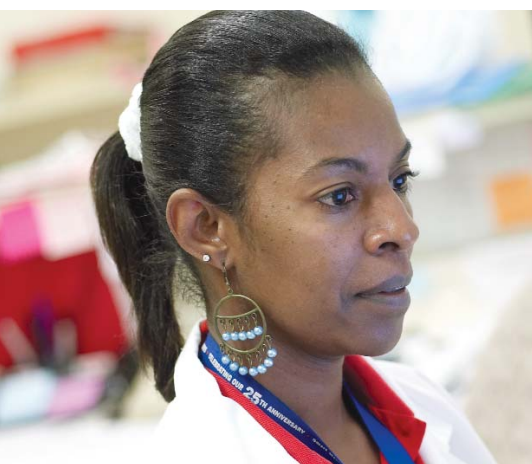




Radiation Oncology

at Stony Brook University Medical Center

Advanced Technology and a Team of Experts
Provide Optimal Treatment and Compassionate Care



Contents

The Radiation Oncology Team **4**

Advanced Technology **6**

Treatments **8**

Our Radiation Oncologists **13**

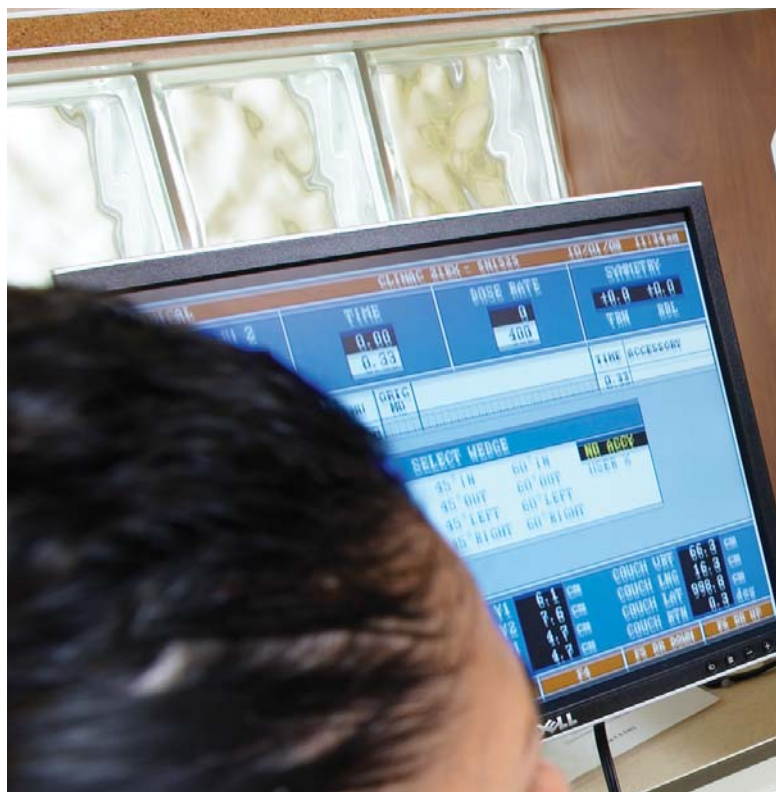
Directions **14**

The Radiation Oncology Team

The Radiation Oncology Team

Radiation oncology plays a vital role in Stony Brook University Medical Center's commitment to provide the highest quality cancer care to residents of Suffolk County, and beyond. Our Radiation Oncology Team uses the most advanced technology and innovative therapies to effectively evaluate and treat patients. As a leading academic medical center, we are committed to advancing the science and practice of radiation oncology and developing novel treatment approaches so that patients have the best opportunity for positive outcomes with the fewest side effects. Stony Brook's focus on patient and family centered care means that patients and their family members play a key role in our collaborative approach to assessing needs and developing treatment plans.

The Department of Radiation Oncology is accredited by the American College of Radiation Oncology (ACRO) Practice Accreditation program. ACRO has determined that the Department meets its high standards, and in many aspects exceeds those standards.



Therapists view images during a treatment session.

Stony Brook's Radiation Oncology Team provides expert, comprehensive, and compassionate care to patients with cancer. As a multidisciplinary team, oncology specialists work with one another to develop individualized treatment plans for each patient. We ensure that referring physicians and other oncologists involved in the patient's care are kept fully apprised of those plans and the patient's progress during and after radiation therapy.

