Bringing home baby

Sensitive, skilled fetal and infant care
At home on the Plaza

This spring, a mallard family took up residence in the Maya Lin-designed water feature on the Ellen S. Clark Hope Plaza. The parents and ducklings proved a popular attraction, often drawing crowds — many taking photos with their cameras and phones — that checked on the family’s progress and watched the fledglings grow.
Taking a Shine to Cells

Light can influence the behavior of individual cells and cell networks, which may one day benefit human health.

The Long Way Home

When expectant families learn their baby has an abnormality, the Fetal Care Center gives compassionate care and hope.

Choices for Lung Cancer Therapy

Patients with early-stage lung cancer receive thoracic surgery or radiation therapy, but sometimes the choice is not clear-cut.

Care to Tango?

Surprisingly, dancing the tango seems to improve the motor skills of people with Parkinson’s disease.

COVER  Hayden Hoskins, born with his abdominal organs outside his body, was treated at the Fetal Care Center, where he and his family received in-depth care. To learn more about services for babies like Hayden, please turn to page 14.

PHOTO BY ROBERT BOSTON
Among the most common pediatric injuries seen in emergency rooms are fractures that occur when children fall and try to catch themselves with an outstretched hand.

For many, that tumble on the playground, around the bases or off a bunk bed results in a buckle fracture, a forearm injury traditionally treated with a cast.

But new research from the School of Medicine shows that removable splints are clearly preferred by patients and their parents, building on earlier findings that such splints are just as effective as casts.

“Our goal is to manage these fractures in a manner that allows healing while maximizing comfort and convenience, yet minimizing disruptions in children’s active lifestyles,” says senior author Janet D. Luhmann, MD, an associate professor of pediatrics and physician in the emergency department at St. Louis Children’s Hospital.

Traditionally, forearm buckle fractures have been managed with casts, which can be heavy, uncomfortable and, in the summer, hot and cumbersome. Without an expensive liner, children can’t get them wet, which results in significant inconvenience regarding swimming and hygiene.”

The new findings, coupled with earlier research into the effectiveness of splints versus casts, have led to a change in the standard treatment of these type of fractures at St. Louis Children’s. Now, prefabricated splints are the chosen treatment.

Further, absent pain experienced by patients, no longer is it recommended that they follow up with orthopedic surgeons and possibly undergo more X-rays. Rather, explains Kristine G. Williams, MD, the study’s lead author, children can be seen by their pediatricians two or three weeks later.

The researchers’ findings are available online in Pediatric Emergency Care.

Children’s bones, when compared with the bones of adults, are less dense, more porous and more likely to bend than break. Buckle fractures are inherently stable and are at low risk for displacement and complete breakage, so they tend to heal well with minimal intervention.

Study findings, authors say, show that when treating uncomplicated buckle fractures near the wrist, splints are preferred by patients and their parents — in addition to being easier, less expensive and less time-consuming than casts.

“Parents rated the splint higher in almost all categories,” says Williams, an assistant professor of pediatrics who treats patients at St. Louis Children’s. “They tended to say they would definitely choose the splint again over a cast if they had a similar kind of injury.”
Bee venom kills HIV, leaves normal cells unharmed

Findings may prevent spread of HIV

Nanoparticles carrying a toxin found in bee venom can destroy human immunodeficiency virus (HIV) while leaving surrounding cells unharmed, researchers at the School of Medicine have shown. The finding is an important step toward developing a vaginal gel that may prevent the spread of HIV, the virus that causes AIDS.

“Our hope is that in places where HIV is running rampant, people could use this gel as a preventive measure to stop the initial infection,” says Joshua L. Hood, MD, PhD, a research instructor in medicine.

The study appears in the March issue of Antiviral Therapy.

Bee venom contains a toxin called melittin that can poke holes in the protective envelope that surrounds HIV and other viruses. Large amounts of free melittin can cause a lot of damage. In addition to anti-viral therapy, the paper’s senior author, Samuel A. Wickline, MD, the James R. Hornsby Family Professor of Biomedical Sciences, has shown melittin-loaded nanoparticles to be effective in killing tumor cells.

