UNC Lineberger Comprehensive Cancer Center

Winter 2014

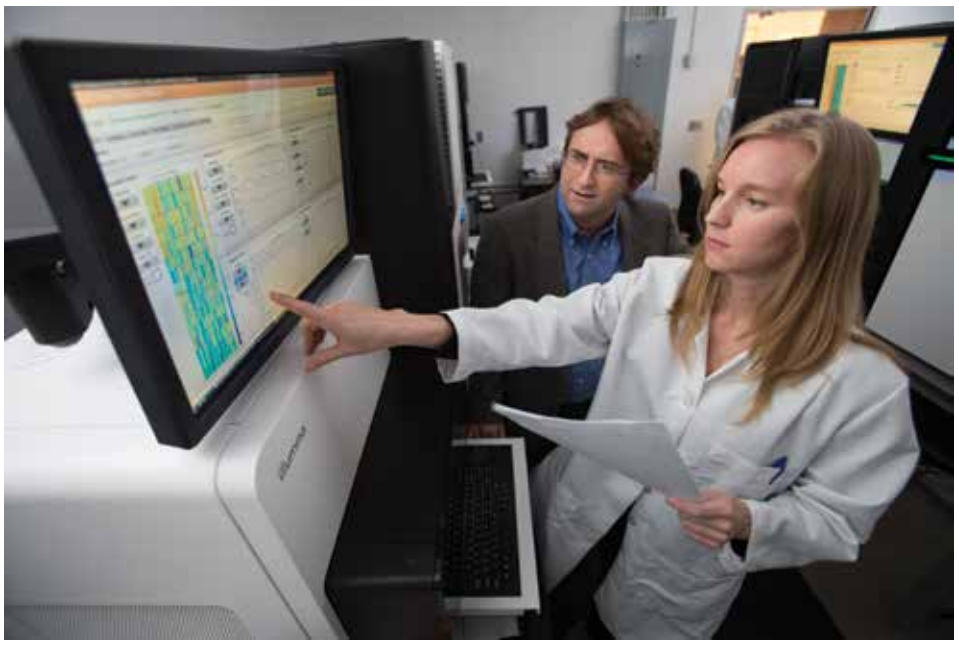
cancerlines

UNC LINEBERGER

the inside line up

UNC CANCER CARE

New year, next generation of cancer treatment



UNCseq provides high-throughput next generation sequencing through its translational core facilities.

What will 2014 hold for cancer treatment? At UNC Lineberger, researchers and physicians are focusing on one of the next generations of cancer treatment — cancer genetics. A better understanding of this rapidly changing field — how the presence and mutation of certain genes play a role in cancer diagnosis and treatment — will help UNC Lineberger develop highly targeted therapies for cancer patients.

With the creation of a new endeavor called UNCseq™, UNC Lineberger is now opening new doors into cancer genetics by creating a way to bring translational research to patient care faster than ever imagined.

"We needed to find a way to bring cutting edge research directly to our patients sooner, but still maintain the ethical, regulatory and safety needs surrounding patient care," said Neil Hayes, co-director of UNCseq and of the Data Analysis Sub-Group for The Cancer Genome Atlas (TCGA) Project at UNC. "UNCSeq allows us to do this on so many levels."

UNCseq is a new genetic sequencing protocol that analyzes tumor samples obtained from a biopsy or surgery using next generation sequencing, comparing them to normal tissue samples. This comparison allows researchers to pinpoint the genetic changes that may influence treatment.

Here's how it works. Think of a cancer cell's DNA as its instruction manual. This instruction manual determines how the cancer will behave and specifically determines if it will grow slowly or quickly, if it will respond to one type of therapy or another, and if it will be cured or come back. Being able to read this instruction manual is critical in treating the cancer.

"With UNCseq, our researchers are able to open that manual, read the instructions and better understand what's driving the tumor's behavior, as compared to the 'normal' DNA gathered," said Hayes. After sequencing, researchers are able to identify all of the mutations present in the cancer cell that aren't present in the normal DNA.

