

# Medical Bulletin

## Pain relievers

U scientists take the  
bite out of chronic pain

**SPRING 2010** Family medicine residents add research to their résumés □ Muscular dystrophy research team builds on its success □ Golden gopher holds clues to surviving traumatic blood loss

## About the Medical School

THE UNIVERSITY of Minnesota Medical School encourages collaborations that spur innovations — discoveries that advance biomedical knowledge, patient care, and educational programs. The Medical School now trains 920 medical students and more than 800 residents and fellows and is home to 1,600 faculty physicians and scientists.

## About the Minnesota Medical Foundation

THE MINNESOTA Medical Foundation is a nonprofit organization that raises millions of dollars annually to help improve the quality of life for the people of Minnesota, the nation, and the world by supporting health-related research, education, and service at the University of Minnesota, including many Medical School initiatives.

### Frank B. Cerra, M.D.

Medical School Dean and  
Senior Vice President for Health Sciences

### Mark S. Paller, M.D., M.S.

Executive Vice Dean, Medical School

### Becky Malkerson

President and CEO,  
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UNIVERSITY OF MINNESOTA

Medical School



## ON THE WEB

 Find web-exclusive content in the online version of the *Medical Bulletin* at [www.mmf.umn.edu/bulletin](http://www.mmf.umn.edu/bulletin).

### Drawn to family medicine

Watch a video about the Medical School's award-winning family medicine program.

### Global opportunities

View a slideshow on the International Medical Education and Research exchange program in Israel.

### Making gains in muscular dystrophy

Find a story about a family's experience with MD and a podcast highlighting new therapies.

### All in the family

Watch a video about one Minnesota family's Medical School legacy.

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COVER ILLUSTRATION: DAVE CUTLER

# Minnesota's medical schools and primary teaching hospitals boost state's economy by \$8.4 billion

**M**innesota's medical schools and teaching hospitals had more than an \$8.4 billion impact on the state's economy in 2008, according to an Association of American Medical Colleges (AAMC) report on its member institutions.

Those institutions include the University of Minnesota Medical School and Mayo Medical School as well as Abbott Northwestern Hospital, Hennepin County Medical Center, Regions Hospital, Saint Marys Hospital, and University of Minnesota Medical Center, Fairview.

The report found that these institutions are responsible directly or indirectly for 65,430 jobs and that government revenue from various types of taxes contributes more than \$496 million.

Other study findings for Minnesota:

- An out-of-state medical visitor impact of \$19.5 million;
- A direct state business volume impact of more than \$3.6 billion; and
- Capital improvements, goods, services, and supplies of more than \$1.8 billion.

"U.S. medical schools and teaching hospitals are substantial economic engines in terms of jobs, state tax revenues, and economic growth," says AAMC president and CEO Darrell G. Kirch, M.D.

"Although some medical schools and teaching hospitals have been grappling with reduced funding as a result of the

recession, AAMC member institutions have continued to be strong economic drivers for their communities, their states, and the nation."

In fact, the AAMC data coincides with recent information from the U.S. Bureau of Labor Statistics indicating that half of the 30 fastest-growing occupations in 2009 were in health care.

Nationally, AAMC member institutions had an overall \$512 billion impact on the country's economy. That figure includes institutional and employee spending, as well as spending by patients (outside of the hospital), their families, and visitors.

Medical schools and teaching hospitals benefit their communities and state beyond their economic impact. They care for patients in an environment where health knowledge and research continually evolve into new treatments and cures, educate the next generation of health-care providers, and serve as core care providers of the uninsured. MIB



PHOTO: EMILY JENSEN

Medical students Ncha Xiong and Melissa Sherman (second and fourth from left, respectively) conduct a mock exam of stand-in patient Megan Tucker, while David Power, M.D., M.P.H., observes.

**U.S. medical schools and teaching hospitals are substantial economic engines in terms of jobs, state tax revenues, and economic growth.**

– Darrell G. Kirch, M.D.

## For the first time, researchers discover a method to objectively identify PTSD

University of Minnesota and Minneapolis VA Medical Center researchers have identified a biological marker in the brains of people exhibiting post-traumatic stress disorder (PTSD).

The study, which involved a group of 74 U.S. military veterans, used a noninvasive technology called magnetoencephalography (MEG) to measure magnetic fields in the brain. The technology appears to be able to objectively diagnose the disease — something conventional brain scans such as X-rays, CT scans, and MRIs have failed to do.

With more than 90 percent accuracy, researchers were able to differentiate people who have PTSD from control subjects using MEG. They also were able to judge the severity of a person's disease.

“These findings document robust differences in brain function between the PTSD and control groups that can be used for differential diagnosis and which possess the potential for assessing and monitoring disease progression

and effects of therapy,” says Apostolos Georgopoulos, M.D., Ph.D., who led the study with Brian Engdahl, Ph.D. Both are members of the Brain Sciences Center at the Minneapolis VA Medical Center and University.

The ability to objectively diagnose PTSD is the first step toward helping those afflicted with this severe anxiety disorder. PTSD often stems from war but can result from exposure to any psychologically traumatic event.

All behavior and cognition involves the continuous interaction of networks of nerves in the brain. The MEG technology uses 248 sensors to record those interactions on a millisecond-by-millisecond basis, much faster than current methods of evaluation, such as functional magnetic resonance imaging, which takes seconds to record.

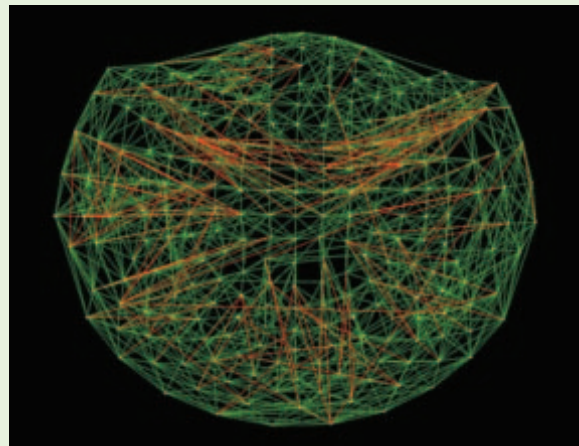


IMAGE COURTESY OF APOSTOLOS GEORGOPOULOS, M.D., PH.D.

University researchers have achieved more than 90 percent accuracy using a noninvasive technology called magnetoencephalography to differentiate people with post-traumatic stress disorder from control subjects.

Previously, Georgopoulos and Engdahl have detected other brain diseases, such as Alzheimer's disease and multiple sclerosis, using MEG. It's likely that the study will be replicated in a larger group to ensure the accuracy of its results.

The study, funded by the U.S. Department of Veterans Affairs, was published January 20 in the *Journal of Neural Engineering*. [\[MIB\]](#)

## U awarded \$8.6 million to manufacture stem cell therapies

The University of Minnesota has been awarded an \$8.6 million contract to help speed the development of novel stem cell- and immune cell-based therapies from the laboratory to clinical trials through the Production Assistance for Cellular Therapies (PACT) program.

The award, from the National Heart, Lung, and Blood Institute, was given to five academic centers, including centers at the University of Minnesota, Baylor College of Medicine, Beckman Research Institute of the City of Hope, Harvard Medical School, and the University of Wisconsin-Madison. These sites will serve as national resources for the

development of new treatments for patients with various heart, lung, and blood diseases.

The University of Minnesota team will continue to work on establishing national best practices for the development of cellular therapies. Investigators here have been at the forefront of research on umbilical cord blood and the development of regulatory T cells and natural killer cell therapies to enhance the effectiveness of blood and marrow transplants and reduce their complications.

“Few institutions in the U.S. have the combined expertise and resources

in one place to take an idea from the research bench to the patient bedside as we have at the Molecular and Cellular Therapeutics Facility,” says principal investigator John E. Wagner, M.D., who together with David McKenna, M.D., and Jeffrey Miller, M.D., will lead the University program.

The PACT award is the second five-year contract Wagner has received at the University to help accelerate work on cellular therapies. The University's first contract, awarded in 2003, fundamentally transformed the pace of new cell-based therapies. [\[MIB\]](#)

## U of M study finds vitamin D levels may be linked to weight loss

UNIVERSITY RESEARCHER Shalamar Sibley, M.D., found that people with higher levels of vitamin D in their bodies while on low-calorie diets may lose more weight — especially in their midsections.

Sibley and her colleagues measured the levels of two forms of vitamin D — the precursor and active hormonal forms — in 38 overweight men and women. Most had what many experts would consider insufficient vitamin D levels. Study participants were



Shalamar Sibley, M.D.


then monitored for 11 weeks while on diets that limited their daily caloric intake to 750 calories fewer than their estimated daily needs.

The results indicate that pre-diet vitamin D levels predicted weight loss. For every unit increase of the precursor form of vitamin D (the commonly measured form of the vitamin),

participants lost almost a half pound more on their diets. For each one-unit increase in the active form of vitamin D,

they lost nearly one-quarter pound more. In addition, higher baseline levels of both forms of vitamin D predicted a greater loss of abdominal fat.

Sibley, an assistant professor of medicine, cautions against excess vitamin D intake and also emphasizes that more research is needed to confirm her results. “Our findings need to be followed up by the right kind of controlled clinical trial,” she says.

This study was funded by the University of Minnesota, National Institutes of Health, and the Pennock Family Endowment. 

## New Medical Biosciences Building brings experts together to accelerate research

A chat between colleagues in the hallway can spark the beginnings of a major medical discovery. For researchers at the University of Minnesota whose offices may be scattered across campus, bouncing ideas off of one another in person just got easier.

In December, the University opened a \$79.3 million, 115,000-plus-square-foot Medical Biosciences Building to house scientists who are studying Alzheimer’s disease and other brain-related diseases as well as the immune system.

Located behind the TCF Bank Stadium, the building is part of the University’s Biomedical Discovery District — the result of a \$292 million funding program approved by the 2008 Minnesota Legislature — and will house 210 researchers, including 25 principal investigators.

It is home to world-leading research programs in Alzheimer’s disease, ataxia,

and other neurodegenerative and neuromuscular diseases such as muscular dystrophy, Parkinson’s disease, ALS (Lou Gehrig’s disease), as well as immunology. And it is linked by a skyway to the University’s internationally renowned Center for Magnetic Resonance Research.



Harry Orr, Ph.D., a lead ataxia researcher and director of the University’s Institute for Translational Neuroscience, says that the new building will strengthen recruiting and collaboration. “There’s a lot of overlap with the pathways in immunology and neurosciences. We talked about joint research over the years, but now we’re in the same building,” he says. “I want to find a treatment for ataxia in the next 10 years. Given that goal, I can’t think of a better place to be.” 



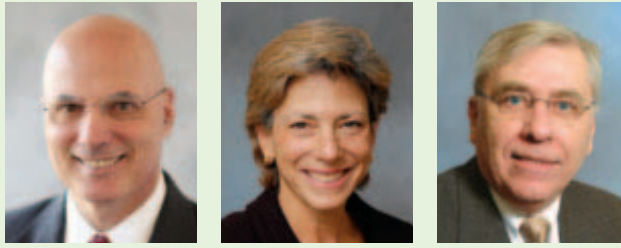
PHOTO: EMILY JENSEN

Alzheimer’s disease researcher Karen Hsiao Ashe, M.D., Ph.D., cuts the ceremonial ribbon at the Medical Biosciences Building opening December 1, while scientist Harry Orr, Ph.D., and Medical School Dean Frank Cerra, M.D., look on.

 Read more about the University’s new Medical Biosciences Building at [www.mmf.umn.edu/mb/mbb](http://www.mmf.umn.edu/mb/mbb).

## UMP appoints three new leaders

William T. Browne, M.D., Barbara Gold, M.D., and David Rothenberger, M.D., have accepted new leadership roles with University of Minnesota Physicians (UMPhysicians), the group practice of University faculty physicians.




Left to right: William T. Browne, M.D., Barbara Gold, M.D., David Rothenberger, M.D.

Browne will serve as senior vice president for clinical operations, Gold as senior vice president for clinical quality, and Rothenberger as senior vice president for leadership development and clinical mentorship.

Browne, a critical care specialist, has spent his 30-year career in the U.S. Army, serving as deputy commander for clinical services at the Eisenhower Army Medical Center and internal medical consultant to the U.S. Surgeon General.

Gold, medical director for anesthesia at University of Minnesota Medical Center, Fairview, has held several leadership roles with state and national professional organizations, including the Society for Ambulatory Anesthesia and the American Society of Anesthesiologists.

