

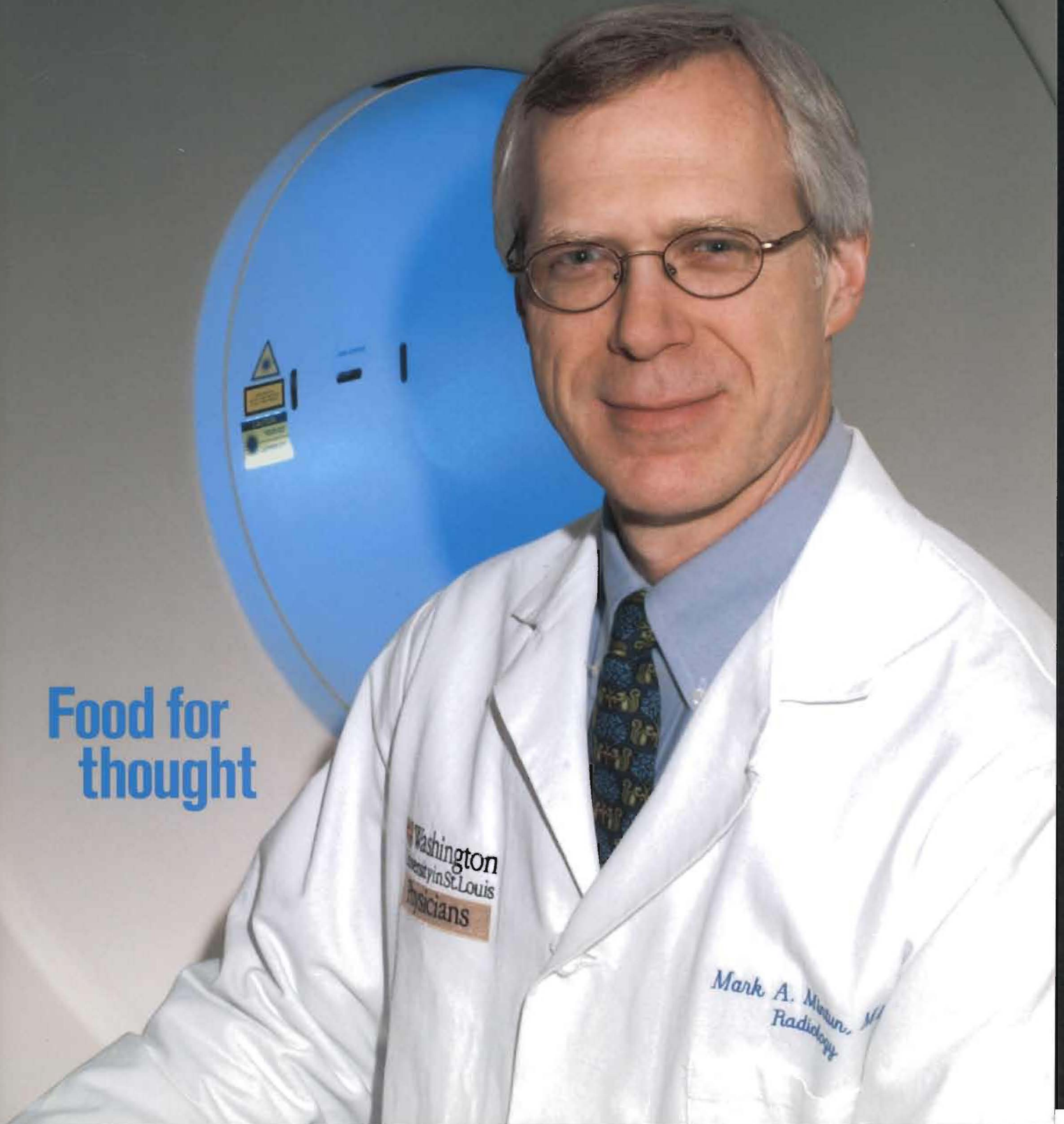
# Outlook

 Washington  
University in St. Louis  
SCHOOL OF MEDICINE

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ABOUT FACES  
.....  
SECOND SIGHT  
.....  
GETTING IN  
.....

SPRING 2004

Food for  
thought





ROBERT BOSTON

**Focus on AIDS** Fourth-year medical student Eri Huang admires a section of the AIDS Memorial Quilt, displayed in the Bernard Becker Medical Library during AIDS Awareness Week, January 12–16, 2004. The weeklong event featured a series of activities designed to educate participants about the global AIDS epidemic and to encourage them to become active in the fight against AIDS. For more on AIDS Awareness Week at the School of Medicine, please turn to page 6.

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# Outlook

**Washington University  
School of Medicine  
ranks 2<sup>nd</sup> in nation**

Remains 1<sup>st</sup> in student selectivity

**2**

**nd**

See back for  
more information

**U.S. News & World Report**



 Washington  
University in St. Louis  
SCHOOL OF MEDICINE

**W**ASHINGTON UNIVERSITY SCHOOL OF MEDICINE IN ST. LOUIS is rated the second best medical school in the nation and ranks first in student selectivity, according to this year's *U.S. News & World Report* rankings of graduate and professional programs.

The medical school ranked second after Harvard University. The No. 3 slot went to Johns Hopkins University, followed by Duke University and the University of Pennsylvania in a tie for fourth. Last year the School of Medicine tied with Johns Hopkins as the second best in the country for research-oriented medical schools.

The rankings, published by the magazine to help students choose graduate schools, are based on research activity, faculty resources, national reputation and student selectivity.

The School of Medicine has remained in the top 10 since *U.S. News* began the annual rankings in 1987. This is the seventh consecutive year the school has been first in student selectivity, a measurement of student undergraduate grade-point averages and scores on medical school entrance exams.

Individually, the School of Medicine's physical therapy program ranked second in the nation, while occupational therapy was third, pediatrics ranked seventh and internal medicine ranked seventh. Drug and alcohol abuse and audiology were tied for eighth, the geriatrics and women's health programs both tied for 15th and the AIDS program placed 17th.



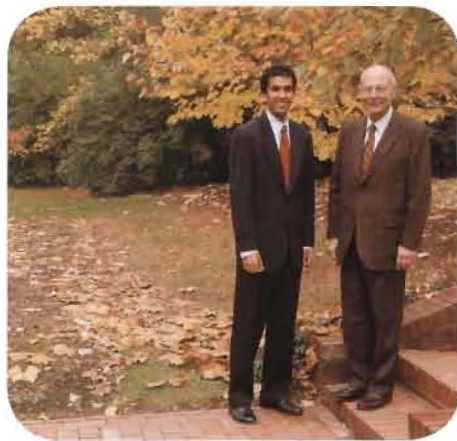


# Outlook

Washington University School of Medicine  
VOLUME XLI • NUMBER 1 • SPRING 2004

**COVER** For decades, scientists like Mark A. Mintun, MD, professor of radiology and of psychiatry, have monitored blood flow changes in the study of human brain function. A recent discovery by Mintun and colleagues provides a more complete understanding of the brain in action. For more on this story, please turn to page 8.

PHOTO BY ROBERT BOSTON



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As cosmetic surgery gains popular acceptance, surgeons study people of all ethnicities to establish more comprehensive standards for beauty.



13 Photoreception undergoes a (re)vision



**Laudable efforts** William A. Peck, MD, the Alan A. and Edith L. Wolff Distinguished Professor of Medicine, and “Today” program co-anchor Katie Couric were honored on Jan. 23, 2004, at the National Children’s Cancer Society International Humanitarian Award Dinner held at the Ritz-Carlton in St. Louis. Peck, pictured above with his wife, Pat, and Couric, also directs the new Center for Health Policy at Washington University. He received the group’s Legacy Award for his significant and lasting contributions to the medical profession, while Couric was honored with its International Humanitarian Award. The National Children’s Cancer Society was established to improve the quality of life for children with cancer and to reduce the risk of cancer by promoting children’s health.

## CID offers doctorate in audiology

CENTRAL INSTITUTE FOR THE DEAF (CID) at the School of Medicine has converted its renowned master’s degree program in audiology into a doctorate program in audiology (AuD).

Individuals in the AuD degree program will receive doctorate-level training in clinical audiology and the fields related to speech and hearing sciences. By 2012, a doctoral degree will be required for certification in clinical audiology nationwide.

“The face of audiology is changing and becoming more complex,” says William W. Clark, PhD, director of the school’s program in audiology and communication sciences and professor of otolaryngology.

With early diagnosis and treatment of pediatric hearing deficits rapidly advancing and with the number of older adults increasing, the U.S. Department of Labor estimates the field of audiology will grow by about 45 percent over the next decade.

“By combining the expertise and resources of CID and the School of Medicine, we can provide graduate students with superior training, including exposure to our highly respected deaf education program and to our world-class research facility,” says Clark.

## Local pediatricians form research network to tackle common childhood problems

WHEN CHILDREN VISIT THEIR PEDIATRICIANS with everyday problems such as acute diarrhea and ear infections, the treatments can vary greatly from doctor to doctor and from office to office.

To identify the most effective treatments for some of these common problems, a group of local pediatricians has joined forces with School of Medicine physicians to form a practice-based pediatric research network.

“We want to identify tests and treatments that are most beneficial to patients when they see their pediatricians and nurse practitioners,” says Jane M. Garbutt, MB, ChB, program director of the Washington University Pediatric and Adolescent Ambulatory Research Consortium.

Garbutt, who also is a research assistant professor of medicine, says the consortium is a grassroots organization that’s had a groundswell of support since its inception in 2002. The network now includes 66 pediatricians from 33 practices.

Funding from the Agency of Healthcare Research and Quality, St. Louis Children’s Hospital Foundation

and Children’s medical staff has enabled the consortium to recruit members, conduct two studies, establish a list-serve and do some faculty development.

One study is measuring the prevalence of antibiotic resistant streptococcus pneumonia—the bacteria most often associated with acute ear infections and acute sinusitis—in children with an acute upper respiratory illness. The other study is determining how children with acute diarrhea, the fourth most common reason children present to the St. Louis Children’s Hospital emergency department, are cared for in the community.

James P. Kearing, MD, the W. McKim O. Marriott Professor of Pediatrics, is the consortium’s faculty liaison director, and Elliot F. Gellman, MD, professor of pediatrics, serves as the membership liaison director.

**“Patients generally are very enthusiastic. They like to see that their doctor is cutting-edge.”**

JANE M. GARBUTT, MB, CHB



## NIH extends school's longest-running research grant for five more years

**F**ive years and \$11 million in funding compose the longest continuously renewed National Institutes of Health (NIH) research grant held at Washington University School of Medicine.

With the renewal, "Cyclotron Produced Isotopes in Biology and Medicine" will be extended into its 44th year of supporting research into imaging techniques and agents at the medical school. The historic grant supplied the funding that allowed physicist Michel M. Ter-Pogossian, PhD, professor of radiology,

to lead the development of the first positron emission tomography (PET) scanner at the school in the 1970s. Ter-Pogossian was the principal investigator on the grant until 1984, when he was succeeded by Michael J. Welch, PhD, professor of radiology, molecular biology and pharmacology and of chemistry.

For many years, the grant was dedicated to imaging studies of the heart, lung and brain, but its current renewal focuses on imaging the heart. The renewed grant supports three research

programs: development of new imaging agents to study cardiac disease, headed by Robert H. Mach, PhD, professor of radiology; use of PET imaging to study heart damage in animal models of diabetes, led by Welch; and application of the imaging agents in a clinical setting with diabetic patients, directed by Robert J. Gropler, MD, professor of radiology and medicine.

The common theme in all three programs is developing a better understanding of how diabetes is linked to heart disease.

## Black, Needleman appointed to leadership positions in administration, research

THE SCHOOL OF MEDICINE has named Michael E. Black as associate dean and associate vice chancellor for administration and finance, and Philip Needleman, PhD, as associate dean for special research projects.

The appointments were announced last December by Larry J. Shapiro, MD, executive vice chancellor for medical affairs and dean of the School of Medicine.



**Michael E. Black**

Needleman's appointment went into effect immediately; Black joined the administration on February 1, 2004.

Before joining Washington University, Black was vice dean for administration and finance at the University of Pennsylvania School of Medicine. Black—who has more than 34 years of experience in financial leadership—redesigned the organizational structure and business processes within the medical school, which resulted in dramatic improvements in productivity, effectiveness, efficiency and communication.

At the School of Medicine, Black will coordinate financial, administrative and capital activities. He will manage the school's non-academic operations and oversee all short- and long-term financial planning as well as ongoing management of physical facilities and related operations. He will work closely with James P. Crane, MD, associate dean, associate vice chancellor and chief executive of Washington University Physicians, in financial management of the 900-physician multispecialty group.

Needleman first came to the School of Medicine as a postdoctoral fellow in 1964. He rose to chair the school's Department of Pharmacology from 1976 to 1989. He left the medical school in 1989 and through a series of promotions became senior executive vice president, chief scientific officer and chairman of research and development at Pharmacia Corp. (formerly Monsanto/Searle), a position he held until 2003.



**Philip Needleman, PhD**

An expert in prostaglandin regulation, Needleman's laboratory at the School of Medicine made key discoveries about the roles of the COX-1 and COX-2 enzymes. Moving to Monsanto, Needleman led the development of the successful arthritis medication Celebrex, which is based on COX-2's unique characteristics. He therefore oversaw the complete path, from basic research to translational research and product development, for a new drug now used by more than 20 million arthritis sufferers.

As the new associate dean for special research projects, Needleman will work closely with Shapiro, the heads of the school's basic science and clinical departments and with scientists on the university's Hilltop campus on new projects related to BioMed 21, a university-wide research and training initiative aimed at bringing the new knowledge of the human genetic blueprint to patients through the strategic pursuit of novel medical therapies.



## New high-tech center focuses on translational research

A GRAND OPENING CELEBRATION was held at the school's new Good Manufacturing Practice facility in December. Faculty and staff from the School of Medicine and the Siteman Cancer Center were invited to mark the occasion; after the opening, the GMP was permanently transformed into an ultra-clean area accessible only to persons outfitted in special suits and protective gear.

The 2,615-square-foot GMP will make it easier for researchers to engineer and manipulate cells for use in a variety of new treatments, including approaches that harness the power of the immune system to attack cancer and genetic modifications that enhance existing vulnerabilities in tumor cells or open up new lines of attack against such cells.


The cells and other materials researchers work on in the GMP will be kept inside sophisticated isolation units and stored in refrigerators and freezers extensively tested for their ability to maintain temperature within strict limits.

The extraordinary dedication to control and isolation in the GMP doesn't stem primarily from a need to keep dangerous materials from getting out of the GMP. Instead, it will keep dangerous contaminants from getting into what the GMP makes: cells modified or manipulated for use in the latest innovative techniques for treatment of cancer and other diseases. Like a tray of surgical tools, the cells are destined for use inside patients and, as such, have to be produced to exact standards of consistency and purity. The GMP takes its name from the FDA's term for these standards.

The GMP also adheres to the standards of the Good Tissue Practices Act, a law that went into effect in early 2004 that requires even minimal tissue manipulations to be performed in a facility that meets strict criteria for contamination prevention.

The first clinical trial using GMP products is set to begin early next year. Researchers working on 30 projects at Washington University already have made arrangement to have materials produced at the GMP. The university also plans to make the GMP's services available to other universities and private companies.

Gerhard Bauer is the laboratory director of the new GMP facility. The GMP's co-directors are Steven M. Devine, MD, medical director, and Jan A. Nolte, PhD, scientific director.



**Celebrating history** Third-year medical student Justin Connor studies Influence 150: 150 Years of Shaping a City, a Nation, the World, an exhibit chronicling key figures, events and discoveries in the life of Washington University in St. Louis. Originally shown at the university's Gallery of Art, the exhibit is on display through May 2004 at the School of Medicine's Bernard Becker Medical Library.

