

Devoted to noteworthy happenings

at the medical school

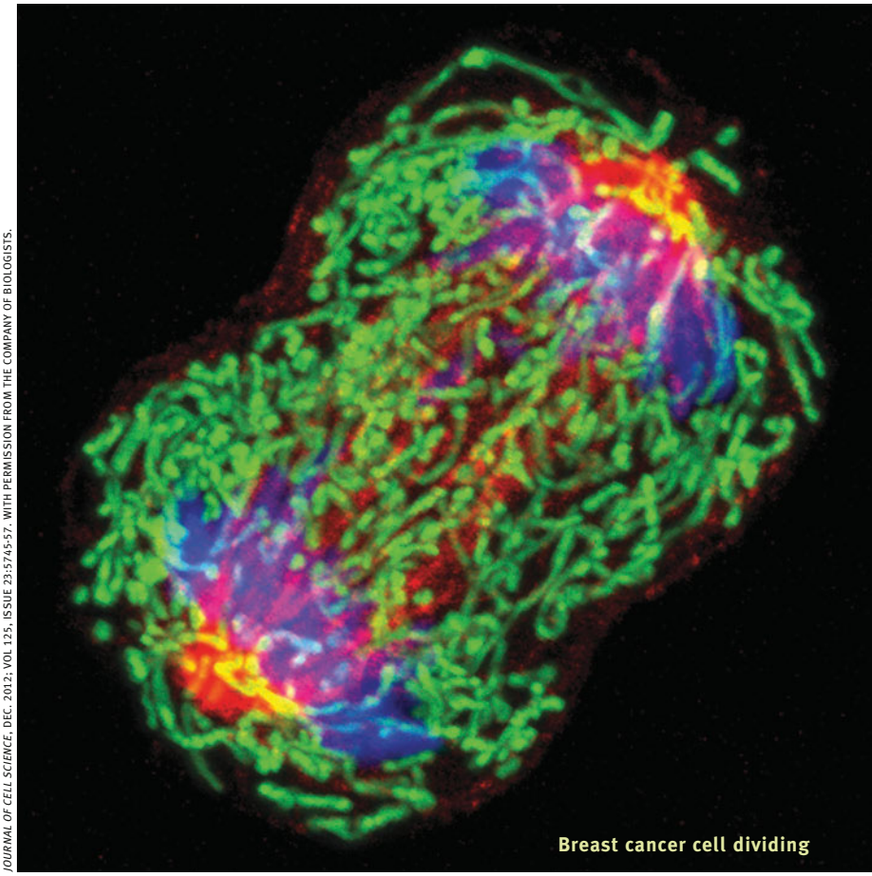


PHOTO: CAMI MESA / MODEL: JACK MIKSCH

Footnote

Word has it that Maud Menten wasn't much of a driver. Reports from the 1920s have the Pitt med prof's Model T lurching up and down Shadyside's streets. Reports from 1913, though, prove that she was one hell of a chemist. One hundred years ago, Menten, with Leonor Michaelis, crafted what has become known as the Michaelis-Menten equation. This was the first mathematical means for determining the rate of an enzyme reaction—a tool that, among other things, led to the rise of the pharmaceutical industry. The equation helps scientists figure out how to build drugs that inhibit enzyme activity.

Now you can celebrate the Michaelis-Menten centennial with a *How Inhibited Are You?* T-shirt. Not kidding: www.zazzle.com/michaelis+menten+kinetics



Breast cancer cell dividing

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Stopping the Great Divide

Cancer cells win through a process of divide and conquer. They keep dividing, making more of themselves until the host body is overwhelmed. The University of Pittsburgh's Bennett Van Houten and Wei Qian have found a way to stop this seemingly unstoppable proliferation, at least at the lab bench. They managed this while exploring the world of mitochondria (our cells' energy factories and much more).

Van Houten, a PhD and the Richard M. Cyert Professor of Molecular Oncology in Pitt's Department of Pharmacology and Chemical Biology, and Qian, a PhD and postdoctoral fellow, tried interfering with cancer cell growth by knocking down a protein that helps mitochondria divide, a process necessary for cell health.

The experiment worked. But the researchers used genetic means, which could make for a difficult leap to the clinic. So, they turned to pharmacology. An existing compound called mdivi-1, they discovered, achieved the same result as the genetic approach, but through different mechanisms.

When combined with the common cancer drug cisplatin, mdivi-1 becomes even more effective in arresting breast cancer cell growth. The potential, Van Houten says, is that a combination mdivi-1/cisplatin cocktail would allow for lower doses of toxic cisplatin while enhancing its efficacy. Also, and this is quite promising, such a cocktail kills cisplatin-resistant cancer cell lines. The breakthrough was a recent cover story for the *Journal of Cell Science*.