The Radiation Oncology Team

The team is led by five board-certified radiation oncologists, each with extensive training and averaging over 20 years experience. Other members of the team include:

- Medical physicists
- Medical dosimetrists
- Radiation therapists
- Specially trained nurses
- Support staff, including social workers, physical therapists, nutritionists, and others



The entire team works collaboratively, providing coordinated and streamlined care that includes:

- Complete clinical evaluation and staging
- Personalized radiation therapy tailored to specific needs
- Ongoing evaluation and assessment to determine how well treatment is working and how the patient is responding
- Comprehensive follow-up care and support.

Our integrated and coordinated care means that the Radiation Oncology Team can evaluate patients, perform treatment planning, and begin delivering treatment in a single visit, providing that all necessary diagnostic imaging is complete.



Patient and her husband at a follow-up visit.

Advanced Technology for Optimal Planning, Management, and Delivery of Treatment

Our primary goal is to deliver treatment safely and effectively, and in ways that enhance and benefit the overall experience for our patients. Stony Brook has invested in the most up-to-date technology, equipment, and systems. We use the most advanced treatment planning and information management software, in addition to leading-edge technologies to provide an integrated network for fast, efficient treatment that minimizes time spent waiting.

Planning and Management Systems

Varian ARIA® Oncology Information System

ARIA is a comprehensive software system that provides an electronic patient medical record, including images, that remains current throughout the course of treatment and allows for up-to-date access to essential patient information. ARIA allows clinicians to confidently arrange a broad range of technologies such as Image-Guided Radiation Therapy (IGRT), Intensity Modulated Radiation Therapy (IMRT), Stereotactic Radiosurgery (SRS), Stereotactic Radiotherapy, Stereotactic Body Radiation Therapy (SBRT), and Respiratory-Gated Radiation Therapy. In addition to standardized patient reports, reports can be customized to fit the needs of referring physicians and can be furnished to referring physicians whenever needed via fax, e-mail, or regular mail.



Specially trained nurses help provide expert care with understanding and compassion.

Eclipse™ Treatment Planning System

Varian Eclipse provides software tools for integrating powerful imaging capabilities into treatment planning and delivery. By combining images from PET, CT, and MRI systems, the Radiation Oncology Team can develop conformal treatment plans that target tumors while minimizing the exposure of surrounding tissues and organs. Eclipse is used to plan external beam irradiation with photon and electron beams, as well as for internal irradiation (brachytherapy) treatments.

Picture Archiving Communication System (PACS)

PACS facilitates the processing, viewing, and archiving of digital radiological images and related information. Our physicists and radiation oncologists use images from the system for evaluation, treatment planning, and follow up. PACS also allows for rapid access to crucial diagnostic information, decreasing the time from examination to treatment; simultaneous access to information for practitioners at different locations; easy sharing of images among radiologists and other physicians; and the elimination of film images (hard copies) and the handling, archiving, and storage associated with film images. However, hard copies will be produced when necessary.

Sophisticated Patient Positioning Systems

BrainLAB-based ExacTrac® System

The ExacTrac is an automated patient positioning system for IGRT and SBRT. It provides x-ray position verification in seconds, enabling precise and reproducible setup to treat patients. This cutting-edge technology assists in making patients as comfortable as possible and helps us to provide accurate, uninterrupted daily treatment that is crucial to patient outcomes.

Real-Time Position Management Respiratory Gating System

Varian's Gating System and GE's Advantage 4D CT Software enable us to adapt to tumor motion due to breathing, and accurately track tumor position, a critical factor when maximizing radiation dose to the tumor and limiting normal tissue exposure. In the past, this task has been complicated in those regions of the body where respiration causes tumor motion, such as the organs of the chest and abdomen, including the lungs, stomach, pancreas, and liver.

The gating system tracks a patient's normal respiratory cycle with an infrared camera and chest and abdomen markers. It coordinates the delivery of radiation with a patient's movement so that radiation is delivered only when the tumor is in the treatment field. With the respiratory gating system, the patient receives better tumor control and less normal tissue complications.

