



# PHILADELPHIA

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## INTERNATIONAL MEDICINE

### PHILADELPHIA INTERNATIONAL MEDICINE® NEWS BUREAU

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#### **For immediate release:**

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*Editors note: Research, new techniques and improved facilities by Philadelphia International Medicine hospitals and physicians may lead to new ways to treat some of our most challenging diseases. Below are just some examples from our hospitals.*

#### **Fox Chase Researchers Find that Intensity Modulated Radiation Therapy Improves Outcomes in Patients with Extranodal Lymphoma of the Head and Neck**

Philadelphia—Lymphoma is a cancer that affects organs of the immune system, including the lymph nodes. In a subtype of the disease called extranodal lymphoma, tumors arise in non-lymphoid organs, such as the tongue and tonsils. Patients with extranodal lymphoma of the head and neck often undergo radiation therapy, but this treatment frequently damages the salivary glands and causes dry mouth, which can lead to problems with eating, speaking and swallowing.

An advanced radiation therapy technique called Intensity Modulated Radiation Therapy (IMRT) produces no major side effects and a high response rate in patients with extranodal lymphoma of the head and neck, according to new research from [Fox Chase Cancer Center](#). Aruna Turaka, MD, a radiation oncologist at Fox Chase, presented the findings at the 2011 Pan Pacific Lymphoma Conference.

IMRT involves using a computer to deliver radiation doses with the optimal intensity and pattern so that the radiation beam conforms to the three-dimensional shape of the tumor and spares healthy surrounding tissue. The procedure is commonly used to treat head and neck cancer because it provides better local control rates and causes fewer side effects—such as dry mouth—compared with standard conventional radiation therapy techniques. But whether IMRT is the best radiation therapy for patients with extranodal lymphoma of the head and neck had not been previously investigated.

“IMRT is a promising technique that should be used to treat extranodal lymphoma, in addition to chemotherapy,” Dr. Turaka says. “Radiation acts as a form of local treatment that prevents loco-regional relapses, and chemotherapy helps to prevent systemic relapses.”

In the new study, Dr. Turaka and her colleagues identified five patients with extranodal lymphoma of the head and neck who were treated with IMRT at Fox Chase between 2007 and 2010. Four of these individuals also received chemotherapy. All of the patients had stage IEA disease, indicating that the cancer was located in a single region and there were no systemic symptoms, such as fever, drenching night sweats and weight loss.

After treatment, the majority of patients showed improved outcomes and only minor symptoms. There were no occurrences of severe dry mouth, no relapses in the head or neck, and no evidence of tissue abnormalities appearing on positron emission tomography scans (PET) of these regions. Only one individual experienced a systemic relapse, and four people survived during the follow-up period. The findings show that IMRT helps to control local tumors while keeping side effects at a minimum.

In follow-up studies, Dr. Turaka will examine the effectiveness and side effects of IMRT, in comparison with conventional radiation therapy approaches, in a larger group of patients with extranodal lymphoma affecting various sites in the body.

“Though these types of lymphomas are rare, it’s important to treat them using advanced techniques, such as IMRT, to achieve better results and give good symptom relief to patients,” Dr. Turaka said.

Co-investigators include Tianyu Li, Adam D. Cohen, Nicos Nicolaou, Barbara Pro, Michael M. Millenson, Valentine Robu, Tahseen I. Al-Saleem, and Mitchell R. Smith from Fox Chase.

### **Blocking Receptor in Key Hormone Fires up Enzyme to Kill Pancreatic Cancer Cells**

Pancreatic cancer researchers at [Thomas Jefferson University](#) have shown, for the first time, that blocking a receptor of a key hormone in the renin-angiotensin system (RAS) reduces cancer cell growth by activating the enzyme AMPK to inhibit fatty acid synthase, the ingredients to support cell division.

With that, a new chemopreventive agent that inhibits the angiotensin II type 2 receptor—never before thought to play a role in tumor growth—could be developed [to help treat one of the fastest-moving cancers](#) that has a 5-year survival rate of only 5 percent.

[Hwyda Arafat, M.D., Ph.D.](#), associate professor of Surgery at Jefferson Medical College of Thomas Jefferson University and the co-director of the [Jefferson Pancreatic, Biliary and Related Cancers Center](#), and her fellow researchers, including the chair of the [Department of Surgery](#) at Jefferson, [Charles J. Yeo, M.D., FACS](#), present their findings in the August issue of *Surgery*.

Angiotensin II (AngII) is the principal hormone in the RAS that regulates our blood pressure and water balance; it has two receptors: type 1 and type 2. AngII is also generated actively in the pancreas and has been shown to be involved in tumor angiogenesis.

Previous studies have pointed to the hormone's type 1 receptor as the culprit in cancer cell proliferation and tumor inflammation; however, the idea that type 2 had any effect was never entertained.

By looking at pancreatic ductal adenocarcinoma (PDA) cells in vitro, Jefferson researchers discovered that the type 2 receptor, not just type 1, mediates the production of fatty acid synthase (FAS), which has been shown to supply the cell wall with ingredients necessary for cancer cells to multiply.

FAS was previously identified as a possible oncogene in the 1980s. It is up-regulated in breast cancers and is indicator of poor prognosis, and thus believed to be a worthwhile chemopreventive target.

“AngII is not just involved in cell inflammation and angiogenesis; it's involved in tumor metabolism as well,” said Dr. Arafat, a member of the [Kimmel Cancer Center at Jefferson](#). “It promotes FAS with both receptors, which makes the tumor grow.”