Van Houten and Qian are now seeking funding to further their research in animal models. —*Joe Miksch*



CAMI MESA

Overheard

A computer guy's take on personalized medicine

Shyam Visweswaran, an MD/PhD, began his career in neurology. But after completing graduate work in biomedical informatics at Pitt, he's more focused on the computer brain than the human one. Perhaps you're aware that the biomedical science community has an eye toward customizing care for each patient. That effort (or dream), called personalized medicine, hopes to get the right therapy to the right patient at the right time. Add "via the right model," to that line, Visweswaran, an assistant professor of biomedical informatics at Pitt, might say. He believes we should also personalize the computer model for each patient.

What that means—modeling for each patient

"Currently, for most risk assessments and other prediction models in medicine, a single model is developed, and that model is applied to everybody. This approach involves building a prediction model that will perform well for the average patient, but not necessarily for the current patient that the physician is seeing. What I am working on is patient-specific (or personalized) modeling, where computer programs build a prediction model for the current patient that is tailored to that patient's information, such as age, gender, blood pressure, cholesterol level, and, in the future, DNA sequence. These computer programs will, on the fly, figure out what are the important factors that should go into the model to achieve the best prediction for the current patient."

Predicting outcomes

"Within 10 years, I anticipate, we will see a patient's DNA sequence become part of the electronic medical record. We are going to need computer programs that combine DNA sequence information with traditional clinical data to help predict well-outcomes that are of interest to the physician, such as, *Is my patient at high risk of developing Alzheimer's? What is the precise DNA sequence abnormality that is causing pancreatitis in my patient? Will my patient respond to this therapy?*"

Another kind of physician assistant

"The current generation of clinical-decision support systems assists the physician with simple tasks such as alerting when a vaccination needs to be done or if two medications that interact are prescribed to the same patient. We want, and hope, to build far more intelligent support systems that will assist physicians in all tasks they do, day in and day out, including better risk assessment, more precise diagnosis, more accurate evaluation of prognosis, and better selection of therapy."

—Interview by Joe Miksch

Faculty Snapshots

The University of Pittsburgh School of Medicine's Bruce Freeman and Valerian Kagan have been named fellows of the American Association for the Advancement of Science (AAAS). Freeman, PhD professor and chair of pharmacology and chemical biology, who holds the UPMC/Irwin Fridovich Chair, was honored for his career-long research into free radicals and their roles in inflammation and cell function. Kagan, professor of radiation oncology in the School of Medicine (whose primary appointment is in the Graduate School of Public Health, where he is vice chair for environmental and occupational health), was also added to the AAAS rolls. Kagan has a distinguished background in free radical biology and programmed cell death research.



Freeman



Kagan

The American Society of Neural Therapy and Repair named Pitt associate professor of radiology Michel Modo, a PhD, winner of the 2013 Bernard Sanberg Memorial Award for Brain Repair. Modo was recognized for his efforts in neurorestorative biology for TBI patients, including better use of noninvasive neuroimaging techniques to identify brain damage and developing strategies for repair. His imaging work focuses on finding ways to best monitor live cells moving through the body.



Modo

A Pitt team received one of the Clinical Research Forum's Top 10 Clinical Research Achievement Awards for work with brain-computer interfaces. The interfaces and the science behind the technology came out of the lab of Andrew Schwartz, a PhD professor of neurobiology. (Early clinical studies were done with support from Pitt's Clinical and Translational Science Institute.) The group's most recent triumph involved using the technology to allow a woman with quadriplegia to manipulate a robotic arm with her mind. She was able to feed herself chocolate. Jennifer Collinger, a PhD assistant professor of physical medicine and rehabilitation, was the lead author of the paper, which was published in *Lancet*.



