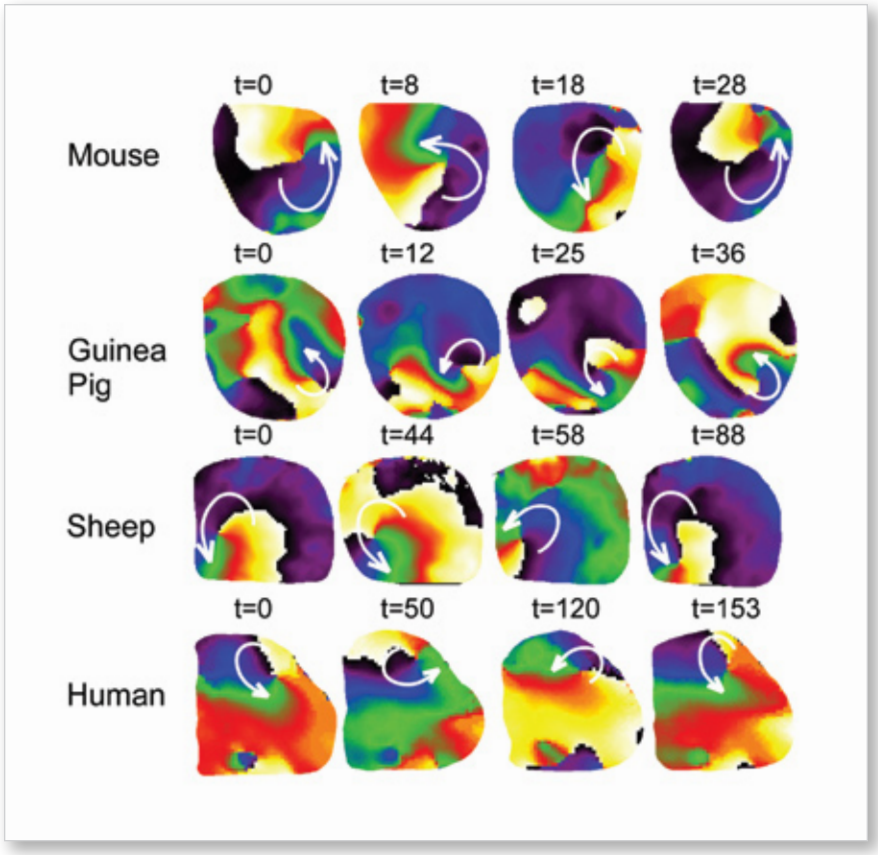
In the Lab

Out of Rhythm



Vortices, indicated by arrows, drive heart arrhythmias.

IT HAPPENS 300,000 TIMES EACH YEAR. Suddenly, often without warning signs, an apparently healthy American dies when a storm of electrical activity overwhelms the heart and stops it from beating. Doctors call it ventricular fibrillation, and it is the leading cause of sudden cardiac death.

Another 2.2 million Americans live with a related heart rhythm disorder, or arrhythmia, called atrial fibrillation. AF can be just as dangerous, because it increases the risk of developing blood clots in the heart and having a stroke.

All cardiac arrhythmias are triggered by disturbances in waves of electrical activity that pass through the heart. These electrical impulses stimulate billions of cardiac muscle cells to beat together in a coordinated rhythm. The problem is that scientists still don't know exactly what causes these electrical disturbances.

The arrival at Michigan of a multidisciplinary team of researchers from the SUNY Upstate Medical University in Syracuse, New York, could change that. Led by José Jalife, M.D., and Mario Delmar, M.D., Ph.D., 35 SUNY scientists and technicians are joining the Cardiovascular Center to create a new Center for Arrhythmia Research.

"Fibrillation is like a tornado in your heart muscle, except instead of wind, it's made up of electrical waves," says Jalife, the Cyrus and Jane Farrehi Professor of Cardiovascular Medicine.