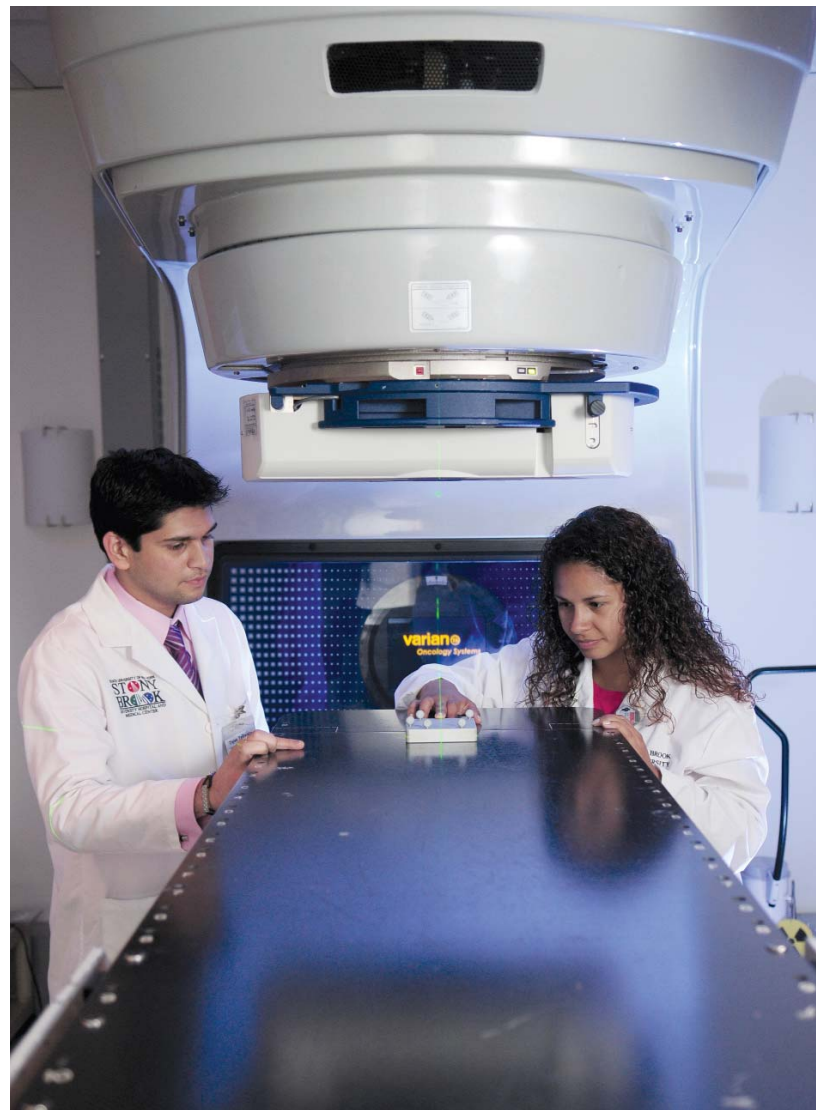
BodyFIX®

BodyFIX is a positioning and immobilization system that addresses the body motion of a patient in imaging and high-precision therapies. While preserving the patient's comfort, this noninvasive system uses a dual vacuum technology to reduce both involuntary and voluntary patient movement, including breathing motion during simulation and treatment.

GE LightSpeed 16-SLICE CT Simulator

The CT Simulator provides the most reliable and practical means to determine target locations and normal tissue for treatment planning and spatial accuracy in dose delivery, in addition to providing reliable external and internal contours and electron density information.

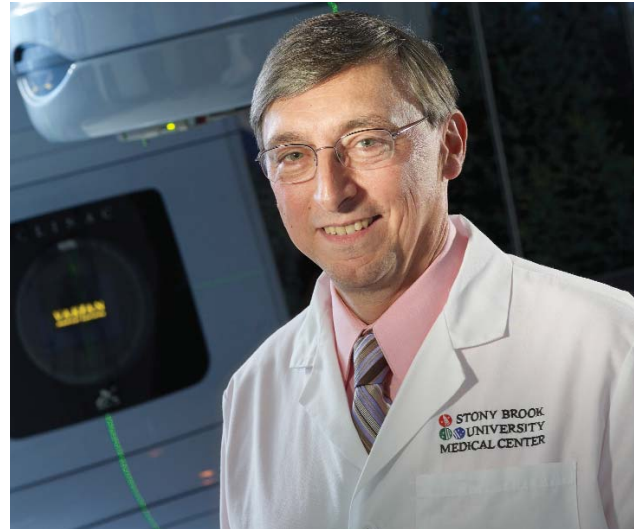
Our primary goal is to deliver treatment safely, effectively, and in ways that enhance and benefit the overall patient experience.