Once the list of mutations has been identified, a group of doctors constituting the Molecular Pathology Tumor Board meets weekly to review mutations found that week. While some mutations are innocent, others signal a certain prognosis or a new therapy for the patient. Once those mutations have been identified and confirmed, the patient's care may change. "If we

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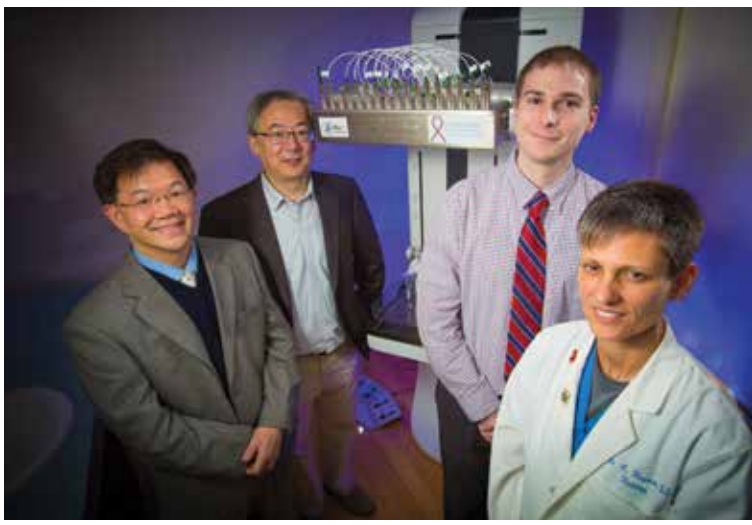
New X-ray technology developed at UNC could revolutionize breast cancer detection

A new X-ray technology developed with support from UNC Lineberger could shape the future of breast screening and has just entered the first clinical stage necessary to move it from the lab to the clinic.

The new mammography screening technology uses a first-of-its-kind stationary breast tomosynthesis mammography system developed by UNC Lineberger member Otto Zhou, PhD, and Jianping Lu, PhD, both professors of physics. This new technology could have two advantages; one, better images and higher resolution scans than what are currently available and two, exposing patients to a lower dose of radiation from the procedure. By using the new carbon nanotube x-ray source array technology invented by the same team at UNC, the device could translate into more accurate detection with fewer callbacks and reduced uncertainty for patients.

The device is currently being tested in clinical trial led by Drs. Yueh Lee, MD, PhD, and Cherie Kuzmiak, DO, Department of Radiology. The trial, a major step on the way to moving the device into clinical practice, will verify the device's ability to



Yueh Lee, MD, PhD, Otto Zhou, PhD, Research Assistant Andrew Tucker and Cherie Kuzmiak, MD

match or improve upon existing mammograms. This trial follows a successful study of the device's capacity

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director's message

Ned Sharpless, MD

With great excitement, I begin 2014 as the new director of the UNC Lineberger Comprehensive Cancer Center. For nearly 40 years, UNC Lineberger has enjoyed strong traditions of outstanding cancer research, clinical care and prevention under the visionary leadership of Drs. Joseph Pagano and Shelley Earp. I look forward to building on these traditions and pushing the boundaries of our work; expanding scientific discovery in the labs and applying those discoveries to clinical advances for our patients across North Carolina and beyond.

By way of introduction, I grew up in Greensboro, was a Morehead Scholar at UNC and am a graduate of the UNC School of Medicine. After medical school, I left Chapel Hill for 10 years to receive oncology training at Harvard Medical School and the Dana Farber Cancer Institute, but rejoined the UNC faculty in 2002. Since returning to UNC, I have published more than 100 papers on cancer biology, filed more than 10 patents describing new cancer therapies, founded two companies with the mission of developing better cancer care, cared for hundreds of patients on the inpatient cancer service, and all the while, tried to be a good husband and father of two teenagers. During that same period, several family and close friends have been diagnosed with cancer and treated for the disease with varying success. My sister is now a long-term survivor of triple negative breast cancer, while my father died of melanoma two summers ago. Because of this personal and professional history, I am passionate about cancer research and motivated daily to find better treatments for the disease.

We have seen amazing recent strides in our efforts to eradicate cancer suffering. Almost every week, we see new discoveries in cancer biology and clinical care. Last month, I cared for a young man with a form of blood cancer that was uniformly lethal 10 years ago. Instead, given recent progress against his tumor type, we gave him a non-toxic chemotherapy pill and sent him on his way to live a normal life, effectively cured of his disease. Coupled with significant advances in cancer prevention (e.g. smoking cessation), we have seen a 20 percent decline in cancer mortality since the early 1990s, translating into more than a million cancer deaths averted thanks to this progress. But there is more to be done, and we are entering the next phase in cancer research. A time where we are analyzing a person's individual DNA to better tailor treatment. A time where we are developing drugs that can attack a tumor with amazing accuracy. A time when we are harnessing the power of the body's own immune system to fight the cancer.