## Cicero to head state research organization

THEODORE J. CICERO, PHD, vice chancellor for research at Washington University in St. Louis, has been elected chairman of the Research Alliance of Missouri, an organization established to help expand Missouri's economy through high-tech job growth.



Theodore J. Cicero, PhD

..... include representatives from 11 of Missouri's universities, including Washington University in St. Louis, Saint Louis University and the University of Missouri.

"Economic development and job creation in our state are driven by technology and knowledge from our research universities," says Cicero. "The job of the alliance is to transfer scientific discoveries and new technology from our universities into the commercial sector to create new products, processes, services and jobs."



## Johnston assumes presidency of Genetics Society of America

MARK JOHNSTON, PHD, professor and interim chair of the Department of Genetics, began a one-year term as president of the Genetics Society of America (GSA) in January 2004.

"It's a tremendously exciting time to be a geneticist, particularly in light of the recent completion of the Human Genome Project," Johnston says. "The Genetics Society is doing some creative thinking about what we can do to help our members take advantage of the advances in science that have happened in the last decade."

Johnston, who studies how cells sense and respond to changes in their environment, says the core membership of the society comprises researchers who use



Mark Johnston, PhD

several key model organisms to study normal and dysfunctional genetic processes. The approximately 4,000-member GSA helps members by lobbying the government for continued support of basic research, securing discounted supplies and encouraging and facilitating the sharing of genetic information.

"In addition to the services we provide our members, the GSA also publishes *Genetics*, which has long been the premiere journal in the field," Johnston says.

## GENETICS

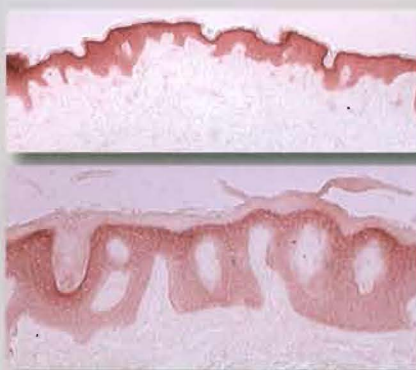
### Ten-year study leads researchers to psoriasis genes

**A**fter a decade of searching, researchers have identified three genes linked to psoriasis, a potentially debilitating and disfiguring skin condition characterized by burning or itching patches of raised, red skin.

The project's leader, Anne M. Bowcock, PhD, professor of genetics, medicine and of pediatrics, says the results could help scientists understand the molecular details of what happens in psoriasis and improve treatments for the condition. The study appeared in *Nature Genetics*.

"Now we can look at the functional roles of these genes—how they normally keep the skin and the immune system from damaging healthy tissue with their defensive mechanisms," Bowcock explains. "These results are going to help us find answers for some very important questions, including how changes in cellular mechanisms cause the disease and whether we can predict who is going to develop the disease early on."

According to the National Psoriasis Foundation, about 4.5 million Americans have been diagnosed with psoriasis.



Researchers used antibodies to image the activity of a gene linked to psoriasis in normal skin (top) and in the skin of a patient suffering from psoriasis.

Psoriasis is a complex trait—a disorder linked to several genes and environmental factors. It comes in a variety of forms, and scientists strongly suspect that the immune system plays a major causative role.

"We think the immune system may be overactive in some way that leads to damage to healthy tissue," Bowcock says. "Or the disease may be turning on a class of immune cells that can't be turned off properly."

Bowcock is the director of the National Psoriasis Tissue Bank, which is located at the School of Medicine. She and colleagues at Baylor University, the University of Washington in Seattle, Rockefeller University and the University of California in San Francisco analyzed DNA from 242 Northern European families with at least two affected individuals.

The search took a decade because they were looking for very subtle effects. The genes involved—SLC9A3R1, NAT9 and RAPTOR—didn't change much. Researchers also found that the forms of the genes that increased risk of psoriasis were present in about 37 percent of a group of people not suffering from the disease.

"Since only 2 percent of the general population develops psoriasis, there are clearly many other genes involved in determining psoriasis risk, and the genes we identified are low-risk," Bowcock says. "But it's encouraging, because they're not genes we would have predicted to be involved in psoriasis, and now that we've found them the connections are starting to make sense."





**AIDS awareness** Adam Taylor (sitting, right), co-founder and executive director of Global Justice, the umbrella organization for two student campaigns, Student Global AIDS Campaign and Student Campaign for Child Survival, met with medical students Kao Ping, Karla Fredricks and Laura Houser after his keynote address at the School of Medicine during AIDS Awareness Week, January 12-16, 2004. Other events included a panel discussion among persons living with AIDS, a lecture on the global impact of current AIDS research, and a letter-writing campaign encouraging government representatives to support measures to fight the AIDS epidemic.

## Cobb to head surgery association

J. PERREN COBB, MD, associate professor of surgery and director of the School of Medicine's Cellular Injury and Adaptation Laboratory, recently was installed as president of the Association for Academic Surgery (AAS).

The largest academic surgical organization in the nation, AAS promotes research and academic pursuits through the exchange of ideas among senior surgical residents, junior faculty and established faculty mentors.



**J. Perren Cobb, MD**

Cobb is renowned for his research on the body's response to trauma. He recently assumed leadership of the Washington University portion of the first national collaborative effort to study the body's response to critical illness and traumatic injuries such as motor vehicle accidents, gunshot wounds and burns. The researchers are investigating a variety of factors, including environmental and genetic contributors, in predicting an individual's response to traumatic injury. The Washington University team, with Stanford University, will lead the genomics component of the project.

## Emerson, Anheuser-Busch commit \$10 million to Siteman Cancer Center

THE AREA'S ONLY FEDERALLY DESIGNATED CANCER CENTER, the Alvin J. Siteman Cancer Center at Washington University School of Medicine and Barnes-Jewish Hospital, recently announced a \$10 million commitment from two of St. Louis' leading corporations. The grant will expand research space and assure that people in and around St. Louis will have the newest cancer treatments close at hand.

This new commitment will be used as a challenge to generate \$20 million in additional matching support from the School of Medicine, Barnes-Jewish Hospital and the Siteman Cancer Center.

Emerson's Charitable Trust and the Anheuser-Busch Foundation are contributing \$6 million and \$4 million respectively. First priority for funding through the Emerson-Busch grant is expansion of cancer research space and programs in a new cancer research facility, which will be located on the top floors of the Southwest Tower in the heart of Washington University Medical Center. The basic and applied research supported by this gift distinguish the Siteman Cancer Center and are keys to finding new treatments and diagnostic techniques for cancer patients.

The new research center will include laboratories and offices for 11 principal investigators and their research teams, plus necessary support space. It also will house and promote expansion of research programs such as the Stem Cell Biology Program and the Bone Marrow Transplantation Program, which is one of the top four of its kind in the United States.

As the leading provider of cancer care in the region, Siteman Cancer Center has more than 300 Washington University researchers and physicians dedicated to developing ways to prevent, detect and treat cancer. The center provides a multidisciplinary approach to cancer care.

Last year, Washington University physicians affiliated with Siteman treated nearly 6,000 new cancer patients and provided follow-up care for more than 28,000 patients at Barnes-Jewish Hospital and at the Center for Advanced Medicine, which houses many of Siteman Cancer Center's outpatient services.





## PSYCHIATRY

### Alcohol-dependence gene identified in national collaborative study

**R**esearch has identified a gene that appears to increase the risk of alcoholism, according to investigators at Washington University School of Medicine, Indiana University School of Medicine and other centers.

The study, published in the January issue of the journal *Alcoholism: Clinical and Experimental Research*, is the first to demonstrate an association between this particular gene and alcohol dependence.

The gene is related to a receptor that allows for the movement of Gamma-amino butyric acid (GABA) between nerve cells. GABA is the major inhibitory chemical in the central nervous system.

"There were lines of evidence from other studies—animal studies, *in vitro* studies—that suggested GABA receptors are involved in the behavioral effects of alcohol," says lead author Danielle M. Dick, PhD, research assistant professor of psychiatry at Washington University School of Medicine in St. Louis. "Because GABA receptor genes were likely candidates and previous studies had linked this area on chromosome 15 to alcoholism, we zeroed in on three GABA receptor genes but only found significant association with one of them."

The study was conducted as part of the national Collaborative Study on the Genetics of Alcoholism (COGA), an ongoing project involving interviews and DNA samples from more than 10,000 individuals from inpatient and outpatient alcohol

treatment centers and their families. Families in the COGA study usually have several members with alcohol dependence.

For this study, the investigators analyzed DNA from 262 families, a total of 2,282 individuals. They isolated three genes on chromosome 15—GABRA5, GABRB3 and GABRG3—that sit very close together on the chromosome. Then the investigators used markers called SNPs (single nucleotide polymorphisms) to study differences between the participants' genes.

**Finding that Gamma-amino butyric acid is involved in alcohol abuse and dependence supports a current theory that predisposition to alcoholism might be inherited as part of a general state of brain overactivation.**

The markers demonstrated that small genetic differences did appear to influence the risk of alcohol dependence, but only in one of the genes: GABRG3.

It is not known how GABRG3 influences alcoholism risk. Dick says previous research has suggested chemicals that increase GABA receptor activity can accentuate the behavioral effects of alcohol, such as

sedation, loss of anxiety and problems with motor coordination. Conversely, chemicals that decrease GABA receptor activity can have the opposite effect.

"This suggests that somehow GABA reception might be involved in these behavioral effects," Dick says. "But we don't know exactly how, so we can't tell what the pathway might be that leads from GABA receptor genes to alcoholism."

Finding that GABA is involved in alcohol abuse and dependence supports a current theory that predisposition to alcoholism might be inherited as part of a general state of brain overactivation. People at risk for alcoholism may inherit a variety of genes that contribute to this state. Perhaps alcohol normalizes that state of excitability, leading people with a hyperexcited nervous system to use alcohol more frequently in order to normalize brain circuits. That, in turn, would put them at greater risk for developing alcohol dependence.

Dick says it is important to point out that genetic make-up does not necessarily mean a person is doomed to become an alcoholic.

"One reason it is so difficult to find genes involved in psychiatric disorders is that there is an interplay between genetic and environmental factors," she says. "A person can carry all kinds of genes that predispose them to alcohol dependence, but if they never take a drink, they won't become an alcoholic."



# Fuel for the

**A burst of brain energy depends more on a unique molecular cycle than on blood flow variation** BY MICHAEL PURDY

**A** CENTURY-OLD MYSTERY is taking place in your head as you read these words. Blood vessels in regions of your brain are widening, bathing cells in an increased blood flow.

Scientists have known for more than 100 years that these changes take place when areas of the brain become activated or when any cell, such as a muscle involved in an exercise routine, increases its workload. They once assumed that the change occurs to supply cells with more of the glucose and oxygen that they needed to fuel their increased workload. Thanks in large part to researchers at Washington University in St. Louis, though, that old explanation has fallen away.

Left in its place is a puzzle: If increased blood flow isn't needed to supply cells with more fuel, then what exactly is it providing? Researchers Joseph Williamson and Mark Mintun don't have the full answer yet, but with a pair of papers published early this year in the *Proceedings of the National Academy of Sciences (PNAS)*, they moved the scientific community a major step closer to it.

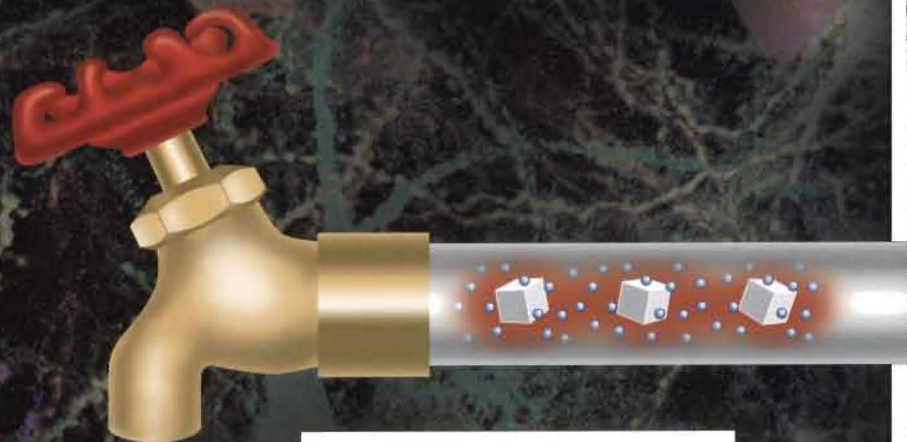
## — Going with the flow

Keeping the energy-producing cycle going requires stripping off the electron and converting NADH back into NAD<sup>+</sup>. This becomes particularly tough when a suddenly increased workload rapidly transforms a cell's storehouse of NAD<sup>+</sup>. More blood flow isn't about more fuel—research shows that it appears to enhance the NADH-NAD<sup>+</sup> conversion.

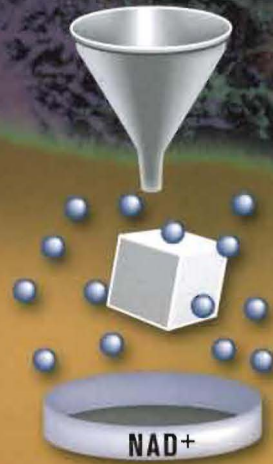
For the three conversion processes, see page 10.



# fire



Blood flow supplies cells with sugar and oxygen, the fuels that drive their engines. This highly simplified diagram shows how interactions with sugar change a compound that plays a key role in energy metabolism.



**1** Cells need a compound known as  $NAD^+$  to produce energy from sugars.



**2**  $NAD^+$  and sugar interact during the rapid energy-producing process known as glycolysis.

## Food for Thought Glycolysis and the $NAD^+/NADH$ Cycle in the brain



**3** Glycolysis needs  $NAD^+$  to peel electrons off sugar. But  $NAD^+$  is also transformed.

**5**  $NAD^+$ , now carrying electrons, has taken an alternate chemical form,  $NADH$ , which can no longer be used in glycolysis.

**4** Without the electrons, the sugar molecule has an electrical potential that can be used to finish glycolysis.





## Three ways to maintain the NAD<sup>+</sup>/NADH cycle



### Change Pyruvate into Lactate

Pyruvate is a product of glycolysis. Conveniently, changing pyruvate into a closely related compound, lactate, helps change NADH back into NAD<sup>+</sup>.



### Use NADH to make energy with mitochondria

NADH can be used in another energy-producing process involving structures in the cell known as the mitochondria. This also changes NADH back into NAD<sup>+</sup>.



### Increase the blood flow

A third way to change NADH back into NAD<sup>+</sup>, only recently identified by Washington University scientists, is to trigger a set of chemical chain reactions that increase blood flow.

Williamson and Mintun have found the answer to a closely related question: How are blood flow increases triggered? Study results reported in *PNAS* link the increases to a molecule that occupies a unique and central spot in cellular energy production.

The investigators hope to apply the new insights to improve imaging of the brain in action and to limit the side effects of diabetes, but their findings also are likely to have ramifications that ripple out far beyond their research specialties. Knowing how increased blood flow in the brain is activated could be relevant, for example, to understanding and controlling Alzheimer's disease and stroke.

Washington University researchers have been leaders in the development of functional brain imaging techniques, many of which monitor changes in brain blood flow levels. They first began to topple the old explanation for increased blood flow in 1988 by looking more closely at what brain blood flow changes reflected.

"Much to our great surprise, what we observed was that when blood flow did come up in an active area of the brain, the amount of oxygen being used didn't," says Marcus E. Raichle, MD, professor of radiology, neurology and of anatomy and neurobiology.