Rothenberger, an internationally recognized colorectal surgeon, has been a member of the UMPhysicians Board of Directors for five years and has held many leadership roles at the University, including chief of staff for University of Minnesota Medical Center, Fairview. 

## Soft drinks may increase risk of pancreatic cancer


Individuals who consumed two or more soft drinks per week increased their risk of developing pancreatic cancer by nearly two-fold compared with those who did not consume soft drinks, according to a University of Minnesota study published in *Cancer Epidemiology, Biomarkers & Prevention*.


Authors Mark Pereira, Ph.D., associate professor in the School of Public Health, and Noel Mueller, M.P.H., also noted that people who regularly consume soft drinks, defined as primarily carbonated sugar-sweetened beverages, tend to have a poor behavioral profile overall.

However, the effect of these drinks on pancreatic cancer may be unique.

“The high levels of sugar in soft drinks may be increasing the level of insulin in the body, which we think contributes to pancreatic cancer cell growth,” Pereira says.

Though relatively rare, pancreatic cancer remains one of the most deadly cancers, and only 5 percent of people who are diagnosed are alive five years later.

Pereira and colleagues observed 60,524 men and women in the Singapore Chinese Health Study for 14 years. During that time, 140 of those people got pancreatic cancer. Those who consumed two or more soft drinks per week — averaging five per week — had an 87 percent higher risk of developing pancreatic cancer. 

 Watch a video of Pereira explaining this research at [www.mmf.umn.edu/mb/soda](http://www.mmf.umn.edu/mb/soda).


## U part of team charged with improving global response to pandemics

University faculty from the College of Veterinary Medicine, School of Public Health, Medical School, and other collegiate units will be on the front lines of a global collaboration to fight emerging zoonotic pandemics — diseases that can spread between animals and humans.

Through the project, called RESPOND, faculty are joining a multidisciplinary team that will implement a U.S. Agency for International Development cooperative agreement with funding of up to \$185 million, \$55 million of which will go to the University’s Academic Health Center over the next five years.

University faculty will travel to pandemic hot spots — potentially in Southeast Asia, the Amazon Basin, and the Congo Basin — to try to prevent the next pandemic. They will be working with DAI, a company based in Washington, D.C., and Tufts University to improve the ability of countries to recognize and respond to new epidemics in places where relationships between humans, animals, and the environment are unstable.

“The University of Minnesota was sought out because of our range of expertise in zoonotic diseases that crosses disciplines and our focus on the connection between animal and human health,” says Frank Cerra, M.D., the University’s senior vice president for health sciences and dean of the Medical School. “We are one of only a handful of places in the country that has this range of disciplines.”

Although the RESPOND team members will be dealing with newly emerging diseases, examples of similar diseases they might encounter include avian influenza, SARS, and the Ebola virus. 

# Global Outreach | IMER Program

LOCATION: Tel Aviv, Israel MISSION: Learning about medicine in a truly multicultural setting



## A lesson from Israel

Students, faculty see a different Israel through IMER exchange program

When a group of four University of Minnesota Medical School students and two faculty members visited hospitals in Israel in 2008 through an International Medical Education and Research (IMER) program, they weren't sure exactly what to expect.

They knew not to expect the same Israel they'd seen on the news. They knew not to expect third-world conditions. They just weren't expecting the huge, leading-edge simulation center they saw at the country's largest hospital, Chaim Sheba Medical Center, near Tel Aviv.

"The Israel Center for Medical Simulation was amazing," says fourth-year medical student Melanie Lo, who took part in IMER's first Quie/Farbstein Health Care in Israel Program excursion, designed to promote an exchange of educational, research, and other scholarly opportunities for students and faculty. "It was an entire building filled with different simulation equipment for all sorts of medical situations, including the clinic, operating room, and field for military and disaster relief training. We were extremely impressed by the high-end technology as well as the sheer scale of the training center," Lo says.

Their visit to the Israel Center for Medical Simulation also made an impression on faculty adviser Marshall Hertz, M.D.,

who will take a second group of students to Israel in April.

"I feel like, in a lot of ways, they are technologically equal or superior," says Hertz, comparing the Israeli hospital to those in the United States. "Yet everybody you talk to still seems to regard America as the gold standard."

### Technology and the physical exam

But as in the United States, not every hospital in Israel has all of the newest technologies. The group visited several Israeli health-care facilities, and Chaim Sheba Medical Center was among the most technologically advanced.

At Baruch Padeh Medical Center in Poriya, the community-based hospital where the IMER group spent most of its time, health-care professionals had access to some technologies typically found in U.S. hospitals — but not everything.

Instead, physicians relied heavily on taking good patient histories, performing very thorough physical exams, and having

PHOTOS COURTESY OF MELANIE LO



Road signs in several languages represent Israel's multiculturalism.





Marshall Hertz, M.D. (second from left), Paul Quie, M.D. (fifth), and student Melanie Lo (sixth) were in the first University of Minnesota cohort to visit Israel through the Quie/Farbstein Health Care in Israel Program in 2008.

a solid understanding of the local epidemiology, especially of genetic diseases.

“They use the tools available to them,” Lo says. “The physical exam is always something you can do, even if you’re going to order a test or ultrasound or something later. In the meantime, you can still be very thoroughly examining the patient.”

### An ever-present concern

The IMER cohort also noticed that safety and security precautions were part of the Israelis’ daily lives. When the Baruch Padeh Medical Center was renovated, its walls were built two feet thick to withstand potential military attacks. Another hospital moved its intensive care unit and daycare facility underground.


The University group didn’t encounter “wartime medicine” by any means, Hertz says. But “the military is around. You see soldiers with rifles. It’s just kind of a presence there.”

(In fact, IMER’s Quie/Farbstein Health Care in Israel exchange program was officially established in 1999, but because of security concerns, University student participation in the exchange has been somewhat restricted.)

Lo says effects of the long-term conflict have permeated through Israel’s health-care system.

“A significant proportion of resources are dedicated to emergency preparedness and treatment of the physical and mental health of all victims,” she says. “But, generally, the focus in the hospitals remained on providing high-quality, culturally appropriate health care.”

And the ethnically and religiously diverse hospital staff—among them Christian Arabs, Muslim Arabs, Jews, Druze, and Bedouins—worked together seamlessly.

“It’s a real crucible of different cultures,” Hertz says. “We got a lot of cultural and religious education in addition to our medical studies.” 

*The Phi Delta Epsilon Fraternity medical alumni group has provided financial support for the first two groups of four students who have taken part in the Quie/Farbstein Health Care in Israel exchange program. Contribute at [www.mmf.umn.edu/giveto/israelexchange](http://www.mmf.umn.edu/giveto/israelexchange).*

By NICOLE ENDRES, associate editor of the *Medical Bulletin*

## DEDICATED TO IMPROVING DISPARITIES

AFTER HIS first international medicine experience in China in 1981, Paul G. Quie, M.D., couldn’t turn back. Quie, a pediatrician and infectious disease expert who has been on the Medical School faculty since 1958, was struck by the glaring health-care disparities between these countries and the United States.



Paul G. Quie, M.D.

“That and hearing the 90-10 rule,” which, Quie explains, estimates that 90 percent of the world’s wealth spent on health care belongs to 10 percent of its population.

Since then, Quie has felt a social responsibility to help address these issues and provide medical students with similar eye-opening medical experiences abroad. He has personally visited 25 of the 26 sites affiliated with the Medical School’s International Medical Education and Research (IMER) program throughout the world.

“Dr. Quie has been a revered teacher of many of the alumni of the Medical School,” says IMER director Phillip K. Peterson, M.D., who with Medical School alumnus James Gavisser, M.D., led the charge to name IMER’s Quie/Farbstein Health Care in Israel Program in his honor.

Quie, an emeritus-but-not-retired professor who celebrated his 85th birthday in February, says that working with students through IMER doesn’t feel like work.

“Medical students are as keen and optimistic as they were when I started medical school in the ’40s, if not more,” Quie says. “Being with that age group is phenomenal.”



View a slideshow on the IMER exchange program in Israel at [www.mmf.umn.edu/mb/imer](http://www.mmf.umn.edu/mb/imer).



University researchers  
take the bite out of a  
formidable foe —  
chronic pain

# Pain relievers

*The worst pain a man can suffer:  
to have insight into much and  
power over nothing.*

– Herodotus

IF HERODOTUS WAS RIGHT about the connection between pain and power, research into chronic pain has been hurting until recently. We've long known much about the nervous system's mechanisms that communicate and register pain, but we have lacked the power to treat and end chronic pain in many patients. This shortcoming produces sobering consequences: About 30 percent of Americans experience chronic pain from a variety of causes, leaving them in continual distress and handing our economy an annual loss of nearly \$100 billion.

There's no denying that pain makes a devious opponent. It often appears and persists for unknown reasons. "It makes me cringe to imagine having pain when you don't know the cause,"

ILLUSTRATIONS: DAVE CUTLER

says Christopher Honda, Ph.D., a professor and pain researcher in the University of Minnesota's Department of Neuroscience. "Besides suffering from the pain, these patients wonder and worry about what's behind it. Unfortunately, there's no consistent course of treatment—no common path to wellness. Many people have to find out what works just for them, which can become very frustrating."

Such a wily foe deserves determined adversaries, which the University can claim in abundance. "We have one of the largest collection of pain researchers in the world working on all aspects of the problem, from determining how people sense and perceive pain to studying new drugs for controlling it," says Timothy Ebner, M.D., Ph.D., professor and head of the Department of Neuroscience.

By pooling their expertise, University of Minnesota scientists from a variety of disciplines are taking on pain in the laboratory, where they are steadily gaining on humanity's longtime enemy. Cancer pain is a prime example: Scientists specializing in such wide-ranging fields as neuroscience, pharmacology, hematology/oncology, orthopaedic surgery, dentistry, and veterinary medicine are discovering new approaches to outwitting the chronic pain that often accompanies cancer.

### **The promise and pitfalls of opioids**

Leading the way is George Wilcox, Ph.D., a professor of neuroscience, pharmacology, and dermatology and program director of the Minnesota Center for Pain Research, which fosters cross-disciplinary research and education. For decades, he has focused his attention on opioids, the drugs that have long offered the best

hope for sufferers of chronic pain. These medications come with serious disadvantages; patients can develop a tolerance or addiction to them, requiring ever-growing doses to ease the pain, as well as other side effects, including nausea and vomiting, constipation, dizziness, and impaired cognition.

"Sometimes people with chronic pain from a disease like cancer will be taking very large doses of morphine for years and years," says Wilcox. "They get to the point where the side effects begin to appear."

Wilcox's lab has devised a way of avoiding the undesirable consequences of opioids by administering drugs near the spinal cord, lessening the amount needed to reduce pain and bypassing many of the side effects. His lab has also investigated the use of chlonidine—a drug normally used to treat hypertension—in tandem with morphine. The two drugs seem to have a synergistic relationship, with the combination easing pain while reducing the amount of morphine needed by 10 to 15 times. As the dose of morphine declines, so does the incidence of side effects. In addition, Wilcox has found that chlonidine, when administered alone, can control types of pain that are resistant to morphine.

Kalpna Gupta, Ph.D., an assistant professor in the Division of Hematology, Oncology, and Transplantation, approaches opioids from a different angle. She asks a previously unexplored question: If morphine and related drugs lose their ability to control cancer pain over time, could the reason be that the opiates are actually making the cancer worse?

"We found that in mice, the drugs do increase the growth of vessels in cancerous tumors over time," Gupta

**Besides suffering from the pain, these patients wonder and worry about what's behind it. Unfortunately, there's no consistent course of treatment—no common path to wellness.**

— Christopher Honda, Ph.D.

**In essence, we're manipulating physiology to make the body generate its own chemicals to alleviate pain.**

– Virginia Seybold, Ph.D.

explains. “That suggests a relationship with the disease process. The ineffectiveness of opiates is not only due to the effect of the drugs on the central nervous system. We have to consider their effect on the disease. The more rapid the growth of a tumor, the greater the increase in pain.”

When Gupta's team explored ways to prevent the opiates' detrimental effects, they found interesting results involving an enzyme in the body called COX-2, which plays a key role in the perception of pain and cancer progression. “If you combine morphine with a drug that inhibits COX-2, you reduce the ill effect of morphine on cancer, and you also block COX-2 activity in the spinal cord,” Gupta says. “We've found that this combination reduces tumor growth and metastasis and increases survival, while it results in much more pain reduction than the use of each drug alone.”

Pain reduction can also result when the nervous system is “primed” to more quickly sense naturally occurring opioids before a painful incident happens. That's been the focus of research by Honda, whose lab studies the sensory nociceptors, or pain-sensing neurons, that contain opiate receptors. His research suggests that it might be possible to prepare the body to deal with cancer pain or another trauma by medically stimulating the nociceptors in advance.