Jalife and Delmar are well-known for their basic scientific work on the underlying cause of cardiac arrhythmias, but Jalife says they needed to be part of an institution with a strong clinical program to transfer their research findings from the lab to the clinic. So the opportunity to collaborate with U-M physicians like Hakan Oral, M.D., and Fred Morady, M.D., was a big reason why they decided to become part of the Cardiovascular Center.

"We have one simple goal and that is to cure arrhythmia," says Oral, the Frederick G.L. Huetwell Research Professor of Cardiovascular Medicine. "Achieving that goal requires a multidisciplinary approach with basic scientists and clinicians focusing on the problem from different perspectives."

Oral and Morady, the McKay Professor of Cardiovascular Disease, are leaders in the use of radiofrequency ablation to treat complex arrhythmias.

"Every cell in the heart is capable of twitching. The trick is you want them to twitch at the same time in synchrony," says Delmar, the Frank Norman Wilson Professor of Cardiovascular Medicine.

To study atrial and ventricular fibrillation, Jalife and his colleagues developed technology that measures the precise frequency interval between heartbeats at specific locations within a patient's heart.

"Our hypothesis is that areas with the fastest frequencies are where the vortices that maintain fibrillation are located," Jalife says.

"The collaboration will benefit not only our patients, but patients with heart rhythm disturbances everywhere," says David Pinsky, M.D., a director of the Cardiovascular Center. —SP

MORE ON THE WEB

COURTESY OF JOSE JALIFE AND SAMI NOUJAIM

Non-Stop Noise

ABOUT 50 MILLION AMERICANS, especially aging baby boomers and military veterans, have forgotten what it's like to hear the sounds of silence. They live with constant noise caused by a condition called tinnitus. For some, it's a high-pitched whine, while others hear a low hum or the sound of ocean waves.

Tinnitus is a common side effect of age-related hearing loss or inner ear damage caused by exposure to loud noises. Trauma to the head or neck — even dental work — can trigger tinnitus. Physicians don't understand exactly what causes it, and have few ideas about how to make it stop.

Susan Shore, Ph.D., a research professor in otolaryngology and an associate professor in molecular and integrative physiology, suspects the brain's response to hyperactive trigeminal nerves in the face and neck plays a role in the development of tinnitus. Shore compared neural activity in deaf and normal guinea pigs and found that sensory-sending nerves respond to hearing loss by ramping up their activity in the brain. —SP

MORE ON THE WEB

Susan Shore

BOTTOM LEFT: SCOTT GALVIN, U-M PHOTO SERVICES; TOP RIGHT: IOFOTO

Drop the Belly Fat

MOST PHYSICIANS AGREE that an overweight patient who carries excess fat around her stomach has a higher risk of heart attack and stroke than a patient whose fat is concentrated in her hips and thighs. But *why* is still a medical mystery.

In an attempt to solve the mystery, Daniel Eitzman, M.D., an associate professor of internal medicine at the U-M and the VA Ann Arbor Healthcare System, is studying obese mice. These mice are fat because they lack the gene for leptin — a hormone produced by fat cells that helps control appetite and metabolism. When Miina Öhman, M.D., Ph.D., a postdoctoral fellow, transplanted fat tissue from normal mice into leptin-deficient mice, they started producing leptin and lost weight. But Eitzman and Öhman were surprised to see signs of chronic inflammation, including immune cells called macrophages, surrounding the transplanted fat cells.

Inflammation is the immune system's way of defending the body against infection or injury. While targeted inflammation is a good thing, uncontrolled or chronic inflammation can do a lot of damage to healthy tissue. Using a strain of mice that develop high cholesterol and atherosclerosis, Eitzman and other scientists conducted a series of experiments to identify the relationship between atherosclerosis and inflammation in fat.

The answer turned out to be the type of fat the mice received. Mice with transplants of abdominal fat developed inflammation and atherosclerosis. Mice given transplants of subcutaneous fat — the kind found under the skin throughout the body — had inflammation, but no atherosclerosis.