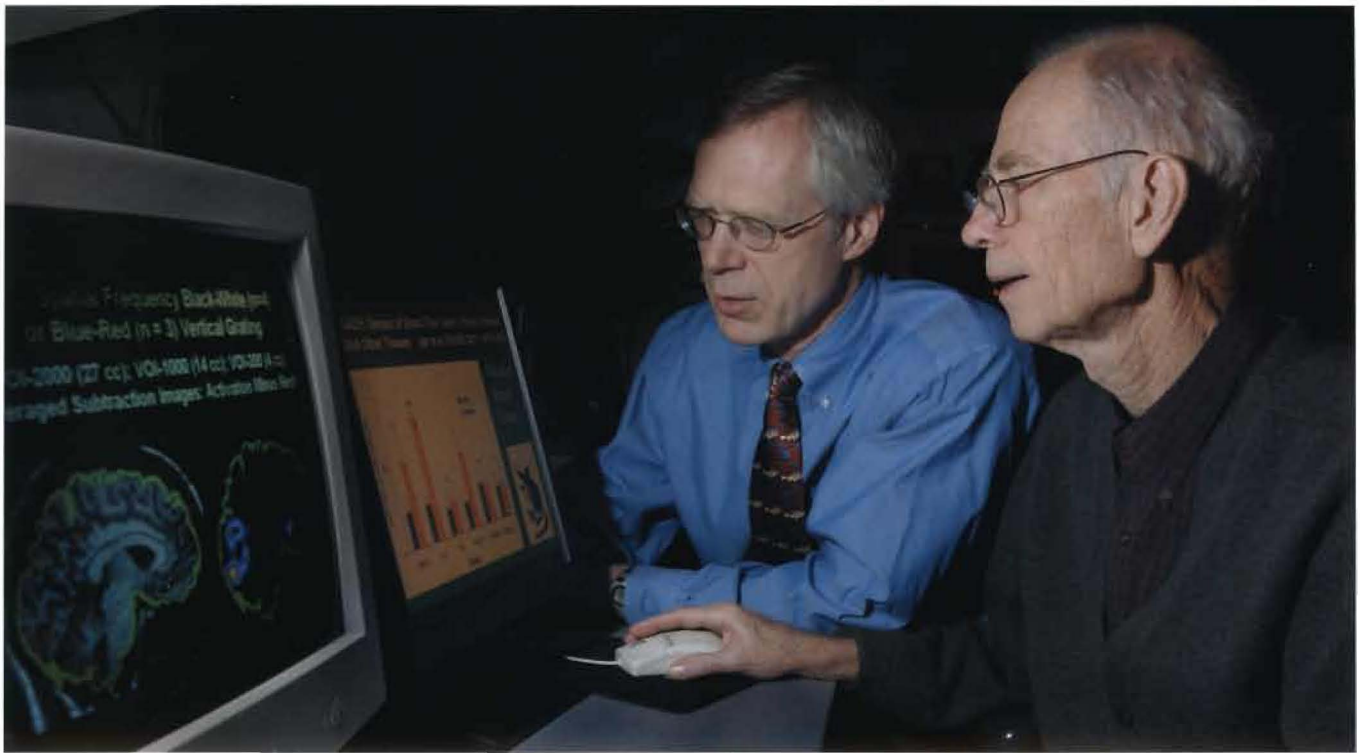
Raichle and other School of Medicine researchers confirmed and expanded the findings over several years, showing that brain activation increased blood flow but produced only a moderate increase in sugar use and a very small increase in oxygen use. "What remained was still the question of how are blood flow increases orchestrated and why?" Raichle recalls.

The answers remained dauntingly out of reach until Washington University pathologist Joseph R. Williamson, MD, now retired, happened onto the search in the mid-1990s. With the support of the St. Louis-based Kilo Diabetes and Vascular Research Foundation and the National Institutes of Health, Williamson was studying the damaging effects of diabetes, which, in addition to elevating sugar levels, increases blood flow and harms blood vessels in the nerves, heart, retina and kidneys. Wondering if connections might exist between

**"It struck me that NAD<sup>+</sup> is strategically positioned — even uniquely positioned — to coordinate blood flow with energy metabolism."**

JOSEPH R. WILLIAMSON, MD





Mark A. Mintun, MD, and retired pathologist Joseph R. Williamson, MD, are studying blood flow in the brains of both rats and humans.

the increases in blood flow brought on by brain activity and those triggered by diabetes, Williamson found Raichle's 1988 study and read it. As he investigated the scientific record further, Williamson recognized a similarity between working muscle cells and endangered cells in people with diabetes: both experienced increases in the ratio of two forms of a compound in energy metabolism, nicotinamide adenine dinucleotide (NAD).

"It struck me that NAD is strategically positioned—even uniquely positioned—to coordinate blood flow with energy metabolism," says Williamson.

**B**iochemists who study cellular energy production put NAD at the center of a complex flow chart linking two different methods of producing the energy that powers most cells. For these methods, NAD serves as the major carrier of protons and electrons.

Most NAD in the body is in an oxidized form scientists refer to as  $\text{NAD}^+$ . During one method, glycolysis, a process that rapidly produces energy from sugar, electrons and protons are transferred from sugar to  $\text{NAD}^+$ , changing it to NADH ( $\text{NAD}^+$  plus a proton and two electrons).

"Not only is glycolysis twice as fast, it doesn't require oxygen," Williamson notes. "It's really vital for survival."

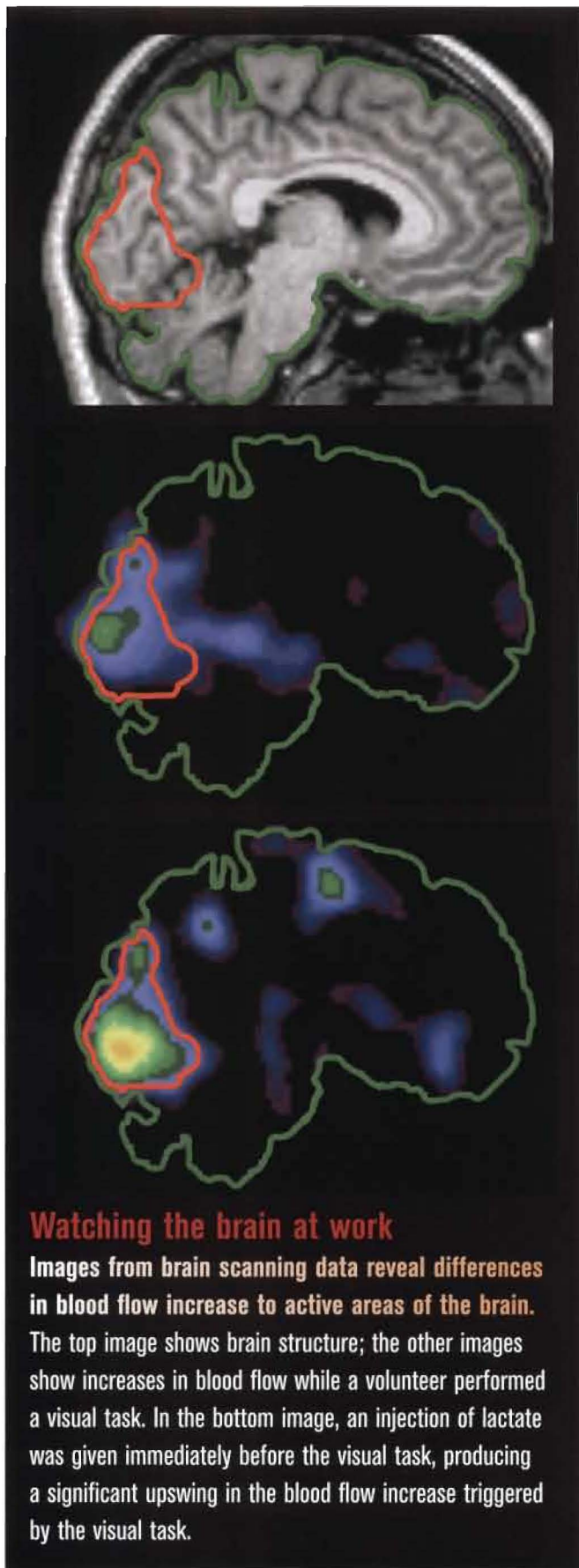
Rapid glycolysis depends on a low ratio of  $\text{NADH}/\text{NAD}^+$ . In activated cells and in cells endangered by diabetes, molecules of NADH increase, driving the  $\text{NADH}/\text{NAD}^+$  ratio up. Williamson suspected the ratio might be controlling changes in blood flow.

He thought he could test his theory using a 50-year-old link between the  $\text{NADH}/\text{NAD}^+$  ratio and the ratio of two other compounds involved in energy production, lactate and pyruvate. This link was the tool he needed to be able to alter  $\text{NADH}/\text{NAD}^+$ : inject lactate or pyruvate, change the  $\text{NADH}/\text{NAD}^+$  ratio, and see if blood flow increased or decreased.

Williamson took his idea to Raichle, who put him in touch with Thomas A. Woolsey, MD, professor of anatomy and neurobiology, cell biology and physiology, and of neurological surgery. Woolsey, the George H. and Ethel R. Bishop Scholar in Neurosciences, had devised a model for studying regions of the rat brain that process sensory input from the whiskers. Using the model and injections of lactate and pyruvate, Williamson and Woolsey were able to prove the link between the  $\text{NADH}/\text{NAD}^+$  ratio and blood flow increases.

In a recent paper, published in January in *PNAS*, Williamson's group confirmed the link again in studies of the rat retina and the visual region of the rat brain. They also identified a signaling pathway in cells that is triggered by high  $\text{NADH}/\text{NAD}^+$  ratios. The pathway activates a chain reaction that recycles NADH back into  $\text{NAD}^+$  and also promotes the production of nitric oxide, which dilates blood vessels.

Williamson shared the successful results of the second rat experiments with Raichle in advance of publication, and they made the idea of testing the same



### Watching the brain at work

Images from brain scanning data reveal differences in blood flow increase to active areas of the brain.

The top image shows brain structure; the other images show increases in blood flow while a volunteer performed a visual task. In the bottom image, an injection of lactate was given immediately before the visual task, producing a significant upswing in the blood flow increase triggered by the visual task.

principles in humans irresistible to Mark A. Mintun, MD, professor of radiology and of psychiatry.

“What we wanted to do is make sure this phenomenon is actually relevant to human work,” Mintun says. “There are many ways of monitoring signals in the animal brain, but we don’t have that many choices in doing human experiments. And so we have learned to depend on this increased blood flow signal. It then becomes very important to understand exactly what that signal represents.”

Andrei G. Vlassenko, MD, PhD, research associate in radiological sciences, played a leading role in the design and implementation of the human study. Scientists used a PET scanner to monitor brain blood flow in seven subjects who either closed their eyes during the scans or performed a visual task, fixing their gaze on an unmoving central crosshair in an animated visual display.

Vlassenko is clearly pleased with the results: without lactate injections, the blood flow increase to the visual cortex during the visual task was 19 percent; after lactate injections, it was 26 percent. “That might not seem like a lot if you look strictly at the gain, but if you look at the gain as a percentage of original level of increase, that’s fully one-third more,” Vlassenko says.

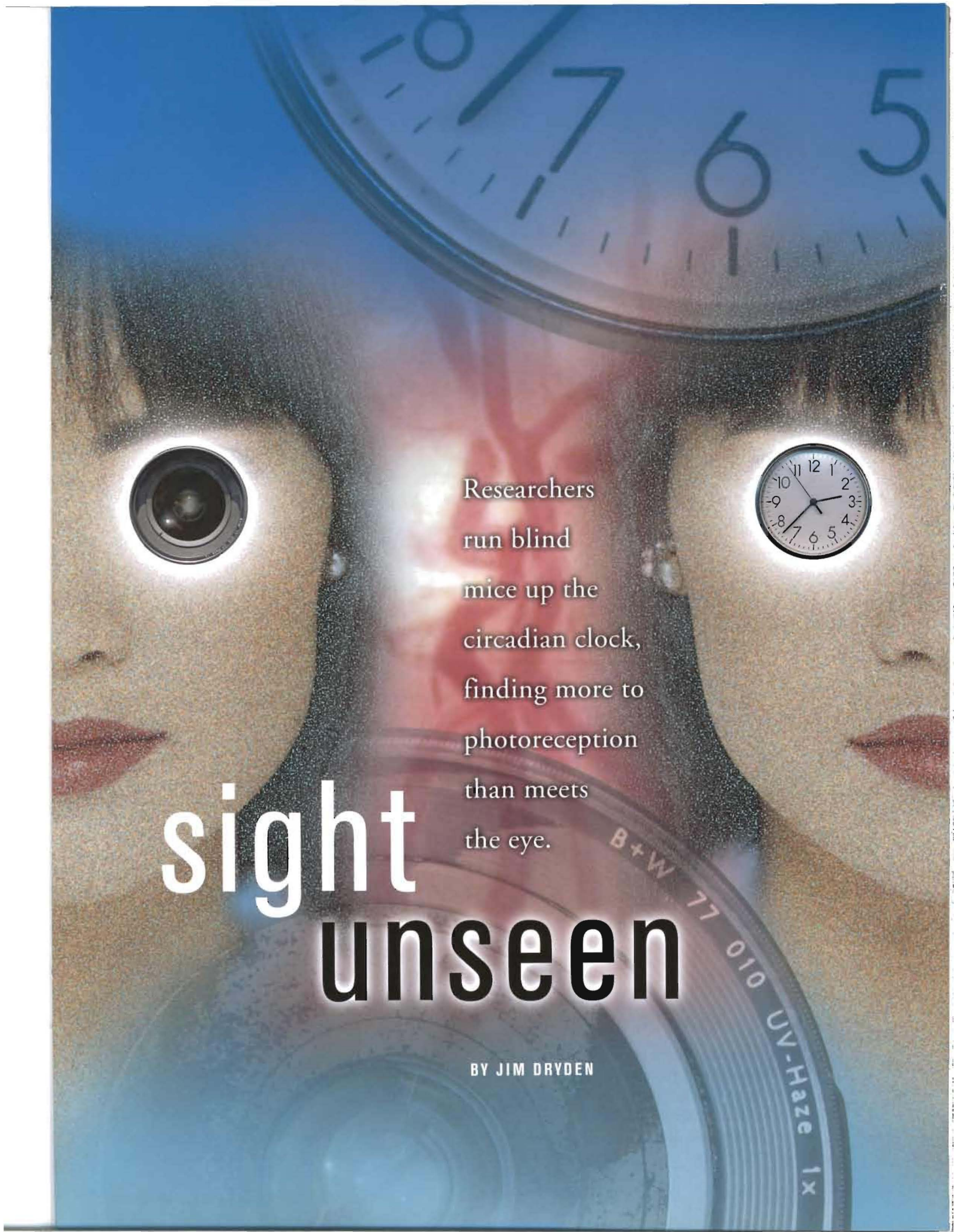
Follow-up work to the human study is generating “gorgeous”-looking data, according to Mintun. He expects the new discovery to generate a rush of interest due to its potential impact on scientists around the world using changes in blood flow to map human brain function.

Williamson notes that while he’s not going to be conducting any follow-up experiments *per se*, he does plan to use the studies of the rat retina and data from other pre-retirement experiments to advance a new theory he has about how diabetes damages tissues.

He thinks the culprit may be increased metabolism of glucose to fructose, which also increases the ratio of NADH/NAD<sup>+</sup>. Convincing colleagues in diabetes research to take a closer look at the mechanism has been an uphill battle; however, he is optimistic that as investigators understand that the NADH/NAD<sup>+</sup> ratio regulates blood vessel function as well as energy metabolism, they will take a closer look at its role in damaging blood vessels and nerves in patients with diabetes.

