

# Cancer Lines

The Cancer Program of UNC-Chapel Hill & UNC Health Care

Winter 2006

## Tiny Technology Promises Big Results

Scientists at UNC Lineberger are using nanotechnology to improve the diagnosis and treatment of cancer.

Nanotechnology involves controlling atoms and molecules on length scales of hundreds of nanometers (one billionth of a meter) or less. The diameter of a human hair is often used to describe the size of microtechnologies. Nanotechnology involves items that are 1000 times smaller.

The National Cancer Institute named UNC Lineberger one of seven institutions nationwide in the NCI Alliance for Nanotechnology in Cancer. The funds for the first year of this five-year award totaled \$3,899,965 and established the Carolina Center of Cancer Nanotechnology Excellence.

Rudy Juliano, professor of pharmacology in UNC's School of Medicine and a UNC Lineberger member, is principal investigator of the grant. Joe DeSimone, William R. Kenan Jr. Distinguished Professor of Chemistry and Chemical Engineering, is co-principal investigator.

"This exciting new thrust in cancer nanomedicine comes as a result of a convergence of the biological and physical sciences," Juliano says. "Scientists have learned that cells function as assemblies of biological nanomachines," he

explains. "The abnormalities of cancer and other diseases are often based on malfunction of those nanomachines, for example, ones involved in cell growth regulation, cellular energy metabolism, or control of DNA stability."

Despite the tiny size, complex nanoscale devices can now be created and manipulated. "This offers the possibility of bringing the power of physical science to bear on problems of biomedical research," he says, "with exciting implications for therapy, diagnosis, and early detection of cancer and other diseases."

### Multidisciplinary Solutions

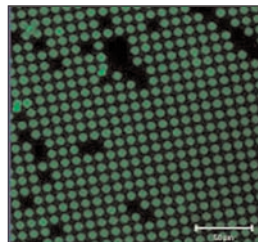
Turning theory into practice, associate professor of chemistry Wenbin Lin leads a team making magnetic nanoparticles that will selectively bind to the surfaces of brain tumor cells. These nanovectors can then be used to deliver imaging and therapeutic agents to brain tumors in mice.

Think of it as the express lane to a tumor.

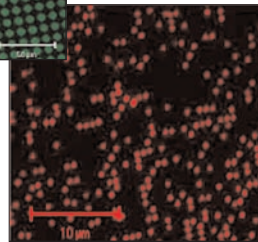
But getting there requires expertise from other disciplines, Lin says. "Professor Richard Superfine's group in the Physics Department will then carry out fundamental studies on

magnetic targeting in tissues, while Professor Terry Van Dyke's group in the Genetics Department will test these new imaging and therapeutic agents on genetically engineered

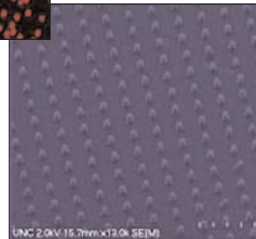
*continued on page 5*



*Personalizing the cure for cancer with physical science (top to bottom): Biocompatible nanoparticles*



*tagged with a protein biosensor; biocompatible nanoparticles loaded with DNA; and nano-carriers embedded in a surgical adhesive. Graphics courtesy of DeSimone lab.*



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**2** Director's Message and Digital Mammography



**3** Head and Neck Cancer



**4** Profile: Carey and Ewend



**7** Ticked Pink

## Lineberger Club Event Features Elizabeth Edwards

More than 260 of UNC Lineberger's most generous donors attended the January 7 Lineberger Club luncheon and saw the Tar Heel men's basketball team beat NC State.

Guest speaker Elizabeth Edwards shared with the group her experience with breast cancer and thanked them for their vital support which has advanced research and enhanced UNC's team approach to care for cancer patients.

Thanks to sponsors Lee-Moore Oil Company, Café Carolina, Sprint, Stock Building Supply and Wachovia Wealth Management for their sustained support of the lunch. This annual event is open to all members of the Lineberger Club, annual donors of \$1,000 or more to the Cancer Center.

Silent auction items, including several pairs of basketball tickets and a basketball signed by the 2005-06 UNC men's basketball team, netted over \$3,000.

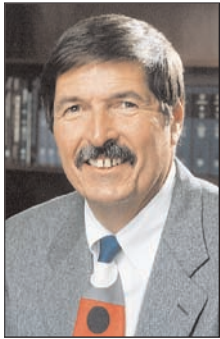


Front row (left to right): UNC Lineberger associate director Dr. Rich Goldberg, speaker Elizabeth Edwards, speaker Dr. Etta Pisano. Second row (left to right): Dr. Lisa Carey, co-director, UNC Breast Center; Dr. Shelley Earp, Lineberger director; Dr. William Roper, CEO, UNC Health Care and Dean, UNC School of Medicine.

the inside line up



# Director's Message



Dr. H. Shelton Earp, III

This issue of Cancer Lines is about teamwork and highlights two of our multi-disciplinary programs: the Head and Neck Cancer Program and the Thoracic Oncology Program, celebrating its 10th anniversary. These programs function as a team for patients and families who benefit

from the expertise of many specialists working together to develop a comprehensive treatment plan and coordinate care.

Collaboration and collegiality are hallmarks of UNC Lineberger. Read about the most recent example - the new Carolina Center of Nanotechnology Excellence (CCNE) that involves an incredible cross-campus team of scientists at UNC and other institutions.

Our teamwork extends beyond our own campus and faculty. Dr. Etta Pisano led a national study of 49,528 women

comparing x-ray and digital mammography. And I am honored to have just begun a two-year term as president of the Association of American Cancer Institutes.

