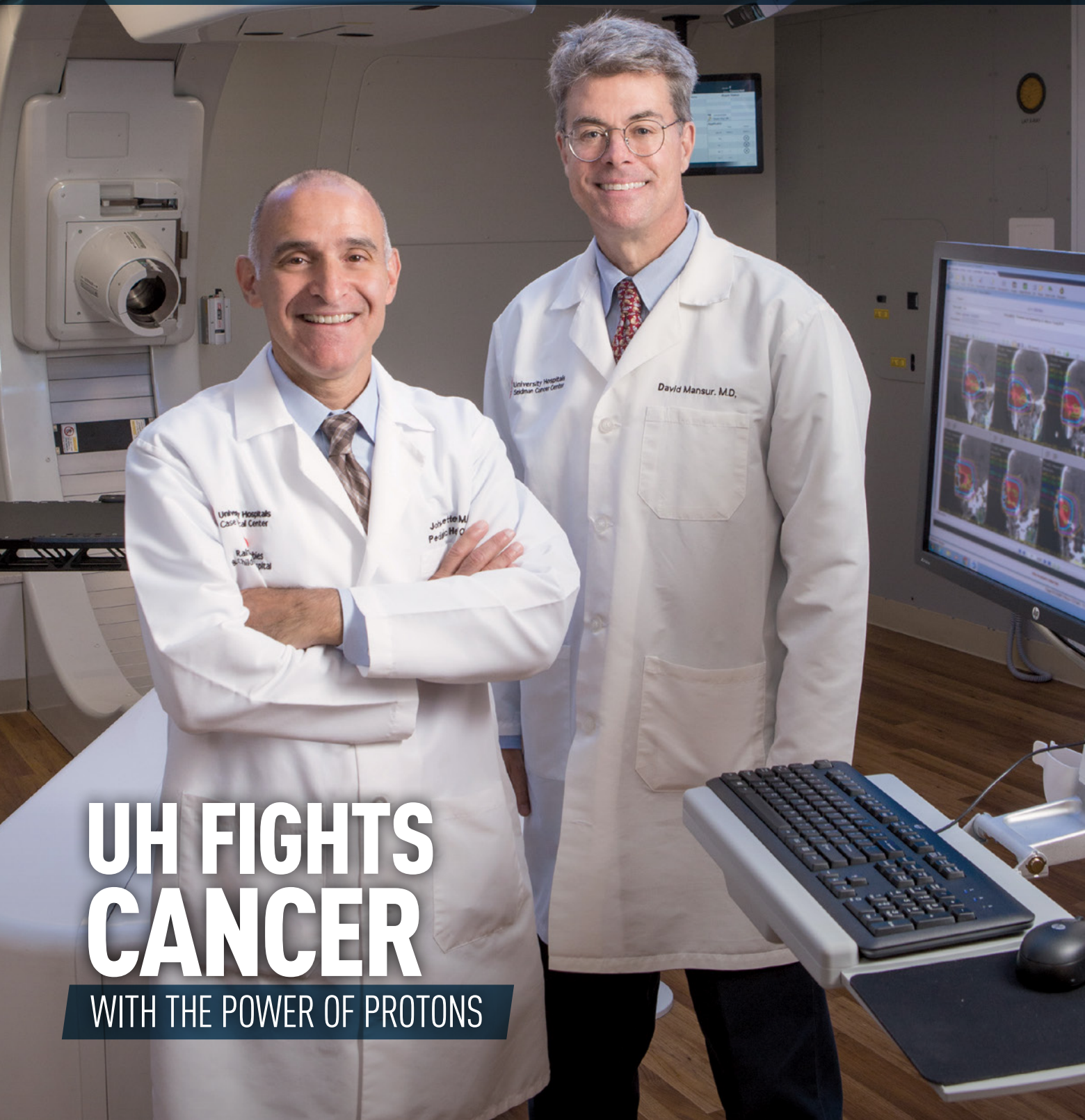


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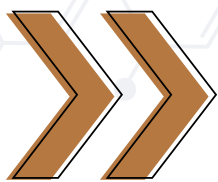
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UH FIGHTS CANCER

WITH THE POWER OF PROTONS



University Hospitals

Fights Cancer with the Power of Protons

BY JO DONOFRIO

IN THE PAST 50 years, improvements in photon (X-ray) based radiotherapy technology have made tumor treatments more accurate and enabled the delivery of higher and more effective radiation doses. Equally if not more important have been the ongoing efforts to decrease radiation exposure to healthy organs and tissues.