Each day, medical physicists and radiation therapists ensure accurate calibration of ExacTrac® equipment.

Radiation Oncology Treatments

Experienced radiation oncologists at Stony Brook University Medical Center provide a wide range of radiation therapies to treat patients with cancer. The goal of radiation therapy is to deliver a high dose of radiation into the patient's body to sterilize cancer cells while at the same time sparing healthy tissue from damage. Several different radiation therapy techniques have been developed to accomplish this. Depending on the type of cancer to be treated, radiation therapy is administered either externally using clinical linear accelerators, or internally by brachytherapy implants for localized contact with the tumor. With the installation of sophisticated new technology, our Intensity Modulated Radiation Therapy (IMRT) and Stereotactic Radiosurgery (SRS) programs have been expanded, and we now offer Image-Guided Radiation Therapy (IGRT) and Stereotactic Body Radiation Therapy (SBRT) programs.



Allen G. Meek, MD, Chair of the Department of Radiation Oncology.

External Radiation Therapies

External radiation therapy involves a beam of radiation directed through the skin to the tumor and the immediate surrounding areas to destroy the main tumor and any nearby cancer cells. We use our sophisticated treatment planning software to help ensure accuracy and spare normal tissue.

Stony Brook is equipped with the most advanced clinical linear accelerators, or “Linacs,” available. The Varian 21EX, Varian SiL21IX, and Varian 6EX deliver a uniform dose of high-energy x-ray and electron beams to the region of the patient's tumor to destroy the cancer cells, while sparing the surrounding normal tissue.

Conventional External Beam Radiotherapy with Photons and Electrons

Therapy is typically given daily for a number of weeks to minimize side effects. Using advanced treatment planning software, the team charts the size and shape of the beam and how it is directed to the body, effectively treating the tumor while sparing normal tissue in proximity to the cancer cells.

Three-Dimensional (3D) Conformal Radiation Therapy

Local tumor control is an essential element in treatment planning for any patient with cancer. Without local control, a patient risks the formation of distant metastases and a reduced chance of survival. The location of a tumor and its proximity to radiosensitive structures dictate how well a conventional treatment method can deliver dose to a tumor. Often, because of the risk of damaging surrounding normal tissue, doses are not adequate to destroy the tumor.

Conformal radiotherapy allows physicians to target a tumor volume while sparing normal tissues. In contrast to standard radiotherapy planning using two dimensional (2D) x-ray images, conformal radiotherapy planning uses sophisticated computer technologies such as CT scans and MRI images to view tumors in three dimensions (3D)—width, height, and depth.

With superior tumor imaging, treatment plans can be created with greater precision. Our Radiation Oncology team prepares 3D conformal radiotherapy treatments using the state-of-the-art Eclipse® treatment planning system. Doctors, dosimetrists, and physicists work together to design radiation treatment beams that conform to the shape of a patient's tumor, thus decreasing radiation to normal tissues and increasing the probability of local tumor control.

Intensity Modulated Radiation Therapy (IMRT)

Intensity Modulated Radiation Therapy is a specialized three dimensional conformal radiation treatment plan, where thousands of tiny beams from multiple beam angles target a tumor. The radiation intensity of these beams is modulated, or controlled, using a system of movable leaves called a multi-leaf collimator. Using sophisticated dose calculation methods, each leaf can move independently for more accurate targeting of a tumor. The leaves conform to the shape of the tumor, blocking out unwanted radiation. This technique provides a way to escalate tumor doses while significantly sparing normal tissue. Less radiation to normal tissues translates into fewer complications for patients.

Stony Brook is equipped with RapidArc™ radiotherapy technology to deliver IMRT, which improves dose

Doctors, dosimetrists, and physicists work together to design radiation treatment beams that conform to the shape of a patient's tumor.



Patient and family centered care is the cornerstone of treatment at Stony Brook. Above, a patient, accompanied by her husband, at the Radiation Oncology registration desk.

conformity while significantly shortening treatment times. RapidArc delivers treatment two to eight times faster than other systems and increases precision, enabling physicians to enhance standard of care.

IMRT is ideal for stationary tumors situated near critical structures such as the spinal cord, heart, and eyes. Some typical treatment sites include the prostate, brain, and breast. As with other 3D conformal treatments, for IMRT our Radiation Oncology Team uses the advanced Eclipse treatment planning system.

