Outlook
SUMMER 2006

Washington University in St. Louis
SCHOOL OF MEDICINE

STUDENT IMPACT
TARGETING HIV
STERILE FACILITY

Beating cancer and building families
Springtime colors  Four years on: The vivid regalia donned by members of the Class of 2006 for their Commencement Recognition Ceremony stands in stark contrast to the white coats they received when they began their medical school journey. The School of Medicine conferred 119 degrees on May 19: Eighty-eight students received the MD degree, 22 received the MD/PhD degree, and nine received the MD/MA degree.
Features

8 Cancer Patient to Parent  BY CANDACE O’CONNOR
Fertility-preservation specialists at the Infertility and Reproductive Medicine Center work with young cancer patients to help them realize their dreams of parenthood.

12 As Clean As It Gets  BY GWEN ERICSON
The Good Manufacturing Practice facility at the School of Medicine maintains a sterile environment so that patients can receive contaminant-free, lifesaving products.

16 What’s Next for HIV  BY MICHAEL PURDY
Researchers investigate the use of new drugs to target the HIV virus at various stages of its attack on the body’s immune cells, slowing its spread and prolonging lives.

21 Outside Looking In  BY BETH MILLER
Medical students find fresh ways to connect with the greater St. Louis community — making a lasting impact on young and old alike — while learning about themselves.
Gregory A. Storch, MD, has been named the first Ruth L. Siteman Professor of Pediatrics and the director of the division of infectious diseases in the Department of Pediatrics. The endowed professorship, given by Alvin J. and Ruth Siteman, supports leadership in pediatric infectious diseases.

Storch, who also is a professor of medicine and of molecular microbiology, will continue in his roles as director of the division of laboratory medicine and of the virology and bacteriology laboratories. He also is medical director of Project ARK (AIDS/HIV Resources and Knowledge), a St. Louis program for mothers and children with HIV/AIDS.

Internationally recognized as an expert in virology and the molecular identification of new and emerging pathogens, his research interests are in developing molecular diagnostic tests for viral infections and other unconventional pathogens, as well as in pediatric HIV.

Education event Third-year medical student Douglas Moekel and Teresa L. Deshields, PhD, manager of Psychoncology Services at the Siteman Cancer Center, discuss Moekel’s poster presentation on cardiac auscultation at Medical Education Day held in May. At the event, three faculty members were presented with Samuel R. Goldstein Leadership Awards in Medical Student Education: Leonard B. Bacharier, MD, associate professor of pediatrics and instructor in medicine, Nigar Kirmani, MD, associate professor of medicine, and Allyson R. Zazulla, MD, assistant professor of neurology and of radiology.

Translating research into business was the subject of “21st Century Science: Foundation for Innovation,” a two-day symposium held in May at Washington University in St. Louis.

The event was designed to encourage a culture of entrepreneurship by bringing together people interested in developing new enterprises in Missouri based on research discoveries. Missouri Gov. Matt Blunt addressed attendees at the event, which also included sessions on scientific entrepreneurship, technology transfer and venture capital led by St. Louis business and academic leaders.

Tours of the Medical Campus, the Genome Sequencing Center, the Center of Research, Technology and Entrepreneurial Exchange (CORTEX) and the Center for Emerging Technologies also were offered.

Key speaker was Barry J. Marshall, MB, BS, joint recipient, with colleague J. Robin Warren, MB, BS, of the 2005 Nobel Prize in physiology or medicine. The Australians were honored for their work showing that stomach ulcers are caused by bacteria, not stress or lifestyle. When animal testing of his theory proved inconclusive, Marshall infected himself with H. pylori to prove it was the cause of ulcers and gastritis. As a result of his work, H. pylori is now recognized as a major factor in the development of stomach cancer.

Nobelist Barry J. Marshall discusses his groundbreaking research on mechanisms that cause ulcers and his experiences as a biotechnology entrepreneur.

Conference examines issues surrounding tech transfer
Powers named Charlotte and Paul Hagemann Professor of Neurology

WILLIAM J. POWERS, MD, has been named the Charlotte and Paul Hagemann Professor of Neurology. Powers is head of the cerebrovascular disease section of the neurology department and a professor of neurological surgery and of radiology.

"Bill has been a world leader in trying to understand how normal regulation of brain blood flow and metabolism is disrupted by conditions such as stroke and Alzheimer's disease," says David M. Holtzman, MD, the Andrew B. and Gretchen P. Jones Professor and head of the Department of Neurology.

In addition to his work on stroke and dementia in adults, Powers' studies have included efforts to identify the ways in which the infant brain uses oxygen and glucose. Improved understanding could provide significant help to efforts to prevent brain damage during the birthing process and early in life.

Powers also is leading an investigation of whether abnormalities in the use of oxygen in adult brains can contribute to the degeneration that occurs in Parkinson's disease and Huntington's disease. If so, drugs that correct those abnormalities might be useful in slowing the progression of the diseases.

ETHNOBOTANY

Non-regulated herbal remedies pose notable risks

 Ginsengs, echinacea and ephedras, oh my! These herbs sound innocuous enough. However, according to Memory Elvin-Lewis, PhD, professor of microbiology and ethno botany in biomedicine in Arts & Sciences, Americans are unaware of the dangers inherent in these herbal supplements.

The American population believes that it is sufficiently educated, whether formally or through Internet resources, to self-prescribe herbal remedies and supplements, she says, but this could be dangerous.

Herbs are not effectively regulated by the Food and Drug Administration (FDA), says Elvin-Lewis, so there are multiple issues including adulterations, pharmaceutical additions, pesticides and pathogenic microorganisms that might alter the safety and efficacy of the herbs available for purchase.


There have been documented cases of clinical poisoning in North America from herbal or ethnic remedies that included mercury or lead. Additionally, it is possible to find unlabelled pharmaceuticals comingling with herbal remedies.

Furthermore, there are concerns about the sterility of herbal remedies in the United States. "It is the nature of herbal products not to be sterile," says Elvin-Lewis, "and if storage is improper or prolonged, certain organisms may multiply or elicit toxins to dangerous levels."

Even timelier for Americans in the wake of hurricane Katrina is the fact that in the face of natural disasters, adulteration of herbs with other plant contaminants becomes more common due to a decreased supply of the original herb.

"We must understand safety in herbal remedies on a global scale," she warns.

Currently, the herbal remedy trade attempts to self-regulate but has no power to enforce stringent guidelines or punishments on dealers who do not follow safety requirements. Additionally, labels of herbal remedies are not standardized.

Another concern is that Americans may underreport herbal use to their physicians, thus producing negative interactions with prescription drugs and other herbal remedies.

"Being aware of the possible side effects and cross-reactivities of each supplement is of paramount importance," Elvin-Lewis says, "but it is only the first step in creating a safe and effective U.S. herbal trade."

Memory Elvin-Lewis inspects a kava plant in the Goldfarb Greenhouse.
Medical school among nation's best

Washington University School of Medicine ranks fourth overall among research-oriented medical schools and continues to rank No. 1 in the nation in selectivity, based on both college grade-point averages and MCAT scores, according to the 2006 U.S. News & World Report rankings of graduate and professional programs.

School of Medicine academic areas also were ranked: immunology/infectious diseases and molecular biology both tied for fifth; genetics/genomics/bioinformatics and microbiology both tied for sixth; pediatrics remained at sixth; internal medicine ranked seventh; cell biology ninth; and drug and alcohol abuse and women's health both ranked 10th.

For the first time, biological sciences (biology in Arts & Sciences, biomedical sciences in the School of Medicine and biomedical engineering) cracked the top 10, ranking in a three-way tie for 9th.

BioMed 21 professors installed

The first two endowed professorships created as a component of the university's BioMed 21 initiative have been filled. Gary D. Stormo, PhD, professor of genetics, is the Joseph Erlanger Professor, and Clay F. Semenovitch, MD, professor of medicine, is the Herbert S. Gasser Professor.

Endowments for the two chairs, and for two additional BioMed 21 chairs yet to be filled, came from John F. McDonnell, vice chairman of the Board of Trustees, and from the JSM Charitable Trust Foundation.

Stormo, director of the computational biology graduate program, specializes in analyzing how genes are turned on and off in various types of normal and diseased cells. His work, which centers on computerized analyses of DNA sequences, exemplifies BioMed 21's commitment to individuals who work at the interface of the physical/computational sciences and biomedicine.

Semenovitch, chief of the division of endocrinology, metabolism and lipid research, studies connections among diabetes, obesity, insulin resistance and heart disease. He has active programs in both basic and clinical research that reflect BioMed 21's goal of putting insights gained in basic studies to use in clinical settings.