Schwartz



Collinger

Robert Arnold has long researched ways to improve communication between doctors and patients in cases where patients face life-threatening illnesses. And now the MD has received the Lifetime Achievement Award from the American Academy of Hospice and Palliative Medicine. Arnold is the Leo H. Criep Professor of Patient Care and the medical director of the UPMC Palliative and Supportive Institute. ***—JM***



Arnold

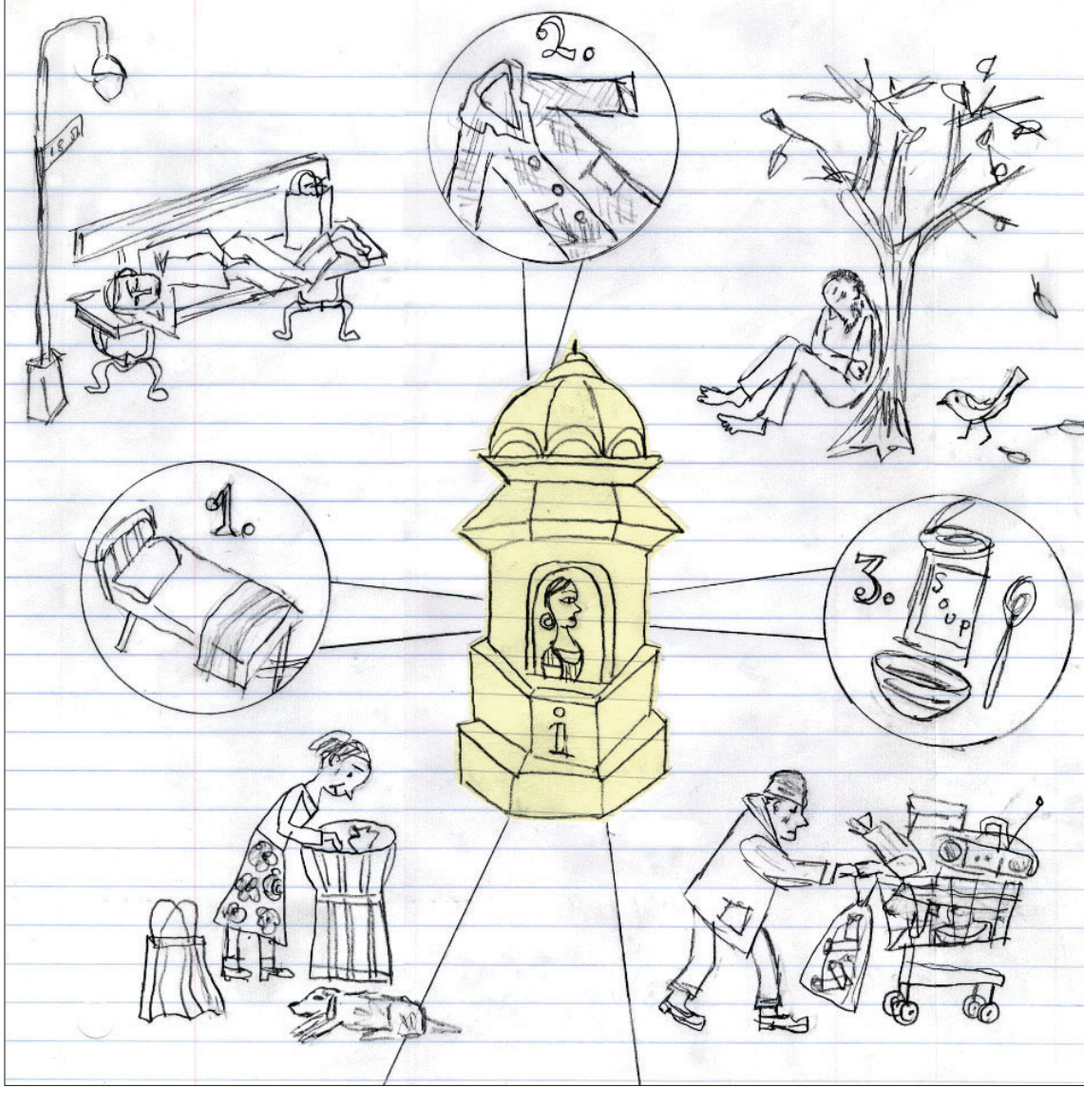
Street Smarts

Third-year Pitt med student Gary Ciuffetelli was visiting Salt Lake City for a conference, and he toured the city's street medicine program. Ciuffetelli was impressed by how cooperative and intertwined the agencies were. From shelters to food banks to a free pharmacy, all aspects of street medicine were well-coordinated. But that seamlessness took years to develop.

"It's great that so many people want to help, but the biggest obstacle is that they don't know how," he says. "Organizations have the same problem: They don't know what others are doing or if there are opportunities for collaboration."

Hence, Serebral.org (a portmanteau of "service" and "cerebral"). The site, now in the proof-of-concept stage (Ciuffetelli and several collaborators are looking for money to go beyond that), will function as a repository of information regarding services available to underserved populations, like homeless people.