“There’s enough recent information now supporting the importance of this mechanism that I think more people will be convinced of its significance in the near future,” he says. □



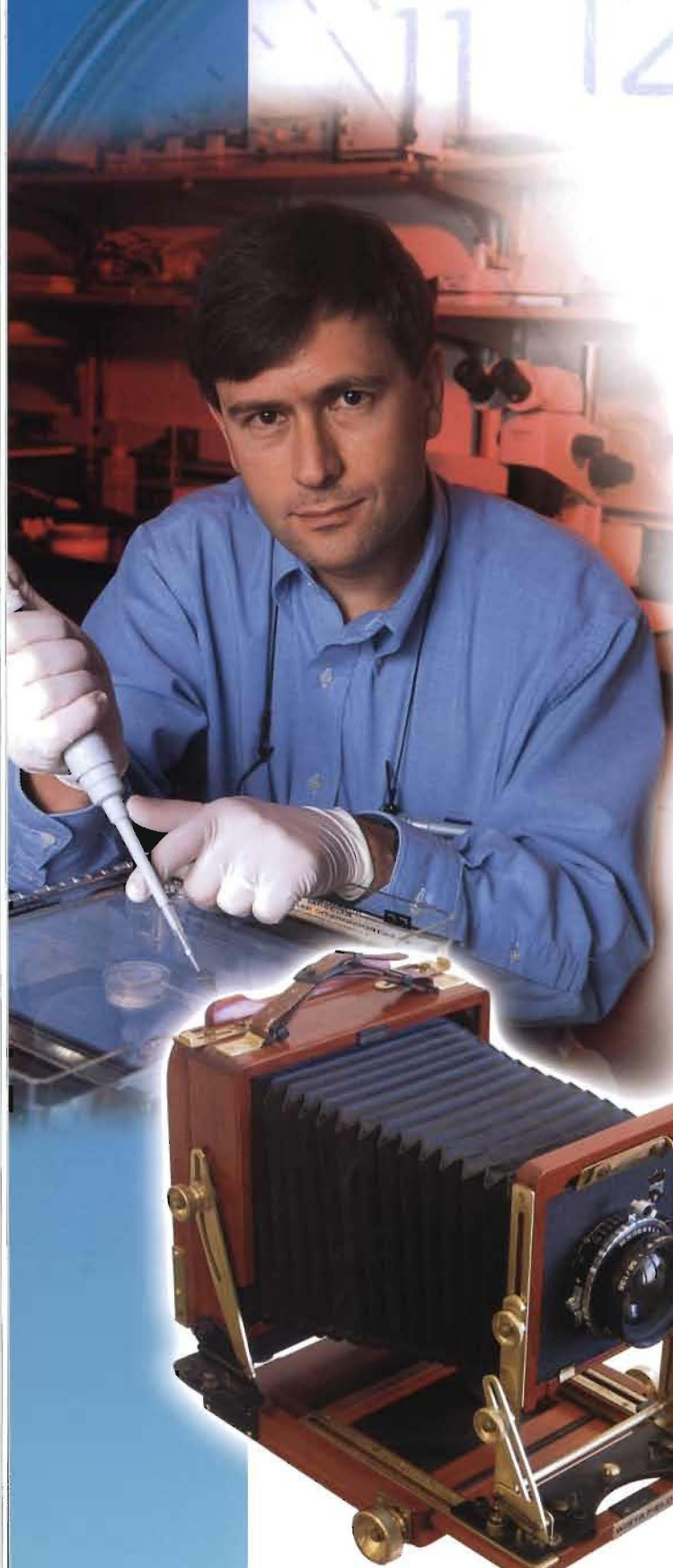


Researchers  
run blind  
mice up the  
circadian clock,  
finding more to  
photoreception  
than meets  
the eye.

# sight unseen

BY JIM DRYDEN





Scientists used to assume that the eye functioned like an old-style camera. Basically, light came in through the cornea, was focused by the cornea and the lens, and wound up on the retina — which, following this metaphor, is the camera's "film." An image was made there as the light was converted into electrical signals by photoreceptor cells — rods and cones — and those signals transmitted to the brain.

“But a few years ago, a group led by Dr. Russell Foster found that mice that lack rods and cones still had sensitivity to light,” says Russell N. Van Gelder, MD, PhD, assistant professor of ophthalmology and visual sciences and of molecular biology and pharmacology at the School of Medicine. “Even visually blind mice had the ability to dilate and constrict their pupils in response to light.”

But how? How would an animal without the ability to see still open and close its pupils in response to light?

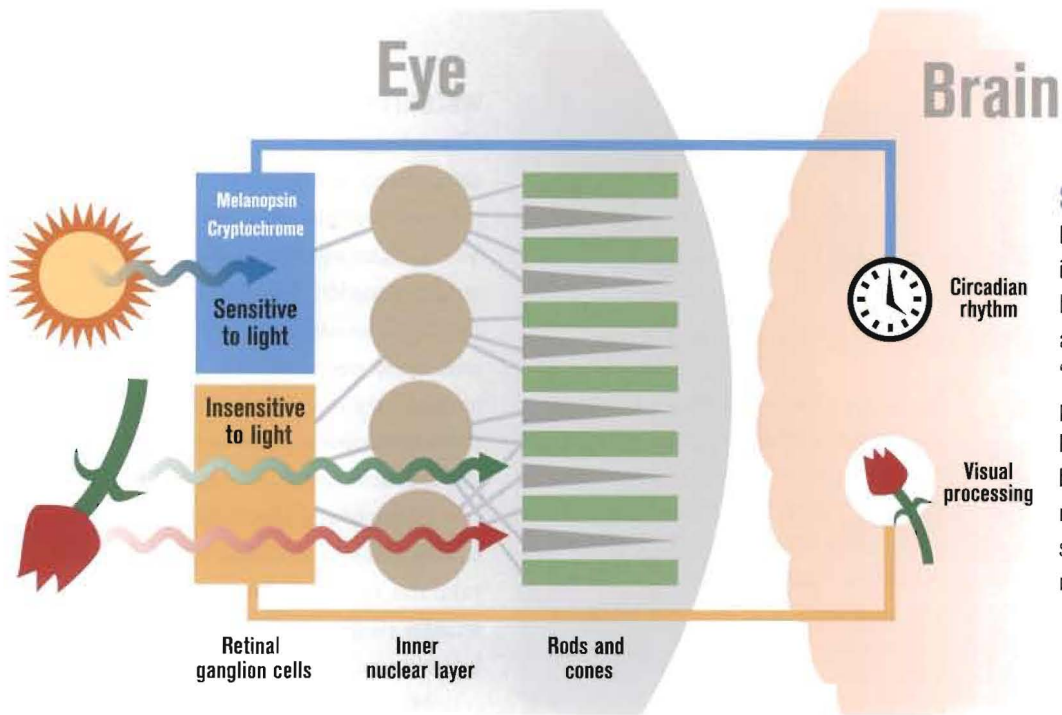
That question has driven much of Van Gelder's research over the past few years. And he's learned that there's a whole other pathway in the eye. The eye's primary job may involve vision, but that's not all it does.



The eye's service to the brain appears more complex than the old analogy of a lens-and-film camera, says Russell N. Van Gelder, MD, PhD.

ERIC YOUNG





**Sight unseen** Among three retinal layers, rods and cones perform the important work of visual perception, but another layer's light-sensitive cells are also essential. These cells do not "see" in the classic sense, but they do perceive light, like a modern camera's light meter — this appears to set the body's internal time clock, the circadian rhythm. Light- and, therefore, time-sensitivity requires special proteins: melanopsin and cryptochrome.

### IMPORTANT PROTEINS

Despite how well the "eye as camera" metaphor works, it's probably time for an update. Modern cameras also have light meters, and Van Gelder's research suggests that the non-visual role of the eye might be compared to a light meter, which cannot form images but can determine how bright the environment is. In a camera, that information helps the photographer determine how to set the shutter speed and whether to use a flash. In the eye, that information is used for much more.

"Brightness information is used in brain systems below the level of consciousness," Van Gelder says. "These systems help synchronize your sleep/wake cycle, reset your internal body clock to jet lag if you travel across time zones, control the pupil of your eye and how it responds to light, and regulate the release of hormones such as melatonin."

Part of the second system's job is to protect vision by controlling the dilation and constriction of the pupil. But it also communicates with

parts of the brain that don't receive much input from the visual system. Whereas the visual system sends messages to the thalamus, the cells that perform the eye's light meter hook up with the hypothalamus, an older part of the brain that's involved with basic physiologic functions like eating and sleeping — and the circadian clock.

The retina's primary visual system consists of the rods and cones, which convert light signals into nerve impulses processed in the

**"Brightness information is used in brain systems below the level of consciousness. These systems help synchronize your sleep/wake cycle..."**

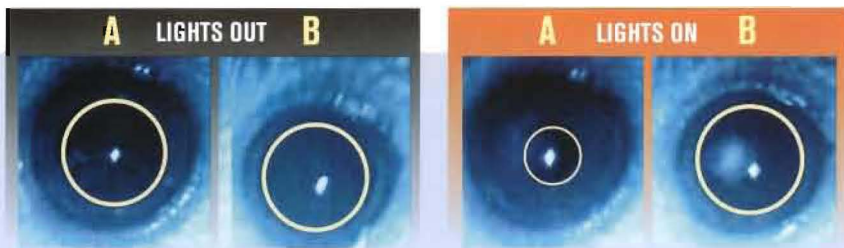
RUSSELL VAN GELDER, MD, PHD

brain. The non-visual system in the retina relies on different kinds of cells called intrinsically photosensitive retinal ganglion cells (ipRG cells). These cells don't appear to be involved in vision, but they are directly light sensitive and play a crucial role in other functions.

Photoreception in the retina begins with light striking a photopigment molecule. Light induces a chemical change in the photopigment, which then is amplified into a signal the photoreceptor cell uses to communicate. Van Gelder is one of several scientists who have worked to identify the photopigments that ipRG cells use.

In a study published last year in the journal *Science*, his team reported that a family of proteins called cryptochromes is important in the pupil's response to light in blind mice.

"First, we showed that blind mice lacking cryptochrome lost about 99 percent of their light sensitivity compared to mice that could see and about 90 percent of their light sensitivity compared to blind



## Measuring the pupillary light responses of mutant mice

Infrared video recordings taken before and during exposure to relatively bright blue light show the responses of “blind” mutant mice—the yellow circles show the outlines of the pupils. Mouse “A” carries two copies of the retinal degeneration (rd) gene, and is visually blind; Mouse “B” carries this gene and is additionally mutant for both cryptochrome genes.

The “lights out” images were taken in darkness under infrared light. After lights are turned on, the pupil constricts in the retinal degenerate mouse, “A,” but not in the retinal degenerate mouse lacking cryptochromes, “B.” Studies in Russell N. Van Gelder’s lab have shown these mice to be only about 5 percent as sensitive to light as the “blind” retinal degenerate mice.

## WATCHING AND WAKING

One of those problems appears to be sleep disturbance. In the February issue of the journal *Ophthalmology*, Van Gelder’s group reported that young people with eye diseases that damage the inner part of the retina and optic nerve are significantly more likely to have sleep disorders than those with other types of eye disease or those with normal vision.

“This study was really an opportunity to go ‘bench to bedside’ and take the results from our animal studies to generate a testable clinical hypothesis,” he says.

His research team studied 25 students, ages 12 to 20, from the Missouri School for the Blind and 12 students with normal sight from the Thomas Jefferson School, a boarding school in suburban St. Louis. The visually impaired students received eye exams and were divided into two groups: one in which visual problems were related to optic nerve disease and another group in which vision loss did not involve the optic nerve.

That’s a key difference, because the ipRG cells form part of the optic nerve and are likely damaged in diseases that affect the nerve. It would be logical to assume that blind children with damage to that part of the retina might have impairments in their non-visual function.



**This watch-like device monitors activity and illumination levels for later download to a computer.**

mice that still could make cryptochrome,” Van Gelder says.

The researchers demonstrated the importance of cryptochrome by exposing blind mice to light. Although the mice could not see, their pupils dilated and constricted in response to light. It took about 10 times more light to make pupils constrict in blind mice with cryptochrome than in mice that could see. In mice without cryptochrome, it took 100 times more light.

In the months following that discovery, Van Gelder and colleagues from the Novartis Gene Research Institute, the Uniformed Services University, and other centers demonstrated that blind mice lacking a second protein called melanopsin were even worse off than those without cryptochrome. They reported in a subsequent issue of *Science* that visually blind mice without melanopsin lost all pupillary responses and had other problems, too.

“These mice not only are blind, they also are circadianly blind, meaning they can’t synchronize their behavior to the day/night transition,” Van Gelder says. “It appears

melanopsin is absolutely required for the regulation of that function.”

The work supports the notion that the eye is responsible for more than just vision, that it regulates circadian rhythms, pupillary responses and hormone secretion, functions that are very important in animals. (In sheep, varying hormonal levels signal the proper breeding time.)

At present, melatonin is the only hormone linked directly to this system; Van Gelder believes others also may interact with the eye’s light meter. The stress hormone cortisol is released by the adrenal glands every morning. Its regulation can be disrupted in mice that carry mutations in so-called clock genes. Van Gelder and collaborator Louis J. Muglia, MD, PhD, associate professor of pediatrics and of molecular biology and pharmacology, are investigating whether mice without melanopsin or cryptochrome experience similar disruptions.

“If you’re blind, you probably think that although you have no vision, everything else should be fine,” Van Gelder says. “But if you lose this second system, you might be at risk for other serious problems.”



"There were no real differences in vision between the two groups," says Van Gelder. "For the most part, the children in both groups were barely able to read the big 'E' on the eye chart, but those with optic nerve disease were 20 times more likely to be pathologically sleepy —as indicated by napping 20 or more minutes per day — than subjects with normal sight, and nine times more likely to have pathologic sleepiness than the kids who were blind from non-optic nerve diseases."

Why? Extrapolating from the animal work, the hypothesis is that children with damage to the optic nerve also might have damaged, or missing, ipRG cells. Animals without those cells don't make melanopsin and cryptochrome and cannot regulate their circadian clocks.

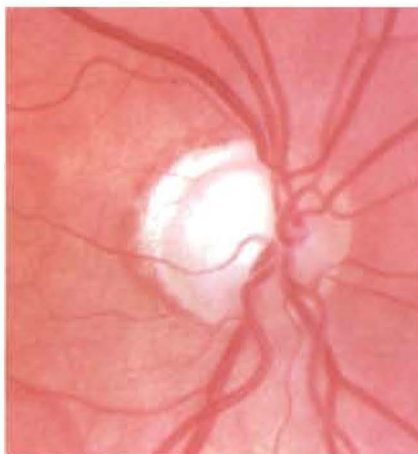
To measure the impact the loss of those cells might have in humans, Van Gelder's team had study subjects wear a device known as an actigraph. Worn like a wristwatch, the actigraph measures every movement a person makes. A sophisticated computer algorithm then takes the movement data and determines whether a subject was awake or asleep, active or inactive. Study subjects wore the actigraphs continuously for two weeks.

Those with optic nerve disease had highly variable wake-up times and also had trouble falling asleep. The children who had optic nerve disease napped, on average, about 28 minutes a day, or eight minutes more than the definition of pathologic sleepiness. Actually, most subjects with optic nerve disease actually napped for almost an hour, but they took naps only every other day.

None of the children in the study had any other conditions that might contribute to sleep disorders,

such as taking sedative drugs, attention-deficit hyperactivity disorder (ADHD), or being treated with Ritalin or other stimulant medications. So, the researchers believe the sleep problems these children experienced were directly related to their eye disease.

"Taken together, these results lead to the unexpected conclusion that eye disease can be a risk factor for sleep disorders, and the health of the optic nerve strongly influences risk," Van Gelder says.