### **Natural cannabinoids**

Neuroscience professor Virginia Seybold, Ph.D., studies the effects on pain—including cancer pain—of cannabinoids, forms of an active ingredient in marijuana and related plants. Like the opioids, cannabinoids occur naturally in our bodies and reduce the sensation of pain by binding with receptors in the nervous system.

## **STARTING FROM SCRATCH**

NEUROSCIENCE PROFESSOR Glenn Giesler, Ph.D., calls himself a relative newcomer to the study of itching, but during the past decade he's scratched well beneath the surface of this uncommon scientific specialty. The physiology of itch perception, he has learned, shares much in common with the mechanics of pain sensation.

Itching is an unpleasant sensation that leads to the urge to scratch. Excessive scratching, however, can cause infections, skin irritation, sleeplessness, and other problems. Understanding how scratching overcomes an itch could suggest other less damaging methods of treating the sensation—and could possibly inform pain research at the same time.

Giesler's research team applied histamine, a chemical released in the skin after insect bites and other itch-producing events, to the feet of primates. Then they used a mechanical device to scratch the feet while tracking the itch signal up the spinal cord.

Scratching, it turns out, inhibits the communications between the brain and a batch of neurons in the spine called the spinothalamic tract, or STT. The research shows that scratching shuts down itch-sensitive neurons in the spinal cord, not elsewhere in the nervous system. “Next, we need to find ways of activating this scratch inhibitory system without actually scratching and causing damage,” Giesler says.

Interestingly, STT neurons also convey pain signals to the brain. Scratching, as we all know, does not reduce the sensation of pain. That suggests separate pathways for pain and itch signals, and Giesler has found that there are even separate pathways for itch produced by histamine and other itch-causing chemicals. Do any neurons respond only to itch, and not to pain? Nobody yet knows. “We're so far from really understanding how the brain works,” Giesler says. “That's part of the mystery and fun of neuroscience.”



Read more about Giesler's itch research and what it tells us about pain at [www.mmf.umn.edu/mb/pain](http://www.mmf.umn.edu/mb/pain).

“The compounds we’re working with are not themselves strictly cannabinoids—they’re compounds that trick the body into increasing levels of naturally occurring cannabinoids,” Seybold says. “In essence, we’re manipulating physiology to make the body generate its own chemicals to alleviate pain. It’s a highly attractive approach and it seems effective.”

Seybold’s experiments on mice suggest that her line of attack works. Increasing the levels of the body’s own cannabinoid compounds by blocking the enzymes that break them down at the site where tissue is injured alleviates pain, Seybold says. “The advantage of this strategy is that it circumvents the brain, which avoids the problems of impaired cognitive function and dependence that are associated with medical marijuana.”

Other University researchers are investigating the power of cannabinoids to fight cancer pain, including Donald Simone, Ph.D., professor in the Department of Diagnostic and Biological Sciences in the School of Dentistry. Simone’s research on mice has shown that cannabinoids can significantly reduce cancer pain and hypersensitivity that result from the growth of certain malignant tumors. That’s a hopeful prospect for cancer patients with chronic pain.

### **A way to block bone cancer pain**

Bone cancer presents its own distinctive challenges for cancer pain therapy. “It’s a very big problem,” says Denis Clohisy, M.D., a professor of orthopaedic surgery. “Most patients who experience it are dealing with end-of-life issues, and controlling their pain is important.”



Traditionally, physicians have treated bone cancer pain like a toothache, headache, or any other kind of pain—with narcotics. “Our approach is to discover why the pain of bone cancer happens at the level of cells and molecules,” says Clohisy. In a 10-year collaboration, he and colleague Patrick Mantyh, Ph.D., now at the University of Arizona College of Medicine, found that anti-inflammatory, nerve-targeted medications are effective in easing bone cancer pain in mice. Conversely, nerve growth factor, a protein that nurtures certain nerves, makes the pain worse.

## THE LESSONS OF PAINFUL NEUROPATHY

WHEN SOMEONE SUFFERS injury to the nervous system, through disease or other mishap, chronic pain often results. “Whenever chronic pain is at work, the chief mechanism is almost always neurologic,” says David Walk, M.D., associate professor of neurology at the University of Minnesota Medical School. “There could be changes in peripheral nerves, the nerve cells and glials of the spinal cord, or the brain structures that modulate pain signals. Just about any chronic dysfunctional pain is really a neurological problem, even the chronic pain associated with cancer.”

For more than a decade, Walk has pursued painful sensory neuropathy, in which people develop pain resulting from nerve damage. His medical practice has intensified his interest. “Neuropathy can cause disability solely from the pain,” he says. “Many patients have the strength, balance, and reflexes to do all they need to do, but they have to see a doctor for the pain. We have five to 10 medications and other treatments to offer. We start with one, and if that doesn’t work, we try another. There’s no way to know in advance which is the right treatment for a given patient.”

Walk’s research seeks to end that hit-or-miss style of treatment. Inspired by the animal models that orthopaedic surgeon Denis Clohisy, M.D., and others use in their pain research at the University, Walk uses a sensory-testing protocol to gather information about patients with sensory neuropathy. “We test them for abnormal sensitivity to warm, cool, hot, cold, and sharp stimuli as well as pressure. We need to characterize the symptoms and signs of sensory neuropathy,” he says.

Since some neuropathy patients are handicapped exclusively by pain, Walk advocates new ways of approaching their treatment. “Their principal need is for pain specialists who understand the nervous system,” he says. “That’s a field we have to encourage neurologists to move into.”

## ANOTHER ANGLE ON NEUROPATHY

TO LEARN ABOUT the pioneering neuropathy and peripheral nerve research of longtime University neurology professor William Kennedy, M.D., whose lab is focused on developing ways to diagnose and grade neuropathy or nerve injury, visit <http://kennedylab.med.umn.edu/>.

“We’re going to see less use of narcotics and more use of mechanism-based therapies,” predicts Clohisy, whose research is now focused on eliminating bone cancer entirely. “Those would be combinations that include anti-inflammatories and medications that block the effect of nerve growth factor. If it proves effective in humans, which we don’t yet know, this could start up within five years.”

Alvin Beitz, Ph.D., a professor in the Department of Veterinary and Biomedical Sciences, recently received a federal stimulus grant to study a different approach to blocking bone cancer pain at the cellular level. His laboratory has found that pain decreases when two proteins secreted by bone tumors are absent. Beitz will study the effect on pain of deactivating these proteins in mice, in hopes that his findings will lead to the development of new drugs to prevent or reduce bone cancer pain in people.

And reducing or eliminating chronic pain—whatever its cause—is the goal these University scientists and many others share.

“What I’ve valued here is that there’s an intellectual environment focused on pain, which always fuels the discussions and possibilities,” says Seybold. “My research advances because of people with expertise who can answer my questions and who contribute to a critical mass of shared interests.” MB

By JACK EL-HAI, a frequent contributor to the *Medical Bulletin* and author of *The Lobotomist: A Maverick Medical Genius and His Tragic Quest to Rid the World of Mental Illness*



# Research opportunity knocks

The chance to conduct clinical research adds to popular family medicine residency's appeal

AT SMILEY'S CLINIC in south Minneapolis, first-grader Hamsa Abdala, 7, waits with his mother, brother, and a Somali language interpreter to see a doctor. He hops up on the exam table, flashes a bashful smile and says that he's glad to miss a school fieldtrip that day because of his checkup. His class was going ice skating, he explains — he prefers golf.

Hamsa is one of six pediatric patients that Sankari Kasi, M.D., a second-year family medicine resident at the University of Minnesota, will see that week for a clinical research study she's working on as part of her residency.

The study, begun in 2009, involves performing developmental screening

of Somali children to assess their growth in motor skills and verbal abilities. The research team, which includes fellow resident Nadia Malik, M.D., and Diane Madlon-Kay, M.D., Smiley's research coordinator, is evaluating how doctors can encourage Somali parents to report health or developmental concerns about their children to help doctors catch potential problems and intervene sooner.

"If you miss a diagnosis, it makes a difference for the whole family and their future," says Kasi. "I think about how that could change the kids' lives."

Doctors at Smiley's had noticed that when Somali parents bring their children to the clinic for well-check

Second-year family medicine resident Sankari Kasi, M.D., examines first-grader Hamsa Abdala at Smiley's Clinic in south Minneapolis.



At the Raiter Clinic in Cloquet, Medical School alumna Victoria Heren, M.D., mentors medical student Brock Urie as part of the University's Rural Physician Associate Program, which is designed to encourage students to practice in rural areas after they graduate.

## DULUTH'S SPECIALTY: EDUCATING PRIMARY-CARE PHYSICIANS

FORTY YEARS AGO, when rural family physicians were in short supply and the problem was getting worse in Minnesota, state legislators established a two-year medical campus in Duluth that would specialize in educating students committed to practicing in rural communities and who would complete medical school on the Twin Cities campus.

Today 50 percent of University of Minnesota Medical School—Duluth Campus alumni practice in small communities, compared with 4 percent of doctors nationwide.

In 2009, 58 percent of Duluth graduates chose primary-care residencies—family medicine, internal medicine, pediatrics, and medicine/pediatrics. Thirty-four percent selected family medicine—four times the national average.

“Our success starts at admissions,” says Gary Davis, Ph.D., senior associate dean of the Medical School's Duluth campus. “We especially select students with a demonstrated commitment to rural or Native American communities. We look for students demonstrating leadership and service—major responsibilities for family physicians.”

Davis also credits a nationally recognized curriculum that emphasizes preceptorships and other opportunities for students to work closely with community doctors.

visits, they seldom describe any problems or ask questions.

“Even though we have interpreters, parents rarely have concerns. This is uncommon,” says Madlon-Kay, an associate professor in family medicine.

To make it easier for these parents to share information and raise questions about their children's health, the research team is using a number of new approaches, including a revised evaluation form that's written in Somali. “We're hoping it will make a difference,” says Madlon-Kay.

Kasi, who joined the study in 2009, says that the opportunity to participate in clinical research helped attract her to the University's family medicine residency program.

After attending Tirunelveli Medical College in southern India, she moved to the United States to complete her residency. When a friend was doing a rotation at Hennepin County Medical Center, Kasi visited her and came to learn about the University of Minnesota.

“I had a gut feeling that this was the place I had to be,” she says.

### Drawn to family medicine

Kasi has plenty of company. The University of Minnesota's Department of Family Medicine and Community Health has graduated more than 1,550 residents from seven of its residency programs since their inception.

And the percentage of the University's medical graduates who choose family medicine is far higher than the national average, says department head Macaran Baird, M.D., M.S.

“The national average is 7 percent. Some medical schools [graduate] 0 to



3 percent in family medicine. We're at 16 to 20 percent," says Baird. He believes that several factors boost this statistic, including the University of Minnesota Medical School–Duluth Campus, which also has a strong family medicine residency program, and the Rural Physician Associate Program (RPAP).

About half of the Duluth campus medical students go on to specialize in family medicine, thanks, in part, says Baird, to their early contact with primary-care physicians, a key component of the Duluth program (see the sidebar on page 14). That number shoots to 70 percent for students participating in RPAP, which is offered on both campuses.

Kasi offers a number of reasons for choosing family medicine, including the variety and the chance to develop long-term relationships with families. "You follow the patient and the whole family. The continuity is the best thing," she says.

Another draw was the job market. "There is a lot of respect for family physicians in the Midwest," says Kasi. "There are a lot of job opportunities."

Baird concurs. "Residents can get jobs in many places," he says, referring to both urban and rural opportunities. "Salaries are going up so fast. Our residents are signing contracts in their second year."

For Kasi and others, the rare opportunity to conduct clinical research as a resident adds to the program's appeal.

"The University provides an experience in research that you don't find in many places," says Kevin A. Peterson, M.D., M.P.H., research director for the

## UNIVERSITY OF MINNESOTA FAMILY MEDICINE RESIDENCY PROGRAMS

- Duluth
- Mankato
- Methodist Hospital
- North Memorial Medical Center
- St. Cloud Hospital
- St. John's Hospital
- St. Joseph's Hospital
- University of Minnesota Medical Center, Fairview, Smiley's

Department of Family Medicine and Community Health. "We have the third-largest research group in family medicine in the country."

Baird believes such research experience is extremely helpful to resident development. "A resident in the real world faces patients with complex, multiple illnesses with psychosocial dimensions," he says. "Research is very specific. Physicians have to know how to interpret research and be able to apply that knowledge appropriately when treating patients."