Treatments

Image-Guided Radiation Therapy (IGRT)

Our state-of-the-art ExacTrac® X-ray 6D System is an Image-Guided Radiation Therapy system that ensures daily setup consistency without prolonging treatment times. IGRT is a type of conformal radiation treatment guided by imaging techniques such as x-rays or CT scans taken within the treatment room just prior to treatment. Systems equipped with IGRT allow clinicians to detect tumor volumes on a daily basis and automatically reposition a patient if necessary. High-resolution stereoscopic x-rays are acquired within the treatment room and compared to images taken for treatment planning to guarantee accurate patient setup. Patients have infrared markers placed on their skin to monitor position from the beginning to the end of treatment, ensuring millimeter precision.

Stereotactic Radiosurgery (SRS)/Stereotactic Radiotherapy (SRT)

Stereotactic Radiosurgery was initially defined as a single-fraction technique using stereotactic principles for targeting and treating intracranial lesions through the use of noncoplanar beams. The techniques on which radiosurgery is founded have been applied to fractionated treatments termed stereotactic radiotherapy. SRT is an advanced and modernized form of radiation therapy that uses high energy x-ray beams to shrink or control the growth of a tumor or abnormal cells by either killing the cells directly or by disrupting their ability to grow.

The type of radiation is the same for both conventional radiation therapy and SRT, however, SRT enables radiation oncologists to deliver high-dose radiation to a small focused area. Using SRT, radiation oncologists are better able to exclude the surrounding normal tissues or organs than with conventional radiotherapy. This specialized form of radiation treatment involves a team of specialists including neurosurgeons, radiation oncologists, radiologists, radiation physicists, radiation therapists, and nurses.

Although very similar therapies, SRS delivers a large dose of radiation on a single day, while SRT has a fractionated treatment schedule. With SRT, treatment will span multiple days. While the total dose with SRT may be larger than in SRS, in any single day, patients undergoing SRT receive a smaller radiation dose.

Cranial SRS or SRT is now the standard of care for benign and malignant brain tumors and numerous benign conditions including arteriovenous fistulas, trigeminal neuralgia, and other pain conditions, and movement disorders such as Parkinson's disease and epilepsy. More recently, SRS and SRT are also being used extracranially, namely for locations outside the brain.

Stereotactic Body Radiation Therapy (SBRT)

The BrainLAB-based ExacTrac®, an automated patient positioning system for IGRT, provides x-ray position verification in seconds, enabling precise patient setup. With this system, we are able to offer the specialized IGRT treatment called Stereotactic Body Radiation Therapy. Stony Brook is one of the few healthcare facilities on Long Island to offer SBRT.

Stereotactic Body Radiation Therapy is a technique that delivers high radiation doses to a tumor target anywhere in the body in a hypo-fractionated schedule, usually 2 to 5 fractions over a one- to two-week period, without increasing complications when compared to conventional radiotherapy. SBRT is an excellent alternate choice of treatment for patients with medically inoperable tumors, elderly patients who are high risk for surgery, or patients who refuse surgical treatment. There is a large volume of published data demonstrating dramatically higher rates of local control with SBRT when compared to conventional radiotherapy. SBRT can deliver optimal radiation dose to both new primary and metastatic cancer sites and to even previously irradiated sites safely to avoid damage to the critical structure, such as the spinal cord. It is well-suited therapy for inoperable primary and metastatic liver tumors, pancreatic tumors, and localized spinal tumors, as well as other selected tumors.

SBRT uses a linear accelerator delivery system for extracranial treatment. Patients with spinal tumors, either primary or metastasis, often have intractable pain and attendant neurological dysfunction. Using conventional irradiation to control spinal metastases can be limited by spinal cord tolerance. This limitation can also prevent re-irradiation at a previous treatment site by conventional techniques. SBRT can deliver the optimal radiation dose to both primary and metastatic cancer

sites and previously irradiated sites safely, avoiding damage to the spinal cord. SBRT is an appropriate treatment choice for patients who have mechanically stable spinal tumors without cord compression, as well as for patients with paravertebral tumors.

Internal Radiation Delivery Systems

These methods have the same goal as our external radiation delivery systems—to bring highly targeted doses of radiation to tumors while sparing adjacent organs and surrounding tissues. With internal radiation delivery systems, minimally invasive procedures are performed. The benefits of this approach include greater accuracy and less damage to the skin, as well as direct contact with the tumor. Techniques include:

Prostate Seed Implants (Brachytherapy)

Prostate seed implants, also referred to as brachytherapy or internal radiation therapy, is a particularly suitable radiotherapy option for patients diagnosed with early-stage prostate cancer, where the disease is primarily localized within the prostate. Radioactive seed implants to treat prostate cancer is not new, and has long held promise for delivering a high dose of radiation to the prostate while simultaneously reducing the amount of radiation to adjacent organs such as the bladder and the rectum.