We are fortunate to have a dedicated and passionate group of community volunteers who are another critical part of our team and who work diligently to raise money for cancer research and treatment. Thank you to these volunteers who organize our successful special events. As you will read, they have been busy with the Tickled Pink luncheons, the Beach Ball and the first annual Fast Break with Roy Williams! Their efforts, coupled with those of our faculty and staff, inspire and extend superb UNC Lineberger teamwork. ●



UNC Lineberger is designated a comprehensive cancer center by the National Cancer Institute.

*Cancer Lines* is a publication of the UNC Lineberger Comprehensive Cancer Center, The University of North Carolina School of Medicine at Chapel Hill.

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## Earp New President of Association of American Cancer Institutes

UNC Lineberger Director Shelley Earp began a two-year term as president of the Association of American Cancer Institutes (AACI), an association of the nation's 85 leading academic and freestanding cancer centers, in October. AACI coordinates the work of universities, foundations and private and governmental organizations toward the eradication of cancer.

Earp, Lineberger Professor of Cancer Research and a professor of pharmacology and medicine, also serves as principal investigator of a National Cancer Institute Cancer Center Support Grant and of a Specialized Program of Research

Excellence in Breast Cancer (SPORE), one of only 11 breast SPORES funded by NCI.

His laboratory studies growth and differentiation signaling from both receptor and non-receptor tyrosine kinases. His long-standing interest in the EGF receptor family is currently focused on HER4/ErbB4 and its unusual growth inhibitory signal in breast cancer cells. A second project is investigating the action of Mer and Ack1 receptor and non-receptor tyrosine kinases, in the regulation of prostate cancer cell tumorigenesis, in vitro and in vivo. ●



## Tepper Named MacLean Distinguished Professor

Dr. Joel Tepper, professor and chair of radiation oncology, has been named the Hector MacLean Distinguished Professor in Cancer Research. Tepper is principal investigator of the UNC Lineberger GI Specialized Program of Research Excellence (SPORE). He is past president of the American Society for Therapeutic Radiology and Oncology and he co-chairs the National Cancer Institute's Gastrointestinal Integroup, which is the organizing body for the nine cooperative groups involved in gastrointestinal cancer.

He delivered the 2005 UNC School of Medicine Berryhill Lecture in September 2005. This annual lecture, named in honor of Norma Berryhill who, along with her husband Dr. Reece Berryhill, contributed immeasurably to the development of the UNC School of Medicine, is delivered by an eminent member of the School's faculty. ●

## Pisano Leads Major Mammography Study

Dr. Etta Pisano was the lead author of a major breast cancer screening study, the results of which were announced in September and published in the October 27, 2005 issue of the *New England Journal of Medicine*. Pisano is Kenan professor of radiology and biomedical engineering at the University of North Carolina at Chapel Hill, director of the Biomedical Research Imaging Center at UNC and member of the UNC Lineberger Comprehensive Cancer Center.

Study scientists found that digital mammography detected significantly (up to 28 percent) more cancers than screen film mammography in women ages 50 and younger, premenopausal and perimenopausal women, and women with dense breasts, according to results from the ACRIN Digital Mammographic Imaging Screening Trial (DMIST).

However, the American College of Radiology

Imaging Network (ACRIN) trial, one of the largest breast cancer screening studies ever performed, showed no difference between digital and film mammography in detecting breast cancer for the general population of women.



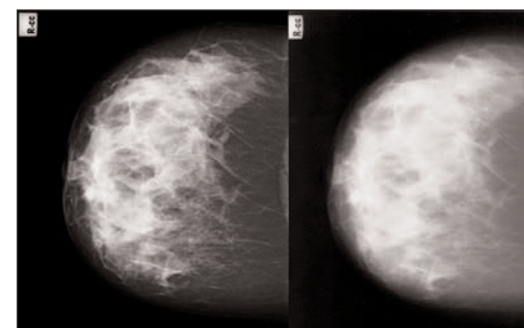
The trial, funded by the National Cancer Institute (NCI), was conducted by ACRIN and included researchers at 33 sites across the United States and Canada.

Starting in October 2001, DMIST enrolled 49,528 women at 33 sites in the United States and Canada who had no signs

of breast cancer. Women in the trial were given both digital and film mammograms. Mammograms were interpreted independently by two different radiologists.

Digital mammography takes an electronic image of the breast and stores it directly in a computer, allowing the recorded data to be enhanced, magnified or manipulated for further evaluation. The electronic

image also can be printed on film. Film mammography units use film to both capture and display the image. The sensitivity of film mammography is somewhat limited in women with dense breasts, a population at higher risk for breast cancer. ●



Comparison of digital and film mammogram (left: digital, right: film) Questionable area, just below the nipple, is more easily visible in the digital image. Image courtesy of UNC-Chapel Hill School of Medicine Department of Radiology, Breast Imaging

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# Team Expertise, Individual Patient Focus

Dave Holton of Kitty Hawk, NC, a throat cancer patient treated at UNC, summarized it this way: "One of the best things about my UNC experience was the coordination of my care. All my doctors talked with each other and really worked together as a team." (Read more about Holton's experience at [www.nccancerstories.org](http://www.nccancerstories.org).)

That comment is just what program leader Dr. Mark Weissler and program members like to hear. "We do take a team approach," said Weissler, "and our specialists work closely together to help our patients with all the issues involved in treating head and neck cancers. We are fortunate to collaborate with faculty in the UNC School of Dentistry since not many programs have ready access to a dental school as part of the health affairs complex."

The UNC Lineberger Multidisciplinary Head and Neck Cancer Program serves referring physicians and patients from across North Carolina and beyond. The program is broad-ranging, from the largest population-based study in the nation involving North Carolina head and neck cancer patients from 46 counties, to innovative clinical trials, to molecular studies to help predict treatment outcomes.

At the heart of the program is patient care. "Referring physicians send us their patients because these patients require much complex care, and UNC has the services they need all in one place," explained Dr. Weissler. "Over half of the new patients we see each year have already had previous therapy - chemo or radiation - and have had a recurrence of their disease."