Eitzman believes some interaction between cells involved in inflammation and abdominal fat cells could be triggering the development of atherosclerosis. In future research, he hopes to figure out exactly what happens and how to prevent it. In the meantime, he says eating a balanced diet and exercising to lose excess fat, especially abdominal fat, is still the best way to reduce your risk of heart disease associated with obesity. —SP MORE ON THE WEB

In the Clinic

MQS Brings Results

COMMUNICATION IS THE KEY TO A STRESS-free discharge, according to a team of caregivers and administrators who work on unit 5B in University Hospital.

When they talked to patients about discharge procedures, the team from 5B found some problems. They learned that patients often didn't know their doctors' names. Patients were packed and ready to leave, but unsure of when they could go home. Getting final dressing changes, test results, prescriptions, follow-up appointments and other items could cause end-of-day bottlenecks that were frustrating for staff and patients. And delays rippled out to affect incoming patients waiting for beds.

"We learned that a lot of pieces need to be brought together for discharge to work well," says Robert Chang (M.D. 2002, Residency 2005), 5B's medical director.

Team 5B is one of many teams involved in the Michigan Quality System, or MQS, an effort to "improve everything we do in patient care, education and research," says Jack Billi, M.D. (Residency 1981), associate dean for clinical affairs and the MQS program director. The philosophy underlying MQS is based on "Lean Thinking," an approach developed by Toyota and later adapted by GM and other manufacturers.

"We chose lean thinking as a philosophy because it represents a holistic approach," Billi adds. MQS focuses on reducing overburden, uneven workload, variability and waste. Involving frontline workers in spotting problems — and finding solutions — improves quality,

MICHAEL PRINCE

safety and service. Managers support workers by giving them time to investigate the root cause of glitches.

Lean thinking isn't about downsizing or cost-cutting, Billi explains, but about freeing up caregivers and staff to provide the best, most appropriate care and service to patients. That's hard to do when you're putting out fires, he says, or fixing the same problem time after time.

During MQS meetings, teams brainstorm possible solutions called countermeasures. If a countermeasure is implemented, the team watches to see if it helps or causes other problems. One countermeasure tested by the 5B team was the installation of white boards to serve as a communications hub in each patient's room. Nurses use the white boards to record the names of the patient's caregivers, the anticipated discharge date and time, and a daily plan for getting to discharge, so patients know what to expect.

The team also developed an online form which prompts a scheduling coordinator to call the patient. Together they make an appointment for follow-up care before the patient leaves the hospital.

Early data evaluating the success of the 5B team's countermeasures are promising: In the past, only 60 percent of patients went to their follow-up appointments; now 71 percent do. The percentage of patients visiting the emergency room within two weeks of discharge dropped from 4 percent to less than 1 percent. And readmissions to the hospital declined from the UMHS average of 11 percent to 8 percent for 5B patients.

—KIMBERLEE ROTH

Ask about Your Catheter

MOST PEOPLE WHO ARE HOSPITALIZED FOR SURGERY OR A SERIOUS ILLNESS expect treatment will make them better, not worse. Unfortunately, it doesn't always work that way. Being in the hospital has risks, and one of the most significant is the risk of infection.

Forty percent of all hospital-acquired infections occur in the urinary tract, and 80 percent of these are associated with the use of indwelling urinary catheters. The longer the catheter stays in the bladder, the higher the risk of infection.

Michigan physicians were surprised to discover that most American hospitals don't have a consistent strategy in place to monitor catheter use and prevent urinary tract infections, called UTIs, in their patients. Sanjay Saint, M.D., a professor of internal medicine and a research scientist at the VA Ann Arbor Healthcare System, and his co-researchers, surveyed 719 U.S. hospitals about practices used to prevent UTIs.

The researchers found that less than half of hospitals responding to the survey kept track of which patients had a urinary catheter, and only 26 percent kept track of how long catheters had been in place.