The new chairs are named for faculty members who won the Nobel Prize in physiology or medicine in 1944 for their studies of the different functions of single nerve fibers. Erlanger was chair of the physiology department at the medical school; Gasser was a former student of Erlanger's who came to join him on the faculty and later became head of the pharmacology department.

Washington University in St. Louis Chancellor Mark S. Wrighton, Clay F. Semenovitch, MD, John F. McDonnell, Gary D. Stormo, PhD, and Larry J. Shapiro, MD, executive vice chancellor for medical affairs and dean of the School of Medicine.
Smokers seven times more likely to receive jolt from heart devices

Patients with heart disease who don't take their doctor's advice to quit smoking may get a "shocking" reminder. A new study has found that heart patients who had implanted defibrillators and also smoked were seven times more likely to have the devices jolt their hearts back into normal rhythm than non-smokers with the devices. When the devices fire, it can feel like a thump or even a strong kick to the chest.

"If having heart disease isn't enough to make patients want to stop smoking," says J. Mauricio Sánchez, MD, lead author of the study, "the evidence from our study should definitely add a strong argument to quit."

The research was published in the April 2006 issue of Heart Rhythm.

Implantable cardioverter-defibrillators (ICDs) are self-contained units placed within the chest to monitor heart rhythms and deliver electrical charges directly to heart muscle to correct abnormal rhythms.

"ICDs are implanted in patients at high risk for sudden cardiac death," continues Sánchez, a cardiology fellow in the cardiovascular division. "The devices shock the heart out of dangerous rhythms within seconds after they detect them."

The study looked at 105 patients with heart disease who had ICDs implanted, following them for an average of two years. During this time, more than a third of the patients who smoked received an electrical discharge from their ICDs to correct a potentially life-threatening heart rhythm. Former smokers (those who had stopped smoking at least a month before the study began) still had a fairly high occurrence of ICD discharge; about a quarter of these patients were shocked by the devices. In contrast, among patients who had never smoked, only about 6 percent received an ICD discharge.

Analysis showed that current smoking generated a seven-fold increased risk for ICD discharge, while having formerly smoked was linked to a five-and-a-half-fold increased risk. The risk of ICD discharge associated with smoking was greater than the risk associated with other factors such as age, diabetes, lung disease or use of ACE inhibitors or beta-blockers.

According to Sánchez, smoking can harm the heart in several ways. Nicotine increases the amount of adrenaline in the body, which can lead to blood vessel constriction and decreased blood flow to the heart. Smoking also increases blood clotting factors, which can raise the chance of blood vessel blockage. In addition, the hemoglobin in smokers' blood has carbon monoxide attached to it and can't carry as much oxygen. Both smokers and former smokers have more atherosclerosis in the blood vessels of the heart, which lowers the oxygen level.

Any of these factors can result in an imbalance of oxygen supply compared to oxygen needed by the heart. This oxygen deficiency predisposes the heart to dangerous rhythms.
Jean Schaffer, MD, has been honored with a Clinical Scientists Award in Translational Research from the Burroughs Wellcome Fund to support her work on understanding how diabetes contributes to heart failure.

Schaffer, associate professor of medicine and of molecular biology and pharmacology, was one of only 10 physician-scientists to receive this year's award, which provides each recipient with $750,000 over five years for research that has an impact on patient care.

According to Schaffer, recently named associate director of the new Diabetes Research Training Center, diabetes increases the risk of heart failure even in the absence of heart valve abnormalities, high blood pressure or significant coronary artery disease. Evidence shows that high levels of fats in the blood and insulin resistance — factors commonly seen in diabetic patients — lead to an unusually large absorption of fat by the cells in heart muscle. Schaffer and her laboratory team will use the Burroughs Wellcome Fund award to support a project exploring the toxic effects of excessive fat uptake by heart muscle in diabetes.

Valente leads development of national adult hearing-aid fitting guidelines

Audiologists nationwide will soon have new guidelines to follow when fitting hearing aids to adults, thanks to the work of Michael Valente, PhD, professor of clinical otolaryngology.

Valente, director of the adult audiology program, recently chaired a task force for the American Academy of Audiology that developed a new national guideline on how hearing aids should be fitted for adults. It is the first national guideline to use evidence-based principles to support the recommendations, he says.

"The method, procedures and protocol the task force developed are based on the way hearing aids have been fitted at the School of Medicine for the past decade," Valente says.

The Division of Adult Audiology sees nearly 13,000 patient visits each year and dispenses about 70 hearing aids per month (about 95 percent of those are digital). Valente's Hearing Aid Research Laboratory has been involved in ongoing studies with hearing-industry manufacturers for about 15 years.
Coffee, tea or dromedary? Camels, llamas help with caffeine detection

Three llamas and two camels have provided a way to tell whether your waiter swapped regular coffee for decaf in your after-dinner cup. Using the heat-resistant antibodies these camels and llamas produce, researchers are developing a quick test for caffeine that works even with hot beverages.

They plan to adapt their technology to a simple “dipstick” test that can be used to check for caffeine in a variety of drinks. Their research appeared in the June 1, 2006 issue of the American Chemical Society’s journal, Analytical Chemistry.

Caffeine can cause restlessness, irritability, dehydration or heart arrhythmias, and those who are highly sensitive to caffeine feel its stimulant effects for as long as 20 hours. In addition, some medicines adversely interact with caffeine.

“We believe our test would be the first consumer test for caffeine and would be beneficial for anyone wishing to avoid caffeine for health or personal reasons,” says senior author Jack H. Ladenson, PhD, the Oree M. Carroll and Lillian B. Ladenson Professor of Clinical Chemistry and director of the Division of Laboratory Medicine.

Ironically, the key to the caffeine test comes from llamas and camels — pack animals that have transported caffeinated commodities such as coffee, tea and cocoa for centuries. These animals, known as camelids, happen to be among the few creatures with immune systems that can produce antibodies that aren’t destroyed at the high temperatures common to brewed beverages.

The most stable version of the caffeine-specific antibody, which came from a llama named Very Señorita, recovered 90 percent of its activity after exposure to 194 degrees Fahrenheit (90 degrees Celsius) — about the temperature of a really hot cup of coffee. A similar antibody produced from mice broke down at 158 degrees Fahrenheit.

A lab test using the caffeine-specific antibody accurately measured the amount of caffeine in coffee and cola drinks. The antibody cross-reacted very little with theophylline or theobromine, the caffeine-like compounds in teas, so the caffeine content of teas could be measured without interference from these substances.

“We believe our test would be beneficial for anyone wishing to avoid caffeine for health or personal reasons.”

“Now that we’ve isolated the sequence of this stable anti-caffeine antibody, we can produce copies in the lab to develop a convenient caffeine test. We don’t need to rely on the animals,” Ladenson says. “And unlike other methods for measuring caffeine, which require large and expensive laboratory equipment, this test is potentially adaptable to a format people could carry with them.”

Ladenson and his colleagues currently are working to develop such a portable, point-of-consumption test.
Cancer patient to parent

Cancer therapy needn't preclude parenthood.

Along with the birds and the bees, new reproductive techniques help ensure the transition from a life-threatening illness to making a new life.

By Candace O'Connor

Whenever longtime sweethearts Tammy Monso and Bryan Figg envisioned their life together, the picture included children. But in 2002, just six weeks before their wedding, Tammy, then 27, discovered that some troubling symptoms she had tried to ignore — bleeding, fatigue and weight loss — were signs of Stage III colon cancer. Right away, she would need life-saving surgery, chemotherapy and radiation therapy, and those treatments would render her sterile.

Today, with little Ayden Michael Figg gurgling in the background, Tammy Figg talks about the extraordinary events that led to the fulfillment of their dream. The birth of the baby whom Tammy and Bryan call their “gift” required cutting-edge reproductive technologies plus the skilled intervention of physicians, nurses, lab technicians and other staff from the Washington University Infertility and Reproductive Medicine Center at Barnes-Jewish Hospital.

“It was exciting,” says Valerie S. Ratts, MD, associate professor of obstetrics and gynecology and a staff member at the center, which assists some 2,000 couples a year with infertility issues. “We had all worked hard to get her there, and it is a miracle of modern medicine that this child exists.”

Left: Modern-day miracle Ayden Michael Figg with mom, Tammy.
As Tammy Figg recalls, she asked her oncology team, during the first dazed period after they discovered her tumor, whether there was any way to preserve the option of having a baby. Their priority, they said, was saving her life, but they directed her to Ratts for a fertility consultation. At that meeting, she learned having her eggs harvested, fertilized and frozen — a procedure called in vitro fertilization (IVF) — would give her the option of a later pregnancy, once her physicians said she was ready.

