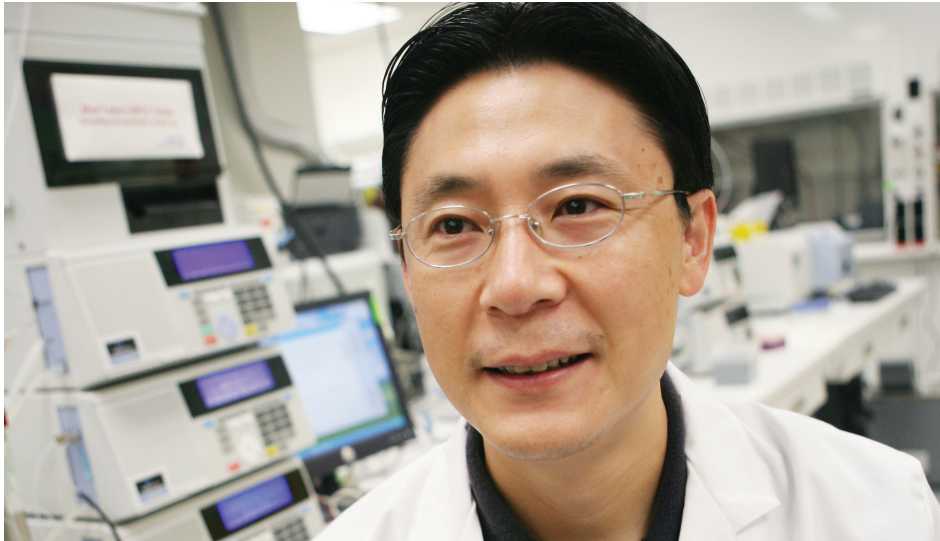


# Cancer Center BULLETIN

A PUBLICATION OF THE HAROLD C. SIMMONS COMPREHENSIVE CANCER CENTER

Dr. Jinming Gao | Associate Professor of Pharmacology



## NANOTECHNOLOGY BOOSTS CANCER RESEARCH

Members of the Harold C. Simmons Comprehensive Cancer Center in the nanotechnology field are collaborating with researchers across multiple disciplines at UT Southwestern and UT Dallas to improve cancer imaging and develop nanoparticles for diagnostic and therapeutic use.

The aim of these interdisciplinary and inter-institutional links is to capitalize on biomedical and engineering expertise and advance the detection and treatment of cancer.

“The idea is to take cancer biology innovations and come up with bioengineering approaches,” said Dr. Jinming Gao, a member of the cancer center and an associate professor of pharmacology at UT Southwestern.

“We want to integrate biology with engineering expertise to improve the therapeutic index and selectivity for treatment.”

One of the current studies, funded by the National Cancer Institute, involves using nanotechnology approaches to enhance magnetic resonance imaging (MRI) for lung cancer detection and, based on the diagnostic information, deliver drug-containing nanoparticles for targeted therapy.

The study is being led by Dr. Dean Sherry, professor of radiology and director of the Advanced Imaging Research Center at UT Southwestern; Dr. Kathlynn Brown, assistant professor of internal medicine; and Dr. Gao. Drs. Sherry and Gao also hold appointments in the chemistry department at UT Dallas.

## GRAND ROUNDS

The speaker for the upcoming Simmons Cancer Center Grand Rounds is Dr. Pasi A. Jänne, associate professor of medicine at Harvard Medical School and director of the Translational Research Laboratory at the Dana-Farber Cancer Institute.

The lecture will be held Oct. 2 from 11:30 a.m. to 12:30 p.m. in the T. Boone Pickens Biomedical Building and Conference Center (NG) 3.112.

The title of Dr. Jänne’s lecture is “Resistance Mechanisms to EGFR Targeted Therapies in Non-small Cell Lung Cancer.”

Dr. Jänne’s research interests include investigation of oncogene mutations and how these correlate with clinical response to targeted therapies in lung cancer. Dr. Jänne was one of the investigators who initially discovered *EGFR* mutations in 2004 and has subsequently studied their effect on the clinical outcome of patients and on mechanisms of resistance.