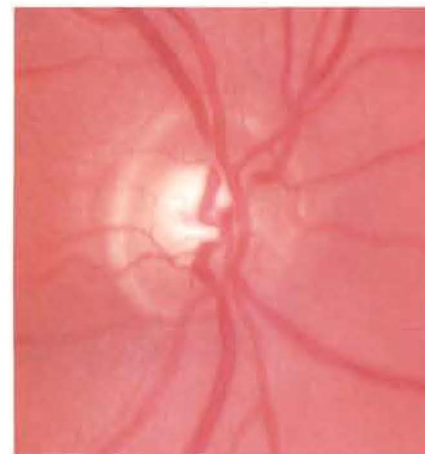
And there may be other risks, too. Heart attack, for example. For reasons not well understood, most heart attacks occur between 4 and 6 o'clock in the morning. Van Gelder says the body's circadian clock somehow interacts with other systems to influence risk. It's possible, he says, that by controlling the release of hormones, this non-visual system in the eye plays a role.

Another group at risk for loss of the non-visual system is patients with the eye disease glaucoma, which affects at least 2 million Americans and is the leading cause of blindness in African Americans. Glaucoma targets retinal ganglion cells like the ones that make melanopsin and cryptochrome. In severe cases, patients can lose 90 to 95 percent

of their retinal ganglion cells. That could affect their ability to sense light with the non-visual system that Van Gelder and colleagues have been studying.

"We need to determine whether patients in the early stages of glaucoma show signs that they're losing this second system," he says. "If so, it's possible they should be treated more aggressively."

In future studies, he hopes to test whether treatment with melatonin will help regulate sleep patterns



**The circadian clock's eye/brain connection is thwarted in patients with optic nerve disease: a glaucoma patient's optic nerve undergoes a slow degeneration, left, compared to a healthy optic nerve, right.**

in children with optic nerve disease. But even before he learns whether it's possible to help these patients synchronize their internal clocks to the outside world, Van Gelder believes it is important for health professionals to begin considering the impact of eye disease on sleep.

"Physicians and other health care professionals should be sensitive to the possibility of daytime sleepiness or insomnia, particularly in patients with severe optic nerve disease," he says. "In the future, your eye doctor might want to make a point of asking you how you've been sleeping." □

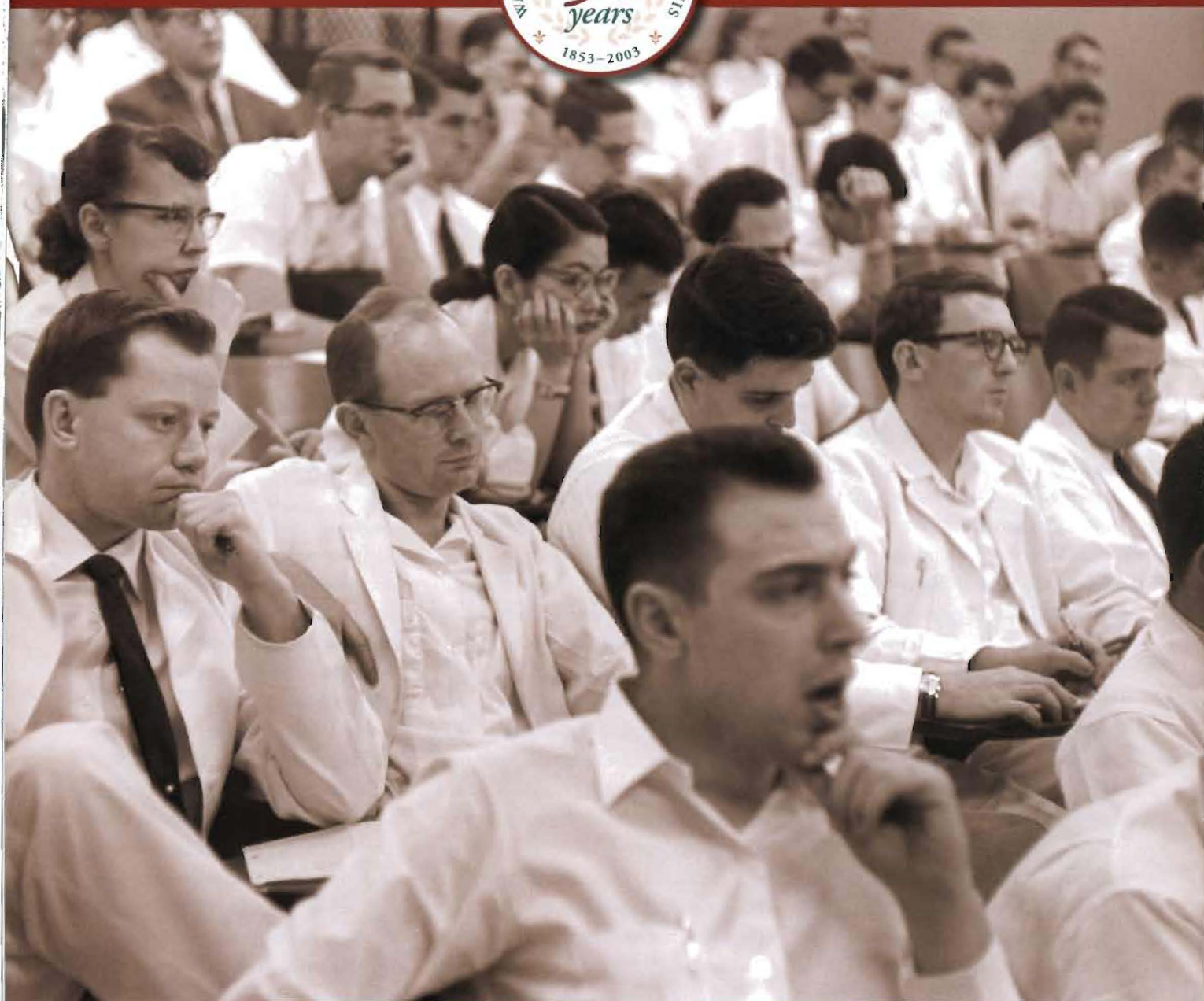


# BY OUR OWN ADMISSION

TREASURING THE PAST



SHAPING THE FUTURE







**For more than 100 years, students have taken their first steps toward a life in medicine at what has become the nation's most selective medical school.**

**BY CANDACE O'CONNOR**

**E**ACH YEAR, THE SCHOOL OF MEDICINE admits 120 first-year students after a months-long winnowing process marked by difficult, often painful, decisions. Of the nearly 4,000 applicants, the Committee on Admissions invites 1,100 or so to campus for interviews, then offers admission to 300-310. Ultimately, the yield from those offers is 1 in 2.6 — making Washington University's medical school the most selective in the nation.

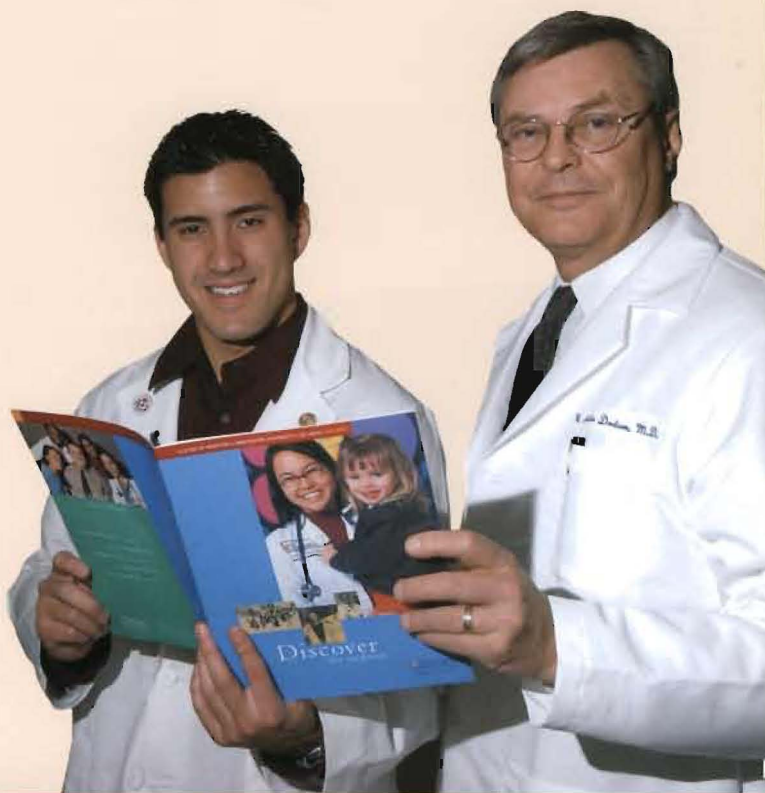
How to make such tough choices? "We run the admissions process as a talent search," says W. Edwin Dodson, MD, committee chairman and associate vice chancellor for admissions. "We are not in the business of rejecting people; we are trying to find the best. By the end of the year, we have found them."

Among the candidates this year is a young man whose stellar achievements indicate just how talented applicants can be. A straight-"A" student from a top eastern school, he has served as an emergency medical technician and a combat medic in the National Guard. He took a year off to teach school. And he and his father belong to the High Peaks Club, having climbed the tallest mountains in 15 states and counting.

In a recent newspaper article, says Dodson, one current student described what it was like to have such accomplished classmates: "I enjoy learning medicine in the company of the poets, painters, engineers, opera singers, philosophers, photographers, biochemists, and dancers who compose our class." Adds Dodson: "And it's true; it's really true."

Yet it has not always been this way throughout the medical school's history. Since 1891, when the St. Louis Medical College affiliated with Washington University and became its new medical department, the School of Medicine has gradually attracted a larger, better educated and more diverse student body.

Diversity in medical student gender and ethnicity has blossomed over the decades (left, circa 1959, and top, today). At right: W. Edwin Dodson, MD, associate vice chancellor for admissions, and first-year student and class president Derek Williams peruse the school's annual Study of Medicine student recruitment brochure.





## Early Days

In September 1891, a *Student Life* writer attacked medical schools for admitting “almost anyone no matter how inferior his previous training.” Every year, the writer said, ill-equipped young doctors “are let loose upon the world... A host of them go about dispensing their poisons — a danger to the community. There ought to be a higher standard of admission to...medical schools, generally.”

Soon, there was. On his whistle-stop survey of American medical schools for the Carnegie Foundation, Abraham Flexner visited the School of Medicine to see how it stacked up. His findings — that the school was “absolutely inadequate in every essential respect” — angered Washington University’s board president, Robert S. Brookings. So Flexner came back a second time to show Brookings just how bad things were, including the admissions process. Later, Flexner wrote:

“We went to the dean’s office, and I asked to see the credentials of the students of the school, for the school pretended to require a flat four-year high-school education of all entering students. It was quickly apparent to Mr. Brookings that no such requirement was being enforced.”

Shortly, Brookings embarked on a top-to-bottom overhaul of the school, while also targeting admissions. Little by little, the requirements increased: from one year of college work in 1910 to two years in 1914, three in 1925, then an undergraduate degree in 1929. Class sizes also burgeoned, from 60 entering students in 1910 to 75 in 1921, 82 in 1925, 109 in 1970 and finally the current 120. Women were admitted in 1918; officially, segregation ended in 1947, though the first black student did not graduate until 1962.



Turn-of-the-last-century instructional technology allowed future physicians to polish their bedside manners *en masse*. Using a unique stethoscope, students of the “Medical Department of Washington University” prepare to deliver a diagnosis as the gallery looks on.



Medical students posed with Dean Robert Moore in 1950: Oscar Zink, John Whitsell, Dean Moore, John Grant, Philip Crossen, James Benepe, Armin Hofsommer Jr., and Joseph Martin.

## The 1940s–50s

Charles Parker, MD 53, recalls the month-long train trip his father — William Parker, registrar for nearly five decades, beginning in 1925 — made each year to interview prospective students. While other members of the Committee on Admissions claimed the east, midwest or south as their recruitment areas, Parker focused on the northwest and southwest, traveling to Montana, Idaho, Washington, Oregon, California and Texas, hitting all the major schools in those states.

“He interviewed virtually every medical student applicant out of the Pacific Northwest who later came here over a period of 20 or 25 years,” says Charles Parker. While the committee voted on each applicant, “I suspect that if members thought they had a particularly good candidate, they were empowered to go ahead on their own. An alumna originally from Montana — the top student in his undergraduate class — told me that, when he was only a junior, he had already taken his MCATs and wanted to get the admissions process over with. He asked my father if he could interview to enter medical school after his senior year — and was accepted on the spot.”

During William Parker’s tenure came the upheaval of the World War II years. Two West Coast students including George Sato, MD 47 — children of internees — were admitted to the medical school, where they worked hard to prove themselves in the face of widespread suspicion of Japanese-Americans. “We never applied for any monetary help at all; we worked at a mental institution from 5 until midnight, then studied



until 3 or 4 a.m. and were up again at 7,” recalls Sato. “We kept our noses as clean as possible, because we thought they were watching us and saying: ‘If they falter, we’re not going to take any more.’”

## The 1960s, 70s and 80s

In 1965, pediatrician John Herweg, MD 45, replaced M. Kenton King as associate dean for student affairs and chairman of the admissions committee, remaining on the job for 25 years. Today, a plaque honoring him hangs outside the School of Medicine admissions office. He



**John Herweg, MD 45**

oversaw vast changes in admissions: an expansion of the admissions committee, including part-time faculty; a shift from interviews on the applicant’s home campus to interviews held at the School of Medicine; an increase in the entering class size, and substantial growth in the applicant pool — from 3,000 to 7,000 in some years.

“Over time we had more young men and women who were academically superb, almost frighteningly bright,” says Herweg. “From that group you would find those who were likewise as exciting as individuals. What has this person done to show they care about people, have leadership skills, can relate to people in a concerned fashion?”

Through these years, admissions became computerized and standardized, with the development of the American Medical College Application Service (AMCAS). Soon medical applicants nationally were filling out AMCAS forms as the first step in the process; AMCAS compiled and verified basic information about each candidate, including grades, activities and Medical College Admission Test (MCAT) scores, and passed this data on to medical schools for further sifting.

A major new program — the Medical Scientist Training Program, developed by Roy Vagelos and his

colleagues — also was introduced during Herweg’s tenure. A seismic shift occurred in another area: the growing number of women in medical classes, a trend encouraged by Herweg whose first wife, the late Janet Herweg, was herself a physician. In the 1970s, Herweg, registrar John Schultz, assistant dean for student affairs John Walters, and assistant dean for minority student affairs Robert Lee, PhD, began targeting minority recruitment.

In a 1981 article, John Schultz summed up the applicant pool: “They make up the best-qualified crop of candidates in history. If we had sufficient openings, two-thirds of them would probably be admitted.”

## 1990s to the Present

The same is true today, says Dodson, who took over admissions in 1990. Still, they grapple with some issues, particularly name recognition. “It’s a huge problem,” he says. “Students from the east or west coasts think we’re one of those ‘George Washington’ places — they don’t know whether we are in Seattle or Washington, DC.”

In the end, they find students like first-year class president Derek Williams, a Vanderbilt graduate who had turned up on short notice to look at the school — and was astonished when Koong-Nah Chung, PhD, associate dean of admissions, took time from her day to show him around. Since then, he has been impressed by the academic and personal qualities of his classmates.

“When a sign-up sheet is posted for neighborhood health clinics, it fills up right away,” he says. “People are here because they want to be doctors, they love helping others, and they think this is the best way in which they can help their community.”

Some students, of course, turn down the medical school, often choosing its coastal competitors. But a number will be back one day as residents or faculty members. “We see these really talented people, and we get a lot of them,” Dodson says. “And the ones we don’t get are never really sure that they shouldn’t, in fact, have come here.” □

## Meet the Class of 2007

- 56 women, 66 men
- 12 under-represented minorities (nine African-Americans, one Puerto Rican, two Mexican-Americans)
- 27 MSTP students
- Average age: 23.02, with a range of 20–27
- Mean GPA of 3.82; mean total MCAT score of 36.5
- All but 18 majored in science or engineering, 41 in biology
- 63 undergraduate colleges and universities represented (Washington University top contributor at 12, Harvard second with eight, UC-Berkeley third with five)
- 33 states and eight foreign countries represented; three of 10 international students are from Nigeria



# COSMETIC *changes*

As society embraces multiethnicity, more people opt for plastic surgery, while researchers study beauty from every angle — and skin tone

BY KIMBERLY LEYDIG

James B. Lowe III, MD, right, and colleagues perform cosmetic surgery, responding to the new century's broader definition of physical beauty.