Some 25 couples a year come in for this kind of counseling because one of them is facing cancer treatment. Often the patient is a young man who wishes to bank sperm, but the center has seen patients with breast cancer, lymphoma, Ewing’s sarcoma and endometrial cancer as well. Some decide not to pursue IVF but plan to adopt instead.

After surgery, Tammy elected, with her oncologist’s approval, to postpone the rest of her treatment by a few weeks in order to retrieve some eggs. Chemotherapy destroys both eggs and sperm; radiation therapy may have the same effect, depending upon the location of the cancer.

Currently, Washington University is beginning a research protocol that approaches this problem from a new angle that allows women with cancer who do not yet have partners to retain reproductive potential. Unlike embryos, unfertilized eggs do not freeze well. To solve this problem, physicians take biopsies of ovarian tissue embedded with eggs and freeze the entire sample. When the patient is ready, they thaw the tissue, grow the eggs and fertilize them for use.

In Tammy’s case, they were able to harvest 14 eggs and freeze 12 embryos before she proceeded with her cancer treatment, which included eight long months of chemotherapy. One difficult part of the IVF was what she refers to as “sticker shock.” While some insurance plans, particularly those in Illinois, may cover the procedure, her insurance did not, and the cost of this phase of IVF was close to $12,000.

“The cost can blow some people away,” says Tammy, “but young couples are often in debt for many other reasons: a new car, their mortgage, credit card payments. This procedure gave us so much more hope than we had before; we knew we could find a way to make it work.”

In their case, five couples they knew decided to help, holding a giant benefit dinner for Tammy and Bryan in November 2002. That event was the genesis of a charitable organization the Figgs have since established, the Figg Tree Foundation, which promotes awareness of colon cancer, offers help to people suffering from the disease and supports the Colonar” — a calendar produced by The Colon Club of New York featuring young colon cancer survivors.

Meanwhile, the Figgs celebrated their wedding on schedule, before an emotional crowd of friends and family.

“Bryan was my rock,” says Tammy of her husband, who remained optimistic and unwavering in his determination to stand by her side.

By 2004, with her cancer in check, Tammy and Bryan felt ready to try for a pregnancy.

“The reason we even have this as an option today is that cancer therapy works and there are more

Valerie S. Ratts, MD, examines a sample in the lab with andrologist Bridget Maniaci, left.
Understanding IVF step-by-step

Before a female cancer patient can postpone therapy to do an IVF cycle, she must have clearance from her oncologist that she is medically stable. If it is critical for her to start therapy, as it often is in leukemia patients, IVF may not be an option.

To begin, the woman takes daily shots of a medication containing follicle-stimulating hormone (FSH), which promotes egg growth. In breast cancer patients, FSH poses a problem because it causes estrogen levels to rise — and estrogen will fuel the tumor. Washington University has a new protocol in which these women concurrently take aromatase inhibitors that prevent the estrogen levels from mounting.

Through blood work and ultrasounds, the center staff monitors the growth and size of the eggs, modifying the doses of medicine as necessary and completing the process with a medication that triggers the eggs to finish maturing. Thirty-six hours later, the patient comes to the procedure room, where she is sedated; the physician inserts a small needle through her vagina into the fluid-filled spaces of her ovary. This follicular fluid then goes to a waiting embryologist, who searches through it under a microscope to locate the viable eggs.

Meanwhile, her male partner provides a sperm sample, which the staff uses to inseminate the eggs. The next morning, they come back to see whether the eggs have been fertilized successfully; if so, they are frozen. When the patient is cleared by her oncologist, they thaw the embryos and place them in her uterine cavity using a small catheter — two or three at a time. Nine months later, with a little luck, the procedure has a happy outcome.

they were treated and where she underwent her treatments, but long before the operative difference that she and Bryan felt. While they were particularly close to the procedure room, and the nurses on this close unit, they were also a giant support for any other cancer survivor, or the cancer survivor herself, and the support that is produced, much like New York, by the people who search through these women concurrently take aromatase inhibitors that prevent the estrogen levels from mounting.

Older adults, a cancer survivor, and the staff: "A healthy family, like one we know."

Tammy underwent another obstetrician said: "Bryan and I glanced at our potential child through a microscope and said a prayer."

Two weeks later, Tammy was crushed when the center did not contact her in the morning, and she was sure they would call early if they had good news. Instead, the phone rang in the afternoon; the nurse had waited to assemble the staff before she conveyed the happy word that Tammy was pregnant, at last.

Her pregnancy was not easy: She encountered early bleeding, gallstones and the need for modified bed rest from week 23 on. Yet the reward came on September 28, 2005, when their "beautiful son" made his appearance — a month early, but still weighing seven pounds, six ounces.

Tammy and Bryan are hoping to try again in 2007 with their remaining embryos to provide Ayden with a sibling. Even if that does not work, however, they say they are content.

As for the team at the center? "The whole unit was involved from the beginning," says Ram. "People rallied around to help with her care. When the baby was born, that was really, really wonderful."
AS CLEAN AS IT GETS

On our fecund planet teeming with life, a School of Medicine facility holds biology at bay while creating specialized biomedical products.

BY GWEN ERICSON
Air at least a million times cleaner than the air we normally breathe rushes within the series of six interconnected labs. Massive air handlers with highly efficient HEPA filters maintain elevated air pressure to keep dirty air out. Gleaming metal surfaces are carefully wiped down and sterilized after use. Researchers and staff wear caps, masks, gowns, gloves and booties at all times to prevent contamination, and staff members perform weekly checks for any microbes on the walls, workbenches and floors.

This is about as clean as it gets—on campus, on the planet. Why such obsessive housekeeping? It saves lives by preventing microbial contamination of specialized products made for patients.
Named for the strict manufacturing regulations required by the Food and Drug Administration, the Good Manufacturing Practice facility (GMP) is a haven of high-tech environmental control. The superclean facility allows scientists to focus on translational research and to manipulate cells for use in a variety of medical treatments.

The GMP recently helped David Hamlyn, age 53, who suffered from myelodysplastic syndrome, a disorder of the bone marrow that disrupts the production of blood cells, including platelets, which are needed to form blood clots. His physician, Ravi Vij, MD, assistant professor of medicine in the division of oncology, knew this placed Hamlyn at risk for a potentially fatal hemorrhage at any moment.

Hamlyn's lack of platelets and his frequent infusions made it impossible to work. He left his job in the paint department of a manufacturing company three years ago and was not able to return.

"I had severe headaches, and I'd bruise really easily," Hamlyn says. "If I got too close to something and skinned myself, I'd bleed and bleed. They told me if a blood vessel burst in my head, I'd be dead."

"After he came to Washington University and Barnes-Jewish Hospital, we followed him for close to a year and a half, treating him for what we thought was an immune system-based destruction of platelets," Vij says.

Several treatment attempts failed to restore Hamlyn's platelet levels, and his disease began to look incurable. But when Vij saw that Hamlyn's production of red and white cells was beginning to decline as well, he knew he was dealing with myelodysplastic syndrome. He recommended a bone marrow transplant, a risky procedure designed to wipe out Hamlyn's defective bone marrow and replace it with cells from a donor's bone marrow.

If all went well, stem cells from the donor marrow would move into Hamlyn's bones and develop to supply the blood components he was missing. Unfortunately, this transplant, performed in July 2005, wasn't effective.

"I still wasn't making any platelets," Hamlyn says. "Every other week I got two units of blood, and once a week I got a bag of platelets."

In addition, the bone marrow transplant left Hamlyn with graft vs. host disease, a complication caused when immune cells present in the donor marrow recognize the new host's cells as foreign and attack them. Because of this, Hamlyn needed to take drugs to suppress his immune system.

"He had the worst of both worlds," Vij says.

In December 2005, Vij considered the possibility of giving a second, booster infusion of bone marrow to restore Hamlyn's ability to make platelets. The problem with this plan was that a second infusion of whole marrow would bring a new wave of donor immune cells to attack Hamlyn's own cells.

"If we gave him more donor marrow, we would run the risk of worsening the graft vs. host," Vij says.

Vij decided that what Hamlyn needed was a concentrated infusion of stem cells minus the immune cells — and for that Vij needed the GMP.

Regular monitoring of the GMP's surfaces — workbenches, walls and floors — ensures that the facility adheres to federal standards of consistency and purity. A cell culture of residue from a human fingertip, left, shows rapid bacterial growth; the sterile culture, right, contains a sample taken from the GMP.

Work done in the GMP facilitates medical treatments that can save lives.
Within an immaculate room of the facility, GMP staff used a magnetic cell selector to separate stem cells in the bone marrow donated for Hamlyn’s procedure from the rest of the myriad of cells — including immune cells — that bone marrow possesses.