Dr. Jänne also has worked on developing non-sequencing based technology to detect mutations in *EGFR* and other oncogenes. Dr. Jänne is a member of the National Cancer Institute’s Cancer and Leukemia Group B respiratory committee.

## SHARIFI NAMED HHMI EARLY CAREER PHYSICIAN- SCIENTIST

Dr. Nima Sharifi, assistant professor of internal medicine at UT Southwestern and a member of the Simmons Cancer Center, has received a Howard Hughes Medical Institute Early Career Physician-Scientist Award.



Dr. Nima Sharifi

He is one of 11 researchers named in a national competition by the institute to be part of the program, which is aimed at increasing the number of researchers who translate basic science discoveries into improved treatment for patients. Each Early Career Physician-Scientist receives \$375,000 in research funding over a five-year period from the HHMI. Established in 2006, the program supports a total of 52 physician-scientists.

Dr. Sharifi's research focuses on how advanced prostate cancer – the second leading cause of cancer death in men – becomes resistant to androgen deprivation therapy. Although prostate cancer initially responds to androgen withdrawal, these tumors eventually become resistant. Dr. Sharifi's labora-

tory focuses on genes that determine how this resistant state occurs. The hope is that this work eventually will help in the development of new therapies.

“This funding will allow my laboratory to look at this problem further in depth,” Dr. Sharifi said. “I am truly honored to receive this award and support from HHMI.”

The Howard Hughes Medical Institute, a nonprofit medical research organization that ranks as one of the nation's largest philanthropies, has in the past two decades invested more than \$8.3 billion for the support, training and education of the nation's most creative and promising scientists.

## GERBER AWARDED ASCO CAREER DEVELOPMENT AWARD

Dr. David Gerber, assistant professor of internal medicine in the division of hematology/oncology at UT Southwestern and member of the cancer center, recently received a Career Development Award from the American Society of Clinical Oncology (ASCO) Cancer Foundation.

The Career Development Awards are presented to physicians in their second, third or fourth year as full-time faculty members in a university setting. Dr. Gerber will receive a three-year grant totaling \$200,000 to establish an independent clinical cancer research program. He was among 11 researchers nationwide to receive this award.



Dr. David Gerber

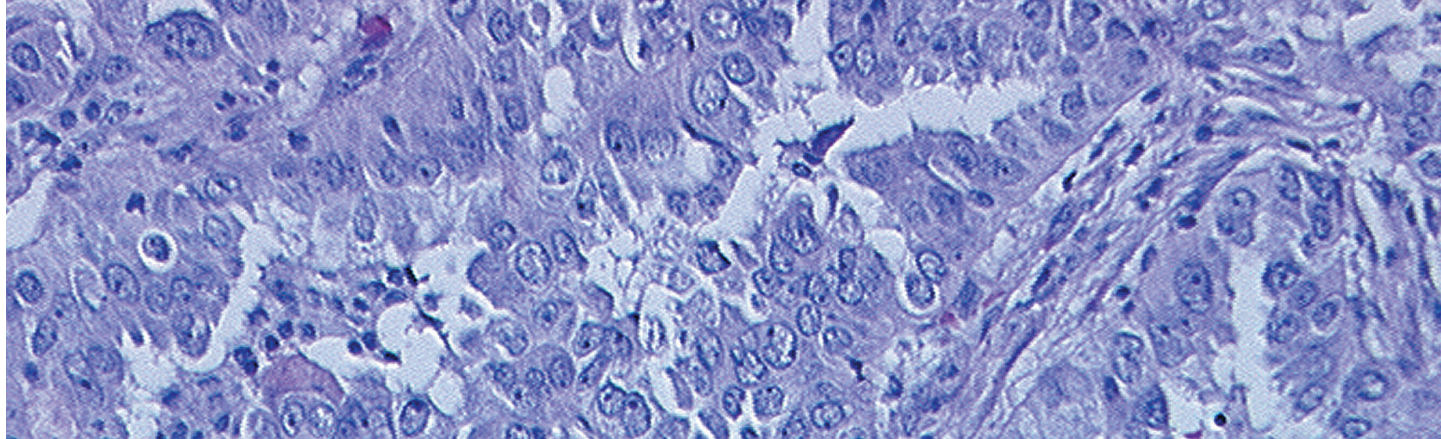
Dr. Gerber will study the biological effects of the drug bavituximab and chemotherapy in patients with advanced non-small cell lung cancer (NSCLC).