Radioactive seeds are inserted directly into the prostate, permitting an escalation of the dose to the “target” and minimizing radiation exposure to surrounding tissue. Usually performed as an outpatient procedure, prostate seed implants can be done alone or in conjunction with external beam therapy.

Bronchial Brachytherapy

Treatment of lung cancer in the vicinity of the bronchial tubes consists of placing a thin plastic tube, called a catheter, into the bronchial through the nasal cavity. Local anesthetic or a general sedative is usually required. The catheter is attached to the high-dose rate remote afterloader. The radioactive source will traverse through the catheter and stop at the treatment site for a length of time necessary to administer the prescribed dose.



Tae Park, MD, and Chief Medical Physicist Zhigang Xu, PhD, work together to develop a treatment plan.

Mammosite Brachytherapy

Treatment is administered to the tissue surrounding a tumor after a lumpectomy has occurred. At the time of surgery, an inflatable balloon is inserted with a catheter. The balloon fills the region that the tumor occupied. A treatment schedule often consists of two treatments a day over a span of five days. During this time, high doses of radiation are given to a very specific region while not threatening healthy tissue.

Tandem and Ovoid Brachytherapy

Tandem and ovoid brachytherapy, used to treat cancer of the cervix, is done less frequently as a high-dose rate treatment. It consists of the tandem, a small metal tube that is placed inside the patient’s uterus, and an ovoid, which is a similar metal tube with a circular shape used for treatment of the cervix. During treatment, the radioactive source passes through both the tandem and the ovoid at different times to ensure that the entire region is properly treated.

Treatments

Vaginal Cylinder Brachytherapy

Vaginal cylinder brachytherapy treatments are most commonly performed on patients who have had a hysterectomy. In this scenario the applicator has a central metallic tube in which the radioactive source will travel. The cylinder is inserted into the vagina and will remain there for the duration of the treatment. Typically, the total preparation and treatment time for the first day is a few hours, while the remaining days the process takes about one hour.

Total Body Irradiation (TBI)

Total body irradiation with megavoltage photon beam is most commonly used as part of the conditioning regime for bone marrow transplantation used in the treatment of a variety of diseases such as leukemia, aplastic anemia, lymphoma, multiple myeloma, autoimmune diseases, inborn errors of metabolism, and other illnesses. The role of TBI is to destroy the recipient's bone marrow and tumor cells, and to immunosuppress the patient sufficiently to avoid rejection of the donor bone marrow transplant. In most cases, the patient will undergo a chemotherapy conditioning program before the TBI and bone marrow transplant. Although chemotherapy alone can be used as a conditioning regimen, addition of TBI is considered beneficial for certain diseases and clinical conditions.

At Stony Brook, TBI is delivered using a 21EX linear accelerator through anterior and posterior fields in a standing upright position at the TBI distance. A special treatment room is available for large-field irradiation. The principle of the technique is that standing TBI allows shielding of certain critical organs from photons and boosting of superficial tissues in the shadow of the blocks with electrons. For example, dose to the lung tissue can be reduced using lung blocks and the chest wall under the blocks can be boosted with electrons of appropriate energy.

Oral and Intravenous Radionuclide Therapy

Radionuclide therapy uses unsealed radioactive sources for the selective delivery of radiation to tumors or target organs. For benign disorders such as thyrotoxicosis and arthritis, radionuclide therapy provides an alternative to

surgery or medical treatment. In cancer treatment, it often combines the advantage of target selectivity (like brachytherapy or external beam radiotherapy) with systemic treatment, such as chemotherapy. It may be used as part of a therapeutic strategy with curative intent or for disease control and palliation.

Radio-Immunoglobulin Therapy (RIT)

The first radioimmunotherapy agent, Zevalin® (ibritumomab tiuxetan), has been approved for the treatment of patients with relapsed or refractory low-grade, follicular, or transformed B-cell non-Hodgkin's lymphoma, including patients with rituximab-refractory follicular non-Hodgkin's lymphoma.