The technique required binding the stem cells to metallic beads coated with an antibody that attaches specifically to molecules on stem cells. The machine could then hold onto the bead-bound stem cells with its internal magnet while the rest of the cells in the marrow were washed away.

When the magnet was removed from the machine, the stem cells were pumped into a waiting IV bag, and the GMP sent the purified and concentrated stem cells to Vij and his patient. Three weeks after Vij infused Hamlyn with the cells, it was clear that this new transplant was working. Results showed that Hamlyn finally had a normal platelet count in his blood, and his life was no longer under threat.

“The air we breathe has billions of particles per cubic meter, including fungal spores, bacteria, viruses, pollen and dust,” says Gerhard Bauer, designer and former director of the GMP. “If we made products like these stem cells in an ordinary lab, we could easily introduce a dangerous contaminant. In the GMP laboratories, the particle count is below a thousand particles per cubic meter so our products are very safe. We can facilitate medical treatments that can’t be done in any other part of the hospital.”

Around the time the GMP was preparing stem cells for Hamlyn, the facility also enabled production of artificial saliva for a study on taste in depressed patients and food oil with a tracer to determine if certain compounds in food are preferentially absorbed. The GMP also is involved in aiding physicians studying regenerative medical techniques to restore heart function after a heart attack, and to replace a defective gene in patients with Sly disease. Its ability to preserve tissue safely allows physicians to use the GMP as a bank for such needs as storing parathyroid tissue for thyroid cancer patients so that it can be reimplanted if needed.

When the magnet was removed from the machine, the stem cells were pumped into a waiting IV bag, and the GMP sent the purified and concentrated stem cells to Vij and his patient. Three weeks after Vij infused Hamlyn with the cells, it was clear that this new transplant was working. Results showed that Hamlyn finally had a normal platelet count in his blood, and his life was no longer under threat.

“The air we breathe has billions of particles per cubic meter, including fungal spores, bacteria, viruses, pollen and dust,” says Gerhard Bauer, designer and former director of the GMP. “If we made products like these stem cells in an ordinary lab, we could easily introduce a dangerous contaminant. In the GMP laboratories, the particle count is below a thousand particles per cubic meter so our products are very safe. We can facilitate medical treatments that can’t be done in any other part of the hospital.”

Around the time the GMP was preparing stem cells for Hamlyn, the facility also enabled production of artificial saliva for a study on taste in depressed patients and food oil with a tracer to determine if certain compounds in food are preferentially absorbed. The GMP also is involved in aiding physicians studying regenerative medical techniques to restore heart function after a heart attack, and to replace a defective gene in patients with Sly disease. Its ability to preserve tissue safely allows physicians to use the GMP as a bank for such needs as storing parathyroid tissue for thyroid cancer patients so that it can be reimplanted if needed.

“The air we breathe has billions of particles per cubic meter, including fungal spores, bacteria, viruses, pollen and dust,” says Gerhard Bauer, designer and former director of the GMP. “If we made products like these stem cells in an ordinary lab, we could easily introduce a dangerous contaminant. In the GMP laboratories, the particle count is below a thousand particles per cubic meter so our products are very safe. We can facilitate medical treatments that can’t be done in any other part of the hospital.”

Around the time the GMP was preparing stem cells for Hamlyn, the facility also enabled production of artificial saliva for a study on taste in depressed patients and food oil with a tracer to determine if certain compounds in food are preferentially absorbed. The GMP also is involved in aiding physicians studying regenerative medical techniques to restore heart function after a heart attack, and to replace a defective gene in patients with Sly disease. Its ability to preserve tissue safely allows physicians to use the GMP as a bank for such needs as storing parathyroid tissue for thyroid cancer patients so that it can be reimplanted if needed.
Understanding how HIV weaves its genetic material into a host cell's DNA can help scientists develop new integrase inhibitor drugs. Lisa Mahnke, MD, PhD, and Lee Ratner, MD, PhD, studied a west African strain called HIV-2 and revealed domains shown in red that are critical for carrying the viral genome into cell nuclei.

By Michael Purdy

Twenty-five years after the first Centers for Disease Control report describing a new infectious disease afflicting the immune system, HIV infection is no longer the automatic death sentence it once was. Still, the virus remains a life-changing and potentially deadly burden, a serious health risk never to be carelessly courted.

Patients and doctors now are finding cause for guarded optimism in two areas of progress linked to drug design and development: a sharp reduction in the number of daily doses of medications most AIDS patients have to take, and new drugs and treatment approaches nearing or in clinical trials.

Researchers at the Washington University AIDS Clinical Trials Unit (ACTU), led by director David B. Clifford, MD, are working closely with AIDS patients to move forward with a program of research that respects both the dignity and wishes of the patient and the priorities of physician-scientists.

The end of the dramatic AIDS that takes just five years from a diagnosis is decades away. That's important for some of us, says Clifford.

"Patients and doctors now are finding cause for guarded optimism in two areas of progress linked to drug design and development: a sharp reduction in the number of daily doses of medications most AIDS patients have to take, and new drugs and treatment approaches nearing or in clinical trials."

Researchers at the Washington University AIDS Clinical Trials Unit (ACTU), led by director David B. Clifford, MD, are working closely with AIDS patients to move forward with a program of research that respects both the dignity and wishes of the patient and the priorities of physician-scientists.

The end of the dramatic AIDS that takes just five years from a diagnosis is decades away. That's important for some of us, says Clifford.

"Patients and doctors now are finding cause for guarded optimism in two areas of progress linked to drug design and development: a sharp reduction in the number of daily doses of medications most AIDS patients have to take, and new drugs and treatment approaches nearing or in clinical trials."

Researchers at the Washington University AIDS Clinical Trials Unit (ACTU), led by director David B. Clifford, MD, are working closely with AIDS patients to move forward with a program of research that respects both the dignity and wishes of the patient and the priorities of physician-scientists.
The cornerstone of treatment for HIV/AIDS — the widely used drug “cocktail” — has quietly but dramatically mutated.

AIDS patient George Dowling says that he now takes just five pills each day to control the virus, down from a considerably larger number just a few years ago. According to Clifford, who is the Melba and Forest Seay Professor of Clinical Neuropharmacology in Neurology, the decrease in necessary AIDS medications is good news for patients like Dowling because it decreases the chances that patients will miss a dose. That’s important, because it limits the HIV virus’ opportunity to mutate and become drug-resistant.

“Patients do have fewer pills to take, but there are no cures yet; treatment is lifelong and still very costly, and the pills bring with them many unpleasant side effects, some of which in the long term may be life-threatening,” says Clifford.

Dowling, who participates in a clinical trial at the ACTU, agrees, emphasizing: “The last thing I want to do is to give people the impression that HIV treatment is now a matter of popping a few pills a day and therefore they no longer need to practice prevention.”

Dowling has been in “remission” from AIDS for approximately seven years. While he once had clinical AIDS and was hospitalized for treatment, he no longer meets any of the conditions that define the disease.

His status has been made possible by a mixture of redesigned versions of old and new drugs. Both have been formulated to stay in the body longer, either via larger per-pill doses, gradual release into the body over an extended period of time, or biochemical features that slow their clearance from the body.

While drug developers have been getting better at producing AIDS medications that stay in the body longer and are somewhat easier to tolerate, many drugs still have unpleasant side effects. These include cosmetic problems (some AIDS drugs melt away subcutaneous facial fat), gastrointestinal discomfort, sleep loss and abnormal dreams, and chronic fatigue.

Researchers also are becoming aware of long-term metabolic side effects of AIDS medications that may potentially be more serious, including dramatically increased risk of cardiovascular disease, insulin resistance and diabetes.
In more ways than one, “HIV becomes part of the person,” says David B. Clifford, MD. The virus sews its genetic material into the host's DNA and takes over a life. A lifetime of treatment awaits—a roller-coaster ride of drug therapies while monitoring the virus' quantity within the body. Although it has become possible to stave off rampant cellular death and weakening of the immune system, the psychological, physical and financial tolls remain high. Researchers continue to examine all aspects of HIV in search of ways to mitigate its destructive effects.

Prevention

The legacy of HIV needn't pass from parent to child. Nurse coordinator Phyllis Ballard, right, examines virus-free Senoria Jones, as HIV-positive mom Kërveena Brown looks on.

Stop the sewing machine.
HIV enters the host's nucleus to begin stitching its DNA into the host's DNA—a process called integration. The enzyme integrase facilitates this; integrase inhibitor drugs can thwart it. The virus can lay dormant within the nucleus for years before it begins using the host cell to produce new HIV components.
HIV weakly destroys a host inmas it uses the cell's copying equipment.