The new study shows that melittin loaded onto these nanoparticles does not harm normal cells because Hood added protective bumpers to the nanoparticle surface. When the nanoparticles come into contact with normal cells, which are much larger, the particles simply bounce off. HIV, on the other hand, is even smaller than the nanoparticle, so HIV fits between the bumpers and makes contact with the surface of the nanoparticle, where the bee toxin awaits.

“Melittin on the nanoparticles fuses with the viral envelope,” Hood says. “The melittin forms little pore-like attack complexes and ruptures the envelope, stripping it off the virus.”

Hood says an advantage of this is that the nanoparticle attacks an essential part of the virus’ structure. In contrast, most anti-HIV drugs inhibit the virus’ ability to replicate, but this does nothing to stop initial infection.

“We are attacking an inherent physical property of HIV,” Hood says. “Theoretically, there isn’t any way for the virus to adapt to that. The virus has to have a protective coat, a double-layered membrane that covers the virus.”

Beyond prevention in the form of a vaginal gel, Hood also sees potential for using nanoparticles with melittin as therapy for existing HIV infections, especially those that are drug-resistant. The nanoparticles could be injected intravenously and should be able to clear HIV from the bloodstream.

Newborn screening

On July 9 at St. Louis Children’s Hospital, Missouri Governor Jay Nixon signed a bill integrating pulse oximetry into routine newborn testing for critical congenital heart disease. A pulse oximeter, a small cuff that fits around a baby’s hand or foot, reads the level of oxygen in the blood, along with heart rate. Sherrie M. Hauft, MD, Cynthia M. Ortinau, MD, and George F. Van Hare, MD, from the Department of Pediatrics helped create the legislation.

Powderly named director of Institute for Public Health

William G. Powderly, MD, the J. William Campbell Professor of Medicine at the School of Medicine, has been named director of the Institute for Public Health (IPH), effective July 1, 2013. Powderly succeeds founding director Edward F. Lawlor, PhD, dean of the Brown School and the William E. Gordon Distinguished Professor.

Graham A. Colditz, MD, DrPH, the Niess-Gain Professor of Surgery, continues to serve as deputy director.

“Washington University’s Institute for Public Health has flourished under the leadership of Eddie Lawlor,” says Chancellor Mark S. Wrighton. “Bill Powderly is the perfect person to take the Institute to the next level, and I’m grateful he has taken on this leadership role.”

“I view my role as building on what Eddie Lawlor and Graham have done,” Powderly says. He oversees all five centers and initiatives of IPH. “I look forward to working with Graham and the other center directors.”

Powderly is co-director of the Division of Infectious Diseases at the School of Medicine and director of the Center for Global Health at IPH.
A key brain structure that regulates emotions works differently in preschoolers with depression compared with their healthy peers, new research at the School of Medicine shows.

The differences, measured using functional magnetic resonance imaging (fMRI), provide the earliest evidence yet of changes in brain function in young children with depression. The researchers say the findings could lead to ways to identify and treat depressed children earlier in the course of the illness, potentially preventing future problems.

“The findings really hammer home that these kids are suffering from a very real disorder that requires treatment,” said lead author Michael S. Gaffrey, PhD, assistant professor of psychiatry. “We believe this study demonstrates that there are differences in the brains of these very young children and that they may mark the beginnings of a lifelong problem.”

The study is published in the July issue of the Journal of the American Academy of Child & Adolescent Psychiatry.

Depressed preschoolers had elevated activity in the brain’s amygdala, an almond-shaped set of neurons important in processing emotions. Earlier imaging studies identified similar changes in the amygdala region in adults, adolescents and older children with depression, but none had looked at preschoolers.

For the new study, scientists from Washington University’s Early Emotional Development Program studied 54 children ages 4 to 6. Before the study began, 23 of them had been diagnosed with depression. The other 31 had not. None had taken antidepressant medication.

“The amygdala region showed elevated activity when the depressed children viewed pictures of people’s faces,” says Gaffrey. “We saw the same elevated activity, regardless of the type of faces the children were shown.”

The depressed preschoolers’ responses were somewhat different from those previously seen in adults, where the amygdala responds more to negative expressions of emotion.
Scientists have decoded the genome of the western painted turtle, one of the most abundant turtles on Earth, finding clues to its longevity and ability to survive without oxygen during winters spent hibernating in ice-covered ponds.