When calling UNC, referring physicians and patients will first talk with program assistant Laura Miller. Patients who visit UNC are followed by Sylvia Wrenn, the program's nurse coordinator. "Many patients or their families just need a person with whom they can talk about what is going on with them. The nurse coordinator is a single contact person that they can talk to without having to make a phone call to each part of the team in order to get a question answered."

At UNC, in addition to surgical, radiation and medical oncologists, patients have access to nutritionists, dentists and a speech and swallowing specialist.

## Specialty Care

Brian Kanapkey, the speech pathology and

swallowing therapist, explains that "the goal of therapy is to give the patient as much normal function - voice and swallowing - as possible." He works with patients who will undergo a laryngectomy (removal of the voice box) to understand the procedure and how it will affect their speech and swallowing. After surgery, he works with them to adapt and to develop proficiency with speech assistance devices.

Additionally, if patients have speech issues due to surgery or non-surgical treatment, he helps them with adaptive techniques such as tongue exercises and movements or slowing speech. "Some patients may have difficulty swallowing because of their tumor or the surgery. We work with them to make that function as normal as possible."

One patient, Herman Stewart of Kings Mountain, NC, calls Kanapkey his "main man." Following his 14-hour surgery, Stewart faced rehabilitation and credits Kanapkey for his expertise in helping him. (See Stewart's profile on page 6.)

Dr. Janet Southerland, assistant professor of dental ecology, estimates that she and her colleagues at the UNC Dental School see more than 80 percent of the patients for evaluation prior to radiation therapy. "It's important that a patient's teeth be in good condition prior to radiation therapy, which can compromise blood flow to the area and exacerbate existing infection or gum disease. If there are problems, we can intervene so that the treatment regime runs smoothly and effectively."

"If needed, Dr. Glenn Minsley, professor of prosthodontics, builds prostheses to correct defects caused by the cancer or cancer surgery. He makes obturators, which are prosthetic devices that close an opening caused by either cancer or cancer surgery. He has constructed prosthetic ears and eyes as well."

## Population-Based Studies Seek Clues to Cancer Causation

In addition to treating head and neck cancers, program members are involved in studying how cancer starts and factors that may initiate cancer growth. The Carolina Head and Neck Cancer (CHANCE) study involves interviewing 1300 patients with head and neck



Head and Neck Oncology team: Front row (left to right): Dr. Carol Shores, Dr. Marion Couch, Dr. Janet Southerland, Melissa Schroeder, PA, Dr. Valerie Jewells. Second row (left to right): Dr. Neil Hayes, Dr. Julian Rosenman, Dr. Andrew Olshan, Dr. Mark Weissler, Laura Miller, program assistant, Dr. William Shockley, Sylvia Wrenn, nurse coordinator, Dr. Lauren Patton, and Dr. David Morris.

cancers and 1300 without cancer. Dr. Andrew Olshan, professor of epidemiology in the UNC School of Public Health and leader of UNC Lineberger's cancer epidemiology program, leads this study. He explains that in this project, scientists are studying gene-environment interactions of variations in genes involved in the metabolism and repair of DNA damage from the two major risk factors, tobacco and alcohol. This constitutes the largest population-based molecular epidemiology study of head and neck cancer ever conducted in the US.

In addition, the study will evaluate disparities in access to health care and the occurrence and treatment of head and neck cancer among different ethnic groups. A follow-up survivorship study of the patient group is underway.

## Clinical Research Strives to Improve Care and Treatment Outcomes

Carol Shores, assistant professor of otolaryngology/head and neck surgery and Lineberger member, is developing a patient clinical database. "We are conducting three retrospective studies," she explained. "One, looking at how to determine cancer spread to the liver, and another looking at a cell-type variant that makes the cancer more aggressive. Also, we are tracking the data to determine where our patients come from and what are their clinical outcomes. Additionally, we just started a prospective study looking at quality-of-life issues for these patients."

"In the future," she explains, "we hope to use these data to help us make treatment decisions, based on the experience and outcomes of the 3100 patients in the database."

Cachexia, or wasting disease, occurs when cancer patients lose significant weight due in part to inability to eat, but also to other yet unknown causes related to the cancer itself. Because many head and neck cancer patients already have compromised nutrition due to swallowing problems, cancer-related cachexia causes worsening weight loss and nutritional status, making the patient less tolerant of any type of therapy. Two cachexia projects are underway at UNC. One project involves defining cachexia in the head and neck cancer patient population and the other is a trial of the effect of celecoxib on short term weight loss in head and neck cancer patients.

The group also is about to open a clinical trial to determine the effect of an antioxidant-depleted diet on the effectiveness of cancer therapy. One of the

continued on page 6

## Head and Neck Cancer Fast Facts

excerpted from the National Cancer Institute Cancer Facts webpage

[www.cancer.gov/cancertopics/types/head-and-neck](http://www.cancer.gov/cancertopics/types/head-and-neck)

Head and Neck cancers include cancers of the oral cavity (lips, hard and soft palate, tongue, gums and tonsils); nasal area (nose, nasal cavity and sinuses); upper respiratory (larynx, trachea and muscles in the neck and upper back); and ear.

### Incidence

Head and neck cancers account for approximately three to five percent of all cancers in the U.S. These cancers are more common in men and in people over age 50.

### Risk Factors

Tobacco (including smokeless tobacco) and alcohol use are important risk factors. 85% of head and neck cancers are linked to tobacco use. Using both tobacco and alcohol increases the risk for developing these cancers more than using either tobacco or alcohol alone.