2 Lose the translator.
HIV must transcribe its single-strand RNA into double-strand DNA—a genetic blueprint—using an enzyme it injected into the host cell. Reverse transcriptase inhibitor drugs, which block this process, were among the first treatments to be developed.

4 Put down the cleaver.
The host cell builds the components of HIV, which must be cleaved apart before final assembly. Protease inhibitor drugs block the cleavage enzyme. If cleavage occurs, the parts assemble into new virions, bud out of the host cell and disperse to infect other cells.

Mike Royal, clinical pharmacist, trains patient Gary Ebrecht to use an injection device for administering HIV drug therapy.

Researchers like Lisa A. Mahnke, MD, PhD, are studying ways to thwart the virus at every stage of its interaction with a cell.
International effort. Clifford and his colleagues in the AIDS Clinical Trials Group are leading a major international trial to determine if dosing schedules similar to those used in the United States can be used to treat patients in developing nations. Scientists will have to be on guard for genetic differences in other nations that alter patients' responses to medications, and economic feasibility is a major concern.

"Some of the newer AIDS drugs seem to be able to retain their potency with fewer of these metabolic problems, but for now we have studies underway to see if we can come up with ways to control such dangerous side effects," Clifford says.

For Dowling, future unknown drug side effects are not a primary concern. "It's an easy choice to make, because I have to find ways to live with the virus now, and that's a big job," he says. "If there are serious long-term side effects 10 years from now, I'll deal with them 10 years from now."

Clinical trials are now underway or coming soon for new classes of AIDS drugs, including entry inhibitors and integrase inhibitors (see illustration on preceding pages). Clifford is excited by the potential of these drugs to open up new fronts in the war on HIV.

Entry inhibitors seem to be potent even against strains of the virus that are resistant to earlier drugs, but currently approved entry inhibitors have to be administered by injection. The inhibitor Fuzeon™ is a key component of a multicenter trial to see if aggressive early treatment of HIV can more thoroughly eradicate latent copies of the virus that until now have made a cure impossible.

"We hope this new approach will be such a potent combination that the latent copies of HIV possibly could decay faster than what we see now with standard therapy," says Lisa A. Mahnke, MD, PhD, a principal investigator who oversees the ACTU's participation in the trial.

The ACTU also will soon be involved in trials to see whether patients can be safely treated with just one of the more potent new AIDS drugs, rather than the three types of AIDS drugs that compose most current treatment regimens.

"There's good evidence to think that some of our most potent new drugs may be strong enough to do this," Clifford says. "And that may let us save back some of our ammunition against the possibility that the virus may one day develop resistance to the drug currently in use."

The effort to develop a vaccine to prevent HIV infection, which is not a research focus for the ACTU, has not fared well in recent years, according to Clifford. But ACTU researchers are involved in trials of two new ideas for using vaccines to help patients already infected with HIV.

One such approach would use existing vaccines for other diseases, such as smallpox or hepatitis, to boost immunity in AIDS patients. Another hopes to use a therapeutic vaccine to reduce the amount of virus in patients' bloodstreams, either as a supplement to regular AIDS treatment or to delay the time when patients with latent HIV have to begin taking AIDS medications.

Many challenges and uncertainties lie ahead in the battle with HIV, but as researchers continue to identify new avenues of attack and clinicians develop approaches to ease the burdens of treatment, the virus' seeming invincibility is beginning to falter.

Patients advise on HIV research

George Dowling is a member of the ACTU's Community Advisory Board (CAB), a group of 20 AIDS patients that meets monthly to help set general goals and priorities and to give clinicians feedback on specific proposals for research trials. "CAB members let us know how likely we are to get patients to volunteer," says ACTU director David B. Clifford, MD. "Their work continues the tradition of patient involvement in motivating and steering AIDS research. "You sometimes read of disaffection for research among patient communities, but that's not the case at all in AIDS," Clifford adds. "These patients are among the most involved and interested in research, and we do our best to reciprocate by telling them what our studies have shown and what they mean for the future of AIDS treatment."

20 What's Next for HIV Summer 2006 Outlook
Connecting beyond the classroom brings new perspectives for medical students and the communities they serve

OUTSIDE LOOKING IN

BY BETH MILLER
Early exposure to medical science may increase the likelihood that minority elementary school children will choose health care professions later in life.

WHILE ACADEMIC ACHIEVEMENT is the main focus of students at Washington University School of Medicine, many also spend their free time learning through participation in dozens of programs and activities in the surrounding community. This past spring, students participated in two pilot programs that reached two very different populations — older adults and minority elementary school children. The programs provided the students with the opportunity for immeasurable professional and personal growth as well as a chance to apply their inherent compassion for the community in which they live.

CATCHING KIDS

About 30 School of Medicine students, including those from physical therapy and occupational therapy, taught a mini-medicine course to kindergarteners, first-graders and second-graders at Adams Elementary School in the Forest Park Southeast neighborhood of St. Louis. Lessons included the senses, dissection, the skeletal system and the nervous system, and provided hands-on activities that allowed each child to participate.

In the nervous system lesson, the students used rubber hammers to test their reflexes. In the dissection lesson, they learned about the anatomy of the eye by dissecting a cow’s eyeball.

The program to introduce minority elementary school students to medicine and spark their interest in health care professions was developed by the university's Center for Health Policy, which has focused on eliminating racial and ethnic disparities in health care. Research shows that interest in medicine by these children starts to drop off by the third grade.

"It is our hope that this early and effective introduction will positively influence career choices and improve literacy in the future," says William A. Peck, MD, the Alan A. and Edith L. Wolff Distinguished Professor of Medicine and director of the Center for Health Policy.

"The program to introduce minority elementary school students to medicine and spark their interest in health care professions was developed by the university's Center for Health Policy, which has focused on eliminating racial and ethnic disparities in health care. Research shows that interest in medicine by these children starts to drop off by the third grade."

"It is our hope that this early and effective introduction will positively influence career choices and improve literacy in the future," says William A. Peck, MD, the Alan A. and Edith L. Wolff Distinguished Professor of Medicine and director of the Center for Health Policy.
Craig Press, a student in the university's MD/PhD program, and Debbie Chase, a senior consultant at the Center for Health Policy, developed the idea for the mini-medicine course after meeting at a lecture by Will Ross, MD, associate dean for diversity and director of the Office of Diversity, about inequality in U.S. health care for minorities and the lack of minority doctors.

Press says he believes this is the only education program in which medical students can work with early elementary children in minority neighborhoods.

"The younger kids haven't been exposed to some of these things, so you see the wonder in their eyes when you do something 'Mr. Wizard-like,'" Press says. "We want them to make the connection between Mr. Wizard and being a doctor, so hopefully they'll see medicine as a career possibility."

Press says the experience reinforced the idea behind the effort — to make a long-term impression on children with a short-term exposure to careers in medicine, occupational therapy and physical therapy. "In just four hours a year, we can have a profound impact," he says.

ENGAGING OLDER ADULTS

On the other end of the age spectrum, older adults spent several sessions making art with first-year medical students through a program funded by the National Institutes of Health's National Institute on Aging.

This pilot program was based on research showing that medical students who interact with older adults early in their training develop better attitudes toward aging.

Through the course, called Vital Visionaries, 15 first-year medical students and 15 healthy adults over age 65 from The OASIS Institute studied art at the Contemporary Art Museum St. Louis. The medical students were randomly paired with an older adult in the first class and worked together in the subsequent sessions on various art pieces.

Stephen S. Lefrak, MD, professor of medicine and assistant dean for the Humanities Program in Medicine, developed the course with the help of Marylen Mann, founder and chairman of OASIS; Bunny Burson, liaison with the National Institute on Aging; and Amy Enkelmann-Reed, project coordinator.

Lefrak says the goal of the Vital Visionaries program is to kindle interest in geriatric medicine and to improve future doctors' attitudes toward older people.

"Young medical students look at people in their 60s, 70s and 80s as ancient, with little vitality and quality of life," says Lefrak. "How do you get them to see that there is a common ground between them?"

The answer in this case was art.

"We're not trying to teach students about art, but common humanity," says Lefrak. "It's to change their perception and show them they can connect with older people in the same way they connect with friends their own age."

36,000 geriatricians will be needed within 25 years. Sparking an interest in geriatrics while students are in medical school may be the answer.
MATCH DAY WAS HELD MARCH 16, 2006, and 114 of the 119 graduating medical students took part in the National Resident Matching Program. During the annual ceremony, senior medical students in the United States learn which residency programs they will enter. School of Medicine graduates are highly successful in obtaining competitive training programs. In 2006, 39 percent of the graduating class selected a primary care field and 33 percent matched into highly competitive surgical subspecialty training positions.