Understanding the mechanisms turtles use to protect the heart and brain from oxygen deprivation may one day improve treatments for heart attacks or strokes, the researchers say. Both can lead to severe disability or death within minutes in patients deprived of oxygen.

The research team includes scientists at Washington University School of Medicine, the University of California at Los Angeles, Saint Louis University and other institutions. Their analysis is now available online in *Genome Biology*.

New data confirm that the turtles’ pace of evolution parallels their speed on the ground. It’s exceedingly slow, about one-third of the rate of human evolution and one-fifth the rate of the fastest evolving python.

In fact, turtles have evolved a distinctive body design that has changed little over the past 210 million years, the authors note. Unlike other reptiles, turtles sport a sharp beak instead of teeth and live encased in a hard shell, a convenient home in which to hide when danger lurks.

“Turtles are nothing short of an enigma,” says senior author Richard K. Wilson, PhD, director of Washington University’s Genome Institute. “They may be slowly evolving, but turtles have developed an array of enviable features. They resist growing old, can reproduce even at advanced ages, and their bodies can freeze solid, thaw and survive without damaging delicate organs and tissues. We could learn a lot from them.”

A close look at the turtle genome reveals that these creatures do not rely on novel genes for their unique physiological adaptations, such as the ability to withstand oxygen deprivation. Rather, they activate gene networks common to most vertebrates, including humans, but use those genes in different ways. “This is a back door route for turtles to evolve,” says co-author Patrick Minx of The Genome Institute. “Rather than evolve new genes, they adapted existing genes.”

The scientists identified 19 genes in the brain and 23 in the heart that are activated in low-oxygen conditions. These genes also are present in humans and may be important candidates to explore for treatments to reduce tissue damage due to oxygen deprivation. They also identified common patterns of gene loss in the turtle associated with longevity, sex determination and a lack of teeth, findings that warrant further investigation.
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Washington University School of Medicine

Couple honors their physician and friend with professorship

Clinician and educator is “the best”

Jess and Alice Yawitz, whose relationship with Washington University goes back more than 40 years, have established the Dr. Phillip and Arleen Korenblat Professorship in the School of Medicine. Jess Yawitz, AB ’68, MA ’69, PhD ’72, majored in economics and served on the faculty of the Olin Business School, where Alice Yawitz earned her MBA degree in 1975.

Supporters of several university schools and programs, the Yawitzes’ long association with St. Louis physician Korenblat, MD, spurred their decision to endow the professorship.

“I would come home from my physical with Phil, and say, ‘Phil is so good,’” says Jess Yawitz. “And my wife would say, ‘He’s the best.’ After a while, it was obvious we needed to do something to honor him and Arleen.”

An internist in private practice who specializes in allergies and asthma, Korenblat has cared for many members of the Yawitz family. His own Washington University connection is strong: He completed an internal medicine residency in 1965 and serves as a clinical professor at the School of Medicine. He has received many honors, including a Distinguished Service Award from the Washington University Medical Center Alumni Association. Arleen Korenblat has been a benefactor and volunteer for many organizations.

While the Yawitzes knew Korenblat primarily as a physician, Jess Yawitz also knew his reputation as an outstanding educator.

“When I would visit him, he frequently had Washington University residents trailing him. He seemed keen on passing wisdom down to the next generation,” Yawitz says.

Elliot L. Elson, PhD, has been elected a fellow of the American Academy of Arts and Sciences.

Elson, the Alumni Endowed Professor of Biochemistry and Molecular Biophysics, is one of 186 Americans elected as fellows this year by the academy, an organization formed in 1780 to cultivate the arts and sciences and to recognize leadership in scholarship, business, the arts and public affairs.

“I am delighted that a member of our outstanding faculty has received this tremendous honor,” says Chancellor Mark S. Wrighton. “Dr. Elson is a dedicated scientist, and this recognition is well-deserved. This achievement demonstrates the good fortune we have had at Washington University in attracting premier faculty.”

Elson also is a professor of biomedical engineering in the School of Engineering & Applied Science and an adjunct professor of physics in Arts & Sciences. His research focuses on cellular motion, the movement and distribution of cell surface proteins and the forces that determine the shapes of cells. He and members of his lab also have studied artificial cardiovascular tissues, including their mechanical and electrical properties.