Kasi hopes her research will help her catch and address patients' developmental problems at an early age. "It's going to bring change," she says of the study. "I'm going to change someone's life." <sup>[MIB]</sup>

By ROBYN WHITE, associate director of editorial services at the Minnesota Medical Foundation



Watch a video about the Medical School's award-winning family medicine program at [www.mmf.umn.edu/mb/familymed](http://www.mmf.umn.edu/mb/familymed).

**The University provides an experience in research that you don't find in many places. We have the third-largest research group in family medicine in the country.**

– Kevin A. Peterson, M.D., M.P.H.

# Building muscle

A strong muscular dystrophy research team responds to an urgent need for new therapies

Every week, University of Minnesota neurologist John Day, M.D., Ph.D., sees muscular dystrophy patients in the clinic, and every week, he says he gets a “kick in the rear.” □ Day conducts research aimed at understanding and eventually curing muscular dystrophy. But as he sees his patients’ disease progress weekly, he is reminded that research can’t

move fast enough. □ “When you’re working in the lab, it’s very easy to be impressed by and enamored with the progress that’s being made,” Day says. “It’s really exciting. It feels like it’s happening at breakneck



speed. But then you go to the clinic and realize it's not nearly fast enough. People are living with and dying of this disease today."

One particularly devastating form is Duchenne muscular dystrophy, which affects young boys. Parents will usually notice by the time their son is 3 or 4 years old that he just isn't keeping up with other kids his age.

The boys, whose muscles get progressively weaker, will likely be in a wheelchair by their early teens. Most will die in their 20s.

"Treatment for this disease is woefully inadequate at the moment," says Day, who directs the University's Paul and Sheila Wellstone Muscular Dystrophy Center. "The only thing that has had any effect is corticosteroids, and there is a whole host of side effects with those drugs."

For many families affected by muscular dystrophy, the University offers a beacon of hope. A large group of researchers here continues to make scientific advances in Duchenne and myotonic dystrophies, as well as other forms of the disease, while a new-to-the-University group of investigators adds power to their efforts.

"What distinguishes this place in part is this breadth of scope on these diseases," Day says.

Today the Paul and Sheila Wellstone Muscular Dystrophy Center helps to coordinate the efforts of 30-some faculty members from 14 departments

Neurologist John Day, M.D., Ph.D., leads a University team of researchers aiming to translate their lab findings into new therapies for muscular dystrophy patients like 10-year-old Luke Kosticky.

and four schools across the University, including the Medical School, College of Veterinary Medicine, Institute of Technology, and College of Biological Sciences. These faculty collaborate with other scientists and clinicians around the world to bring the most promising treatments to patients as fast as possible.

"There's just an enormous momentum right now," says Michael Kyba, Ph.D., a stem cell scientist and facioscapulo-humeral dystrophy (FSHD) researcher who moved his lab to the University in 2008.

### Searching for answers

Duchenne muscular dystrophy is caused by a genetic mutation preventing the body's production of dystrophin, a protein crucial to maintaining muscle structure. The disease is generally characterized by progressive deterioration of the muscles in the body that control all movement, including those needed to move the arms and legs and also to speak, swallow, and breathe.

Different forms of muscular dystrophy vary in terms of how much muscle weakness they cause, which muscles they affect, how quickly the diseases progress, when symptoms appear, and how they're passed from generation to generation.

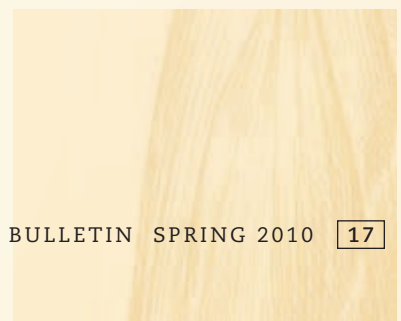
All muscular dystrophies, however, have this in common: There's no known cure and no proven way to stop their progression.

But one University research team, led by biochemist James Ervasti, Ph.D., recently obtained promising results in the search for a treatment for Duchenne.



**There's just an enormous momentum right now.**

— Michael Kyba, Ph.D.

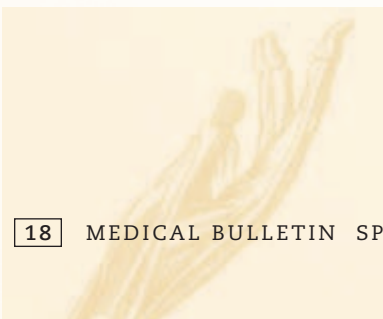




James Ervasti, Ph.D.



Laura Ranum, Ph.D.



The team injected a mouse model with a substitute for the missing dystrophin, repairing the weakening muscle tissue. The substitute is a modified protein called utrophin—a dystrophin relative—with a cell-penetrating tag known as TAT. The team found that, once injected, TAT-utrophin efficiently spreads throughout the body.

This approach overcomes major hurdles in treating Duchenne because it delivers the therapy to every muscle cell in the body. Also, because every cell makes utrophin naturally, the immune system does not reject the therapy.

It's not a cure, but Ervasti says this treatment could one day be an effective therapy for boys with Duchenne, very much like lifesaving insulin shots for people who have type 1 diabetes. And the work keeps advancing.

"We have made substantial progress in optimizing the TAT-utrophin for future clinical trials in humans, which we hope will commence within three years," he says.

**A discovery with help from a Minnesota family**

The University is one of two major research hubs nationally focused on myotonic dystrophy, the most common form of muscular dystrophy in adults, Day says. (The other major center is the University of Rochester in New York, with which the University team frequently collaborates.)

Myotonic dystrophy often goes undiagnosed because it not only causes muscle weakness but also can cause diabetes, cardiac arrhythmias, early cataracts, and infertility, among other health problems.

"[Physicians] don't know how to think about it," Day says. "It's listed as a muscular dystrophy and it is a muscular dystrophy, but it affects every other organ system as well, often leading to confusion about which clinical problem is the primary underlying cause."

The University team's renown in this area stems from its 2001 discovery of the gene that causes myotonic dystrophy type 2. This breakthrough study, led by Wellstone Center research director Laura Ranum, Ph.D., and Day, involved 60 members of a northern Minnesota family known to carry the disease.

The gene mutation that causes myotonic dystrophy type 1 had been discovered nearly 10 years earlier by scientists in England and Texas, but researchers still weren't sure how that mutation caused disease. The discovery of the second genetic form showed that both types of myotonic dystrophy were caused by abnormal RNA, the messenger molecule that translates DNA code into proteins.

"[The discovery] allowed us finally to understand the mechanism of myotonic dystrophy types 1 and 2," says Day, and nail down a target for future therapies.

Today Ranum and Day—along with colleagues Timothy Ebner, M.D., Ph.D., and H. Brent Clark, M.D., Ph.D.—are completing the second year of a five-year National Institutes of Health (NIH) study in collaboration with the University of Florida aimed at learning more about brain changes in people who have myotonic dystrophy. The disease can cause both developmental and degenerative brain function,

producing mental retardation in some children and dementia in some adults.

“It’s the thing that most affects patients,” Ranum says. “There are marked effects on cognitive function and patients’ ability to plan and carry out their everyday tasks.”

Through the NIH grant, Ranum’s group is creating a mouse model of myotonic dystrophy and will examine whether brain changes that occur in the mice also occur in humans.

It’s a great example that shows how neurodegenerative diseases are related, Days says, and that a breakthrough in one disease area could lend knowledge about other diseases as well.

“You think of muscular dystrophy as being completely on the other end of the spectrum from Alzheimer’s disease, but that’s just not true,” Day says. “People with muscular dystrophies very commonly have central nervous system abnormalities directly due to their disease.”

### Heart repair with a Band-Aid

Muscular dystrophy often affects the brain and all muscles, including one of the body’s most important muscles—the heart. Duchenne muscular dystrophy, for example, causes muscle degeneration in the heart and progressive cardiomyopathy, Day says. Eventually, the heart can just stop pumping.

That’s why Joseph Metzger, Ph.D., chair of the Medical School’s Department of Integrative Biology and Physiology, is developing a new therapy that could keep Duchenne patients’ hearts strong.

He calls it the “molecular Band-Aid.” When injected into the bloodstream, this chemical Band-Aid seeks out tiny cuts in the heart muscle and protects them from harm so that the heart can function normally.

Metzger has studied the potential of this therapy in large animals and hopes to begin clinical trials in humans soon.



Joseph Metzger, Ph.D.

## IMPROVING LIFE FOR BOYS WITH DUCHENNE

WHEN PARENTS OF boys who have Duchenne muscular dystrophy ask University neurologist John Day, M.D., Ph.D., how much exercise their boys should be getting, he doesn’t really know what to tell them. There’s little science to go on.

So he approached University muscle physiologist and exercise scientist Dawn Lowe, Ph.D., and asked for help.

Lowe’s mouse studies so far indicate that the boys shouldn’t need to slow down.

“We saw no indication that [physical activity] was causing muscle damage, and we saw some beneficial adaptations,” says

Lowe, an assistant professor in the Medical School’s Department of Physical Medicine and Rehabilitation.

Because osteoporosis is often a secondary consequence of muscular dystrophy, Lowe is investigating the value of mechanical vibration as a therapy for boys with Duchenne.

It’s not as hokey as it sounds, she says—and it’s not the picture that may come to mind of “women back in the ’50s with the weight belts where they stand and do the jiggling.” A person—or in Lowe’s lab, a mouse—undergoing mechanical vibration therapy stands on a high-frequency, low-

magnitude vibrating board that can trigger reflexes, may activate muscles, and increases the efficiency of osteoblasts, the cells that make bone.

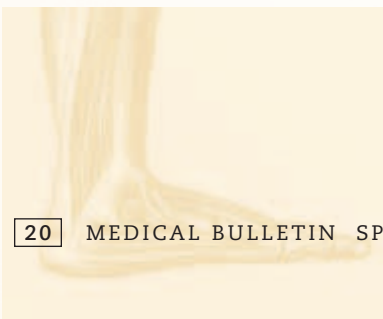
Lowe says the science showing that vibration therapy benefits bone health is solid already. But, before Day starts recommending it to his patients, he and Lowe want to make sure the vibration doesn’t damage muscle.

“With many of the things we learn in the lab, there are a lot of steps before it can get to the clinic,” Lowe says. “But with this, there aren’t. Transitioning this from our lab to the clinic is relatively easy.”



Rita Perlingeiro, Ph.D.

**Using a gene called PAX3, Perlingeiro essentially “instructed” embryonic stem cells to make muscle cells instead of other cell types.**



“We are encouraged by the present findings,” says Metzger, who holds the Maurice Visscher Land-Grant Chair in Physiology. “We’re very much interested in applying this to Duchenne patients and more broadly to acquired diseases of the heart.”

### **Restoring muscle function with stem cells**

Improving muscle function from a different angle—with the use of embryonic stem cells—is the research focus of Rita Perlingeiro, Ph.D. Her recent findings have significant implications for advancing new therapies for muscular dystrophy.

But first, she faced some hurdles. Making muscle cells from embryonic stem cells in a Petri dish wasn’t easy to do, says Perlingeiro, an associate professor who joined the Division of Cardiology in 2008. “We were seeing that muscle cells were inefficiently produced, and not enough of them were being produced to make muscle,” she says.

But using a gene called PAX3, Perlingeiro essentially “instructed” embryonic stem cells to make muscle cells instead of other cell types.

Once enough muscle cells were produced, Perlingeiro’s team injected them into the injured muscles of mice that have muscular dystrophy. Upon transplantation, the cells not only helped to grow muscle tissue but also improved muscle function.

Her lab team has shown that this approach can restore function to defective muscles in mouse models of Duchenne and FSHD.

### **Searching for the best treatment target**

To help steer future FSHD treatment- and cure-focused research down the right path, Kyba and his team are studying how the gene variation that causes FSHD, the third most common type of muscular dystrophy, causes muscle loss.

Scientists know that FSHD is caused by a missing piece of DNA that is part of a repetitive sequence. This area of DNA normally has about 100 copies of this particular sequence, Kyba says, but people who have FSHD have 10 or fewer copies.

“So there’s something in this repeat sequence that causes the disease when you have only 10 repeats but doesn’t cause the disease when you have more than 10 repeats,” he says. “Genetically, it’s a very mysterious disease.”

Kyba wants to know why this happens. By removing cells from people who have muscular dystrophy and reprogramming them to become induced pluripotent stem (iPS) cells, the team expects to gain insight into the genetic basis for this form of muscular dystrophy and hopes to find ways to genetically repair that disease-causing defect.