**O**PEN ANY ISSUE OF *VOGUE*, and it's apparent that the iconic American standard of beauty — the tanned, blue-eyed blonde — now shares the pages with beauties of every race.

“In the 50s, the only ethnic models in fashion magazines were the ones that looked Caucasian but with slightly different skin tones,” says James B. Lowe III, MD, assistant professor of plastic and reconstructive surgery at the School of Medicine. “Today, beauty transcends race and color and is truly dependent on the harmonious relationship of a person's features.”







**Lowe and his colleagues** at the School of Medicine are among a handful of scientists worldwide studying how to preserve ethnicity in plastic surgery procedures. For the past three years, they have been researching aesthetic attractiveness among different ethnic groups.

"Caucasian beauty is well-defined in our culture, so we know what's acceptable," says Lowe, who also is a plastic surgeon at Barnes-Jewish Hospital in St. Louis. "But what's attractive for Caucasians isn't necessarily beautiful for everyone. We ought to know what's acceptable to other ethnic groups."

A recent study conducted by the American Academy of Facial Plastic and Reconstructive Surgery revealed that cosmetic and reconstructive surgery among minorities increased exponentially between 1999 and 2001 — quadrupling among Asian-Americans and African-Americans; tripling among Hispanics.

As the number of ethnic patients seeking plastic surgery continues to rise, understanding how to preserve ethnicity is critical to creating an attractive and natural look.

In Lowe's study, researchers measured the position of facial features — lips, brow lines, cheekbones, noses — in African-Americans, Middle Easterners, Hispanics and Native Americans, along with a breakdown of Asian subcultures into

Chinese, Japanese, Vietnamese and Hawaiian. They also analyzed ethnic models in fashion and other popular magazines to further define the aesthetic for major ethnic groups.

"We can't make someone look 'natural' if we don't know what 'natural' is for them," says Lowe. "Japanese people don't want to look Chinese, and Chinese people don't want to look American. Our goal is to probe the depths of what is aesthetically acceptable and beautiful for each group."

*"Our goal is to probe the depths of what is aesthetically acceptable and beautiful for each group."* James B. Lowe III, MD

Study results help Lowe treat patients like Lucille Harris, a 59-year-old, African-American elementary school teacher who came to the medical center because she wanted to rejuvenate her face.

"I felt like I was 25 inside, but I looked 60 on the outside," she says. "I wanted to look as good as I feel."

Harris had been considering having a face-lift and a brow-lift for years, but was afraid of the pain and had concerns about the cost. In the early 1990s, Harris' mother, then in

her 70s, elected to have a face-lift at the School of Medicine. She was one of the first older African-American women in the region to have facial plastic surgery.

"My mother was my mentor, and she gave me the courage to go forward with it because she loved the results so much," says Harris.

**Skin tone and facial structure** influence the aging process and affect the types of procedures that are most effective for a particular skin type.

African-American and Middle Eastern skin may scar and change color after surface procedures that penetrate the skin, such as laser resurfacing. Light skin shows signs of aging — fine lines and deep wrinkles — much earlier than Hispanic or African-American skin; therefore, procedures that minimize aging, such as face-lifts, brow-lifts, Botox injections and chemical peels, are common with this group.

Lowe says the majority of patients want to improve their appearance while preserving their ethnicity. Most of the time patients bring in a picture of a brother, sister or other person who is considered attractive in their culture.

"The goal," says Lowe, "is to achieve a natural look that brings individual facial features into a harmonious balance while maintaining ethnic traits." □





**Out of the baby swing and into the gym? Not exactly. But babies do need to exercise, and parents make the best “personal trainers.”**

**BY JENNA ZERVAS, PT, MS 95**

## Best baby exercise

**W**HAT DOES A BABY REALLY NEED IN LIFE? Food, clothing, a warm place to sleep, love, exercise. Exercise? Yes, exercise. Not only does it help to build strength and coordination, it's also a fun way for babies and parents to interact.

Physical development, which precedes both cognitive and emotional development, can't take place without exercise. As a physical therapy student at Washington University School of Medicine in St. Louis, I had no idea that this truth would be foundational to my career. Much less did I ever think I would be standing in front of three cameras making a baby exercise video called *Baby Builders*.

I have always enjoyed taking risks. When I graduated from high school, I decided against going to a local Oklahoma college and instead went out of state to the University of Arkansas, where I joined the diving team. I was studying hard as a pre-med major during the day, while throwing my body off a 10-meter platform every morning and night. I loved it.

After suffering a back injury, I decided to change my career plans from cardiovascular surgery to physical therapy. I applied to Washington University simply because I heard it was the best. I still look back with amazement that I was allowed to receive such an incredible education. The faculty instilled in me the importance of parent education, preventative medicine and studying research. The education and support I received at Washington University gave me the confidence to risk making a video focused on exercise for infants.



# e mixes play with productivity

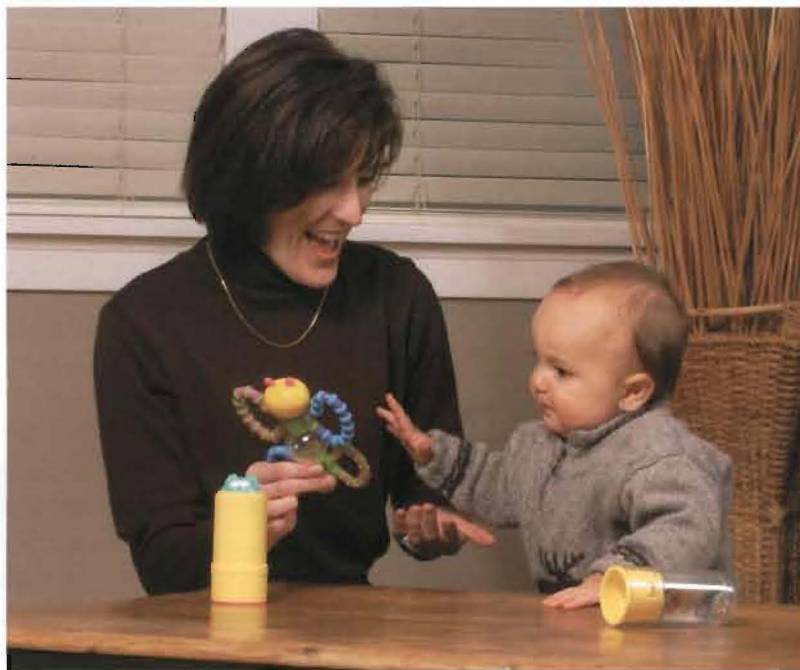
Baby Builders is an infant exercise video program that teaches parents how to be proactive in their child's development. Parents work through four developmental stages — strength, balance, movement and coordination — that stimulate a baby's motor and cognitive development from birth through walking. The exercises and techniques on the video show how to make playtime constructive. In addition, the video educates parents on the progression of development and recommends toys that can enhance cognitive and motor skills at each stage.

My goal with Baby Builders is to meet the needs of both healthy babies and those with special concerns. Not every healthy baby needs our video to develop his or her motor skills, but every baby can benefit from motor skill stimulation. Research overwhelmingly shows that the first three years of life are critical for brain development. As well, early intervention can improve emotional stability and a child's overall ability to learn.

The first year is especially important because as the child learns to move, his or her environment begins to expand, which allows more cognitive, fine motor and visual development to occur. Essentially, the earlier a baby learns to roll, crawl and walk, the earlier cognitive development begins. Unfortunately, many babies are spending more and more time in fancy equipment like motorized swings, bouncers and exisauers that slow down development and may start them on a sedentary path that eventually could lead to childhood obesity.

I also wanted the video to help “at-risk” infants (such as preemies) and those babies who are born with physical challenges such as Down syndrome or cerebral palsy. Many of these babies do not get the help they need early enough. By the time they do see a physical therapist, many have developed bad movement patterns and muscle imbalances that have to be corrected. This not only further impedes their motor skills, but also their cognitive development. Many of these problems could be prevented or significantly reduced by earlier treatment.

Preventing or reducing developmental delays in children were the main reasons I created the Baby Builders program. While working in a pediatric clinic, I was getting frustrated because I felt like so many of the cases of delayed development and clumsiness easily could have been prevented with constructive playtime activities. At the same time, I had many parents of healthy babies asking me what exercises



**Pediatric physical therapist Jenna Zervas, MS 95, at left and above, “works out” with baby Ryker Lott. Through a video she developed, Zervas teaches parents how to maximize infant playtime in order to enhance their baby's cognitive and motor development.**

they should be doing to be proactive in their baby's development. When I couldn't find a video to recommend, I decided to make one. It has been so rewarding to hear the success stories from parents who have used our program. I feel blessed to have been able to make a difference in children's lives. □

*Jenna Zervas, PT, MS 95, lives in Branson MO, with her husband, Chris, and their daughters, Zoe and Elle. To learn more about the Baby Builders program, please visit the web site: [www.babybuilders.net](http://www.babybuilders.net).*



*Highlighting the accomplishments of students, medical graduates, current and former house staff, and faculty who embody the School of Medicine's unbroken tradition of excellence.*



**Stephen T. Joyce,  
MD 84, MPH**

## Health benefits made better

Stephen T. Joyce, MD 84, MPH, is the primary author of the Integrated Health Advocacy Program (IHAP), winner of four national quality awards. Twice

cited for the Best Practices Award by the American Society for Healthcare Human Resource Administration of the American Hospital Association (1999 and 2002), the program also has garnered a Gold Achievement Award from the Worksite Wellness Council of America and the Corporate Health Achievement Award from the American College of Occupational and Environmental Medicine.

Joyce is medical director of the employee benefit plan at Sherman Health in Elgin IL and partner and chief medical advocate of Benefit Performance Associates, LLC, a benefit management support and consulting firm. After graduation from the School of Medicine, he began a general surgery residency at the Cleveland Clinic, but eventually specialized in occupational medicine. He earned a degree in public health from the University of Michigan in 1995 and confesses to being "just a little passionate" about his work.

From a variety of experiences, Joyce became keenly aware of "the importance of multiple factors in health, of the connectedness of all things in our lives to our minds and bodies — whether through stress or happiness, joy or strife." His "broad-minded father" introduced him to yoga, meditation and the value of healthy diet and exercise. Much traveled, Joyce observed Germany's spa approach to health and China's combination of traditional Eastern and Western medicine.

Practicing occupational medicine inevitably led Joyce to confront insurance, legal, governmental and work site issues. Presented with the dilemma that, typically, 5 percent of employees account for 50 percent of health care costs, he designed the medical components

and structure of a program to help chronic health care users reach and maintain their best achievable health. He worked with interdisciplinary professionals to create IHAP, which provides participating patients long-term help with physical, social, psychological, environmental, spiritual and financial components of health. It has reduced costs significantly, but, more importantly, Joyce notes "how utterly dramatic it can be to work with people whose list of problems exceeds your arm's length and who have struggled with those problems for decades, and then watch them turn their entire lives around for the better. Some days you want to go home and cry ... and other days you float on air."

Besides work, the joys of Joyce's life are his wife, Lee, and his sons, Stephen, 15, Liam, 7, and Evan, 5.



**Patrick J. Meehan, MD 82**

## Prevention and public health

When Patrick J. Meehan, MD 82, began work in August 2000 as director of Emergency and Environmental Health Services at the National Center for Environmental Health (NCEH) at the Centers for Disease Control and Prevention (CDC) in Atlanta, he didn't expect that, a year later, he would find himself at "Ground Zero," coordinating the CDC's response to the September 11, 2001 tragedy. New York City's Emergency Management Agency was located in the World Trade Center, and lost its entire operation center. Meehan and his team worked with state and local health departments to respond, bringing medical supplies, monitoring hospitals for signs of bioterrorism and potential disease outbreaks, providing medical care for rescue workers, and monitoring data on environmental contaminants.

Since then, Meehan's responsibilities have increased. In August 2003, he was named deputy director for Program at NCEH, CDC and the Agency



for Toxic Substances and Disease Registry, providing oversight to programmatic and scientific aspects of those entities. He has a lead role in the development of public health response plans for all types of terrorist and non-terrorist emergencies, working with Homeland Security, the FBI and other agencies. He helps oversee the evaluation of health effects of toxic waste sites and the management of programs that address all types of environmental health issues, including the development of systems to monitor environmentally related illnesses and to respond to outbreaks.

Despite the stress of crisis situations, Meehan thrives on his work. He says, "I believe that environmental factors in human health are still very undefined, and I love being part of addressing these important issues ... I went into preventive medicine because I believe (and there are lots of data to support it) that prevention can have a much more positive impact on human health than medical treatment can."

After earning his medical degree from Washington University, Meehan completed a family practice residency at Natividad Medical Center, a University of California affiliate in Salinas, and a preventive medicine residency at the Epidemic Intelligence Service Program at the CDC. Before joining the CDC staff, he spent more than three years each as director of the New Hampshire and Georgia state public health agencies and served as director of the East Metro Health District of Georgia.

Meehan is married to pediatrician Diana Wells, MD, and has "two great kids: Owen, 11, and Isabel, 8."



**Jeffrey L. Greenwald,  
MD, HS 97**

## Honing diagnostics

Jeffrey L. Greenwald, MD, HS 97, maintains that it was "just dumb luck" that made him the first hospitalist at Boston Medical Center in 1999. A graduate of Harvard Medical School, he didn't know about hospitalist careers when he completed his residency in internal medicine at Washington University School of Medicine/Barnes Hospital. He

learned about them "on the interview trail" when he returned from a year in Oxford, England, working at The John Radcliffe Hospital as a "specialist registrar" (senior trainee) in the Intensive Therapy Unit and on the general medicine service.

Being a hospitalist allows him to concentrate on what he most enjoys: inpatient medicine and teaching. Greenwald says, "I love direct patient interaction mixed with the acuity and pace of the diagnostic process. The medical and social issues can be intense, and the opportunities for teaching students and residents are rich and unending."

Teaching the "Introduction to Clinical Medicine" course for first-year students, Greenwald observed their struggles with recording the information they gathered while doing patient histories and physicals (H&P). Available references provided mechanics of "what goes where" but not how to think about the H&P write-up in a logical, useful manner. He "decided to spend a few hours pounding out a guide for them." Over several years, Greenwald refined the draft, taking into account medical student and colleague input, and, in 2003, his book, *Writing a History and Physical*, was published by Hanley and Belfus, a subsidiary of Elsevier. He says the book "tells learners why pieces of information go where they go, not just where to put them, and helps them organize their thinking about the case."

Greenwald's memories of Washington University include "four wonderful undergrad years" (he earned a degree in biology, with honors, in 1990) during which he worked with the Emergency Support Team and Alpha Phi Omega, a service fraternity. He loved singing and acting, and produced shows for the Thurtene Carnival, including the first "South 40" production in the university's history.

Before entering college, Greenwald met and had a "smitten crush on Suzie Bavly" during a trip to Israel for students interested in the arts, but "the love was unrequited." Happily, 8 1/2 years later, while he was at Harvard and she was at the University of Chicago working on her PhD in education policy, they reconnected with different results and married when he finished his residency. Suzanne now works at the Massachusetts Institute of Technology in the Cambridge-MIT Initiative.