### Other risk factors include:

- Sun exposure (lip)
- Possibly human papillomavirus (HPV) infection
- Radiation to the head and neck from diagnostic x-rays or from radiation therapy for noncancerous conditions or cancer.
- Certain industrial exposures, such as wood or nickel dust inhalation, or airborne particles of asbestos.
- Poor oral hygiene
- Possibly, the use of mouthwash that has a high alcohol content

### Common Symptoms

- A lump or sore throat that does not heal
- A sore throat that does not go away
- Difficulty swallowing
- A change or hoarseness in the voice

# Profile

Lisa Carey and Matt Ewend give new meaning to the term "married to your work." They're devoted to cancer research and treatment, and they're devoted to each other. Though this husband-and-wife team works in different labs - Carey focuses on breast cancer specifically, while Ewend trains his sights on all forms of cancer in the brain - their work overlaps in the area of breast cancer brain metastasis.

More than 200,000 U.S. women deal with breast cancer each year (about 35,000 die from it). But, Carey notes, "improvements in diagnosis and treatment have produced about a 25 percent decrease in breast cancer mortality since 1990." By contrast, metastatic brain tumors will affect 125,000 Americans annually, about 4,000 to 5,000 North Carolinians.

"Progress by researchers such as Lisa in treating breast cancer, lung cancer and melanoma has increased the survival for these patients - that's good," Ewend explains. "However, many of the treatments do not reach the brain, so isolated recurrence there is more common. In a way, my wife's good work is making my job harder."

## An Indirect Path

Neither initially intended to wind up in medicine. Carey's interest was in animals - prehistoric and otherwise. At age five, she was set on becoming a paleontologist ("I was a weird little kid"), but by 12 had decided on being a vet. In high school, she settled on medicine.

Ewend planned to follow his grandfather into law, then considered a career as a sportscaster ("Lisa says I can always guess what the announcers are going to say"). In high school, he too chose medicine.

The two met in the first year of medical school at Johns Hopkins. "We did have adjacent anatomy tables," Ewend notes. "Isn't that a creepy story?" Carey quips.

## Choosing Oncology

Carey originally chose surgery as her specialty. "As I got into the clinical part of medical school, I realized that I hated being in the operating room," she recalls. "This is a problem for a surgeon."

She switched to internal medicine. "I was interested in oncology because it is scientifically fascinating and because the science was being so quickly translated to benefits for people with the disease," she notes.

This led to a career in clinical and translational research. "We examine either new drugs or new combinations of drugs by giving them to women with breast cancer to see whether they work," she explains. She also applies new technologies or tests that are developed by her colleagues in the laboratory "to see what role they might play either in diagnosis or treatment decisions."

Ewend went into med school hoping to be an oncologist and became interested in neurosurgery during a summer research project. "I saw that I could combine it with my interest in tumors and focus on brain tumors," he says.

Today, Ewend's research and clinical interests are in developing new ways to treat patients with cancer that spreads to the brain from other sites. "In the clinic, we use combinations of surgery,



Lisa Carey and Matt Ewend

radiation therapy and local treatments like chemotherapy wafers to treat brain tumors," he says. "In the laboratory, we look at the genetic fingerprints of cancers that spread to the brain to see if we can figure out why they spread and how to better treat them."

## The Southern Part of Heaven

They chose UNC in Chapel Hill for a number of reasons. "The opportunities were spectacular here," he says. "The area and the basketball were just icing on the cake."

Adds Carey, "It is hard to find a place with excellence and needs in both neurooncologic surgery and breast cancer. UNC Lineberger provided an incredible clinical research environment and an environment that fosters the junior academic faculty. What Matt calls the icing on the cake for me was that we could live close to where we work, it's a great town for our kids to grow up in, and the appeal of a college town atmosphere." They have three children: two boys, Nash, 10, and Kelly, 8, and a daughter, Abby, 7. ●

# Briefs

## Cancer support cells may evolve, fuel tumor growth, study shows

UNC Lineberger scientists have demonstrated in a living organism that cancers may cause surrounding supportive cells to evolve and ultimately promote cancer growth.

The new research offers what is believed to be the first evidence that mutations within cancer cells can signal surrounding tissue cells to alter their molecular composition in ways that promote tumor growth and proliferation.

Moreover, the findings also suggest that cell mutations that promote cancer progression may arise in cells other than the predominant cancer cell.

The new findings were published as the cover story in the 12/16/05 issue of the journal *Cell*.

While not offering immediate application to the treatment of human cancers, the research indicates that new anti-tumor therapies may be more effective if their targets are broadened to include molecules within supporting cells of the cancer.

Dr. Terry Van Dyke, professor of genetics and biochemistry and biophysics in the School of Medicine and member of the UNC Lineberger Comprehensive Cancer Center, was the study's senior author.

## Novel enzyme offers new look at gene regulation; UNC scientists' findings have diverse implications

UNC Lineberger scientists have purified a novel protein and have shown it can alter gene activity by reversing a molecular modification previously thought permanent.

In the study, the authors showed that a protein called JHDM1A is able to remove a methyl group from histone H3, one of four histone proteins bound to all genes. Until just last year, the addition of a methyl group to a histone had been regarded as irreversible.

Dr. Yi Zhang was the lead author. Zhang is professor of biochemistry and biophysics at UNC's School of Medicine and the university's first Howard Hughes Medical Institute investigator.

The new study appeared in the 12/18/05 online version of the journal *Nature*.

"Human genes are so tightly compact within the nucleus that if the DNA of a single cell were unwound and stretched, it would be a line of about two meters in length," said Zhang. "Histones are necessary to package the DNA so that it fits inside a cell's nucleus."

Because they are so intimately associated with DNA, even slight chemical alterations of histones can have profound effects on nearby genes. Depending on the precise location and how many

methyl groups are added, their presence can either switch affected genes on or off.

The implications of the new findings are as diverse as the proteins that contain a JmjC domain. For example, hair loss occurs in individuals with mutations in the JmjC domain of a protein called "hairless," possibly due to defects in the appropriate removal of histone methyl groups.