“The protein encoded by this repetitive sequence is probably the best target for therapeutic intervention in FSHD, but we really haven’t proven it yet,” Kyba says. “We hope to use the iPS cells to show that the protein is expressed in muscle stem cells and validate that idea.”

## INSTITUTE FOR TRANSLATIONAL NEUROSCIENCE

AS RESEARCHERS LEARN more about progressive, degenerative neurological diseases, they're discovering that many of these disorders are interrelated in terms of their underlying causes and clinical features.

In 2007 the University launched its Institute for Translational Neuroscience, which coordinates the basic and clinical research efforts in the Paul and Sheila Wellstone Muscular Dystrophy Center with programs in the N. Bud Grossman Center for Memory Research and Care, the Bob Allison Ataxia Research Center, and other areas of neurological investigation.

### Help for patients today

While University research teams get closer and closer to finding better ways to treat the root causes of muscular dystrophies, they acknowledge that translating lab work into therapies for patients takes time and money.


And Day is reminded—every week—that his patients need help now.

For some Duchenne patients, that help comes in the form of clinical trials. The University is one of the largest centers for Duchenne muscular dystrophy trials in the country, Day says, because of its participation in a five-site clinical research network through the Muscular Dystrophy Association.

For one subset of boys with Duchenne, early clinical trials are under way using a medication to potentially slow—or even stop or reverse—the effects of the disease. The University was one of 10 sites nationwide involved in a Phase II clinical trial to test the drug's effectiveness on boys whose Duchenne was caused by a single letter change on the dystrophin gene—about 10 to 15 percent of cases—and who can still walk.

The University is the lead site on another study testing the drug on boys with the same dystrophin mutation who have more advanced disease and can no longer walk.

And in September the University scientists hope to join a new treatment trial aimed at altering the way RNA is processed in boys who have Duchenne. This drug would essentially put an artificial patch over the abnormal section of RNA so that the boys' muscles would produce a nearly normal dystrophin protein, only missing the piece with the genetic flaw. The mouse studies of this approach are “dramatic,” Day says.

“We are eager, obviously, to be able to treat all boys,” Day says. “Part of our whole effort here is correcting the disease and the underlying problem, but it's also making sure that these boys and young men are living as full and active lives as they can.” 

By NICOLE ENDRES, associate editor of the *Medical Bulletin*



Find a story about a family's experience with MD and a podcast highlighting new therapies at [www.mmf.umn.edu/mb/md](http://www.mmf.umn.edu/mb/md).



Michael Kyba, Ph.D.



PHOTO: BILL MARCHEL

# A trick of nature

## University scientists turn to the hibernating golden gopher for the key to surviving traumatic blood loss

MAJOR BLOOD LOSS is a medical conundrum. Lose enough blood and the brain, heart, and other organs starve for oxygen and die. Even if you survive the blood loss, restoring normal blood and oxygen levels—called reperfusion—can cause as much harm as the blood loss itself.

But three University of Minnesota scientists have developed a drug that prevents both from happening, a discovery that could save thousands of lives in trauma centers and on battlefields worldwide—thanks to a squirrel.

The drug, called Tamiasyn™, contains two compounds the 13-lined ground squirrel uses to survive Minnesota

winters. University of Minnesota, Duluth biologist Matthew Andrews, Ph.D., has studied the “golden gopher” since the mid-1990s. How, he wondered, can it survive extremely low oxygen levels and blood flow—a condition that resembles major blood loss—then wake up without any harm done when oxygen levels and blood flow are restored? In humans who experience blood loss, reperfusion releases a storm of cell-damaging, unstable molecules called free radicals.

Andrews discovered that when the ground squirrel hibernates, it switches from burning glucose for fuel to burning beta-hydroxybutyrate. A byproduct



of fat breakdown, the compound is a more efficient fuel than glucose because it requires less oxygen to produce the same amount of energy for cells. “Beta-hydroxybutyrate gives you a lot more energy-bang for your buck,” Andrews says.

He also observed that as ground squirrels wake up, their melatonin levels skyrocket—ironically, the same melatonin people take to sleep. “Melatonin is a powerful antioxidant,” Andrews explains. “It scavenges free radicals by chemically binding to them and reduces the damage they do to cells when you restore normal blood and oxygen levels.”

Surges in beta-hydroxybutyrate and melatonin are two of the most striking changes that happen in hibernating animals, says Andrews. “That’s why they can live for six months with very little oxygen, a heart rate of only a few beats per minute, but wake up unharmed.

“Might these molecules have medical benefits for non-hibernating animals?” Andrews wondered. Two buildings over from his lab at the Medical School–Duluth Campus, Lester Drewes, Ph.D., was researching ways to protect the brain from the oxygen-depleting damage caused by strokes and heart attacks. And he was studying how to prevent reperfusion injury to the brain when oxygen and blood levels are restored. Beta-hydroxybutyrate was one of the protective molecules he was studying. “An instant collaboration developed between Matt and me,” Drewes says.

“We decided to apply what Matt discovered about the natural biology of hibernation,” says Drewes, who had tried unsuccessfully to reduce brain

injury using antioxidant vitamins E and C. UMD graduate student Amanda Klein administered beta-hydroxybutyrate and melatonin to rats that had lost as much as 60 percent of their blood. Reperfused rats not receiving these molecules died within seven minutes. Those given beta-hydroxybutyrate lived for three hours.

To take their findings to the next level, Andrews and Drewes needed to replicate their results in large animals. About that time, UMD hosted an Integrated Biosciences (IBS) graduate program colloquium. Among the speakers was IBS faculty member Gregory Beilman, M.D., a trauma surgeon and professor at the University’s Minneapolis campus. Beilman presented his studies on prolonging survival in pigs after major blood loss.

“Our jaws dropped,” says Drewes. “This was exactly what Matt and I were looking for. We didn’t know Greg. It was serendipitous that he showed up

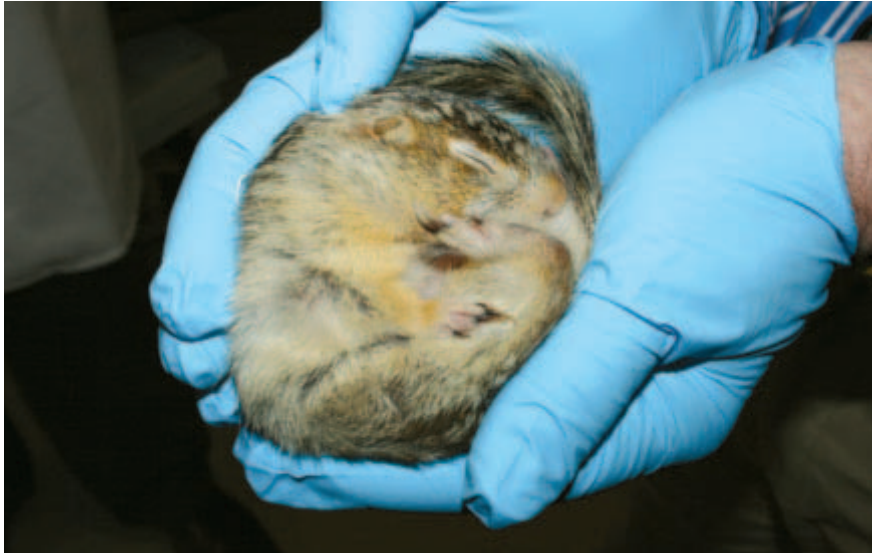
**Our jaws dropped. This was exactly what Matt and I were looking for. It was serendipitous that Greg Beilman showed up... to talk about blood loss in larger animals.**

– Lester Drewes, Ph.D.



PHOTO: DAN SCHLIES

Medical School–Duluth Campus scientists Lester Drewes, Ph.D. (left), and Matthew Andrews, Ph.D., working with their Twin Cities colleague Gregory Beilman, M.D. (not pictured), discovered that a drug made with two compounds that help hibernating gophers survive the winter may also help humans recover after major blood loss.



A molecule called beta-hydroxybutyrate helps the hibernating ground squirrel survive the winter with extremely low oxygen levels and blood flow.

**We observed a complex and elegant biochemical trick that 100 million years of mammalian evolution produced in a ground squirrel widely considered a pest in Minnesota.**

— Matthew Andrews, Ph.D.



Watch a news story about the lifesaving potential of Tamiasyn™ at [www.mmf.umn.edu/mb/tamiasyn](http://www.mmf.umn.edu/mb/tamiasyn).

at our symposium to talk about blood loss in larger animals.”

A colonel in the U.S. Army, Beilman had served four tours of duty trying to prolong survival in war zones. Back home in his lab, he'd experimented with a dozen ways to preserve organ function after blood loss. “Nothing worked,” he says.

Beilman conducted three pig trials of Tamiasyn™ to determine safety, effectiveness, and dose. After 24 hours, four times as many Tamiasyn™-treated pigs survived. “It also took less fluid to rehydrate the Tamiasyn™-treated pigs, and it was easier to restore their normal blood volume,” Beilman says. As for the drug's safety, “We haven't found a downside to it.”


The potential benefits of Tamiasyn™ are tremendous. Most people who initially survive motor vehicle accidents, gunshot wounds, or battle injuries but still end up dying do so because they bleed to death, explains Beilman.

Tamiasyn™ is not a blood or oxygen substitute. Instead, it buys time. The body survives on less blood and

oxygen because—like the hibernating ground squirrel—it requires less oxygen to produce the energy needed to function. Tamiasyn™ delays death and organ damage while the victim is rushed to a hospital or MASH unit that can stop the bleeding and restore blood volume without reperfusion injury. “You can live with less oxygen,” says Drewes. “That's pretty significant.”

Getting Tamiasyn™ into ambulances, trauma centers, and war zones will take several more years, says Doug Johnson with the University's Office for Technology Commercialization (OTC). An early attempt to develop and market Tamiasyn™ fizzled out when the company could not secure adequate funding. The OTC is now exploring other options for commercializing Tamiasyn™, including licensing to a pharmaceutical company. In the meantime, all three researchers have secured funding from federal agencies to advance the technology. Once approved by the FDA, Tamiasyn™ could potentially save 33,000 lives in the United States each year, Johnson says.

For now, prolonging survival after blood loss is the focus, but eventually, says Drewes, “Tamiasyn™ may be used to reduce brain damage from stroke.” And it may prove useful during invasive surgery and as a way to prolong storage life of transplantable organs, adds Beilman.

“We simply had to observe what nature had already done for us,” says Andrews. “We observed a complex and elegant biochemical trick that 100 million years of mammalian evolution produced in a ground squirrel widely considered a pest in Minnesota.” 

By HOWARD BELL, a freelance medical writer living in Onalaska, Wisconsin

## President's Column

### Connecting students and alumni

WHEN MEDICAL STUDENTS told us that they wanted more opportunities to connect with alumni, we at the Medical Alumni Society (MAS) responded.

Last year, we started hosting informal dinners that offered first-year medical students and alumni a chance to network and learn from one another. We received so much positive feedback from students and alumni alike that we have planned more of these dinners. The next one will take place on May 25 at True Thai in Minneapolis.

We also organized a night of networking and socializing April 8 at the Walker Art Center for those involved in our successful Connections Physician-Student Mentoring Program. It provided a casual and unique atmosphere for mentors and students to meet and catch up in a new setting off campus and outside of the clinics.

MAS will be hosting many other social events for alumni to take part in:

- To introduce graduating medical students to MAS and immediately welcome them as alumni, we're co-hosting the Medical School graduation party on May 5, during commencement week.
- Because our first "speed networking" event — modeled after the popular "speed dating" concept — was so successful, it will again be part of this fall's orientation for medical students, and we will consider making it a permanent first-week event.



Martin J. Stillman, M.D., J.D.

- In response to requests from both alumni and students, we are looking forward to our upcoming mixed student/alumni golf tournament this summer. All alumni and students are

invited to participate, but space will be limited. More details will be available shortly at [www.mmf.umn.edu/alumni](http://www.mmf.umn.edu/alumni).

I'm very excited about all of these events. Students consistently tell us they appreciate forming stronger connections with our alumni, and we believe

this will have a positive effect on their future involvement with students when they become alumni themselves. And physician-alumni tell us how much they enjoy reconnecting with the Medical School while forming friendships with these impressive students — all through volunteering their time with MAS.

If you're interested in joining us for any of these events, please register by contacting Katrina Roth at 612-625-0336 or [k.roth@mmf.umn.edu](mailto:k.roth@mmf.umn.edu). I hope to see you soon.