# Keeping dreams alive

One alumnus shows his gratitude by giving back to others

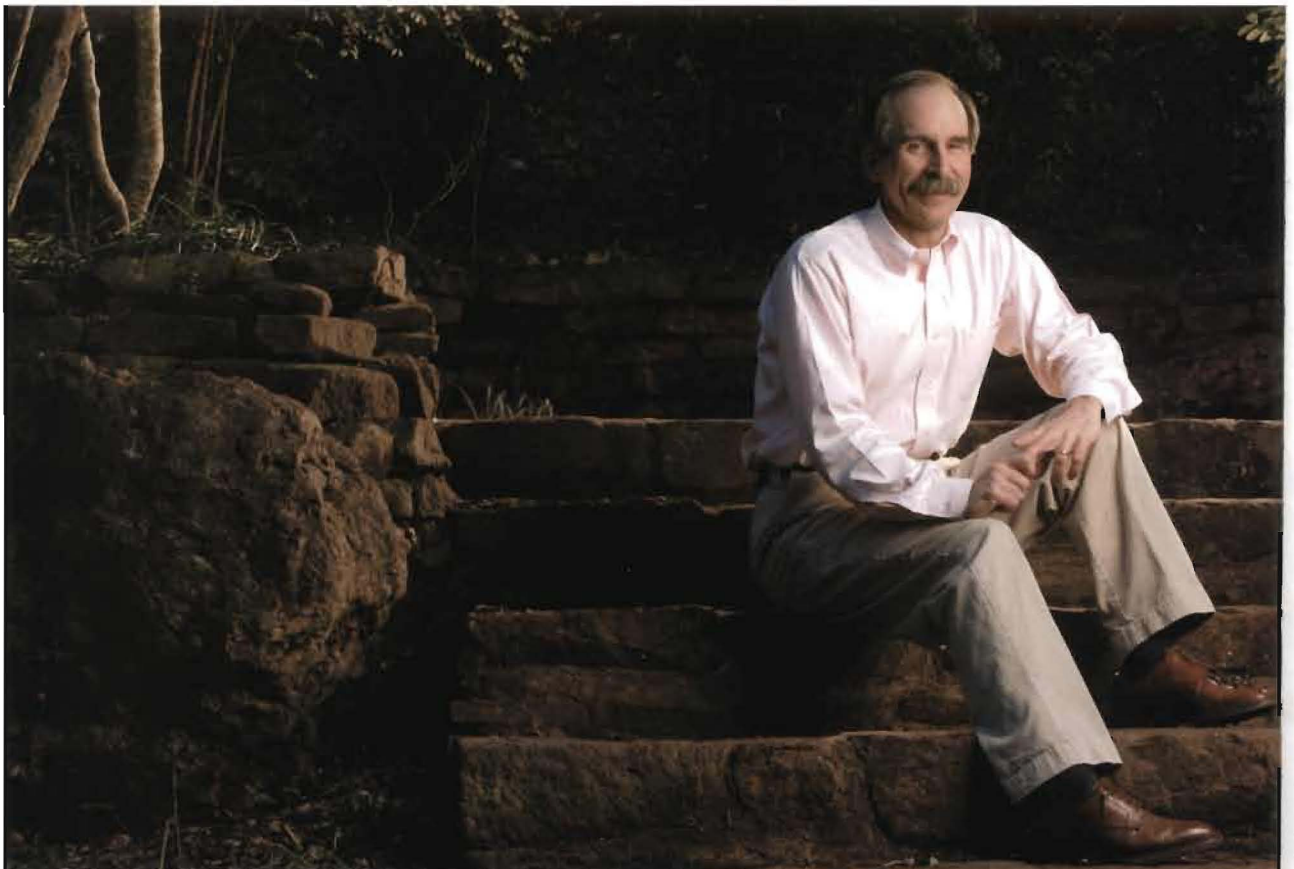
**R**obert Connor, MD 79, almost lost his dream of completing medical school. After his third year, he was completely out of money and had borrowed all he could in student loans. He saw his goal slipping away.

But the School of Medicine found him an interest-free loan from a small bank in Kansas City. "I was very impressed with that; it was a lifesaver for me," says Connor.

To help students in similar situations and in gratitude to the School of Medicine,

Connor has established the Robert Emmet Connor Family Loan Fund. The fund will provide zero-interest loans to deserving medical students who have unforeseen or emergency needs. The Connor family also is providing support for the new Farrell Learning and Teaching Center.

"Washington University treated me so well, and it meant so much to my education," says Connor, who now is chairman, chief executive officer and lab director of Clinical Pathology Laboratory in Austin TX.



Robert Connor, MD 79, at his home in Austin TX.

TAYLOR JONES



Connor grew up with two sisters in a middle-class family in Ossining NY, a suburb of New York City that was home to the infamous Sing Sing Prison. His father worked chartering tankers for small oil companies.

Connor's parents were from the Bronx, and his father loved the New York City area. "He lost his job and had opportunities in other areas, but he never wanted to leave New York," Connor says.

When Connor moved to Boston to attend the Massachusetts Institute of Technology, he had never been more than 50 miles outside the New York area.

"I loved it in Boston," Connor says. "It was a fantastic place to be a young person."

A biology major, Connor was introduced to the emerging field of molecular biology at MIT. Whereas friends studying biology at other colleges were learning about butterflies and plants, Connor was learning molecular biology and biochemistry from Nobel Prize winners. "We were learning things that other people weren't, and I was surrounded by brilliant people," Connor says. "I also learned a lot of humility at MIT."

During his junior year at MIT, Connor decided he wanted to attend medical school. But he wasn't that interested in patient care — he wanted to conduct research. "PhD candidates told me if they had to do it again, they'd be MDs. They said 'They're the ones who get the research grants.'"

MIT faculty advised Connor that many good researchers specialized in pathology and that Washington University School of Medicine had the best pathology department in the United States. Moving to the Midwest was appealing to Connor because he liked a lot of the Midwesterners in his college fraternity.

"I was very happy to get into Washington University and thrilled to go there," says Connor, who wasn't able to visit the school before he arrived for classes.

He was pleasantly surprised by the nurturing administration and support staff, which greatly differed from what he had encountered in high school and college. "It was very, very hard work," Connor says. "But once you got there and it was obvious you were going to make it, Washington University really took care of its students."

While a medical student, Connor became more interested in the practical aspects of pathology, including cancer diagnosis, by conducting breast cancer research with pathologist John S. Meyer, MD.

He chose the University of Minnesota for his residency, where Juan Rosai, MD, a surgical pathologist from Washington University, had become head of the Division of Surgical Pathology. He also trained under Louis "Pepper" Dehner, MD, now chief surgical pathologist at the School of Medicine.

"It was wonderful to be trained by them. They were a great inspiration for me," Connor says.

Connor also fell in love and married his wife, Barbara, during his residency. They now have five children ranging in age from 20 to 11. His oldest child is a junior at Washington University in St. Louis.

During his residency in Minnesota, Connor started moonlighting for Lufkin Medical Laboratory, conducting

"Washington University treated me so well, and it meant so much to my education." ROBERT CONNOR, MD 79

autopsies and evaluating pap and blood smears. At the end of his residency, the private laboratory asked Connor to replace their chief pathologist, who was retiring.

"It was a great opportunity," Connor says.

In 1984, Connor was able to use the experience he gained at Lufkin when he joined Clinical Pathology Laboratory in Austin. He has grown the business into a major regional laboratory. He spends about 60 percent of his time on diagnoses and 40 percent on business matters. It's a perfect combination for him.

"I enjoy working with other physicians, with lab people and with sales staff," Connor says. "I love everything about it."

Although he originally wasn't interested in patient care, Connor says being able to streamline diagnoses and contribute to good patient care is extremely gratifying. And he says he still uses information that he learned at the School of Medicine in operating the laboratory.

"I'm very grateful for all that the School of Medicine taught me — the work ethic, the perfectionism, and the love of knowledge that was instilled in me," Connor says. "Washington University taught me how to be excellent in medicine."



## Class of 1979 continues giving tradition

When the Class of 1979 entered medical school in 1975, about 6,000 applications were received by Washington University School of Medicine. From this pool, the entering class of 128 members was selected, with representatives from more than half of the states and four international students. Twenty-six women were in the Class of 1979. The tuition was \$3,100 and average indebtedness upon graduation of those who borrowed was minimal.

This year, 3,733 applications were received to attend the School of Medicine. The Class of 2007 consists of 122 members, with representatives from 33 of the states and 10 international students. Fifty-six women are in the class. The tuition is \$37,032, and the average debt of medical students who borrow can exceed \$90,000 upon graduation.

To support current students in need of financial assistance and celebrate their 25th reunion, the Class of 1979 has decided to continue the tradition of establishing an endowed class scholarship. Under the leadership of Brent Allen, MD, and Jeffrey



Cichon, MD, class gift chairs, the scholarship effort has raised more than \$40,000 in gifts and pledges. The goal is to bring the total to \$50,000 by the time of reunion.

The tradition of establishing class scholarships in celebration of 25th reunions was initiated by the Class of 1969 under the leadership of C. Garrison Fathman, MD 69, who then challenged the Class of 1970 to continue the effort. The Class of 1979 is the 11th class to follow this tradition. Other classes have also established class scholarships, raising more than \$1.6 million.

During their freshman year of medical school, members from the Class of 1979 compare information and skills in anatomy lab.



### More Than Just a Social Event

#### The Norland Class of '59 Challenge



Charles C. Norland, MD

Charles C. Norland, MD 59, is a familiar face to his classmates — especially at reunion time. Norland has served as social chair for every reunion since his 25th, and once again, he's busy beating the drum for his upcoming 45th. This year, however, he is extending his commitment in the form of a novel challenge.

Norland wants to see every member of his class give to the Annual Fund in honor of Reunion 2004. To that end, he is

matching every percent of participation with a \$100 gift of his own. The math is simple: 100 percent will bring a \$10,000 match, along with a new participation record for class giving!

"We were supported by brilliance when we were here," says Norland. "I'd love to see 100 percent of the class support the school now." Both joy and commitment play an obvious role for someone in his fifth stint as reunion social chair. Anybody taking bets as to Chuck's role for the 50th?





# 2004 Reunion

## WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

As St. Louis celebrates the 1904 World's Fair and the 1804 launch of the Lewis and Clark expedition, Washington University School of Medicine is gearing up for a party of its own in 2004.

On May 6-8, Reunion 2004 will bring MD alumni together to celebrate 10 to 60 years post-graduation. Classes will chat, laugh and learn throughout three days of activities. Campus tours, dinners, the Dean's Luncheon, and other events will provide time for catching up in settings from casual to elegant.

These distinguished alumni will be honored with special recognition at the reunion's awards banquet on Saturday, May 8:

### Alumni Achievement Awards

Danny O. Jacobs, MD 79  
David E. Smith, MD 44

### Alumni/Faculty Awards

James P. Crane, MD,  
former house staff  
Barry A. Siegel, MD 69

### Distinguished Service Awards

Dennis M. Bier, MD,  
former house staff  
William A. Peck, MD,  
former house staff

### Continuing Medical Education

Continuing medical education sessions can help you acquire new knowledge and skills for the delivery of patient care and assist you in translating the results of research into clinical diagnosis and treatment. These sessions will feature alumni and School of Medicine faculty speakers on the latest in research and clinical practice:

Timothy J. Eberlein, MD  
Steven L. Teitelbaum, MD 64  
Katherine I. Uraneck, MD 84  
David M. Holtzman, MD  
Michael J. Kelly, MD 69  
Tiffany L. Tibbs, PhD

Reunion-year alumni can return registration materials by mail or register online at [medicine.wustl.edu/alumni](http://medicine.wustl.edu/alumni).

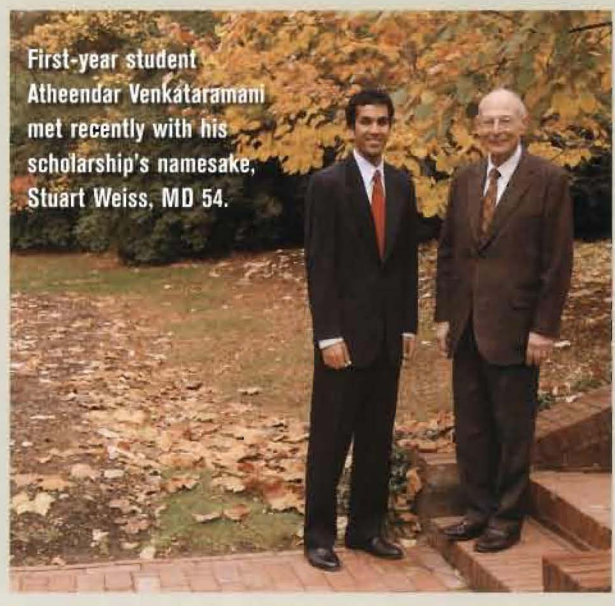
## Distinguished Scholars honored

Continuing a 13-year tradition, the School of Medicine welcomed five medical students into the entering class with four-year Distinguished Alumni Scholarships. Each scholarship is named to honor an alumnus or alumna who has served on the School of Medicine faculty. The Executive Council of the Washington University Medical Center Alumni Association funds a portion of each scholarship and selects alumni to be honored. Administrative funding from the School of Medicine brings each award to full-tuition amount.

The following students are Distinguished Alumni Scholars:

- John Huetsch holds the scholarship named for Walter Benoist, MD 72.
- Vishal Verma is the James Fleshman, MD 80, scholar.
- Kristoff Reid's award was named for Alexis F. Hartmann Jr., MD 51.
- Jennifer Chu is the Clay Semenkovich, MD 81, scholar.
- Atheendar Venkataramani's scholarship honors Stuart Weiss, MD 54.

Many of the students have the opportunity to meet the alumni with whom they are paired. To date, more than 60 medical students have benefited from the Distinguished Alumni Scholarship Program.



First-year student Atheendar Venkataramani met recently with his scholarship's namesake, Stuart Weiss, MD 54.



# Class Notes

**50s** **Marvin E. Levin, MD 51**, had his photograph of Machu Picchu published on the cover of the September 2003 issue of the *Archives of Internal Medicine*. He has previously had photographs published in the *New England Journal of Medicine* and the *Annals of Internal Medicine*. Levin, who lives in St. Louis MO, is still teaching at Washington University School of Medicine, where he is an adjunct professor of medicine.

**Anna Lou Hall, OT 52**, and her husband enjoyed a visit to the Program in Occupational Therapy on Oct. 6, 2003, and were shown around by faculty and a current student. She writes, "Congratulations on your new building complex. I was most impressed!" The Halls live in Lummi Island WA.

**James E. Darnell Jr., MD 55**, was the recipient of a 2002 National Medal of Science at a White House ceremony held on Nov. 6, 2003. A pioneering researcher in the field of gene regulation, he was one of eight scientists to receive the award, the nation's highest honor for lifetime achievement in scientific research. Darnell is Vincent Astor Professor and head of the molecular cell biology laboratory at Rockefeller University in New York. His discoveries include a pathway by which molecular cues on the outside surface of a cell signal the genes in that cell's nucleus to take specific actions. One such signaling route, the "JAK-STAT" (Signal Transducers and Activators of Transcription) pathway, has provided important new information into the biology of specific human cancers, including multiple myeloma and head and neck tumors. Often honored, Darnell also has received the Albert Lasker Award for Special Achievement in Medical Science. A member of the National Academy of Sciences and the Royal Society of London, and an honorary member of the Japanese Biochemical Society, he is the co-author of *General*

*Virology*, now in its fifth edition. He has mentored more than 120 doctoral and postdoctoral students, more than 50 of whom are full professors and laboratory directors at research institutions throughout the world.

**J. Robert Benson, MD 59**, served as 2003 Commodore of the Florida Council of Yacht Clubs, a nonprofit organization representing 40,000 members of 37 yacht clubs throughout Florida.