This cutting-edge therapy attaches a radioactive molecule onto an antibody that will attack a tumor specifically, in contrast to other types of radiation treatments where the physician must manually target the tumor. Generally injected, the antibody/radiation complex travels through the blood stream and attaches itself directly to the tumor in question. Radioimmunotherapy is a new and promising modality in cancer treatment that combines the targeting mechanism of monoclonal antibodies with the cytotoxicity of localized radiation.

Amifostine (Ethyol®) Radioprotection

We offer amifostine (Ethyol) radioprotection to some patients to help prevent or lessen mucositis, xerostomia, and esophagitis reactions from radiation treatments to the head and neck area, lung, esophageal, and rectal areas.

For more information about the Department of Radiation Oncology, or to make an appointment, please call us at (631) 444-2200 or visit www.StonyBrookMedicalCenter.org/radiationoncology.

We are located on the 2nd Floor of Stony Brook University Medical Center. For the convenience of patients receiving radiation oncology treatment, we offer free valet parking and a separate entrance close to the treatment area. See page 14 for directions.

Our Radiation Oncologists

**Allen G. Meek, MD**

Chair and Clinical
Director, Radiation
Oncology

Board Certifications:
Radiation Oncology and
Internal Medicine

Clinical Practice Began:
1974

**Language (other than
English):** French

Best Doctors Lists:
Top Doctors: New York
Metro Area,
BestDoctors.com

Medical School:
Johns Hopkins University

Residency:
Johns Hopkins Hospital,
Internal Medicine and
Radiation Oncology

Fellowship:
Johns Hopkins Hospital,
Medical Oncology

Clinical Trials:
ECOG

**Bong Soon Kim, MD**

Board Certification:
Radiation Oncology

Clinical Practice Began:
1964

**Language (other than
English):** Korean

Medical School:
Chunnam University

Residency:
SUNY Downstate,
Radiation Oncology

Fellowship:
Tufts Medical Center,
Radiation Oncology

**Tae L. Park, MD**

Board Certification:
Radiation Oncology

Clinical Practice Began:
1976

**Language (other than
English):** Korean

Best Doctors Lists:
Top Doctors: New York
Metro Area

Medical School:
Kyungpook National
University

Residency:
SUNY Downstate,
Radiation Oncology

Fellowship:
University of Texas M.D.
Anderson Hospital
and Tumor Institute,
Radiation Oncology

**Edward Valentine, MD**

Board Certification:
Radiation Oncology

Clinical Practice Began:
1978

**Language (other than
English):** French

Medical School:
New York Medical College

Residency:
Memorial Sloan-Kettering
Cancer Center, Radiation
Oncology

Fellowship:
Memorial Sloan-Kettering
Cancer Center, Radiation
Oncology

**Tamara Weiss, MD**

Board Certification:
Radiation Oncology

Clinical Practice Began:
1987

**Language (other than
English):** Hebrew

Medical School:
Medical College of
Pennsylvania

Residency:
Cooper Hospital
University Medical
Center, Radiation
Oncology

Clinical Trials:
GOG, COG, ECOG

At Stony Brook University Medical Center, experienced radiation oncologists work with other members of the Radiation Oncology team to treat patients with cancer. The team uses a wide range of radiation therapies and advanced techniques—all with the goal of killing cancer cells and sparing healthy tissue from damage.

Directions

Directions to Stony Brook University Medical Center Radiation Oncology Entrance

From the Long Island Expressway (I-495)

- Take the Long Island Expressway to Exit 62 North, Nicolls Road (CR 97).
- Travel approximately 8 miles, crossing Route 347 (Nesconset Highway).
- At the third traffic light, turn right at the sign for “Stony Brook South Entrance, East Campus” (Health Sciences Drive).
- At the third light, turn left and left again into the parking lot following the signs for “Radiation Oncology.” At the far end of the parking lot is the Patient Pickup/Radiation Oncology Hospital entrance and free valet parking.

From Technology Park

- Take Belle Mead Road, south to Route 347 (Nesconset Highway).
- At Route 347, turn right (west) and proceed to Nicolls Road (CR 97).
- At Nicolls Road turn right (north) and travel approximately two miles, following signs to the Hospital.
- Turn right at the sign for “Stony Brook South Entrance, East Campus” (Health Sciences Drive).
- At the third light, turn left and left again into the parking lot following the signs for “Radiation Oncology.” At the far end of the parking lot is the Patient Pickup/Radiation Oncology Hospital entrance and free valet parking.