Until more hospitals start taking urinary tract infections seriously, Saint advises patients to speak up. "The bottom line for hospitalized patients and their families is, if you have a catheter, ask the doctor or nurse every day if you still need it," he says. —SP

Counting Lymph Nodes

HOW DO YOU MEASURE THE quality of medical care? It can be tricky, especially when it comes to cancer. For example, how many lymph nodes should be tested after colon cancer surgery to determine whether the patient's tumor has spread?

The National Quality Forum, an organization that sets health care quality standards for hospitals and physicians, says the right answer is at least 12 lymph nodes. But a recent U-M analysis of medical records from 30,625 patients undergoing colon cancer surgery found no statistically significant difference between patient survival times in hospitals that examined 12 or more lymph nodes compared to hospitals that checked fewer lymph nodes.

The bottom line is that valid indicators for the quality of hospital care must be clearly correlated with patient outcome, according to Sandra Wong, M.D., a surgical oncologist in the U-M Comprehensive Cancer Center. Wong was first author on the study which was published in the *Journal of the American Medical Association*. —SP

MORE ON THE WEB

In the Clinic

Carolyn and Bob Collins

Focus on the Caregiver

IN 2005, BOB COLLINS AND HIS WIFE, Carolyn, received devastating news. The prostate cancer he fought four years earlier had spread to his lymph nodes and was now incurable. As Bob's primary supporter and caregiver, Carolyn kept many of her fears to herself. "He has enough on his plate without worrying about me falling apart," she says.

"The spouse of a patient with advanced cancer experiences as much distress, if not more, than the patient," says Laurel Northouse (Ph.D. 1985), R.N., the Mary Lou Willard French Professor of Nursing at the School of Nursing and co-director of the Cancer Center's Socio-Behavioral Program. "Often, they don't get the support they need to carry on their care-giving role."

Recently, the Collinses agreed to be part of a pilot education and support program called FOCUS. The program was created by Northouse and her colleagues to study the effects of cancer on patients and their caregivers.

Specially trained nurses met with more than 200 couples participating in the FOCUS study. During three 90-minute home visits and two 30-minute phone sessions, nurses tailored the program to address each couple's needs. In the Collinses' case, Bob and Carolyn discussed their worries openly. "We had been pretty open about talking about tests and things," says Carolyn, "but fear about what the end will be like and how I will hold up — those we hadn't really dealt with."

Northouse found that FOCUS had positive effects on both patients and partners, but partners actually benefited more. After being in the program, caregivers reported feeling less hopelessness and uncertainty, and more confidence in their role, as well as better mental and physical quality of life. Northouse is now working on a larger study, involving other types of cancer and looking at different ways to offer caregiver support at a lower cost and to a broader audience, perhaps using the Internet.

That would please Carolyn Collins who, with Bob, concentrates "on living every day as fully as we can." The two recently returned from a trip to India and visiting grandchildren in Wisconsin. FOCUS helped them through some rough patches, she says, "and it makes me sad to think others who are fearful wouldn't have the opportunity to participate." —KIMBERLEE ROTH

MORE ON THE WEB

SCOTT GALVIN/U-M PHOTO SERVICES

More than Diabetes

CONTROLLING DIABETES IS NEVER easy, but older adults who must cope with diabetes in addition to other chronic diseases find it especially difficult. According to a research study led by Eve Kerr, M.D., and John Piette, Ph.D., 92 percent of diabetics over age 55 have at least one other serious medical condition — often hypertension, heart disease, stroke, lung disease, cancer or arthritis. Nearly 50 percent have three or more diseases.