"Organizations and volunteers will have profile pages to help with recruitment and scheduling," Ciuffetelli says. "And everyone will be able to see a community map that you can filter by resource. If you're at an organization that offers clothing, and you have a client who needs food or a place to sleep, you can use Serebral to make a referral to that type of organization." And creating a community of helpers, Ciuffetelli says, will also make for more powerful grant applications, streamlined service, and a greater sense of community. *—JM*



CATHERINE LAZURE



FLASHBACK

The above photo is from the 1964 yearbook of Cheltenham High School in Wyncote, Pa. See numbers 56 and 53? Neither really panned out as a hoopster, but each met with some success after leaving Wyncote. Reggie Jackson, 56, had a pretty notable baseball career. And 53, National Academy of Sciences member Peter Strick, went on to inform the world about how neural networks control voluntary movement—like dribbling balls. Among Strick's titles: Distinguished Professor and chair of neurobiology at Pitt and codirector of the Pitt/CMU Center for the Neural Basis of Cognition.

Keeping Our Talent

From the very start, Esa Davis shared a productive dynamic with her mentor, Dennis McNamara, an MD, professor of medicine in the Division of Cardiology, and director of the UPMC Heart Failure and Transplantation Program. "We had a mutual research interest," says Davis, who's an MD, MPH, and assistant professor of medicine in the Division of General Internal Medicine.

Then the two learned they could apply for a grant to develop a research proposal. "It made us come together around the project," resulting in an arrangement "more collaborative than the traditional, 'I'm the mentor, you're the mentee'" setup, Davis says.

The duo is one of 15 mentor/mentee pairs who have completed the first year of the Promoting Academic Talent in the Health Sciences (PATHS) program, a partnership between Pitt and UPMC that seeks to retain and promote trainees from underrepresented groups within the institutions. PATHS offered the grant Davis and McNamara received.

PATHS is expanding quickly: Its next cohort will include 30 mentees from 19 departments in the School of Medicine. With continued success, the program will be implemented in, ultimately, all six schools of the health sciences. According to Paula Davis, assistant vice chancellor for health sciences diversity, "We have all of these phenomenal people, and if we can show them that they have a place at the table, we can keep them."

—Chad Vogler



COURTESY JOSEPH SAMOSKY

BODY EXPLORERS

Through the glass doors to Joseph Samosky's fourth-floor lab in Pitt's McKee Place, a simulated heart rhythm fills the area with emergency room–style urgency. Inside, a mannequin lies flat on a table as a projector hovers above, displaying a behind-the-skin reaction of the heart to a dose of adrenaline.

This is Samosky's evolving teaching tool, BodyExplorer, in action. It can show how a patient might react to various interventions, with data readouts on organ systems and, of course, sound effects. The device uses "augmented reality," placing computer-generated input and simulations onto real-world objects.

With an infrared pen, users can explore structures of the human body. (This gesture interface is a lot like using the Nintendo Wii.) Samosky, a PhD and assistant professor of anesthesiology and bioengineering, directs Pitt's Simulation and Medical Technology Research and Development Center. He's been developing the device with bioengineering PhD student Douglas Nelson (demonstrating the system above, center).

All these bells and whistles are about improving patient safety and quality of care. Samosky imagines BodyExplorer one day training doctors- and nurses-to-be and those who are already caring for patients. ***—Jeff Ihaza***

Immunology Gets New Leader



Shlomchik

Mark Shlomchik has had a lengthy and impressive record as a scientific investigator. He was among the first to flesh out the roles of B lymphocytes and Toll-like receptors (both of which are key players in our immune systems) in systemic autoimmune diseases like lupus; that research recently garnered him the Lupus Insight Prize. He has also been a leader in understanding how long-lived antibody immunity develops, which is critical for understanding how vaccines function.

As of July 1, Shlomchik, a PhD, formerly of Yale University, will succeed founding chair and Distinguished Professor Olivera Finn as leader of Pitt's Department of Immunology. Finn, who remains at Pitt, recently stepped down in order to focus more intensely on her research into developing peptide vaccines against pancreatic and colon cancers.

The move to Pitt, Shlomchik says, will allow him to scratch an itch he's had for some time. "It's been a great run [at Yale], but I felt like I have leadership skills and talents, and I wanted to pursue them," he says. Leading immunology at Pitt was an especially attractive opportunity. "I think the relationship between the medical school and UPMC is fantastic and enviable," he says. "The whole culture of how they work together has been instrumental in making [the School of Medicine] so successful. It has risen in an unprecedented way."

In his capacity as chair, Shlomchik hopes to find inventive ways to acquire funding (as federal dollars have declined in recent times), inspire creativity, and grow the department. *—JM*