Sincerely,

**Martin J. Stillman, M.D., J.D., F.C.L.M.**

Class of 1997  
President, Medical Alumni Society

### Help us celebrate outstanding achievements

Nominate a deserving physician for one of the following Medical Alumni Society awards:

- The Harold S. Diehl Award honors individuals who have made outstanding professional contributions to the Medical School, the University, and the community. This is the Medical Alumni Society's most prestigious award.
- The Distinguished Alumni Award recognizes University of Minnesota Medical School alumni who have made outstanding contributions to their communities — at the local, regional, or national level — through medical practice, teaching, research, or other humanitarian activities.
- The Early Distinguished Career Alumni Award honors physicians for exceptional accomplishments within 15 years of medical school graduation.

Nominations must be received by May 7. Awards will be presented at the Alumni Celebration Banquet on October 15.

For more information, contact Katrina Roth at 612-625-0336 or [k.roth@mmf.umn.edu](mailto:k.roth@mmf.umn.edu), or visit [www.mmf.umn.edu/alumni/awards](http://www.mmf.umn.edu/alumni/awards).


## Readership survey helps to shape *Medical Bulletin's* future

Thank you to the nearly 700 readers who responded to the *Medical Bulletin* readership survey conducted last spring and summer via mail. Your input is extremely valuable, and we've already made changes to the magazine in response to your suggestions.

The survey provided good news about *Medical Bulletin* readership habits: 69 percent of respondents reported reading every issue of the *Medical Bulletin*, and 81 percent said they're satisfied with the magazine overall. Feature stories and Medical School news emerged as the top-read items, followed by alumni news.

In response to reader feedback, we've moved Medical School News to the front of the magazine, and we've added regular departments on global medicine and alumni-funded scholarships. We will also offer significant coverage of research discoveries, as we have in this issue.

While few respondents reported reading the *Medical Bulletin* online, we know that number is growing fast, so we are also tailoring our content to suit readers of both print and electronic publications. To save money and paper, we will be publishing the *Medical Bulletin* twice a year instead of three times and expanding the magazine's online presence.

If you have comments to share, please send them to [mmf@umn.edu](mailto:mmf@umn.edu) or *Medical Bulletin* Editor, Minnesota Medical Foundation, 200 Oak Street SE, Suite 300, Minneapolis, MN 55455-2030. 

## Walking in his patients' shoes



Will Nicholson, M.D.

AS A FAMILY MEDICINE resident at St. John's Hospital in Maplewood, Will Nicholson, M.D., saw every day how health insurance coverage affected the care his patients received. Patients wouldn't get the medicine he'd prescribe because they couldn't afford it. Or when they had health concerns that needed follow-up, they'd be charged for another office visit and often any diagnostic tests that were done.

"I was taught that you always put patients first," says Nicholson, University of Minnesota Medical School Class of 2006, who's now a hospitalist at St. John's. "If it's the right thing to do, you do it."

But health insurance—or lack thereof—kept getting in the way of optimal care. Even in Minnesota, which historically has had one of the lowest rates of uninsured people in the nation, the number of uninsured people rose from an estimated 374,000 (7.2 percent of the population) in 2007 to 480,000 (9.1 percent) last year, according to a new survey by the Minnesota Department of Health and the University's School of Public Health.


So Nicholson decided to conduct an experiment. For six months, he'd opt out of his employer's health insurance plan and purchase short-term policies as an individual through the consumer market—just as many of his patients have to do. Starting in July, when he completed his residency, Nicholson tried a new plan every month.

Even as a physician, he found that the paperwork and fine print made his head spin. Yet when the six months were up, Nicholson decided to keep going with his experiment.

"I hate to make conclusions with incomplete evidence," he says. "I want to give the market a chance to work. ... I'm still optimistic, but before I give too much criticism, I want to leave no stone unturned."

So far Nicholson has found that each insurance provider has an extensive menu of coverage options, and he has discovered the importance of knowing what each package does *not* cover. He also has struggled with quantifying his risk of getting sick and finding the right balance between not paying too much while getting enough coverage "just in case."

To his surprise, Nicholson's experiment has received media attention from outlets such as CNN and Minnesota Public Radio. The sudden spotlight has made him realize people's immense hopes that someone is digging into the issue.

"They want to hear that someone's really doing something, that somebody's putting themselves in their shoes, that they're not alone." 

By NICOLE ENDRES, associate editor of the *Medical Bulletin*



To learn more about Nicholson's experiences as an independent buyer of health insurance, visit his blog at [www.triagepolitics.com](http://www.triagepolitics.com).

## A healthy dose of theater

An elegant, bespectacled brunette — acclaimed local actor Angela Timberman — took the makeshift stage at the Mill City Clinic in Minneapolis. But it was the voice of a loopy schoolgirl, in a riotous reading of Shel Silverstein’s poem “Sick,” that greeted the audience at this theatrical pageant in mid-November.

*“I cannot go to school today,  
Said little Peggy Ann McKay.  
“I have the measles and the mumps,  
A gash, a rash and purple bumps.  
My mouth is wet, my throat is dry,  
I’m going blind in my right eye. ...”*

So began Hippocrates Café, the brainchild of Jon Hallberg, M.D. (Medical School Class of ’92), the Mill City Clinic’s medical director. That night, the hour-long presentation of bite-sized readings focused a specific theme — influenza — with, as Hallberg wryly noted, “a little dose of hypochondriasis tossed in for good measure.” The vaudeville-flavored evening varied in tone and content, with a range of performances by several Minneapolis actors.

In stark contrast with her antic reading of the Silverstein poem, Timberman gave



Attendees of the first Hippocrates Café in November enjoyed a laugh at the performance.

a tender, moving reading of P. McTim’s “1918 Influenza Epidemic at University of MN Hospital.” The memoir describes a student nurse’s effort, in defiance of early 20th-century hospital protocol, to comfort her young patients by covertly rocking them to sleep at night.

Hallberg, an assistant professor of family medicine and community health at the University of Minnesota, has long worked to incorporate arts and humanities into medical education.

“I’m interested in choosing medical topics that have powerful, universal themes within them, and [bringing people together] to reflect on them, inject some humor into them,” says Hallberg, who also serves as company physician for the Guthrie Theater and medical commentator for Minnesota Public Radio.

“This thing has been percolating in my brain for many years. It feels like all my previous interests have coalesced with this,” he says of Hippocrates Café.

In January, the café featured hors d’oeuvres, wine, conversation, and theatrical readings chosen to evoke the “essence of family medicine.” Funny and

poignant readings of work by writers ranging from E. B. White to Garrison Keillor made a compelling case for Hallberg’s chosen specialty.

Several pieces acknowledged that family medicine — a field in which the clinician is also expected to be a counselor, advocate, nutritionist, administrator, and more — is not about pay, prestige, or simple answers.




PHOTOS: ERIC MELZER

Actor Angela Timberman took the podium at Hippocrates Café for a dramatic reading.

But the show made clear that for a person with curiosity, humility, and compassion, the chance to get to know a fascinating array of people — and the privilege of witnessing some of the most intimate moments of their lives — is worth it.

“Medicine is absolutely an art as much as it is a science,” Hallberg says. “Every single encounter with a patient also requires right-brain — creative, innovative, nonlinear — thinking.

“You have to have a firm grounding in the sciences,” he hastens to add. “Everything’s interesting. That’s why I’m a family physician; my specialty is the human condition.” 

*To receive Hippocrates Café updates, please contact Jon Hallberg, M.D., at [hallb006@umn.edu](mailto:hallb006@umn.edu).*

By SUSAN MAAS, a freelance writer and editor, arts lover, and self-described borderline hypochondriac



View a photo slideshow of Hippocrates Café highlights at [www.mmf.umn.edu/mb/hippocrates](http://www.mmf.umn.edu/mb/hippocrates).

# Alumni Spotlight | The Drs. Rutledge

## Like father, like son—again

LOTS OF MEDICAL students come from medical families. But few can match Geoff Rutledge's family legacy.

When Rutledge graduates from the University of Minnesota Medical School in May, he will be the fourth generation Rutledge to do so and the fifth-generation physician in his family.

"I think it's really unusual that there were four of us at the same school," says Geoff's father, Robb Rutledge, M.D., an orthopaedic surgeon in Red Wing, Minnesota. "There has always been a Dr. Rutledge in the state since 1920."

Geoff, who is specializing in general surgery and matched for his residency at Mount Sinai hospital in New York, says that his family's history had an impact on him while he studied at the University. He recalls experiencing a sense of connection in Jackson Hall, where his father and grandfather had sat for anatomy class.

"Three generations in a row, we were all on campus in the same building learning anatomy," says Geoff.

The legacy began in the early 1900s with Lloyd Howard Rutledge, whose father was a doctor (although not a University of Minnesota graduate). After a brief stint working for a glass

**I think it's really unusual that there were four of us at the same school. There has always been a Dr. Rutledge in the state since 1920.**

— Robb Rutledge, M.D.



Fourth-year medical student Geoff Rutledge—here with his father, Robb Rutledge, M.D.—represents the fourth generation of Rutledge men to graduate from the University of Minnesota Medical School.

company in Kansas City, Missouri, Lloyd followed mentor Clarence M. Jackson to the University of Minnesota, where he received an M.A. in anatomy and his medical degree in 1919. (Jackson was an anatomy professor and director of the anatomy department at the University, and in 1954, Jackson Hall was named in his honor.)

Shortly after graduating, Lloyd took a job in Detroit Lakes, Minnesota, where he practiced from 1920 to 1970. "Nobody does that anymore," says Robb. "He knew that county backwards and forwards."

Lloyd's son, John Rutledge—Robb's father—was next in line to attend the Medical School. After graduating in 1950, he went on to specialize in general practice and completed additional training in surgery. He worked in Minnesota's Becker County. "Dad practiced till the day he died in 1983," says Robb with pride.

Although he never felt pressured to go into medicine, Robb says that curiosity lured him in. "The first time I scrubbed in was with my father. I somehow didn't get sick. In fact, it was interesting."

While his attraction to medicine was developing, so was his love for the University.

"I went to a Gopher [football] game when I was 9. We watched Bobby Bell and Carl Eller play," Robb recalls. "Every time I step on campus, it feels like home. Gopher sports has been a constant in my life."

Just over a decade later, Robb followed in his father's—and grandfather's—footsteps, enrolling at the University in 1970. As an undergrad, he lived in the Frontier Hall dorm on campus and says that Gopher sports played a major role in his life.

“Gopher basketball probably saved me,” says Robb. “It gave me something to cling to while I was trying to get my bearings as a freshman.”

He also joined the Kappa Sigma fraternity, forging friendships that continue today.

Robb, who initially considered becoming a lawyer, says he’s grateful for the Medical School faculty members who helped him find his niche. “I was a third-year student, and I knew I wanted to do surgery, so I asked Dr. [James] House if I could scrub in on a case,” he says. “I saw them dislocate a hip [as part of a hip replacement], and I thought, ‘Wow! I want to do that.’”

His career path was set.


After graduating from the Medical School in 1979, Robb began a surgical internship at Hennepin County Medical Center, where he met his future wife, Jane. “A peds patient with a broken ankle played matchmaker,” he says.

In 1984, Robb started an orthopaedic practice in Red Wing, where he and Jane raised two sons and a daughter. Today, Geoff, their older son, is taking after his father in more ways than one.

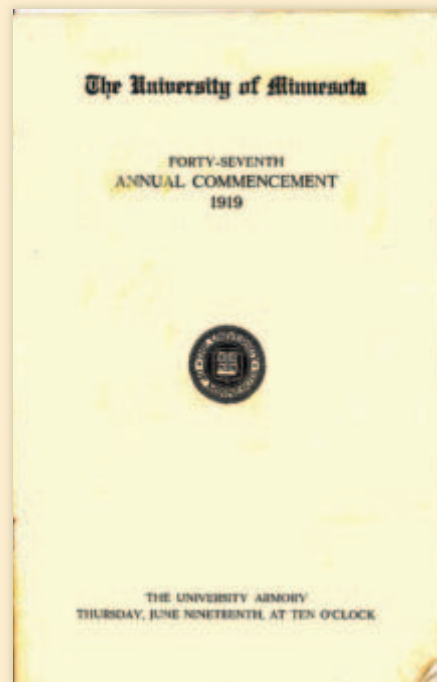
Like his father and grandfather, Geoff had an early curiosity about medicine. When he was a sophomore in college, he asked Robb if he could observe an operation. “I never felt woozy. It really excited me,” Geoff says.

After receiving his undergraduate degree from the University of St. Thomas, Geoff spent two years in North Carolina working for Teach For America, unsure whether medicine was right for him. After concluding that it was, he started medical school at the University in 2006.

Observing his father’s career inspired his decision. “My dad had a huge influence on me. He loves his job. He’s a real role model,” says Geoff, who, like his dad, has developed strong ties to the University. “It’s a great school—a top-notch medical university.”