Dealing with multiple conditions can affect a patient's ability to manage their diabetes effectively and prevent complications, adds Kerr, an associate professor of internal medicine and acting director of the Ann Arbor VA Center for Clinical Management Research. "It's important to treat the whole patient," she says. "In addition to talking about diabetes, physicians also need to talk about how heart failure, hypertension or other diseases can affect self-management." —SP MORE ON THE WEB

Health Briefs

Are you looking for **an easy way to add more fruits and vegetables to your diet**? Then the Comprehensive Cancer Center has a Web site for you. Do you love asparagus, but loathe eggplant? Enter your preferences, and the site brings up recipes that include only the fruits and vegetables you like. Recipes were developed by Graham Kerr, TV's "Galloping Gourmet." A link to the site appears in the Web version of this issue.
MORE ON THE WEB

David Stutz (M.D. 1971, Residency 1974) is the creator of a Web site called **"Ask the Podcast Doctor"** (www.askthepodcastdoctor.org). Stutz interviews Health System experts to provide answers to health and medical questions submitted by e-mail. A new podcast is posted every Thursday.
MORE ON THE WEB

So you've tried antihistamines, antibiotics and sprays, but the drainage and stuffed-up feeling keeps coming back? The good news is there's a cheap, safe and easy treatment that can help.

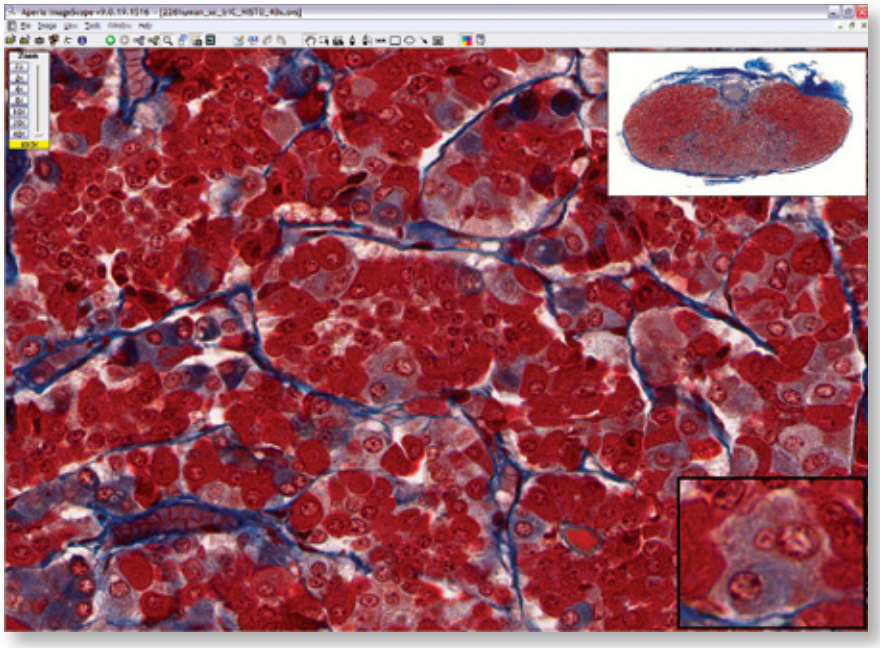
It's called **nasal irrigation** or nasal lavage. U-M researchers found that flushing warm salt water through the nasal passages reduced the severity of symptoms more than a saline spray.

All you need is salt, warm water, a bulb syringe and a little practice. —SP MORE ON THE WEB

BOTTOM: JAKUB SEMENIUK/ISTOCKPHOTO; TOP: PLUSH STUDIOS

In the School

The Digital Advantage



COURTESY OF MATT VELKEY

MEDICAL STUDENTS TAKING FIRST-YEAR histology courses used to spend hours in the laboratory centering and focusing slides of cells, tissues and organs under a microscope. Now, students with a laptop computer and Internet access can do their lab work wherever and whenever it's convenient — at Starbucks, McDonald's or the kitchen table on Saturday night — using the Medical School's new digital microscopy resource.

Matt Velkey (Ph.D. 2005), a lecturer in cell and developmental biology, directs the histology course and helped implement the digital microscopy program, along with Lloyd Stoolman, M.D., professor of pathology, and staff in the Taubman Medical Library and Medical School Information Services.

From the instructor's point of view, Velkey says digital slides are a better teaching tool. They eliminate the aggravation of handling microscope slides, as well as the inconvenience and confusion that can result when teacher and student are trying to look at the same slide. With digital slides and a laptop computer, students can take notes and ask questions while looking at the same image at the same time as the instructor.