Proton therapy, the next generation of radiotherapy, targets tumors with the maximum radiation dose while reducing radiation exposure to surrounding healthy tissue. This advanced therapy, which is proving very beneficial in the treatment of many cancers — especially in children and young adults, is currently available only at a small number of cancer

centers across the country. University Hospitals (UH) in Cleveland, with the opening of its new Proton Therapy Center in July 2016 at UH Seidman Cancer Center, is now a member of this elite group.

The Proton Therapy Center at UH is Ohio's first and only proton therapy center and one of the world's first "compact" centers featuring the Mevion S250 system. This unique single-room system, requiring only a 40-foot by 40-foot by 40-foot space, is significantly smaller than traditional proton therapy systems, which are the size of a football field. Yet it is equal in power. Housed in an 11,000-square-foot facility, UH's Proton Therapy Center

is located on the same campus as UH Seidman Cancer Center and just 100 feet from the Angie Fowler Adolescent & Young Adult Cancer Institute at UH Rainbow Babies' & Children's Hospital.

"Our proton facility is centrally placed among the 17 Seidman Cancer Center sites across northern Ohio. In addition, within the large campus of UH Case Medical Center at University Circle, the proton facility is convenient to both adult and pediatric patients and to cancer physicians from all disciplines," says Nathan Levitan, MD, President, UH Seidman Cancer Center. "This provides our cancer patients with easy access to multidisciplinary care."

Leaders from the University Hospitals Proton Therapy Center include (L-R) David Mansur, MD, Division Chief, Radiation Oncology, UH Rainbow Babies & Children's Hospital; Mitchell Machtay, MD, Chairman, Department of Radiation Oncology, UH Case Medical Center; John Letterio, MD, Division Chief, Pediatric Hematology & Oncology, UH Rainbow Babies & Children's Hospital; and Duncan Stearns, MD, Director, Pediatric Neuro-Oncology, UH Rainbow Babies & Children's Hospital.



PROTON VS. PHOTON THERAPY

Traditional radiation therapy uses high-energy photons. While effective for a broad range of cancers, photons pass through the patient to the tumor and then exit, resulting in radiation being deposited in healthy tissue. This radiation scatter can result in short- and long-term complications, including secondary malignancies.

“A proton beam differs from an X-ray beam as it is a charged particle, so it interacts differently with matter,” explains David Mansur, MD, Division Chief, Radiation Oncology, UH Rainbow Babies & Children’s Hospital. “Unlike an X-ray beam that essentially goes right through the patient, a proton beam penetrates to a depth that is proportional to its energy and then it stops, eliminating the unnecessary exit dose and resulting in less radiation to healthy, uninvolved tissue.”

With UH’s proton therapy system, the maximum dose of radiation is safely delivered to the targeted tumor site. This is accomplished with beam-modulating technology which shapes and regulates

the proton therapy beams, conforming them to the treatment plan. In addition, a robotic couch allows optimal positioning of the patient, which is confirmed through an image guidance system prior to each treatment session. The result is a significant decrease in radiation to healthy tissue and organs. And that, according to Dr. Mansur, is especially of benefit for children, teens and young adults whose developing organs are more vulnerable to damage from radiation.

“Many pediatric and young adult patients have cancers that have a very high cure rate,” he says. “The real hope is that proton therapy can potentially limit the long-term effects of unnecessary radiation to uninvolved healthy tissue ... long-term effects such as neurocognitive deficits and secondary malignancies that can manifest over decades and are a big concern with younger patients.”

Just like photon-based therapy, proton therapy

- + is noninvasive and painless

- + enables many patients to enjoy normal daily activities throughout treatment

- + can be used with chemotherapy or surgery, as needed

- + allows the use of sedation during treatment sessions, if needed.

“Proton therapy is both an evolution and a revolution. It is the next generation in how we achieve these goals of getting the best, most effective radiation to the tumor or target, and at the same time protect the person’s normal body structure and normal functioning,” says Mitchell Machtay, MD, Chairman, Department of Radiation Oncology, UH Case Medical Center.