**60s** **Mordecai P. Blaustein, MD 61**, stepped down from the chairmanship of the Department of Physiology at the University of Maryland School of Medicine on September 15, 2003, after 24 years at the helm. He writes, "My laboratory has expanded during the last few months, and I am delighted to be spending much more time doing the things I enjoy most." Blaustein was honored at several events, including a lecture, reception and dinner in October. The lecturer, **Mark T. Nelson, PhD 80**, was one of Blaustein's students when he was on the faculty at Washington University. Nelson moved with Blaustein to the University of Maryland in 1979 and is now professor and chair of the Department of Pharmacology at the University of Vermont. Blaustein notes, "I was especially honored by the presence, at the lecture and dinner, of two of my mentors with past Washington University affiliations ... one was Dr. Daniel C. Tosteson, Harvard Medical School Dean Emeritus, with whom I did research when he was an associate professor of physiology at Washington University and I was a medical student. The second was Carlton C. (Cuy) Hunt, professor and chairman emeritus of the Department of Physiology and Biophysics at Washington University; I was an associate professor and then professor in his department (one of 'Cuy's boys,' 1968-1979)."

**W. Allan Walker, MD 63**, is serving as supervisor and principal investigator of a three-year, \$300,000 Bristol-Myers Squibb/Mead Johnson Unrestricted Nutrition Research Grant at Harvard University. Walker is Conrad Taft Professor of Nutrition, professor of pediatrics, and director of the Harvard Medical School Division of Nutrition. He is also chief of the combined Program in Pediatric Gastroenterology and Nutrition at Massachusetts General Hospital. Funds from the grant will support translational research, including pilot feasibility studies to test basic research findings in clinical studies. In addition, it will support development of new ways to increase exposure among medical students to the role of nutrition in health through summer nutrition research fellowships and positions in clinical settings such as obesity clinics.

**David H. Hussey, MD 64**, served as chairman of the Board of Directors of the Radiological Society of North America during 2003. A member of the board since 1998, Hussey is clinical professor in the Department of Radiation Oncology at the University of Texas Health Science Center in San Antonio. Previously he had been director of the division of radiation oncology at the University of Iowa College of Medicine. He is a trustee of the American Board of Radiology, heading the Examination Committee for Radiation Oncology, and a past president of the American Radium Society, the American Society for Therapeutic Radiology and Oncology, and the Gilbert H. Fletcher Society.

**Brian H. Gross, MD 65**, of Winchester MA, writes that he is "working about half-time doing anesthesia in a Boston-area fertility clinic. For three or four hours weekly I am volunteering at Winchester Hospital as a messenger-volunteer ... pushing patients in wheelchairs, delivering messages, lab results, specimens, drugs and supplies, etc."



**70s** **Linda Russell Moran, PT 71,** has been working in the field of therapeutic horseback riding for more than 15 years. She writes, "Since moving to Greenville NC, eight years ago, I have been running a program—just this fall we moved into our own facility and expanded to a full-time TR operation."

**Leslie M. Brandwin, MD, HS 76,** is medical director of Greenspring Village Medical Center in Virginia. The center staff consists of five physicians and three nurse practitioners and/or nurse specialists in the sole practice of geriatrics.

**Albert Hammerman, MD 76,** is teaching a spring semester undergraduate course, "Medical Imaging of the Human Body," in the Department of Biology at Washington University's University College. A radiologist in private practice in the St. Louis area, Hammerman has taught the course for four years. It is intended to give both science and non-science students a practical understanding of human anatomy and of some of the current diagnostic imaging approaches used in modern health care.

**Roger M. Perlmutter, MD, PhD 79,** has been named chairman of the board of directors of the Institute for Systems Biology (ISB), a non-profit research institute in Seattle dedicated to the study and application of systems biology. Systems biology combines biology, technology and computer modeling to study biological information (DNA, RNA, proteins, protein interactions, biomolecules, cells, tissues, etc.) with the goal of identifying strategies for predicting and preventing diseases such as cancer, arthritis and AIDS. Perlmutter has a longstanding relationship with ISB and has been a member of the board since the Institute's inception in January 2000. He currently serves as the executive vice president, Research and Development, at Amgen Inc., where

he oversees the company's worldwide research and development operations. Before joining Amgen, Perlmutter was an executive vice president at Merck Research Laboratories. From 1984 to 1997 he was a faculty member in the Departments of Medicine and Biochemistry, and later professor and chairman of the Department of Immunology at the University of Washington, where he continues as an affiliate professor. He was also an investigator of the Howard Hughes Medical Institute at the University of Washington during this period. He is a past president of the American Association of Immunologists and a Fellow of the American Academy of Arts and Sciences.

**80s** **Alice Ann Gricoski-Dachowski, MD 81,** has been invited to serve on the Board of Trustees of the University of Rio Grande, in Rio Grande OH, where she received an honorary master's degree of public service on October 11, 2003. She lives in Gallipolis OH.

**John G. Saint, MD 80, HS,** and **Casey C. Younkin, MD 83, HS 87,** have joined the faculty at Southern Illinois University School of Medicine as associate professors of obstetrics and gynecology. Younkin also serves as division chief for the second general obstetrics and gynecology division at the school. Before joining SIU, they were part of the Sangamon Obstetricians and Gynecologists medical group in Springfield IL, which has now dissolved. Both Saint and Younkin completed their residencies at Barnes Hospital, and Younkin was on the faculty at Washington University School of Medicine in 1987-1988.

**Steven Lentz, MD, PhD 85,** has been named Henry Hamilton Professor of Hematology at the University of Iowa College of Medicine. Lentz has been on the internal medicine faculty there since 1992. He studies vascular biology

and treats patients with hemophilia or blood-clotting problems and those with blood-related cancers through the university's Holden Comprehensive Cancer Center. He is also a physician with Iowa City's Veterans Affairs Medical Center.

**90s** **Renee Hazlewood, PT 91,** recently acquired certification as a wound specialist by the American Academy of Wound Management in Washington DC. She and her husband, Mike, live in Martin TN, with their three children.

**Lisa Pollard Atkins, OT 93,** a specialist in hand therapy and pediatrics, is working at Miami Children's Hospital. She is married to a pilot, Nigel Atkins, and they welcomed their first child, a son named Alex, on Dec. 1, 2003. The family lives in Homestead FL.

**Darrell Kotton, MD 94,** is the proud father of David Kotton, born May 20, 2003. "Mom is Camille Kotton and big brother is Benjamin Kotton, who was born September 22, 2000."

**Scott A. Staples, MD 98,** was selected by the American Academy of Family Physicians Foundation (AAFP/F) as a recipient of the 2003 Pfizer Teacher Development Award, given to honor his scholastic achievement, leadership qualities and ongoing dedication to education in the field of family medicine. The \$2,000 award is supported by Pfizer U.S. Pharmaceuticals Group, and provides funding for recipients to attend the American Academy of Family Physicians' Annual Scientific Assembly, the AAFP's largest meeting for continuing medical education. Staples was recognized during the assembly's opening ceremony on Oct. 2, 2003, in New Orleans. A graduate of the Duluth Family Practice Program Residency, Staples practices in Hutchinson MN, and teaches family medicine part-time in the Rural Physician Associate Program at the University of Minnesota School of Medicine.



# Class Notes

## IN MEMORY

**Adeline Emma Parker Box, NU 36**, died in Silverdale WA, on Sept. 17, 2003, at age 88. For many years she had lived in Dexter MI, working as a nurse at the University of Michigan Hospitals in Ann Arbor, where she cared for post-cardiac surgery patients. She is survived by two daughters, both of whom are nurses, and two brothers.

**Margaret McLaughlin, NU 37**, died May 16, 2003, in Chapel Hill NC.

**Daniel Anders Glomset, MD, HS 39**, died on November 17, 2003. He had practiced internal medicine in Des Moines IA.

**Virginia Cantrill Cline, NU 43**, died at the age of 84 on August 23, 2003, in Greenville IL. Survivors include two daughters, Nancy Labounty and Virginia Phillips.

**James Fredrick Tagge, MD 43**, died November 28, 2003, at the age of 83. A retired internist, he practiced in Enid OK, for 40 years and was the grandson of one of Enid's pioneer physicians. Tagge served two years in the U.S. Army Medical Corps during World War II. He was a Fellow of the American College of Physicians and a past-president of the Garfield County Medical Society. Among his survivors are his wife, Betty Stieg Tagge, one daughter, Carol Adams, and two sons, Dale and Fred Tagge.

**Robert W. Tichenor, MD 43**, died of congestive heart failure on December 17, 2003, in St. Louis MO. He was 89. During World War II he served in the Army, then practiced family medicine in St. Louis for nearly 40 years. In addition to his undergraduate and medical degrees from Washington University, Tichenor earned a bachelor's

degree from the St. Louis College of Pharmacy. He was on the founding medical staff of St. Joseph's Hospital in Kirkwood and was a past president of the local chapter of the American Academy of Family Physicians. Apart from medicine, Tichenor was known as a breeder and judge of German shepherd dogs and was a Roll of Honor member of the German Shepherd Dog Club of America. He is survived by two sons, a sister and other relatives.

**Gerald E. Hughes, MD 44**, died September 10, 2003, at the age of 82. He had been a pediatrician in Columbia MO. Survivors include his wife, Mary Ellen Hughes.

**Henry H. Hutchinson, MD 44**, died December 10, 2003, in Montgomery AL, where he had practiced internal medicine. Among his survivors is a son, Henry H. Hutchinson III, and a grandson, also his namesake, who will attend Washington University in St. Louis in 2004.

**Martha June Stevens, NU 46**, of Alpharetta GA, died on November 17, 2003. She was the widow of the Rev. Charles L. Stevens; together they had served the United Church of Christ for more than 40 years. During World War II she served in the Nursing Corps. Two sons survive; one son preceded her in death.

**James C. Mason, MD 51**, died October 8, 2003, in Seattle, where he practiced child and general psychiatry until his retirement. He was a graduate of the U.S. Naval Academy, Class of 1944, and served in World War II on the destroyer *USS Terry*, which sustained severe damage from enemy fire off the coast of Iwo Jima. His horror at so many lives lost led him to enter medical school. From 1954 to 1968 he practiced pediatrics in Bellingham WA, before training in psychiatry at the University of Washington. He was an ardent outdoorsman who enjoyed sailing, skiing, backpacking and kayaking. His survivors include his



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wife, Claire Tangvald, two sons and other relatives.

**William B. Hutchinson, MD 56**, a radiologist, died August 17, 2003, in St. Louis.

**Thelma Ruth Cox Teachenor, NU 58**, died in Decatur AL, on September 19, 2003, at the age of 88. She earned both BS and MS degrees in nursing from Washington University and an MS degree in education from St. Louis University. A practicing nurse for almost 50 years in Evansville IN, and St. Louis MO, she worked at Barnes Hospital and was on the faculty of Barnes Hospital School of Nursing. She retired in 1978 from the position of director of the Department of Nursing at Forest Park Community College in St. Louis. She held numerous offices in state and local professional organizations during her career and was listed in *Who's Who in the Midwest*. Her survivors include a daughter, **Ellen Montgomery, NU 66**, and two grandchildren.

**Ray J. Wolff, MD 58**, an obstetrician and gynecologist in the St. Louis area for more than 40 years, died November 20, 2003, of pneumonia. He was 71. Following graduation from medical school, he was chief resident at Jewish Hospital and then served in the Air Force for two years. He was affiliated with Jewish and DePaul hospitals and volunteered delivering babies of unwed mothers at the old Booth Memorial Hospital. After retiring from private practice five years ago, Wolff worked on pharmacology research. While earning his undergraduate degree at Dartmouth College, he played violin and viola with the Vermont Symphony Orchestra to earn money. He was a Fellow of the American College of Obstetrics and Gynecology and served on the ethics committee of the St. Louis Metropolitan Medical Society. Among his survivors are his wife, **Dolores P. Wolff, MD 59**, two sons and two daughters.

**Letty Lane Gaier, NU 60**, of Coffeyville KS, died of cancer May 18, 2003, at the age of 82. During her nursing career she had been director of nursing at the Labette County Medical Center in Parsons KS, director of the LPN School at Neosho County Community College in Chanute KS, a nursing instructor at the Mount Carmel School of Nursing in Pittsburg KS, and director of the associate degree nursing program at Labette Community College. For two years she held the position of supervisor of health education for the state of Kansas, and she was a past president of the State Board of Nursing. Survivors include her husband, Ralph W. Gaier, two sons and a daughter.

**Marian M. Holtgrewe, NU 67**, died in St. Louis on December 19, 2003, at the age of 77. She had worked at Saint Louis University for more than 30 years, and when she retired was an associate professor and chairperson of the Department of Community Health Nursing and Nursing Service Administration. She continued her education throughout her career, having earned an RN in the 1940s from Case Western Reserve University, bachelor's and master's degrees in nursing in 1967 and 1968 from Washington University, and a PhD from St. Louis University in 1981, soon after she had become a grandmother. She was recognized as a leader in nursing in the field of mental retardation and developmental disabilities. Survivors include three daughters and three grandchildren.

**Irene Powers, NU 67**, of Jerseyville IL, died November 1, 2002. She had retired in 1995 after 20 years as professor of nursing at Western Kentucky University.

**Thomas Frank, MD 84**, died July 10, 2002. He had been medical director of Myriad Genetic Laboratories in Salt Lake City UT. He was known for his research on breast and ovarian cancer.

## FACULTY

**Theodore Reich, MD, HS 69**, the Samuel and Mae S. Ludwig Professor of Psychiatry and professor of genetics at the School of Medicine, died in St. Louis on December 25, 2003, after suffering from laryngeal cancer. He was 65. He was considered a leader in the field of psychiatric genetics and recently had led an international team of geneticists attempting to uncover the genetic basis of depression. His research also contributed to important discoveries in the genetic aspects and treatment of schizophrenia, bipolar disorder, alcoholism and other illnesses. He had published more than 200 scientific articles. A native of Canada, Reich earned bachelor's and medical degrees from McGill University there. After an internship at Jewish General Hospital in Montreal, he spent a year as general medical officer for the Thomas Dooley Foundation in Nepal. In 1965, he became a resident in psychiatry at Washington University. He joined the faculty after completing a postdoctoral fellowship in genetics at the University of Edinburgh. Reich served as psychiatrist-in-chief at The Jewish Hospital of St. Louis and, after its merger with Barnes Hospital, as the director of the Barnes-Jewish Psychiatry Clinic. He was a member of the American Association for the Advancement of Science, the American Society of Human Genetics, and the Society of Biological Psychiatry. Reich was a past president of the International Society of Psychiatric Genetics, which gave him its Lifetime Achievement Award in 1998. Survivors include his wife, Wendy Reich, PhD, a research professor of child psychiatry at Washington University; a son, Jonathan, and a daughter, Sarah. Memorial contributions may be made to the Department of Psychiatry at Washington University School of Medicine.



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75	7.1%	75 & 75	6.3%
80	8.0%	80 & 80	6.9%
90	11.3%	85 & 85	7.9%

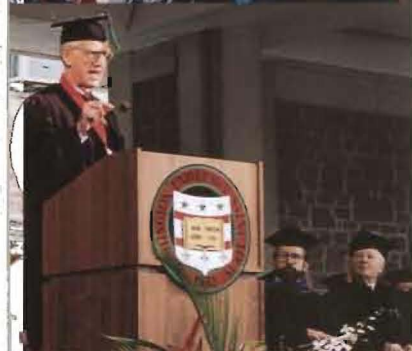
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**One last look** A wintry view south from the Euclid Garage (formerly Wayco) looks toward the construction site of the School of Medicine's new Farrell Learning and Teaching Center, scheduled for completion in the summer of 2005. To view progress on the new facility, see <http://medicine.wustl.edu/ltc/>. The multilevel Euclid Garage, built in 1959, was closed for good on March 1, 2004, to make way for new development at the medical center.





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**Look inside** The brain's physiology—blood flow and metabolism—conveyed through positron emission tomography (PET) is studied by researchers such as Mark A. Mintun, MD (front cover). One of the first human PET scanners (above), developed at Washington University School of Medicine, is on display this spring at the St. Louis Science Center. In addition, the grant that funded the development of PET has become the longest continuously renewed National Institutes of Health grant held at the School of Medicine (see page 3).



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