Also like his father, Geoff is spending a lot of time at Hennepin County Medical Center. Perhaps he’ll meet a pediatric nurse, his dad teases, and continue the Rutledge family legacy. 

By ROBYN WHITE, associate director of editorial services at the Minnesota Medical Foundation




Among the medical graduates listed in this 1919 commencement program is Lloyd Howard Rutledge, M.D., Geoff Rutledge’s great-grandfather.


## Save the date for the 2010 Alumni Reunion

Save the date for this fall’s Medical School Alumni Reunion, September 23–24, and a chance to reconnect and reminisce with friends and former classmates while enjoying social activities, a medical education forum, tours, lectures, an all-class reception, and your class dinner.

Celebrating reunions this year are the classes of 1950, 1955, 1960, 1970, 1980, 1985, 1990, and 2000. Invitations and registration materials will be mailed in July and will also be available online.

We are seeking volunteers from each class to help contact classmates about the reunion—no meetings required, just a few hours of your time. To volunteer or learn more about this year’s reunion, visit [www.mmf.umn.edu/alumni/reunions](http://www.mmf.umn.edu/alumni/reunions) or contact Katrina Roth at 612-625-0336, 800-922-1663, or [k.roth@mmf.umn.edu](mailto:k.roth@mmf.umn.edu).

Look for updates about the reunion and connect with classmates by becoming a fan of the Medical Alumni Society Facebook page at [www.facebook.com/umnMedicalAlumni](http://www.facebook.com/umnMedicalAlumni). 

 Watch a slideshow and video about the Rutledge family’s ties to the Medical School at [www.mmf.umn.edu/mb/rutledge](http://www.mmf.umn.edu/mb/rutledge).

# Scholarship Winner | Curt Nordgaard

## A diversity of experience

MUSIC, LITERATURE, travel, foreign languages, and simple curiosity. These were some of the things W. Albert Sullivan, M.D., valued most, says his widow, Theresa Sullivan.

She helps administer the Albert Sullivan Endowed Scholarship fund, created by an anonymous Medical School alumnus to honor the longtime educator and associate dean of student affairs, who died in 1990. The scholarship helps support students who are not only promising future physicians but also “well-rounded people,” says Theresa, who contributes regularly to the fund.

“Sully,” as many knew him, was conversant in several languages, read voraciously, enjoyed baking and gardening, and loved to travel. “He was really interested in the humanities and believed in a classic education,” Theresa says. “He believed that people who are ill are, first of all, individuals — and a physician who is a well-rounded person will have a better understanding of the whole patient.”

You could say that Curt Nordgaard, a second-year medical student at the University of Minnesota Medical School, is well-rounded. The Princeton, Minnesota, native has worked as a janitor and a mechanic, studies Spanish and Mandarin Chinese, loves making and listening to music, cares deeply about social justice, and yearns to serve abroad. He also has a focused awareness of what really matters that the scholarship’s namesake would no doubt appreciate.

Sully was beloved by students for his counsel and friendship, Theresa says. “He was a teacher in every regard —



PHOTO: SCOTT STREBLE

Second-year medical student Curt Nordgaard spends some of his free time organizing fundraising events to benefit health-related projects overseas.

totally available to the students,” day and night. Moreover, she says, he felt strongly that the Medical School should not only be in the business of training skilled researchers but also wise and caring clinicians.

### Honoring a legacy of compassion

Nordgaard’s path to medicine has been purposeful, if not direct. Long before he chose his profession, his ultimate goal — to help others in need — was clear. After completing master’s degrees in psychology and biology at McMaster University in Ontario, Canada, then spending a year and a half working in an ophthalmology lab back at the University of Minnesota, he had an “epiphany.” Home in bed, sick with the flu, “I had this realization that I really could go in any direction I

wanted. I asked myself, what is it I want to do in my life?”

What he wanted most, Nordgaard realized, was to serve those less fortunate and to fight social inequity.

“My values have always been in place,” Nordgaard says, “but my actions have been catching up over time.” He’s fond of a quote by the 19th-century pathologist and public health champion Rudolf Virchow: “The physicians are the natural attorneys of the poor, and social problems fall to a large extent within their jurisdiction.”

One of the first in his family to attend college, Nordgaard initially enrolled at the University of Minnesota in 1996. But financial pressures forced him to drop out after one semester.

“In order to pay the rent, I had to work too much,” he says. “My parents encouraged me, but they couldn’t give a lot of



**Princeton, Minnesota, native Curt Nordgaard has worked as a janitor and a mechanic, studies Spanish and Mandarin Chinese, loves making and listening to music, cares deeply about social justice, and yearns to serve abroad.**

specific advice.” He spent a few months working as a janitor and a mechanic before enrolling at St. Cloud State University, where he earned his undergraduate degree in psychology.

“Perhaps because of my background,” Nordgaard says, “it never occurred to me that I had the opportunity to enter professions like medicine, law, and public health when I was an undergraduate. There was no one who said to me, ‘You could become a physician.’”

### **Serving at home and abroad**

Nordgaard is attracted to primary care and is particularly interested in internal medicine, although he looks forward to exploring other specialties during his rotations.

“I picture myself at one of the local public hospitals,” Nordgaard says. But he also wants to devote some time each year to international work. Last summer, he and several friends started a nonprofit, the Just Health Network, to raise funds for a number of overseas projects, including one that provides food for young HIV patients in Zambia, an orphanage in Peru, and a community wellness endeavor in Tanzania.

Nordgaard also has been closely involved with the Students’ International Health Committee as president.

This year, SIHC funded two educational events on campus about neglected tropical diseases. “[We] got several bands together to play at Memory Lanes, and the bands donated their proceeds to the cause,” he says.

Music is another abiding passion. Nordgaard played the bass drum and the string bass in high school and was a member of a “non-music-major orchestra” for one year in college. “Music was always this second thread running through my life,” he says. “By the time I came back to Minnesota, I was making home recordings.”

Nordgaard never takes his opportunities, or the Sullivan scholarship that’s helping realize them, for granted. The cost of higher education in general, and especially medical school, is prohibitive for students of modest means, he says. “The more expensive medical school becomes, the more it propagates inequity.

“I feel like Dr. Sullivan’s dedication to students now continues in the form of the scholarship,” Nordgaard says. “It’s great to be a student here and feel that support.” <sup>MIB</sup>

By SUSAN MAAS, a freelance writer from Minneapolis



Known to many as “Sully,” longtime educator W. Albert Sullivan, M.D., believed that future physicians should be not only intelligent but also well-rounded individuals.

# In Memoriam

**FRANK J. ANDERSON, M.D.**, Class of 1947, Prior Lake, Minnesota, died October 1 at age 84. Dr. Anderson practiced radiology in Minneapolis. He is survived by his wife, Marcia, and 8 children.

**ROBERT M. ANDERSON, M.D.**, Class of 1956, Sierra Vista, Arizona, died September 4 at age 77. Dr. Anderson worked as a family practitioner in Cumberland, Wisconsin, and Sierra Vista, Arizona. He was preceded in death by 1 child and 1 grandchild. He is survived by his wife, Mae; 2 children; and 5 grandchildren.

**CHARLES H. BLOMQUIST, PH.D.**, Class of 1964, died August 17 at age 75. Dr. Blomquist was recognized for his work on steroid hormone regulation and metabolism. After working at Regions Hospital in St. Paul, he joined the Department of Obstetrics, Gynecology, and Women's Health at the University of Minnesota. He is survived by his wife, Joyce, and 2 children.

**ROBERT S. CLARK, M.D.**, Class of 1946, Bloomington, Minnesota, died May 18, 2009, at age 87. Dr. Clark practiced psychiatry in Minneapolis and was a clinical professor at the University of Minnesota. He was preceded in death by 1 child. He is survived by his wife, Dona; 4 children; 11 grandchildren; and 3 great-grandchildren.

**JAMES A. COSGRIFF JR., M.D.**, Class of 1946, Olivia, Minnesota, died September 29 at age 85. A family practitioner in Olivia, Dr. Cosgriff helped establish the family practice department at the University of Minnesota. Dr. Cosgriff was preceded in death by his parents and 2 siblings. He is survived by 4 siblings and many nieces and nephews.

**DONALD T. CUNDY, M.D.**, Class of 1941, Edina, Minnesota, died August 2 at age 92. Dr. Cundy served as chief of staff at the former Metropolitan Medical Center and founded Downtown Opticians in Minneapolis. He is survived by his wife, Lola; 5 children; 8 grandchildren; and 2 great-grandchildren.

**JEROME H. DAYTON, M.D.**, Class of 1958, Eugene, Oregon, died December 26 at age 77. Dr. Dayton was a pediatrician in Eugene. He is survived by his wife, Arlene; 3 children; and 7 grandchildren.

**JAMES W. GERBER, M.D.**, Class of 1978, Cottage Grove, Minnesota, died July 31 at age 58. Dr. Gerber specialized in family medicine at the University of Minnesota Medical School. He is survived by his wife, Linda; 3 children; and 3 grandchildren.

**ELIZABETH M. HAALAND, M.D.**, Class of 1960, Midlothian, Texas, died December 13 at age 77. Dr. Haaland practiced dermatology.

**JUJI HANADA, M.D.**, Class of 1958, Wailuku, Hawaii, died June 26 at age 83. Dr. Hanada specialized in pediatrics at the University of Minnesota Medical School.

**JOHN W. HARMALA, M.D.**, Class of 1999, Ham Lake, Minnesota, died January 12 at age 40. He is survived by his wife, Lisa, and 3 children.

**MILTON M. HURWITZ, M.D.**, Class of 1939, St. Paul, died October 21 at age 91. Dr. Hurwitz had a private practice and worked at United Hospital in St. Paul. He served on several boards, including the Minnesota Medical Foundation's. He is survived by his wife, Eunice; 2 children; 2 grandchildren; and 2 great-grandchildren.

**ROBERT L. KING JR., M.D.**, Class of 1945, Pensacola, Florida, died September 21 at age 88. Dr. King was an ear, nose, and throat specialist. He was preceded in death by his wife, Eleanor, and is survived by 1 child.

**FRED H. KOENECKE JR., M.D.**, Class of 1948, Richland Center, Wisconsin, died November 14 at age 85. Dr. Koenecke was the founding medical director of Newstart Program in Madison, Wisconsin. He was preceded in death by 1 child. He is survived by his wife, Laurie; 2 children; 1 stepchild; and 4 grandchildren.

**OLIVER E. LARSON, M.D.**, Class of 1945, Red Wing, Minnesota, died July 5 at age 87. Dr. Larson was a family practitioner in Zumbrota, Minnesota. He was preceded in death by 1 child. He is survived by his wife, Agnes; 3 children; 4 grandchildren; and 9 great-grandchildren.

**DOUGLASS A. LOWE, M.D.**, Class of 1959, Sanibel, Florida, died July 26 at age 77. Dr. Lowe practiced psychiatry in Edina, Minnesota. He is survived by his wife, Jean; 3 children; and 9 grandchildren.

**J. MICHAEL MCMILLIN, M.D.**, Class of 1965, Sioux Falls, South Dakota, died April 4, 2009, at age 69. Dr. McMillin had a private endocrinology practice and was director of research and chair of endocrinology at the University of South Dakota School of Medicine in Sioux Falls. He is survived by his special friend, Lynn Schrick; 2 children; and 2 grandchildren.

**LORAN B. MORGAN, M.D.**, Class of 1943, Torrington, Wyoming, died November 23 at age 91. Dr. Morgan practiced medicine in Torrington, Wyoming, and in Gilman, Colorado. He invented the Morgan Lens, an eye irrigation device. Dr. Morgan is survived by his wife, Beth; 2 children; and 5 grandchildren.

**MARK A. MUESING, M.D.**, Class of 1959, East Gull Lake, Minnesota, died September 14 at age 75. Dr. Muesing served as president of the Vadheim Medical Center in Tyler, Minnesota, and of St. Joseph's Medical Center in Brainerd. He also worked at the VA Hospital in St. Cloud. He is survived by his wife, Shirley; 4 children; and 11 grandchildren.

**ELIZABETH A. SCHMIDT, M.D.**, Class of 1979, St. Cloud, Minnesota, died January 22 at age 63. Dr. Schmidt practiced gynecology in Minneapolis and St. Cloud. She is survived by 1 child and her former husband, Bill.

**VERNON L. SOMMERDORF, M.D.**, Class of 1952, St. Paul, Minnesota, died October 19 at age 88. Dr. Sommerdorf practiced medi-

## Alumni Connections

cine in St. Paul and represented St. Paul in the Minnesota House of Representatives. He is survived by his wife, Norma; 4 children; 9 grandchildren; and 23 great-grandchildren.