Spouse response: Albert Gee, MD 05, reacts to the news that his wife, Jennifer Gardner, MD 06, will be joining him in Philadelphia.
Andrew Bowman, MD 06, along with his wife, Holly, and daughters Alexa, 2, and Callie, 4 months, are headed to Florida. New York Presbyterian Hospital-Columbus
ANESTHESIOLOGY
May S.R. Hua
PEDIATRICS
Daniel Nam Hoang Vo
New York Presbyterian Hospital-Cornell
EMERGENCY MEDICINE
Timothy Christopher Loftus
New York University School of Medicine
EMERGENCY MEDICINE
Jeffrey Arno Glaberg
Rochester
University of Rochester-Strong Memorial Hospital
ORTHOPAEDIC SURGERY
Calvin Takuo Hu
North Carolina
Chapel Hill
University of North Carolina
INTERNAL MEDICINE/PEDIATRICS
Lauren Elizabeth Galpin
Durham
Duke University Medical Center
DIAGNOSTIC RADIOLOGY
John David Wilde
INTERNAL MEDICINE
Junyoung Lou
OBSTETRICS AND GYNECOLOGY
Madeleine Beata
Cincinnati
Cincinnati Children's Hospital
PEDIATRICS
Terri Michele Moncrief
Cleveland
Case Western-University Hospitals
DIAGNOSTIC RADIOLOGY
Vincent Kwock Wai-Wong
Unswerving loyalty
Alumna and longtime faculty member sets standard for involvement

A technological revolution has taken place since Emily L. Smith, MD 68, became a radiologist.

Unlike early X-ray film, computerized tomography (CT) scans and magnetic resonance imaging (MRI) now provide instantaneous medical information. And, with interventional radiology, radiologists can perform a wide range of procedures, from injecting materials and stabilizing collapsed vertebrae to using stents to open arteries in the brain, kidneys and extremities.

"You can see and do so much more to treat patients," says Smith, assistant professor of radiology at Washington University School of Medicine. "Plus, most of the procedures are easier for patients to tolerate."
Smith grew up in Belleville IL. Valedictorian of her class at what is now Belleville Township High School West, she aspired to cross the Mississippi River to attend college at Washington University in St. Louis.

When her father, a sales representative, died during her senior year of high school, Smith wondered if her dream would be realized. However, a four-year scholarship enabled her to begin undergraduate studies at Washington University in 1961.

Smith, who liked science and was especially fascinated by biology, earned a bachelor's degree in zoology. She decided on medical school after breezing through her freshman chemistry class while many pre-meds were struggling with the course.

Washington University was the only medical school to which she applied. Just one of eight women in a class of 88, she again received a four-year scholarship.

During her third-year clerkships, Smith realized that her favorite part of the day was making X-ray rounds. She says she felt a great sense of accomplishment when she identified abnormalities. “I started thinking, ‘This might be a pretty good life.’”

A rotating internship at Parkland Hospital in Dallas confirmed her decision to become a radiologist, and Smith hasn’t regretted it.

She completed a radiology residency at Washington University School of Medicine, joining the faculty in 1972. Soon after, she became director of Radiological Services in Queeny Tower. In the small radiology suite, she and a resident spent their days reading bone and chest X-rays and performing gastrointestinal studies. “I got to do a little bit of everything, which I enjoy,” Smith says.

Smith now specializes in bone and joint X-rays, assessing broken bones, arthritic joints, and postsurgical knee and hip replacements.

“Emily has been a loyal member of the Mallinckrodt Institute for as long as I have been here — more than 30 years,” says its director, R. Gilbert Jost, MD, who also is the Elizabeth E. Mallinckrodt Professor of Radiology and chairman of the Department of Radiology. “She is an excellent radiologist; we are fortunate to have her as part of our faculty.”

In addition to serving on the radiology faculty for the past 34 years, Smith is an Eliot Society Patron and has led the School of Medicine’s Annual Fund as volunteer chair for a record-setting 11 years.

“Washington University and its School of Medicine have provided me with a wonderful life,” Smith says. “I’ve really felt motivated to give back to the university.”

Randy L. Farmer, associate vice chancellor and director of medical alumni and development at the School of Medicine, is grateful for Smith’s commitment. “As chair of our Annual Fund and a member of our Alumni Association’s Executive Council, Dr. Smith has devoted countless hours to advocate for our programs,” Farmer says. “She sets a high standard of loyalty, and we will never be able to thank her enough for all she’s done.”

“I have found that serving as chair of the Annual Fund and supporting the School of Medicine make me feel more a part of the university.”

EMILY L. SMITH, MD

Despite her generous financial support and dedication as a volunteer at the School of Medicine, Smith is humble about the impact she has had.

“In addition to being on the faculty, I have found that serving as chair of the Annual Fund and supporting the School of Medicine make me feel more a part of the university,” Smith says. “I don’t know that I have aspirations to be more than a loyal alumna.”
REUNION 2006 celebrated 12 classes of medical alumni. Setting foot into the new Farrell Learning and Teaching Center — the home for today's medical students — brought forth stories of student days from the past six decades. Though the backdrop has changed, excellence continues at the School of Medicine.

PHOTOS by ROBERT BOSTON and MARK BEAVEN
Maral Kibarian Skelsey, MD 91, served as social chair for the 15th reunion class.

Classmates John T. Crosson, MD 61, and Paul W. Herrmann, MD 61, recalled their student days.

enjoying yesterday, anticipating tomorrow

H. Brad Keller, MD 71, center, listed Rigazzi’s and Forest Park as his favorite hangouts during medical school. With him at the reunion are his spouse, Toni Wurth, and classmate Robert F. Stephens, MD 71.

Alumnus Alvin L. Nickel, MD 56, fondly recalled learning from Millie Trotter in anatomy and "working in a pediatric elective with then pediatric resident physician Dr. Bill Danforth."

The reunion's Medical Update 2006, left, offered continuing medical education on several areas of research and clinical practice. Friday's lectures were followed by the Executive Vice Chancellor/Dean’s Luncheon, above, enjoyed by Sondra Orup, left, Robert J. Petersen, MD 56, and Bernice Petersen.

journey of lifelong learning
Harriet Smith Kaplan, MD 56, traveled from the West Coast for her 50th reunion.

Alison J. Whelan, MD 66, assistant dean for medical student education at the School, spoke about changes in the curriculum.

Sheri L. Bortz, MD 76, taught yoga classes to reunion participants. She also shared a laugh with classmate Gary R. Ensz, MD 76.

Aaron Hamvas, MD 81, celebrated his 25th reunion with a presentation about his research on newborn respiratory distress.

First-year medical student Katherine VandenHeuvel discussed her poster with Charles L. Robertson, MD 66.

Executive Vice Chancellor for Medical Affairs and Dean Larry J. Shapiro, MD 71, left, celebrated his 35th reunion with classmates Kathleen B. Schwarz, MD 72, and Thomas J. Blanke, MD 71.

renewing friendships

Brian C. Organ, MD 81, chatted with Associate Dean for Student Affairs Leslie E. Kahl, MD, after her presentation.

Celebrating their 30th reunion, clockwise from back left: Bruce S. Frank, MD 76, Enid Weisberg-Frank, Meryl K. Abenroth, MD 76, Kathy Ensz, Lynn R. Gibbs, MD 76, Cheryl Brown, Sheri L. Bortz, MD 76, Marion Spinn, Irwin Spinn, MD 76, and Kathleen G. Todd, MD 76.
At the Reunion Awards Banquet, the School of Medicine honored seven outstanding members of the Washington University Medical Center community. Alumni, faculty, family and friends gathered to celebrate these physicians for their laudable contributions to research and patient care.

Alumni Achievement
Marshall E. Bloom, MD 71, is associate director for the Rocky Mountain Laboratories of the Division of Intramural Research of the National Institutes of Health's National Institute of Allergy and Infectious Diseases, located in Hamilton, Montana.

Willard B. Walker, MD 46, is an associate professor emeritus of clinical surgery at Washington University School of Medicine.

Alumni/Faculty
Clay F. Semenkovich, MD 81, HS 87, is Herbert S. Gasser Professor, professor of medicine and director of the division of endocrinology, metabolism and lipid research at Washington University School of Medicine.

Gregory A. Storch, MD, HS 81, is Ruth L. Siteman Professor of Pediatrics and professor of medicine and of molecular microbiology at Washington University School of Medicine.

Distinguished Service
William H. McAlister, MD, is professor of radiology and of pediatrics at Washington University School of Medicine.