First-year medical student Conroy Chow gives the program a positive review. "With digital microscopy, all the students are looking at the same slides, and our professors can quickly show a certain slide to the entire class to highlight a particularly difficult object to identify," Chow says. "This would be much more difficult to do with variations across individual glass slides."

The program works on the same principle as Google Earth. The server stores a one-gigabyte file of the original, high resolution image and then delivers only a portion of that image over the Web when requested. By giving users pixels on demand, the server can accommodate many users querying the same image at the same time, with access available 24 hours a day, seven days a week.

Even examinations are now given over the Web, using an honor system. "Quizzes and exams typically open on Friday night and close on Sunday at midnight," Velkey says. "Students come to the library and log in with their honor code number and a password to access the examination server." Students get about one hour for each quiz, and exams take around three hours. Under the old system of laboratory practicums, examinations were a nerve-wracking affair where students had just 90 seconds to answer each question before moving on to the next station.

"It limited the kinds of questions you could ask," Velkey says. "Now that it's all online in a virtual slide, you can put an arrow on the slide, and ask a second-order question, like 'What is the function of this cell?' It's more than just rote identification."

For medical students, the biggest advantage of digital microscopy may be the ability to do homework in their underwear, but the real benefit is giving future physicians a better clinical understanding of the course material. It trades a source of technological frustration — the microscope and all its limitations — for a much more powerful learning and teaching tool.

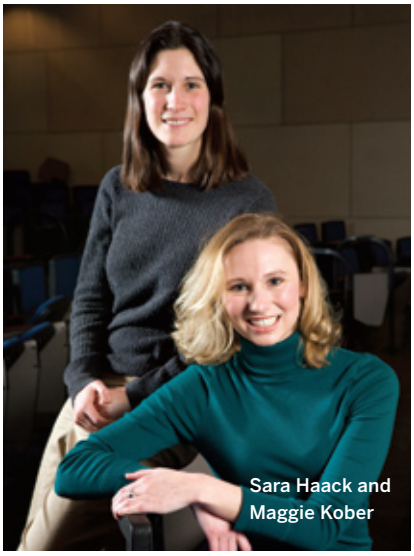
—CATHERINE SHAFFER

Summer in Geneva

THE SUMMER OF 2008 WILL BE A summer to remember for first-year medical students Sara Haack and Maggie Kober. The two women will spend eight weeks working and studying at the World Health Organization (WHO) in Geneva, Switzerland, as participants in Duke University's Global Health Fellows Program.

U-M students who participated in the program previously were Adam Castano, a third-year student; Allison Leung, in her second year; Bina Valsangkar, fourth-year; and Tanyaporn Wansom, fifth-year.

Open to graduate students worldwide, the Global Health Fellows Program combines an eight- to 10-week health policy-related internship with an intensive one-week course. Fellows have opportunities for networking with people from around the world who are interested in global health issues. —SP



Sara Haack and Maggie Kober

Doug Strong (left), director and CEO of U-M Hospitals and Health Centers, and James Woolliscroft (right), dean of the Medical School, are embarking on a new initiative to integrate administrative units in the Medical School with parallel units on the hospital side. In the short-term, that means preparing just one budget instead of two, and more staff collaboration. In the long-term, it means eliminating redundant procedures, cutting costs and working together to administer high-quality patient care, research and medical education as efficiently as possible.

Happy Anniversary, AΩA

U-M members of Alpha Omega Alpha, the world's only honor medical society, celebrated their local chapter's 100th anniversary at a dinner and symposium in March. Considered the "Phi Beta Kappa of medical schools," AΩA is an international organization with more than 100,000 members. Since 1908, 2,212 students in the Medical School have been initiated into the honor society. —SP

BOTTOM LEFT: LIN JONES/U-M PHOTO SERVICES; TOP RIGHT: SCOTT SODERBERG/U-M PHOTO SERVICES