In this issue of *Cancer Lines*, you will read about our effort to leverage a greater understanding of cancer genetics to better tailor treatment for our patients. This effort — called UNCseq — will help us understand the role of cancer genetics in treatment and most importantly, help patients who may not have any other options. You will also read about two new exciting clinical trials now underway. The first trial, aimed at treating rectal cancer patients, is one of the only trials in the country to pair nanomedicine — a rapidly growing field — with standard care. The second trial is to test new breast screening technology that could replace traditional mammography. These are exciting times at UNC Lineberger.

In my new role, I look forward to personally meeting and thanking our many supporters. Without your support, we could not change the lives of our patients as we do. I look forward to what the future holds for UNC Lineberger, our research, and most of all, for our patients.

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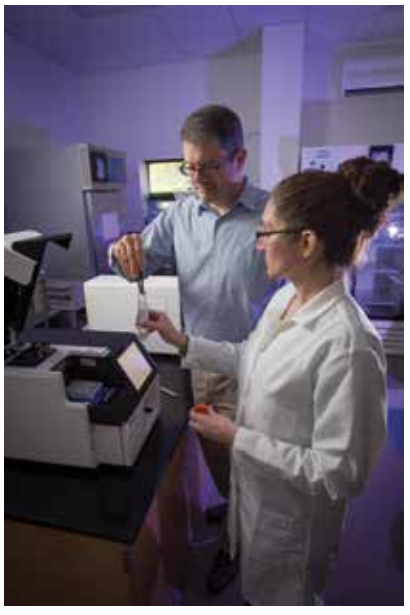


Top: UNC Lineberger is one of the few places in the world with as much experience in using clinical samples for RNA sequencing.

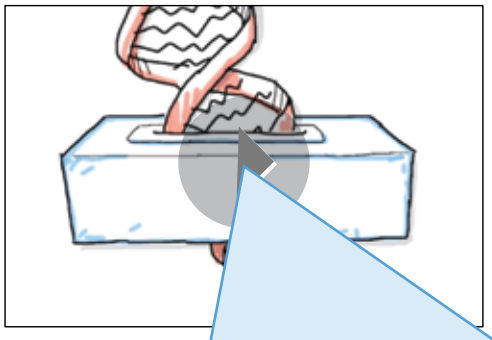
can identify the mutations, there may be a drug or clinical trial available that can address that mutation," said Hayes. To date, over 930 patients have been consented for UNCseq and that number grows every day.

Expanding beyond sequencing of DNA, UNCseq also allows researchers to analyze RNA, blood and other samples.

"With UNCseq, we now have the vehicle that enables us to significantly expand our work beyond DNA sequencing to more cutting edge sequencing work using RNA," said Hayes. "UNC Lineberger is one of the few, if any, places in the world with this much experience in using clinical samples for RNA sequencing."

UNCseq especially serves as a resource for patients with difficult to treat tumors, identifying and targeting the molecular weaknesses specific to the patient's cancer. Beyond the individual benefits to patients, UNCseq will help provide the genetic data needed to pursue new research into novel treatments and to test the effects of clinical therapies currently being investigated.

Looking forward, UNCseq aims to provide every patient with tumor analyses that will allow their physicians to prescribe targeted and efficient therapies on an individualized basis.



To watch a short video about UNCseq, please visit bit.ly/1n7sEdZ

Honoring excellence in nursing and clinical services

UNC Lineberger once again honored excellence in clinical services and nursing this year. Nurse navigator Melissa Holt and nurse practitioner Blaine Brower received the 2013 Nursing Excellence Awards, while radiation therapist Anne Camp and clinical pharmacist Aimee Faso received the 2013 Clinical Services Excellence Awards.

Single fathers support group member publishes book

After losing his wife Lisa to colon cancer in 2010 and faced with raising his three daughters alone, Bruce Ham turned to Single Fathers Due to Cancer, a support group developed by the UNC Comprehensive Cancer Support Program. Ham, one of the original members of the support group, has written a memoir, "Laughter, Tears and Braids," about his journey raising his daughters, learning how to braid hair and supporting his children after the death of their mother. To read Bruce's blog and find out more about his book, please visit therealfullhouse.wordpress.com.