“This grant will allow me to explore the mechanism of bavituximab's tumor-specific targeting in patients,” Dr. Gerber said. “Target specificity remains a principal, though often elusive, goal of cancer drug development.”

Bavituximab, a cancer drug created in the laboratory of Dr. Philip Thorpe, professor of pharmacology at UT Southwestern, is an antibody that homes in on a specific molecular target on the blood vessels that feed tumors.

Dr. Gerber's study will supplement a phase 2 trial evaluating bavituximab in combination with carboplatin and paclitaxel in patients with advanced NSCLC. Bavituximab also is currently being tested in combination with chemotherapy in two phase 2 trials in advanced breast cancer.

Established in 1983, the ASCO Cancer Foundation Grants Program is one of the largest among professional medical societies and funds leading clinical oncologists across a broad range of specialties from around the world. Since its inception, the grants program has awarded nearly 700 grants totaling more than \$55 million.



NANOTECHNOLOGY continued from page 1

Other small-molecule agents are used for dynamic contrast-enhanced MRI applications, which are techniques that help differentiate different kinds of tumors. Those agents, however, are not very sensitive and cannot be used for detecting specific biological markers in vivo, Dr. Gao said.

“The challenge for MRI is that it is not sensitive enough to look at the biochemical processes of cancer formation or the transformation from normal tissue to tumor tissue,” Dr. Gao said. “That’s where the nanotechnology comes in.”

The Simmons Cancer Center team is using super paramagnetic polymeric micelles (SPPM) that are loaded with a cluster of magnetite nanoparticles to molecularly image lung tumors. “This platform has demonstrated much improved sensitivity of detection by MRI that will be essential for diagnosing lung cancers,” Dr. Gao said.

The next stage will be to use the approach to study these tumors inside the lungs of living mice, which is challenging because the animal is breathing and the lungs are moving, Dr. Gao said.

The nanotechnology team has paired up with Dr. Masaya Takahashi, associate professor in the Advanced Imaging Research Center, whose expertise is controlling breathing motions to get high-resolution images of lung tissue.

The team also is using a novel class of lung cancer targeting peptides identified from phage screening that were developed by Dr. Brown. These peptides are encoded on the surface of the micelles to target lung cancer cells. Researchers are testing whether these micellar probes will allow for highly sensitive and specific diagnosis of different types of lung cancers.

“The goal is to combine Dr. Brown’s peptides with the imaging probe technology,” Dr. Gao said. “This knowledge will allow clinicians to determine the specific cell characteristics of lung tumors and provide the most effective, personalized therapy to target that type of tumor.”

Several other studies also are being conducted in collaboration with UT Dallas to advance nanotechnology applications. For example, Dr. Ellen Vitetta, director of the Cancer Immunobiology Center at UT Southwestern, and nanotechnology experts from UT Dallas recently tested a new way to kill cancer cells selectively by attaching cancer-seeking antibodies to carbon nanotubes tubes that heat up when

exposed to near-infrared light. Dr. Vitetta and her team used monoclonal antibodies that targeted specific sites on lymphoma cells to coat the carbon nanotubes.

In addition, UT Southwestern recently received \$1.2 million in appropriations from the Department of Defense to continue collaborative studies with UT Dallas dealing with combining nanotechnology and molecular medicine.

Under this funding, cancer center researchers are leading the development of a federally certified facility that will enable nanoparticles produced to be used directly in humans, dramatically reducing the time required to turn nanoparticles into therapies and cures. In addition, Dr. Gao and Dr. Walter Hu, assistant professor of electrical engineering at UT Dallas, are characterizing the sizes and shapes of nanoparticles best suited for medical use.

“This funding is enormously valuable and allows us to catalyze interactions among sister institutions,” said Dr. James Willson, director of the Simmons Cancer Center. “This funding also will help provide infrastructure for new diagnostic tools and treatments for cancer and many other diseases.”