

December 6 2004

Northern Illinois University today announced plans to revive a unique and proven cancer treatment that blends advanced medical science with accelerator physics developed at Fermi National Accelerator Laboratory, a Department of Energy laboratory in Batavia, Ill.

The newly formed NIU Institute for Neutron Therapy at Fermilab will deliver neutron therapy to patients and conduct extensive research on the high-tech cancer-fighting treatment. Neutron therapy has been shown to be superior for some types of cancer, including adenoidcystic carcinoma, locally advanced prostate cancer, locally advanced head and neck tumors, inoperable sarcomas, and cancer of the salivary glands.

The institute will serve as many as 145 patients annually and could begin treating patients as soon as mid-January. Working in tandem with hospitals in the region, the neutron therapy center at Fermilab treated more than 3,100 patients over nearly three decades. But treatments came to a halt in May of 2003, when a local hospital ended its involvement with the program.

“I’m pleased to announce that Northern Illinois University has brought new life to this important cancer treatment program,” U.S. House Speaker Dennis Hastert said. The congressman, a longtime supporter of Fermilab’s cancer-treatment efforts and NIU research, worked to secure commitments for congressional appropriations of \$2.7 million over three years to fund the institute.

“The clinic at Fermilab has provided a viable, important treatment option to thousands of patients, and we couldn’t let it disappear,” Hastert

added. “This new NIU Institute will continue to investigate, document and advance the benefits of this treatment, which is not widely available in the United States.”

The NIU Institute for Neutron Therapy will be one of only three sites nationwide to offer the neutron therapy option.

“We must express our gratitude to Speaker Hastert. His support of this new partnership will potentially benefit thousands of cancer patients in the future and lead to new innovations in battling the disease,” NIU President John Peters said. “Fermilab is recognized as a pioneer in the field of neutron therapy. With the newly combined resources of Fermilab and NIU, we believe the institute will take a leadership role in advancing this form of cancer treatment and making it more universally available.”

Neutron therapy is a highly effective form of radiation using neutrons instead of electrons or photons, which are used in conventional radiation treatments. Fermilab’s proton linear accelerator generates the neutron beam. It is applied to localized malignant tumors that may occur anywhere in the body and are otherwise inoperable or resistant to conventional radiation.

Because neutrons work so well, neutron therapy patients typically require only 12 treatments over four weeks—compared to 30 to 40 treatments over eight weeks for conventional radiation.

Neutron therapy was a natural extension for Fermilab; the world’s premier high energy physics laboratory, funded by the DOE’s Office of Science, was one of the few places with the necessary technology.

“The Office of Science welcomes the NIU Institute for Neutron Therapy at the Department of Energy’s Fermi National Accelerator Laboratory,”

said Dr. Raymond L. Orbach, Director of the DOE Office of Science. “From the earliest days of high-energy physics in the 1930s to the latest 21st-century initiatives, the innovative technologies of particle accelerators have created powerful new tools for medicine. The technology breakthroughs that allow physicists to unlock the deepest secrets of the universe also inspire advances in the understanding, diagnosis and healing of disease. The NIU Institute for Neutron Therapy at Fermilab is a good example.”

Fermilab Director Michael Witherell welcomed the new contract with NIU.

“Fermilab has been providing neutrons for cancer therapy here since 1976,” Witherell said. “We are pleased to be entering a new phase in the history of neutron therapy, in partnership with Northern Illinois University.”

Dr. Aidnag “A.Z.” Diaz has been hired to serve as medical director of the NIU Institute for Neutron Therapy. He comes to NIU from Buffalo’s Roswell Park Cancer Institute, a National Cancer Institute-designated comprehensive cancer center. There he served as co-director of the Gamma-Knife Center, director of neuroradio-oncology and associate professor in the Department of Radiation Medicine.

“I’m very excited about this opportunity because we have a real chance to expand the field of neutron therapy, which is available at only about a dozen clinics worldwide,” Diaz said. “Our main task is to give health centers in the region an extra tool to treat their patients.

Neutron therapy has an important niche in radiation oncology, and losing this tool would be detrimental to the entire field.

“I’ve been exposed to neutron therapies both in my research and in my

clinical practice,” Diaz added. “For a specific group of cancer types, neutron therapy is significantly better than standard radiation. The field has the potential to take off, but we need to continue to demonstrate the usefulness of neutron therapy and investigate new indications while showing that clinics offering this type of treatment can be self-sustaining.”

The institute will focus on treatment of those cancers that have been clinically proven to respond to neutron therapy. While the facility at Fermilab in the past drew patients from across the country and around the world, Diaz said the institute will work to strengthen its ties to the northern Illinois region and neighboring states. The university affiliation will allow the neutron therapy center to ramp up research efforts as well.

“Once we have accomplished our initial goals, we intend to conduct research on the effectiveness of neutron therapy on other types of cancer,” Diaz said. “It’s advantageous to have NIU with its many resources running this program because the university’s mission is to educate and to discover.”

The NIU Institute for Neutron Therapy also will benefit from the expertise of medical physicist Arlene Lennox, considered one of the world’s leading experts in neutron therapy. She recently was named a fellow of the American Physical Society in recognition of her contributions to neutron therapy. She has managed the neutron therapy facility at Fermilab since 1985 and will continue as technical director of the institute.

“I’m thrilled that we’re reopening,” said Lennox, who also is an adjunct professor of physics at NIU. “The accelerator we have here at Fermilab produces the highest-energy neutron beam in the world. That’s important because it means the beam can reach cancer cells anywhere in the body. Because of the superior technology and technical support that we receive

at Fermilab, we've produced very good clinical results.

“We would very much like to build upon those encouraging results,” Lennox added. “That’s why the clinic needed to partner with a major research university. NIU will help to disseminate more information about neutron therapy and extend our research efforts. Neutron therapy certainly could be extending more lives, possibly saving more lives and providing a better quality of life for many patients.”

The institute will draw on the expertise of NIU experts in health administration and researchers and clinicians in such fields as chemistry, physics, biology, nursing, engineering, counseling and speech and language pathology. NIU scientists will explore the effects of treatment, map out cancer-related genes, work toward developing new drugs and study the efficiency of combined therapies, such as chemotherapy and neutron therapy.

“We want to bring our best researchers and brightest students into the effort to document the success story behind the neutron therapy facility at Fermilab and to further develop applications of neutron therapy beyond its current state through basic and clinical research,” said Rathindra Bose, NIU vice president for research and dean of the Graduate School. Bose himself is an award-winning biochemist and cancer researcher.

Fermilab has developed highly effective treatment protocols, but without an academic link, the research aspect of neutron therapy just hasn't been able to flourish,” Bose added. “If we can ratchet up the efforts of NIU scientists, I think it will benefit the field greatly. The potential for expanded uses remains largely unexplored.”

Source: Northern Illinois University

Citation: Accelerator Physics to Treat Cancer (2004, December 6) retrieved 26 April 2024 from <https://phys.org/news/2004-12-physics-cancer.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.