"Given the large numbers of JmjC domain-containing proteins that exist in diverse organisms ranging from yeast to human, our discovery will keep many people in the field busy for the years to come," said Zhang.

Other UNC scientists as well as two from Memorial Sloan-Kettering Cancer Center were involved in the work.

## Less-extensive biopsy method helps diagnose progression of large breast tumors

New research by David Ollila, associate professor of surgery at UNC and co-leader of the UNC Breast Center and leader of the UNC Melanoma Program, showed that women with large breast tumors can benefit from the less-invasive sentinel lymph node biopsy performed before chemotherapy. The procedure can help some patients avoid the pain and discomfort of full armpit node removal, which often causes swelling, numbness and infection.

"We're looking at a way in which the patient has definitive breast cancer and nodal staging before she ever undergoes chemotherapy, so we know exactly where she starts," Ollila says. "Performing this procedure before neoadjuvant chemotherapy



## Tiny Technology

continued from page 1

mouse models of brain tumors. This multidisciplinary team works very closely to solve this highly challenging problem."

This development could be a boon to brain cancer patients. "Few imaging and therapeutic agents can readily cross the blood brain barrier," Lin notes. "New approaches are desperately needed."

### Faster, Smaller, Better

Otto Zhou, Lyle Jones Distinguished Professor, Department of Physics and Astronomy, is the principal investigator for a project using nanotubes made of a single layer of carbon atoms to create clearer x-rays faster.

"One of the unique properties of the carbon nanotubes is that they can generate electrons without high-temperature heating," he explains. This "cold" electron technology has the potential to change the way x-ray radiations are generated.

There are two potential benefits of this application. "The technology can lead to better x-ray sources and imaging systems which are smaller, faster, and more accurate than today's commercial devices," Zhou explains. "For cancer patients, the technology has the potential to provide earlier detection at lower x-ray doses."

### Get It In PRINT

A new method called PRINT (Particle Replication In Non-wetting Templates) allows researchers to use techniques traditionally used by the electronics industry for making transistors to create nano-carriers for the detection, diagnosis and treatment of cancer.

"PRINT appears to be a platform technology that allows us to make particles absolutely uniform in size and shape," explains Joe DeSimone, co-principal investigator for the grant. "PRINT particles can be made from just about any material (biocompatible, bioabsorbable), can contain any cargo (imaging beacon, small molecule therapeutic, protein, nucleic acid, viruses), and can be surface-functionalized with almost any targeting substances (proteins, cell-targeting peptides, aptamers, etc.)."

The uniformity of PRINT particles stands in stark contrast to traditional state-of-the-art delivery approaches (including liposomes, micelles, dendrimers and other macromolecules) which are complex mixtures yielding very heterogeneous and often not shelf-stable formulations. "The uniformity of PRINT particles will raise the standard for particle technologies in regard to uniformity and efficacy, much in the way enantiomeric purity (or uniformity) of drugs is now the standard for today," says DiSimone, who is the principal investigator for two PRINT programs within the grant.

Using PRINT, DeSimone and his team expect to improve the detection limits for cancer, including the diagnosis and location of the proliferation. "We

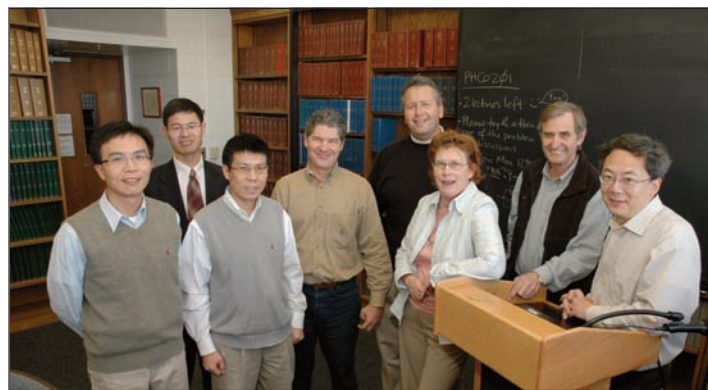
believe our PRINT particles will lead to new, highly effective therapies for the treatment of cancer, including cell-specific targeting of cancer cells to mitigate the side effects of chemotherapy treatments and to improve the efficacy of the treatments."

### Fast, Accurate, Painless

J. Michael Ramsey, Minnie N. Goldby Distinguished Professor of Chemistry, is using nanotechnology to develop point-of-care diagnostic devices that include nano-scale features for diagnosing the efficacy of chemo-therapeutic treatments. "These measurements require a determination of the concentration of very specific molecules in certain cells," he explains.

"The devices that we envision must first separate the overwhelming number of red blood cells from the white blood cells," he continues. These "nanofluidics" machines, about the size of a playing card, will analyze one drop of blood and have almost instantaneous results on a vast array of blood measurements.

"Then the white blood cells must be sorted to identify only a small subset of white blood cells and finally these sorted white blood cells are chemically characterized to determine the



Carolina Center of Cancer Nanotechnology Excellence team members: front row (left-right) core leaders Drs. Weili Lin, Rehe Liu, and Terry Van Dyke, principal investigator Dr. Rudy Juliano, and project leader Dr. Otto Zhou. Second row (left-right) project leaders Drs. Wenbin Lin and Mike Ramsey, and grant co-principal investigator Dr. Joe DeSimone.

makes it easier for the medical oncologist and the radiation oncologist to know exactly what they need to do.

"Any woman diagnosed with breast cancer should ask her physician what role this technique might play in her overall treatment," Ollila suggests.

The study appeared in the September 2005 issue of the *American Journal of Surgery*.

### Cellular molecule may provide target for prostate cancer treatment

Scientists under the direction of Shelley Earp identified a molecule, Ack1, that stimulates tumor formation in part by signaling prostate cells to rid themselves of a tumor-suppressor protein. "Tumors grew more rapidly and invaded as if they were converted to advanced prostate cancer," Earp explains.