BENEFITS FOR CHILDREN AND ADULTS

One of the challenges in the use of proton therapy is prioritizing the patients who will benefit the most. “Naturally, our youngest patients, those with brain tumors, spinal tumors, and other solid tumors who have

Dr. Duncan Stearns admires the artwork of a patient in the waiting room of the UH Proton Therapy Center — less than 500 feet from a nationally-ranked children’s hospital, UH Rainbow Babies & Children’s Hospital.





University Hospitals is one of the first in the world to install the Mevion S250. This unique single-room system requires only a 40-foot long by 40-foot wide by 40-foot tall space — significantly less than traditional proton therapy systems which are the size of a football field. Yet it is equal in power. Dr. David Mansur is shown here with the gantry-mounted superconducting synchrotron.

their whole life ahead of them, are the patients for whom the application of this technology offers the greatest advantage,” says John Letterio, MD, Division Chief, Pediatric Hematology & Oncology, UH Rainbow Babies & Children’s Hospital. “We will have the opportunity to answer important questions regarding the extent to which proton therapy will enhance our capacity to preserve cognitive function and maintain a higher IQ or better school performance in all children receiving this treatment for brain tumors.”

In a recent study of children with brain tumors treated with radiation therapy, unintentional radiation doses from traditional radiation therapy were linked to a permanent 10-point drop in IQ. Children treated with proton therapy, however, saw no neurocognitive impact.

“The real hope,” says Dr. Letterio, “is that we can improve the long-term outlook, health and well-being of our survivors of childhood cancer.”

Proton therapy is also proving beneficial for certain malignancies in adults. “The two most critical areas for adults are tumors and other lesions in the brain and spine and, secondarily, in the chest near the heart and lungs,” explains Dr. Machtay. “These are critical organs to all patients, young and old. By reducing radiation to these organs, we can hopefully not only cure patients of their cancer, but allow them to have the best possible quality of life.”

The location of the Proton Therapy Center on University Hospitals’ main campus is another benefit, especially for inpatients, because it eliminates the need to transport them out of town for treatment.

“The treatment for cancer in children is months to

years,” explains Dr. Letterio, “and can cause a great deal of anxiety and challenge for our youngest patients. Now they can come down to the new UH proton center for their radiation and then immediately return to their hospital room (at UH Rainbow), to the familiar faces of their nurses, physicians and other staff.”

ONGOING RESEARCH

While the key benefit of proton therapy is to limit the risk for complications related to the unnecessary exposure to radiation, research is also comparing clinical outcomes with photon-based therapy.

“It is likely we will find that outcomes are improved due to the characteristics of proton therapy that allow the delivery of a higher dose of radiation to the tumor while protecting surrounding tissue,” says Dr. Levitan. “There is currently a lot of

ongoing research in the application of proton therapy to a variety of different cancer types and stages.”

He points out that there has been some controversy about the use of proton therapy for prostate cancer. “Proton therapy is a pioneering new technology that has significant benefit to certain patient populations. For several indications, it is already widely accepted. For prostate cancer as well as several others, we will learn about the applicability of proton therapy through current and future clinical trials.”

For those who are not candidates for proton therapy, University Hospitals offers the most comprehensive and advanced photon-based radiation oncology treatments in a multi-state region, including Synergy-S Hexapod, Cyberknife, and Perfexion Gamma Knife. And these, along with University Hospitals’ proton therapy services, are available not only to UH’s own patients but also to the patients of other medical centers within a five-state region. This, according to Dr. Levitan, demonstrates University Hospitals’ ongoing commitment to improving the health of Northeast Ohio and beyond.

“We believe it is important for us to provide state-of-the-art care to all patients with cancer,” says Dr. Levitan, “and to assure that we are providing leading technology and innovation that includes carrying out potentially life-changing research and innovative clinical trials, while providing the best patient experience.”

UH Seidman Cancer Center, part of the National Cancer Institute designated Case Comprehensive Cancer Center at Case Western Reserve University School of Medicine, is the only freestanding cancer center in Northeast Ohio and is a national leader in cancer research and treatment. The Angie Fowler Adolescent & Young Adult Cancer Institute at UH Rainbow, fully integrated with UH Seidman Cancer Center, is reportedly one of the nation’s leading centers for teen and young adult cancer care. For more information about the Proton Therapy Center at University Hospitals, visit UHhospitals.org/Proton or call 216-286-PROT (216-286-7768). ■