**SHERMAN O. STRAND, M.D.**, Class of 1945, Rancho Mirage, California, died August 25 at age 89. Dr. Strand was an ear, nose, and throat physician and surgeon. He served as chief of staff at the Santa Monica-UCLA Medical Center and head of surgery at Saint John's Hospital in Santa Monica. He is survived by his wife, Ruth.

**ROBERT L. TIEL, M.D.**, Class of 1980, New Orleans, Louisiana, died August 2 at age 55. Dr. Tiel practiced neurosurgery in Mississippi, Louisiana, and Michigan and was widely known for his contributions to the management of nerve injuries. He is survived by his wife, Constance, and 4 children.

**H. JAMES VER STEEG, M.D.**, Class of 1963, Colorado Springs, Colorado, died October 1 at age 71. Dr. Ver Steeg practiced radiology in Colorado Springs. He is survived by his wife, Barbara, and 1 child.

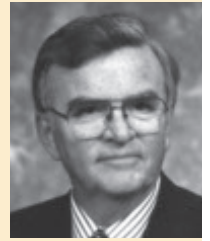
**GEORGE WERNER, M.D.**, Class of 1942, Minneapolis, died January 11 at age 92. He practiced surgery in Minneapolis and helped to establish Group Health (now HealthPartners). He is survived by his wife, Lillian; 2 children; and 2 grandchildren.

**JOHN C. WOHLRABE, M.D.**, Class of 1952, Eden Prairie, Minnesota, died October 11 at age 82. While at the University of Minnesota Medical School, Dr. Wohlrabe specialized in psychiatry. He is survived by 5 children; their mother, Lillian; 20 grandchildren; and 4 great-grandchildren.

**BEVERLY J. WURSTER, M.D.**, Class of 1956, Milwaukee, Wisconsin, died February 16 at age 86. Dr. Wurster worked for the City of Milwaukee Health Department. She was preceded in death by her husband, Norbert Blochowiak. She is survived by 2 children, 2 grandchildren, and 1 great-grandchild.

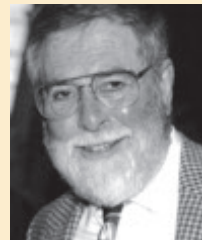
**ROBERT T. KELLY, M.D.**, Class of 1951, Grand Rapids, Minnesota, died January 26 at age 83. Dr. Kelly practiced medicine in Grand Rapids and was a clinical professor in the Department of Family Medicine and Community Health at the University of Minnesota Medical School. He was a preceptor in the early years of the Rural Physician Associate Program. He also was the youngest physician to be elected as president of the Minnesota

Medical Association. Presidents Ronald Reagan and Bill Clinton both appointed Dr. Kelly to serve on the National Advisory Committee on Rural Health. Dr. Kelly was preceded in death by 1 grandchild. He is survived by his wife, Donna; 4 children; 8 grandchildren; and 4 great-grandchildren.



**FRED A. LYON, M.D.**, Class of 1957, Tucson, Arizona, died February 10 at age 81. President of his class, Dr. Lyon went on to practice obstetrics and gynecology and was a champion for reproductive, civil, and human rights. He was a member of the clinical faculty of the Department of Obstetrics, Gynecology, and Women's Health in the University of Minnesota Medical School and a dedicated member of the school's Medical Alumni

Society board, as well as a member of the Minnesota Medical Foundation's board of trustees. He was a national and international consultant in his field and an advocate for reproductive freedom. Dr. Lyon is survived by his wife, Naomi; 3 children; 6 grandchildren; and 2 great-grandchildren.



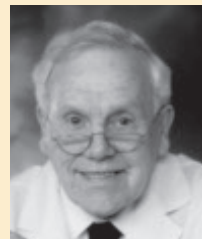
**JOHN V. THOMAS, M.D.**, Class of 1946, Duluth, Minnesota, died October 25 at age 87. Dr. Thomas worked in Duluth, where he practiced surgery, helped to establish the Miller-Dwan Burn Center at St. Mary's Medical Center, served as chief of staff of the burn center at St. Luke's Hospital, and was medical director of DCI Plasma Center. He was instrumental in establishing the University of Minnesota

Medical School—Duluth Campus. In recognition of his volunteer work in medicine, he received the Harold S. Diehl Award from the Medical School's Medical Alumni Society. He is survived by his wife, Margaret; 5 children; and 6 grandchildren.



**JOHN J. WILD, M.D., PH.D.**, Class of 1946, St. Louis Park, Minnesota, died September 18 at age 95. Early in his career, Dr. Wild worked at the University of Minnesota, where he collaborated on some of the first ultrasound equipment used to obtain images of human tissue. The ultrasound scans commonly used today for cancer diagnosis and for monitoring fetal development derived from the discoveries of Dr. Wild, who was

nominated for the Nobel Prize in Medicine, and his contemporaries. Dr. Wild had a private medical practice and was director of Medico-Technological Institute in Minneapolis. He is survived by his wife, Valerie; 3 children; and 3 grandchildren.



# Asking all the right questions

At 25, the Center for Bioethics confronts the issues that shape modern medicine

**N**ever doubt that a small group of committed students can make a far-reaching and lasting impact. □ Indeed, it was a small group of students that provided the initial spark for the University's Center for Bioethics, which this year celebrates its 25th anniversary.

Today the center is widely regarded as one of the few "top-tier" bioethics programs, says Arthur Caplan, Ph.D., who was its first director, from 1987 to 1994, and now heads the bioethics program at the University of Pennsylvania.

But it all began in the early 1980s with a group called the Student Committee on Biomedical Ethics, which organized an annual lecture series on ethical issues in health care.

Those lectures generated intense interest among medical students, recalls Timothy Culbert, M.D. (Medical School Class of 1986), who chaired the student committee in 1984–85.

At the time, medical students were increasingly aware of the complex ethical challenges they would soon face as practitioners.

"We felt we were going into medicine without enough training on all of these issues," says Culbert, who is now medical director of integrative medicine at Children's–Minneapolis. "We wanted to talk about these issues out in the open."

Those early lecture series also caught the attention of faculty, recalls Paul Quie, M.D., an emeritus professor who was then head of pediatric infectious diseases at the Medical School.

Soon, both faculty and students were engaged in efforts to establish a bioeth-

ics center at the University, and with help from the Northwest Area Foundation, the center was born.

The initial push from students was the key, says Quie, who was appointed the center's first interim director in 1985. "It was definitely the product of student passion and enthusiasm."

## Growing the center

Soon, the focus turned to recruiting a permanent director who could put the program on firm footing. That person was Caplan, who was then associate director of the Hastings Center in Garrison, New York.

Caplan's arrival, "put bioethics on the map in Minnesota," says longtime faculty member Dianne Bartels, R.N., Ph.D., who became the center's interim director in 1986.

Under Caplan's leadership, the center hosted a number of important conferences on subjects ranging from reproductive technologies and health-care access to genetic counseling, end-of-life care, fetal tissue transplantation, and the use of data from Nazi medical experiments.

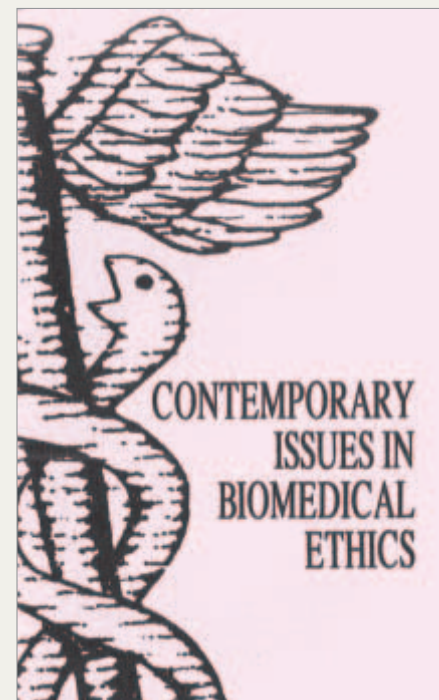
"We took on issues that were controversial," Caplan says. "And we had a lot of influence in those areas."

## Realizing the vision

Following Caplan's departure, Jeffrey Kahn, Ph.D., M.P.H., was recruited to take over as director in 1996. Under Kahn, the center has grown into a leading bioethics program nationally with a robust record of education, scholarship, and public engagement.

Today, the center is highly regarded for its strong, interdisciplinary faculty—considered among the best in the country.

From just three core members in the mid-1980s, the faculty has grown to 11, and they represent a diversity of expertise: medicine, philosophy, law, public health, nursing, and religious studies. The core faculty is augmented by



As medical issues have evolved, so have the range and scope of the Center for Bioethics' work.



PHOTO COURTESY OF THE CENTER FOR BIOETHICS

14 affiliate members from across the University as well as the Mayo College of Medicine.

“Colleagues from across the University and around the country and the world seek out our faculty for research collaborations, invited lectures, and even informal curbsides,” says Kahn. “In terms of both productivity and impact, our faculty members are regarded as leading scholars in the field, taking on issues that are both important and controversial.”

Over the last five years alone, the center’s Steve Miles, M.D., uncovered evidence of the complicity of health-care professionals in torture of Iraqi prisoners; Deb DeBruin, Ph.D., led analysis for the Minnesota Department of Health on how best to allocate scarce resources during a pandemic; John Song, M.D., M.P.H., worked with homeless populations as part of an NIH-funded project to help them engage in meaningful end-of-life decision-making; and Kahn chaired a project funded by the Mellon Foundation to create new ways for bioethics scholars to find research resources and collaborate on projects using social networking technologies.

The faculty is particularly proud of the center’s new graduate program.

For nearly two decades, the center has offered a graduate minor in bioethics. Now it also offers a master’s degree.

“There is a growing need for top-notch educational programs in bioethics,” says DeBruin, the center’s associate director, who spearheaded the effort to establish the new master’s program. “Our M.A. program offers the opportunity to study at a premier bioethics center with an internationally recognized faculty.”

Additionally, the center regularly reaches out to its communities in a variety of ways, from public talks and regular media appearances by faculty members, to the center’s annual presence at the Minnesota State Fair — a faculty favorite.

Over its 25 years, the center has grown and evolved with the field, says Kahn. “The range, scope, and impact of our work have expanded to keep pace with the complexities of modern health care and biomedical science.”

The discussion of nearly every major bioethics issue in the last quarter-century bears the imprint of the Center for Bioethics — a true testament to the Medical School students and faculty who launched it nearly a generation ago. MIB

By AMY SNOW LANDA, a doctoral student in the School of Journalism and Mass Communication at the University of Minnesota

In 25 years, the Center for Bioethics faculty has grown from three core members to 11 faculty and 14 affiliate faculty across the University today.

**Today, the Center for Bioethics is widely regarded for its strong, interdisciplinary faculty — considered among the best in the country.**

# Match Day to benefit Minnesota


PHOTO: EMILY JENSEN



Kara Roberts (left) called loved ones with the news that she had matched in internal medicine at Abbott Northwestern Hospital in Minneapolis. “I’m relieved,” she said. “I haven’t eaten or slept in two days.” Looking on, Jennifer Vesely, who matched in family medicine at Methodist Hospital, held her one-year-old son, Liam. “I’m really, really happy,” she said.

ANXIOUS STUDENTS FROM the University of Minnesota Medical School’s Class of 2010 gathered at the McNamara Alumni Center on March 18 for this year’s Match Day ceremony. Surrounded by family, friends, and Medical School staff and faculty, the students learned where they would complete their residency training.

“I want to thank medical students for keeping us employed,” Gary Davis, Ph.D., senior associate dean of the Medical School–Duluth Campus, told the fourth-year medical students. “In times of change learners inherit the earth,” he said, quoting Eric Hoffer. “I hope we’ve helped you become learners. I hope it will help you in your residency, and you’ll be learners for life.”

Of the 201 University of Minnesota medical students who were matched with residencies, more than half will stay in Minnesota. Fifteen students matched in psychiatry – double the usual number. Also, for the second year in a row, nearly 47 percent matched in primary-care residencies – up from about 44 percent in 2008. 



To find more Match Day stats and a video, visit [www.ahc.umn.edu/education/matchday2010](http://www.ahc.umn.edu/education/matchday2010).



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Gift annuities from the Minnesota Medical Foundation are currently not available in some states.

# Minnesota Medical Foundation

The Minnesota Medical Foundation is a nonprofit organization that provides support for health-related research, education, and service at the University of Minnesota Medical School and School of Public Health.

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