The study also identified the molecule as a potential target for developing novel drugs against prostate cancer. In tests involving an experimental drug developed by the National Cancer Institute called geldanamycin, the Earp team found Ack1 activity could be inhibited through interference with its molecular interactions.

"Because we found Ack1 is more active in advanced prostate tumors, and its inhibition blocks experimental tumor growth," Earp notes, "we believe Ack1 should be a target for novel drug development."

The study appeared in the 11/15/05 issue of the journal *Cancer Research*.

### Altering time of sentinel lymph node biopsy may improve mastectomy reconstruction process

Altering the standard step-by-step procedure from diagnosis to surgery to reconstruction can improve the process for mastectomy patients and help determine if immediate reconstruction is the best course of action.

Key to the new approach is the use of sentinel lymph node biopsy (SLNB) performed as an outpatient procedure a week or so prior to mastectomy, rather than doing the SLNB at the same operation as the mastectomy and reconstruction.

The approach is beneficial for two reasons, says lead study author Nancy Klauber-DeMore, assistant professor of surgery in UNC's School of Medicine and a member of UNC Lineberger. It eliminates the need for another operation, axillary lymph node dissection, or removal of all the lymph nodes under the armpit. It also will provide better information to help patients and physicians determine if post-mastectomy radiation therapy is indicated.

"With the knowledge of the final pathology, the patient can make more informed decisions in discussion with the radiation oncologist and plastic surgeon, to determine whether or not the patient will need radiation after the mastectomy," Klauber-DeMore said. "This in turn will influence whether or not the patient should have immediate reconstruction. We also know definitively if the patient needs an axillary lymph node dissection at the time of mastectomy."

The study appeared in the October 2005 issue of the *American Journal of Surgery*.

concentrations of specific molecules or proteins." The concentration of these molecules will determine if a particular type of chemotherapy is working or not.

It is hoped that these labs-on-a-chip, like modern blood sugar testing devices, will produce results during patients' office visits using very small quantities of blood. This will allow physicians to start each patient on the most beneficial chemotherapy program as fast as possible.

Ramsey is the project's lead investigator. Also on the team are Ned Sharpless and Lishan Su, who direct the biological aspects of the project; Klaus Hahn, who is working on fluorescent biosensors for identifying and quantifying specific proteins; and Glenn Walker, who is developing a device for quickly sorting red and white blood cells.

### In Good Company

Other institutions named as Centers of Cancer Nanotechnology Excellence are: the California Institute of Technology, the University of California at San Diego, Emory University and the Georgia Institute of Technology, the Massachusetts Institute of Technology and Harvard University, Northwestern University, and Washington University in St. Louis.

"The Carolina CCNE provides a means for physicians and cancer researchers to join forces with physical scientists," Ramsey says. "The joint venture will hopefully allow the development of technologies that neither could accomplish on their own." ●



# Thoracic Oncology Program Turns 10

The physicians at the Multi-disciplinary Thoracic Oncology Program (MTO) at UNC have one basic premise in their approach to battling lung cancer: Every patient can be helped.

"These days, there are many treatments and therapies available that can cure patients who have lung cancer," said Dr. Richard Feins, professor of thoracic surgery. "Certainly, not all lung cancer can be cured, but we can extend life and enhance the quality of that life for patients. Every cancer is treatable." Dr. Feins came to UNC this summer from the University of Rochester.

MTO offers leading-edge medical care to patients with thoracic malignancies, including cancers of the lung, esophagus, thymus, chest wall and mediastinum.

This year, MTO celebrates its 10th year of distinguished service to the citizens of North Carolina.

"The program's approach to treating patients is unique. Here at UNC, we have assembled a team of experts in the areas of pulmonary medicine, surgery, medical and radiation oncology, thoracic radiology, pathology, oncology nursing and patient counseling," said Dr. Mark Socinski, associate professor of medicine. "Together, our team tailors a plan for each patient so that his or her treatment is individualized, coordinated and delivered in a sensitive manner."

At MTO, the first person patients speak with is Ginny Ditzel, the program assistant. She schedules tests and appointments and smoothes the way for their visits to UNC.

Patients receive coordinated care through the nurse coordinator, Ann Steagall, as they move among the different medical specialties and among phases of treatment and follow up. And because their doctors



The MTO team: Front row (left-right) Ann Steagall, nurse coordinator; Dr. Richard Feins, program co-leader; Dr. M. Patricia Rivera, program co-leader; Dr. Mark Socinski, program co-leader. Second row (left-right): Dr. Neil Hayes, Dr. Tom Egan, Dr. Tom Stinchcombe, Tammy Allred, protocol nurse, Maureen Tynan, protocol nurse, Ginny Ditzel, program assistant. Not pictured is Dr. Jan Halle, program-co-leader.

practice at one of the leading academic medical centers in the country, patients have access to technological advances, new therapies and clinical trials.

"MTO physicians are committed to clinical research to advance care and increase therapeutic options for patients," explained Socinski. "We strive to treat as many of our patients as are eligible on leading-edge clinical trials."

"When we established MTO, we established a new standard of care and responsiveness for doctors and patients in the community," said Dr. M. Patricia Rivera, associate professor of medicine. "Whenever a physician in the community calls us, we help. That's our mission, to serve the health care needs of patients and the professional needs of physicians throughout the state."

For more information about the program or to make an appointment, visit: [www.unclineberger.org](http://www.unclineberger.org).

## Head and Neck Cancer

continued from page 3

main drugs used in chemotherapy for head and neck cancers, cisplatin, works by producing oxidative stress in cells. This stress - DNA damage- is what kills cancer cells. If patients are taking antioxidants, such as Vitamins A, C and E, they may be rendering their therapy less effective.