Alumni L. Schwartz, PhD, MD, is the Harriet B. Spoehrer Professor and chairman of the Department of Pediatrics and professor of molecular biology and pharmacology at Washington University School of Medicine and pediatrician-chief at St. Louis Children's Hospital.

Samuel L. Stanley Jr., MD, HS 88, is professor of medicine and of molecular microbiology and vice chancellor for research at Washington University School of Medicine.

The Class of 1971 broke the attendance record for a 35th reunion, thanks largely to the efforts of Social Chair David L. Thorne, MD 71, left, pictured here with classmate, presenter and award recipient Marshall E. Bloom, MD 71.

Chauncey C. Maher III, MD 72, Katherine Heck Maher and Richard Hudgens, MD 56, at the Reunion Awards Banquet.

Sixty-year alumnus Albert P. Raucher, MD 46, got to know students Jaclyn Grenzer, left, and Monique Farrow.

John P. Schilling, MD 75, "introduced" his classmates to his son, Joel D. Schilling, MD 03, PhD 03, clinical fellow in cardiology at the School of Medicine.
Thomas S. Shane, MD 06, spoke to alumni on behalf of his class just one week before Commencement.

Jan Mosley Ruzycki, MD 81, chaired reunion events as president of the Washington University Medical Center Alumni Association.

Classmate couple Monika K. Shah, MD 96, and Robert M. Minutello, MD 96, began the reunion tradition with their 10th.

Celebrating their 55th reunion, from left: Wendell C. Kirkpatrick, MD 51, Kenneth E. Pitts, MD 51, Bill G. Prater, MD 51, Lowell A. Gess, MD 51, Allie Lu Dunlevy and James H. Dunlevy, MD 51.

excellent vintage

The Farrell Learning and Teaching Center was the venue for 50-year alumni, from left: William M. Helvey, MD 56, Grace Helvey, Ronald C. Hertel, MD 56, Stanley B. Smith, MD 56, Robert E. Kuhlman, MD 55, Ana Maria Kuhlman, Mary Lou Johnston and Glen Paul Johnston, MD 56.

Let's meet next year!

2007 MD REUNION
May 10, 11 & 12, 2007
I. Jerome Flance, LA 31, MD 35, works with a group dedicated to improve the delivery of social services, including health care, to large populations of underserved people in St. Louis.

Irving L. Berger, MD 39, enjoys doing artwork and organizing a lecture series at his residence. He continues to be active in the Middle East Studies Society at Florida Atlantic and Florida International universities.

Angelo J. Madonia, MD 42, turned 90 years old on March 1, 2006. He and Annette, the “St. Louis gal” he met on Kingshighway in 1940, celebrated their 66th wedding anniversary on July 11, 2006.

David Talmage, MD 44, continues to volunteer on medical school admissions and IRB committees and is currently working on a paper on calcium homeostasis. He has five children and eight grandchildren, all in the Denver area.

Marvin E. Levin, LA 47, MD 51, was elected a fellow of the American College of Endocrinology on April 29, 2006.

John W. Drake, MD 56, was honored by the Oklahoma County Medical Society Alliance for 50 years of service.

Harry A. Fozzard, MD 56, cardiologist and cardiac electrophysiologist, received a Distinguished Scientist Award from the American Heart Association in 2005. Among many accomplishments, he established the first coronary care unit at Barnes Hospital in 1965 and, with engineering colleagues, developed a digital computer system for real-time arrhythmia monitoring. He continues his research as the Otho S.A. Sprague Distinguished Service Professor Emeritus at the University of Chicago.

Steven Oppenheimer, MD 61, is working part-time as an on-call physician in infectious diseases and part-time as a hospitalist. His pastimes include playing the piano, teaching music as a volunteer in his grandson’s first-grade class and teaching medical students, also on a volunteer basis.

Joshua B. Grossman, MD 65, taught Acute Coronary Syndromes as an advanced cardiac life support instructor in April 2006. Classmates who might like to write may contact him at zjb2@email.etsu.edu or drjosh@charter.net.

Arthur L. Rosenbaum, MD 66, currently serves at UCLA as professor and vice chairman in the Department of Ophthalmology and chief of the Division of Pediatric Ophthalmology and Strabismus, Jules Stein Eye Institute. In the last few years, he has been honored with the Lifetime Achievement Award from the American Association of Pediatric Ophthalmology and Strabismus, and the Part’s Medal for excellence in pediatric ophthalmology.

Joseph M. Davie, MD 68, has joined the board of directors of Ocera Therapeutics, Inc. He is the former senior vice president for the Department of Research at Biogen, Inc. He also served as vice president of science and technology at G.D. Searle; professor and department head of microbiology and immunology at Washington University School of Medicine; and on the boards of directors of various other companies. He is currently a member of Washington University School of Medicine’s National Council.

Phillip A. Hertzman, LA 67, MD 71, served in and completed a medical partnership with a closed Russian community. The effort, funded by USAID, included successful pilot projects in asthma, diabetes, hypertension, tobacco cessation and women’s wellness. He also has embarked on a new subspecialty — phlebology, which has included two trips to Honduras to provide a cure to patients with severe venous disease.

James E. Oda, MD 71, is an orthopaedic surgeon who has a private solo practice in Honolulu HI. He serves as president of the medical staff of the Rehabilitation Hospital of the Pacific.

Randall Dalton, MD 76, was appointed by U.S. Secretary of Health and Human Services Tommy Thompson to serve a four-year term on the National Advisory Research Resources Council of the National Institutes of Health. He is the only “non-academic” physician on this council of 16 individuals.

Kathleen G. Todd, MD 76, is a rural family practitioner in a private practice in Valdez AK. Her pastimes include coaching synchronized swimming; playing the piano, recorder, French horn and guitar; being on the school board; water and snow skiing; kayaking; hiking; and, of course, shoveling.

W. Timothy Garvey, LA 74, MD, HS 81, has been named to the Charles E. Butterworth Jr. Professorship in the Department of Nutrition Sciences at the University of Alabama at Birmingham. A recognized researcher in the fields of diabetes, obesity and insulin resistance, he is only the second holder of the Butterworth Professorship since it was established in 1996.

Allen M. Evans, MD 86, recently received a 2006 Portraits of Success Award. These awards recognize outstanding leaders in the African-American, Hispanic, and Asian-American communities throughout the Central San Joaquin Valley in California.
IN MEMORY

Ruth H. Junkin, NU 33, MD, died on March 26, 2005. She was a well-trained nurse who later became a physician, practicing in Arkansas for more than 50 years.

Lawrence M. Aronberg, LA 32, MD 36, died on Feb. 1, 2006. He is survived by two children, Lauren Aronberg and Jerome M. Aronberg, LA 67, MD 71, two step-children and 11 grandchildren.

Fred Cooley, MD 36, died on Monday, April 10, 2006, at the age of 94. He served as an army captain during World War II and practiced surgery and medicine until 1977. He was named a “Fabulous Fresnan” during Fresno’s centennial celebration in 1985 for his exemplary service to the community, including serving as the first chairman of the Salvation Army Adult Rehabilitation Center in Fresno CA.

Anthony F. Piraino, MD 38, died on Nov. 11, 2005, at the age of 93. He served his country during World War II in a town 50 miles south of Algiers, in the south of France and in Italy. During this time he had the opportunity to meet and serve President Eisenhower and Pope Pius XII. His wife of 68 years, Jane; two sons, Anthony Jr. and John; and two brothers, Tom and Aldo, survive him.

Wanda Du Bose, NU 42, died on April 29, 2006, in Carol Stream IL. She was 86.

Raymond M. Charnas, LA 39, MD 43 March, died on May 4, 2006. He proudly served his country in the U.S. Army Medical Corps from 1943–46 and practiced medicine in St. Louis for the next 40 years.

Robert L. Bretenon, LA 42, MD 45, HS 46, died on April 7, 2006, at the age of 85. He served as a lieutenant in the U.S. Navy following graduation and later was a general surgeon.

Class Notes

Gara M. Sommers, MD, HS 88, recently joined the medical staff of the Valley Hospital in Ridgewood NJ as a gynecologic oncologist. The hospital states that she is the only female gynecologic oncologist practicing in their county.

David G. Standaert, MD 88, PhD 88, recently moved from Massachusetts to Alabama to be the director of a new Center for Neurodegeneration and Experimental Therapeutics in Neurology at the University of Alabama at Birmingham.

January. He is serving a four-year term and performing the second level of Medical Science” one of the National West HealthCare Center in O’Fallon School of Medicine.

Edward G. Malone, PT 99, DPT 03, jointly owns TheraSpecialists Physical Therapy Center, which recently relocated to a new, state-of-the-art facility near Sandy Creek Park in Jasper TX.