“Blocking the type 2 receptor reduces PDA cell growth with the activation of AMPK, revealing a new mechanism by which chemoprevention can exploit,” she added. “In fact, maybe combined blocking of the two receptors would be more efficient than just blocking one receptor.”

AMPK, or adenosine monophosphate-activated protein kinase, is the focus of several agents today, including ones for diabetes and related metabolic diseases. It is a master metabolic regulator for cells that is activated in times of reduced energy availability, like starvation. Activation of AMPK has been shown to improve energy homeostasis, lipid profile and blood pressure. The enzyme also activates a well-known tumor suppressor, p53.

“The main thing is activation of AMPK in tumor cells,” said Dr. Arafat. “AMPK is the perfect candidate as it regulates multiple targets that both halt tumor cell division and activate programmed cell death. Although it is yet to be determined how the type 2 receptor imposes deregulation of AMPK activity, identification of the type 2 receptor as a novel target for therapy is very exciting”

Next, Dr. Arafat and fellow researchers are proposing to take this research into animal studies. They hope to target the receptors early on in the disease to better understand its prevention capabilities and also study its treatment potential. Considering pancreatic cancer is typically detected in later stages, finding better ways to treat cases that have progressed further along would be of great benefit to patients.

## **Temple Burn Center: Bringing Healing and Comfort to Profoundly Injured Patients**

Whether suffering from first-degree burns, in which the outer layer of the skin becomes red and painful; second degree burns, which penetrate the lower layer of the skin and cause swelling and blistering; or third-degree burns, which go all the way through to deeper tissues, turning skin black and leathery, the [Temple University Hospital's Burn Center](#) offers a wide range of evidence-based treatments for both inpatients and outpatients.

Temple's Burn Center provides the most complex acute care in a dedicated, state-of-the-art intensive-care unit staffed by emergency physicians, surgeons, nurses, and other specialists. The center treats between 250 and 300 patients a year, ranging from 14 years old to the elderly. Patients admitted to the center remain an average of 10 days, depending on the severity of their injuries.

"We are the only adult 'verified' burn center in Philadelphia, meaning that we meet optimal burn care criteria established by the American Burn Association and the American College of Surgeons," says Director William B. Hughes, MD. "And we're the only burn facility in the area to be affiliated with a Level 1 Trauma Center, giving patients the added measure of confidence that they're getting the best care possible. Many hospitals, both in the US and abroad, send us their burn patients," adds Dr. Hughes.

Temple Burn Center's well-earned reputation for excellence received another boost this June, when it moved to a new location on the hospital campus. "Our new space is larger, and has ten ICU beds, three more than in our old location. Our patient rooms now have large, bright windows, making the healing environment much more cheerful," says the center's nurse manager Patricia Regojo, RN. "We've acquired ceiling lifts to transfer patients in and out of their beds and reposition them more gently." notes Regojo.

The Center provides a wide variety of treatments—ranging from outpatient care for less serious burns to sophisticated skin grafting procedures for second and third-degree burns—as well as ancillary services that many burn patients need, such as physical and occupational therapy help to maintain or restore mobility and function.

"Burn victims are some of the most severely injured patients, with injuries to multiple systems of their body. Their ability to breathe and eat is affected as are internal organs. "We are equipped to care for all of these aspects of our patients' lives. Our tight, interdisciplinary team includes physicians; registered nurses; burn technicians; physical, occupational, respiratory and

speech therapists; dietitians; and social workers who round on a daily basis,” he adds. Psychologists and psychiatrists are consulted, as needed.

“You need respiratory and speech therapy to evaluate and treat swallowing functions and inhalation injuries that affect the airway,” Regojo explains. “Burn patients require a lot of calories, plus proteins, to heal their wounds. Nedicated dietitians are essential,” she adds.

Dr. Hughes explains that second-degree burns will generally heal within two weeks, if kept cool and clean, with antimicrobial dressings to prevent infection. Third-degree burns, also called “full-thickness” burns, require dead tissue to be removed. Healthy skin—usually from the patient's thigh—is then grafted onto the wound.

In some cases, bio-synthetic xenografts are used for larger, serious burn wounds. The xenograft is applied for a week or so, and then removed once the patient's own new skin has grown. The process can result in less scarring than other healing methods, Dr. Hughes says.

Family members also suffer from their loved-ones’ burn injuries. “Sometimes it’s the families that do the most worrying, since our more seriously-injured patients are often sedated during most of their stay to protect them from the pain of their injuries,” says Regojo. “I think our staff does an excellent job guiding families through the healing process, and teaching them how to care for their loved-one’s wounds,” says Regojo.

Walter Rivera, a patient whose legs were severely burned when his motorcycle crashed and caught fire in early June, said the Temple Burn Center has been like a home to him during his recovery. “The nurses and doctors have been taking very good care of me since I got here,” says Rivera. “Everyone has been very nice to my mother and my family members when they come to visit me,” he adds.

The two of them, plus Temple surgeon Daniel Hensell, MD, and several other team members have worked together since Temple's Burn Center first opened in 1999. “Working with each other for over a decade builds a tremendous level of camaraderie and efficiency. We know what each other expects, and we've developed a lot of respect for each other,” says Regojo. “When a new care team member comes in, they recognize our enthusiasm, and we try our best to encourage and nurture that feeling in them.”

“We want to see our patients get better. Sometimes there are setbacks. But we experience great joy when we see them get back to their lives and their family. It’s that joy that keeps us going,” adds Dr. Hughes.