Study patients will be fed either a diet depleted in antioxidant Vitamins A, C and E or a diet that includes these antioxidants. Scientists will then compare treatment responses to see if taking the antioxidants alters efficacy.

The UNC Head and Neck Cancer Program conducts clinical trials of several new drugs. Said Dr. Neil Hayes, assistant professor of medicine, "Our goal is to be able to offer not only the best standard of care for our patients, but access to new and developing cancer therapeutics. We do this by offering interested patients participation in one of a number of clinical trials investigating the most promising treatments in head and neck cancer."

"Our program is investigating head and neck cancer from all angles," concludes Dr. Weissler. "We provide excellent care, effective patient and family support, and are conducting innovative work in clinical trials and epidemiology." ●



**Herman Stewart** first had cancer in 1987, but radiation to destroy the tumor that was on his vocal cords cured his disease. In 2004, after several months of not feeling well,

he went to his doctor for what seemed to be bronchitis. When multiple courses of antibiotics did not resolve the problem, he asked to see a specialist. The specialist sent him to UNC to see Dr. Carol Shores who found a second cancer in the hypopharynx, behind his vocal cords.

He underwent a 14-hour surgery during which his voice box and upper portion of the swallowing tube were removed. His esophagus was reconstructed using part of his small intestine, restoring his swallowing function. He underwent further surgery to stretch the new esophagus to improve his ability to swallow. He worked with speech pathology and swallowing therapist Brian Kanapkey to learn how to use his speech assistance device and to swallow. "Brian was encouraging, and thanks to him and the Lord Jesus I am functioning well."

Recently elected president of his Sunday School class, Herman and his wife Sylvia live in Kings Mountain, NC with their four daughters and their families close by. He retired from truck driving in 1998. "These folks at Chapel Hill know what they're doing. What I would tell anyone is that if you have a problem, get it checked out sooner rather than later." ●

## 2005 Oncology Nursing and Service Awards

UNC Lineberger awarded its 2005 Oncology Nursing and Clinical Services Excellence Awards to three staff members in recognition of their extraordinary hard work, care and dedication that they bring to the center each day.

Elaine Bryant won the Clinical Services Excellence Award, and nurses Carol Marlowe and Susan McKenney won the Oncology Nursing Excellence Awards. Bryant is the executive assistant to the cancer center's administrative director, Bobbi Marks. Marlowe, RN, has worked at UNC for 15 years, most recently in the Bone Marrow Transplant Unit. McKenney, a nurse practitioner, has worked with the multidisciplinary breast cancer group since its inception in 1993.

The Oncology Nursing Excellence Awards are in their fourth year at UNC. Winners receive a \$1500 stipend along with the award to be used towards professional education activities. The award was named in memory of Charmayne S. Gray, an outstanding oncology nurse practitioner who died in an auto accident in 2002. The Clinical Services Excellence Awards are in their second year. ●



Front row (left-right) Dr. Shelley Earp, UNC Lineberger director; award winner Carol Marlowe; Bobbi Marks, administrative director, UNC Health Care Oncology services; Elaine Bryant, award winner; Susan McKenney, award winner; Dr. Ben Calvo, chief, surgical oncology division and co-leader, GI Cancer Program. Second row: (left-right) Dr. Tom Shea, director UNC Bone

Marrow and Stem Cell Transplantation Program; Dr. Rich Goldberg, associate director, UNC Lineberger and director, oncology services, UNC Health Care.

## David Anderson Named Medical Foundation President

David B. Anderson is the new associate dean for Advancement and president of The Medical Foundation of North Carolina, Inc. He succeeds James L. Copeland who retired after 15 years. The Medical Foundation is the fundraising arm for the UNC School of Medicine and the hospitals that comprise UNC Health Care.

Anderson comes to UNC having just served as the associate vice chancellor for



University Development at North Carolina State University. Previously, Anderson also was the executive director of Medical Center Development at Duke University and has held major fundraising positions at Rice University, the University of Pittsburgh and the University of Virginia. ●





### Sole Sisters Hold Five-Year Reunion

The Sole Sisters program celebrated its five year reunion on Saturday, October 15, 2005 at the William and Ida B. Friday Center. Over 500 women have participated since 2001. Representatives from all five years attended the reunion and participated in a two-mile walk followed by breakfast, a silent auction and raffle for prizes donated by local businesses. Guest speakers included Shelley Earp, MD, Director Lineberger Comprehensive Cancer Center, Elizabeth Hopkins, President, Board of Directors, Girls on the Run and Jeanne Peck, Susan G. Komen Foundation and founder of the NC Triangle Race for the Cure. The Sole Sisters program provides education, motivation and support for women to begin and maintain a regular exercise program and raises awareness for breast cancer screening, prevention and treatment.

Shown here are "Coach" and founder Judy Swasey and 2002 Sole Sisters participant Diana Steele. ●



### Light the Night

Team UNC Lineberger, led by captains Tammy Allred and Rey Garcia, participated in and served as a sponsor for the Eastern North Carolina Leukemia & Lymphoma Society's "Light the Night" event in Raleigh on September 24. Dawn Hardison, a former employee in the oncology clinic, a cancer survivor and winner of last year's UNC Lineberger Clinical Services Excellence Award, was one of the featured speakers at the event. A number of UNC patients also took part in the event. ●

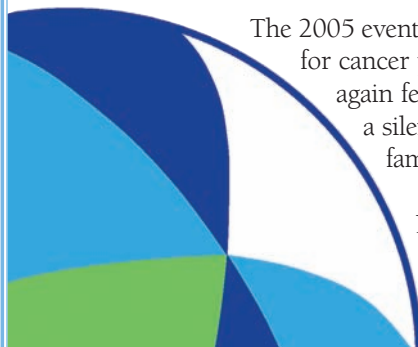


UNC Lineberger Board of Visitors chair Anne Cates (left) and vice chair Edwina Woodbury (right) visit with Nancy Brinker, founder of the Susan G. Komen Breast Cancer Foundation. Brinker spoke on the power of ideas and individual determination during the Leader-In Residence program at Chatham Hall in Chatham, Virginia last fall.