Dena Minning, MD 00, PhD 00, completed her medical internship at the University of California, San Francisco, and then moved to Boston and worked for a biotech/pharma consulting firm. In 2003, she joined Amgen, where she now designs and oversees early clinical trials in hematology and other disease areas.

Kelle H. Moley, MD, HS 93, an associate professor of obstetrics and gynecology, has been named vice chair for basic science research and director of the Division of Basic Science Research in the Department of Obstetrics and Gynecology at Washington University School of Medicine.

Robert R. MacDonald III, MD 93, HS 99, was recently elected chief-of-staff-elect at Barnes-Jewish St. Peters Hospital. His tenure will begin January 2007. This year he is serving as the physician adviser to the patient safety committee and as a physician adviser to the board of directors for Barnes-Jewish St. Peters Hospital.

Edwin S. Flores, PhD 93, was appointed to the National Advisory General Medical Sciences Council in January. He is serving a four-year term and performing the second level of peer review for research and research training grant applications assigned to the National Institute of General Medical Sciences, one of the National Institutes of Health.

John D. Antes, HA 94, has been named the president of BJH HealthCare’s new hospital, Progress West HealthCare Center in O’Fallon MO. Progress West is slated to open in early 2007.

Frank Nicholas Franano, MD 94, PhD 94, is president of Proteon, a Kansas City-based biotech startup that recently received $19 million in venture capital support for its new laboratory-replicated human protein that permanently dilates blood vessels, a protein Franano discovered.

Timothy W. Broadbent, PT 94, was named winner of the Song of the Year songwriting contest, an international competition supporting VH-1’s Save the Music Foundation. He has signed a distribution deal and has a chance at publication of his music or a recording deal. He put himself through undergraduate pre-med at Drury University via a jazz scholarship (tenor sax) and also sat in for the Washington University jazz ensemble while in the Program in Physical Therapy.

Melissa S. Curtis, PT 96, moved to South Carolina in July 2005 so her husband, Brian, could advance his career. She is taking a year off from physical therapy work to stay at home with her three sons, the youngest born in May 2006. She would love to hear from classmates at melcurtis2002@yahoo.com.

Cary G. Malone, PT 99, DPT 03, jointly owns TheraSpecialists Physical Therapy Center, which recently relocated to a new, state-of-the-art facility near Sandy Creek Park in Jasper TX.

90s

00s
at St. Joseph Hospital and at the former Deaconess Hospital. He is survived by his wife, three children, six grandchildren and a great-grandson.

Walter H. Patt Jr., LA 43, MD 46, died on April 29, 2006, in Bella Vista AR, at the age of 84. After graduating from Washington University School of Medicine, he served in the U.S. Army during World War II. He practiced pediatrics in Brookings SD for more than 34 years and was a member of the College of Pediatrics and Allergy. He is survived by his wife of 59 years, Frances S. Patt, NU 46, a sister, two children, seven grandchildren and a great-grandson.

Lorna Greer, NU 48, died on Feb. 22, 2006, in Memphis TN. She started her nursing career in 1948 at the old Kennedy VA Hospital in Memphis and then served in the United States Air Force for nine years before becoming a full-time homemaker. She is survived by her husband, George Greer, two sons, and three siblings.

Robert L. Korn, MD 49, died on May 21, 2006, in Las Vegas NV. He was a pediatrician in St. Louis for 46 years and served as chief of pediatrics at Missouri Baptist Medical Center. He also was a professor at Saint Louis University and on staff at SSM Cardinal Glennon Children’s Medical Center. After retiring, he acted as medical director of the St. Louis division of PRUcare. He moved with his wife, Annette Kagan Korn, BS 49, daughter and son-in-law to Nevada in 1998.

William Charles Nichols III, HA 50, died on Dec. 10, 2005, at the age of 82. He served in the U.S. Army in the Battle of the Bulge during World War II. He later became the hospital administrator for Memorial Hospital of Laramie County WY and served in that position for the next 38 years.

Marian Howard Tidwell, NU 52, died on Oct. 26, 2005, at her home in Manchester GA. Following graduation from Washington University School of Nursing, she served the next 30 years as a head nurse at the Veterans Administration hospitals in Dublin GA and Atlanta.

Iva M. Barnard, NU 53, died on Feb. 5, 2006, in Westtown PA. She is survived by her husband, John C. Barnard.

Harrison H. Shoulders Jr., MD, HS 54, died on Feb. 3, 2006, at the age of 82. He was chief resident of surgery at Barnes Hospital before returning to his hometown of Nashville as assistant professor of surgery at Vanderbilt University School of Medicine. In 1972, he traveled to London to become honorary assistant in surgery for diseases of the rectum and colon at St. Mark’s Hospital. He would later become one of the early practitioners of colonoscopies in Tennessee.

Richard O. Fox, MD 56, died on Dec. 26, 2005, in West Frankfort IL. Following graduation from Washington University School of Medicine, he served as an intern and then as a resident in surgery at Cleveland’s Case Western Reserve University Hospital. He returned to southern Illinois in 1961, where he practiced until his retirement.

Barbara D. Gardner, NU 56, NU 63, died on April 21, 2006. She served as a registered nurse in the St. Louis area for 20 years before becoming a full-time mother and homemaker. She is survived by her husband of 40 years, John, and son, James.

Eulalie Wilkerson, NU 57, died on March 4, 2006, at the age of 70. She worked as a critical care nurse for more than 30 years and later did home care before retiring in 1998. She is survived by her husband of 48 years, four children and 12 grandchildren.

Phyllis H. Schuessler, PT 62, died on April 29, 2006. She is survived by her husband, Ted Schuessler; two children, Julie Hogan and Linda Deal; four grandchildren, Joshua, Brendan, Erika and Justin; and a brother, John Hoffman.

Marvin Harold Feldman, MD, HS 69, died on Dec. 28, 2005. He was a clinical professor of neurology at Columbia and chief of neurology at New York-Presbyterian Hospital’s Allen Pavilion. He worked tirelessly on behalf of the underserved, was a dedicated teacher and skilled clinician. He is survived by his wife, two sons and four stepchildren.

Vincent R. deMello, MD, HS 75, died on Jan. 23, 2006, in St. Louis MO. He is survived by his wife, Daphne Efregina deMello, MD; son, Eric Glen deMello; and other family.

Linda A. Fisher, MD, HS 78, died on Jan. 23, 2006, at Johns Hopkins Hospital in Baltimore of complications following a heart transplant. She performed her internal medicine internship and residency at Jewish Hospital. After maintaining a general internal medicine practice and working part-time with the St. Louis Police Department providing occupational medicine services, she became the chief medical officer of St. Louis County. As one of the first public officials in the area to recognize and speak openly about AIDS, she helped establish the Metropolitan St. Louis AIDS Program and volunteered with the AIDS Foundation of St. Louis. Her interest in history later led to a career as a writer and editor.

Dana B. Martinez, OT 87, died on March 21, 2006, at her home in Lynnwood WA, of ovarian cancer. She was an influential advocate for the disease during her 4½-year battle. She is survived by her husband, Ron; daughters, Abigail Marie and Jennifer Sue; and many other family and friends.
A legacy of dedication and service to others will live on through the David English Smith Professorship. "I wanted a lasting memorial to my father," says daughter Mary Ann Smith. Two unitrusts she established provide her with tax benefits and an annual income. Eventually, her gifts will fund the professorship, which will bear her late father's name.

Your School of Medicine

Receive life income and tax benefits when you make a gift to the School

Appreciated securities, real estate or cash can be used to make a gift. Please contact us to see how a charitable trust or gift annuity can work for you.

Call (314) 935-5848 or (800) 835-3503

For more information, complete the reply card or e-mail us at plannedgiving@wustl.edu.

Visit our web site: plannedgiving.wustl.edu

Personal information held in strict confidence. Seek advice from your tax and legal advisers when considering a planned gift.
First-grader Fairah Jeffries closely inspects a dissected cow's eyeball in the mini-medicine course at Adams School in the Forest Park Southeast neighborhood, while first-year medical student Saroj Fleming explains the anatomy of the eye. For more on this story, please turn to page 21.
Unhealthy alteration  Advancements in drug therapies allow patients to take fewer pills to regulate HIV, and research continues to shed light on the deadly workings of the virus. "Mitochondrial impairments are often 'blamed' on anti-HIV drugs," says Kevin E. Yarasheski, PhD, "but these images suggest otherwise." On the right, disorganized mitochondria (yellow) from a mouse genetically altered to express an HIV-related protein, compared to normal tissue, left, show that proteins related to HIV replication can alter mitochondrial structure — thereby impairing the function of mitochondrial-rich tissues. For more about the ongoing fight against HIV, please turn to page 16.