# SURF'S UP!

## on Saturday, April 8th

UNC Lineberger Comprehensive Cancer Center will host the third annual Beach Ball on Saturday, April 8, 2006 in Center Court of University Mall in Chapel Hill. Please plan to be a part of this year's event!



The 2005 event was a huge success, attracting 680 guests and raising over \$100,000 for cancer prevention, treatment and outreach programs. This year's event will again feature live music by East Coast favorite "Liquid Pleasure", great food, a silent and live auction, and a chance to dance the night away with your family and friends.

Look for your invitation at the beginning of March. Tickets can be purchased in advance for \$60. Online registration will be available through our website in March at [www.unclineberger.org](http://www.unclineberger.org). ●

### Sisters' Network Health Fair

UNC Lineberger participated in the October 2005 Sisters' Network Health Fair. Drs. Don Baucom, Laura Porter and their team took part to promote their breast cancer partners support program. UNC Breast Center nurse coordinator Beth Fogel answered questions for participants and UNC Lineberger breast cancer survivor Senator Jeanne Lucas was the guest speaker. Pictured (left-right) are Beth Fogel, Durham Mayor Bill Bell, and Sisters' Network leader Mary Jackson, UNC Lineberger BMT social worker and breast cancer survivor. ●



Missy Julian-Fox, Jamie LaForce, General Manager, Squid's Restaurant, Margie Haber, and Greg Overback from Chapel Hill Restaurant Group.

### Tickled Pink Luncheons Raise Over \$55,000

Led by Margie Haber and Missy Julian-Fox, 30 dedicated volunteers from Chapel Hill and Durham presented two incredible Tickled Pink luncheons to raise money for research for women's cancers. The first was held on October 6 at Squids Restaurant and the second on October 11 at Galloway Ridge at Fearington Village. Thanks to their tremendous efforts, generous sponsors and an extremely supportive community, Tickled Pink raised over \$55,000!

Tickled Pink participant Rebecca Clark and organizing committee member Dianne Pledger.



### Party Favors Sent to Gulf Coast Cancer Patients



Cancer patients displaced by Hurricanes Katrina and Rita were "tickled pink" by gifts from women in the Triangle community. Close to 1000 gifts were sent to patients at treatment centers in Louisiana and Alabama from UNC Lineberger Comprehensive Cancer Center.

Tickled Pink organizers asked the 450 women attending the two luncheons to bring party favors rather than receive them, stating that their gifts would be sent to cancer patients undergoing therapy who were forced to get their treatment elsewhere because of the storms. Sheri Logan of MIX 101.5

heard about this effort and asked listeners to bring fun items to the station for patients. Logan attended the event bringing two huge baskets filled with gifts.

Over 160 pounds of gifts including slippers, hats, handbags, socks, scarves, inspirational books, candles, jewelry, and toiletries were delivered to several cancer centers in Louisiana and Alabama.

Pictured (left-right) are Tickled Pink co-chairs Margie Haber and Missy Julian-Fox with the party favors sent to Gulf Coast cancer patients. ●



# First Annual *Fast Break Against Cancer* Raises \$90,000 for Cancer Research

Close to 300 people attended the first annual *Fast Break Against Cancer*. The event was held on the floor of the Dean E. Smith Center on Friday, October 14. The seated breakfast was co-sponsored by UNC Lineberger Comprehensive Cancer Center and the American Cancer Society and raised \$90,000 to support cancer research in our community.



Coach Roy Williams with event chair Mary Seagroves

The event was the kick off to the day's activities for "Late Night with Roy Williams" and featured a showing of "One Shining Moment" celebrating the 2005 National Championship on the new video walls.

Coach Williams opened his talk by asking the audience how many people had had cancer or knew someone who did. All but a few of the participants raised their hands. "That's why we're holding this event," he said. "Cancer has touched almost every one of us."

"Cancer is a huge battle, a battle we must fight with the best science and the best therapies. It's a battle we must win."

Event chair Mary Seagroves, a Chapel Hill breast cancer survivor, shared her cancer experience and stressed why cancer research is so important to

improving the lives of cancer patients and to preventing the disease and having it diagnosed early.

Chad Holbrook, father of Reece Holbrook, a pediatric cancer patient being treated at UNC Lineberger, talked about how he and his wife, Jennifer, discovered Reece's cancer and described Reece's treatment regimen. (To read about Reece's experience, go to [www.nccancerstories.org](http://www.nccancerstories.org).) Chad Holbrook is the UNC assistant baseball coach while Jennifer works in the UNC men's basketball office.

The "Voice of the Tar Heels," Woody Durham, served as master of ceremonies and led a spirited auction that brought in almost \$16,000! One of the few remaining, autographed basketballs from the 2005 National Championship Team went for \$5,000 - the most Woody had ever seen a for a signed basketball.

Special thanks to PPD, the presenting sponsor of the event. The other inaugural sponsors were Atlantic Corporation, Curtis Media Group, and GlaxoSmithKline. ●



Fast Break attendees UNC Lineberger Board of Visitors member Lillian Lee from Chapel Hill and former UNC men's basketball player King Rice.

## calendar *of events*

A P R I L 2 0 0 6

*8<sup>th</sup>* Third Annual Beach Ball,  
University Mall, Chapel Hill, NC

*21<sup>st</sup>* UNC Lineberger Board of  
Visitors Meeting, Chapel Hill, NC

*24 - 25<sup>th</sup>* 30th Annual  
Scientific Symposium. Chapel Hill, NC

J U N E 2 0 0 6

*10<sup>th</sup>* NC Triangle Komen  
Race for the Cure, Raleigh, NC

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