Elson and his lab members are well-known for designing and building unique scientific instruments for highly specialized inquiries. One such instrument evolved from a novel technique to measure molecular motion.

‘Cancer doesn’t take a Holliday’

St. Louis Cardinals left fielder Matt Holliday and his mom, Kathy, are joining forces to spread the word about the importance of colon cancer screening. Kathy, who battled the disease last year, says screening saves lives. The two are teaming up with the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine to encourage colon screenings for anyone age 50 and older.

Elliot L. Elson, PhD

Arleen and Phillip Korenblat, MD

Elliot L. Elson, PhD

COURTESY OF SITEMAN CANCER CENTER

BENJAMIN RAPHAEL, BROOKLYN UNIVERSITY

MAK BEAVEN

COURTESY OF SITEMAN CANCER CENTER

Autumn 2013
A team of researchers led by Washington University School of Medicine has identified virtually all of the major mutations that drive acute myeloid leukemia (AML), a fast-growing blood cancer in adults that often is difficult to treat.

The findings, published online in The New England Journal of Medicine, pave the way for developing better treatments for AML based on the genetic profile of a patient's cancer. They also could lead to ways to more accurately predict the severity of disease in individual patients.

“We now have a genetic playbook for this type of leukemia,” says study co-leader Timothy Ley, MD, the Lewis T. and Rosalind B. Apple Professor of Oncology in the Department of Medicine. “We don’t know all the rules yet, but we know all the major players. This information can help us begin to understand which patients need more aggressive treatment right up front and which can be treated effectively with standard chemotherapy.”

Some 200 patients newly diagnosed with AML were involved in the study, funded by the National Institutes of Health (NIH) as part of The Cancer Genome Atlas project. Nearly 150 researchers were involved in the effort.

A second Cancer Genome Atlas paper was published in May in Nature. That research, also led by the School of Medicine and focusing on endometrial cancer, shows that adding genomics-based testing to the standard diagnostic workup could change the recommended course of treatment for some women.

For the leukemia study, the scientists sequenced the DNA of each patient's leukemia cells and compared the data to DNA from each patient's healthy cells. They found the mutations that only occurred in the cancer cells and contributed to the development and progression of AML in each patient. They also looked for defects in RNA (a close chemical cousin of DNA) and other changes that alter the expression of genes without actually changing the DNA.

“These results provide important new insights into the genomics of a deadly and difficult-to-treat cancer, and underscore the power and scope of The Cancer Genome Atlas project,” says NIH Director Francis S. Collins, MD, PhD.

Compared to other adult cancers, AML is caused by relatively few mutations. Cancer cells in the AML patients had an average of 13 mutated genes, far fewer than the several hundred typically found in breast, lung and other solid tumors.

By studying a large number of AML cases, the scientists predict they have found nearly all of the major mutations that occur in patients with the disease.

“If only 5 percent of AML cases have a particular gene that is mutated, there is a greater than 99 percent chance that we encountered that mutation at least once in this study,” says co-leader Richard K. Wilson, PhD, director of Washington University's Genome Institute and research member of the Siteman Cancer Center. “There are still rare mutations that remain to be discovered, but we expect they will fall into the same genetic pathways or gene sets that we identified as being very strongly associated with AML.”

An estimated 14,600 Americans will be diagnosed with AML this year and some 10,400 will die. Unfortunately, few good markers exist to help guide treatment decisions for many patients.
Outstanding colleague, student mentor, superb physician and educator — these are just some of the ways that colleagues describe W. Edwin Dodson, MD, professor of pediatrics and neurology, associate vice chancellor and associate dean for admissions and financial aid.

As Ed Dodson retires at the end of 2013, he will leave behind a legacy of passion, commitment and ethic of duty. Indeed, it’s hard to separate his many accomplishments in admissions from his remarkable career in pediatric neurology and his tireless devotion to community service.

For four decades Dodson has nurtured caring, compassionate relationships with his patients and their families. For the last 23 years, he also has worked passionately to bring the very best students to Washington University School of Medicine.

And which aspect of his career will he miss most? Dodson replies: “I’ll miss it all.”

Ed Dodson, MD, begins his next chapter having started thousands of students in the practice of medicine.

**BY HOLLY EDMISTON**

In his role as associate dean for admissions, W. Edwin Dodson, MD, center, has nourished relationships with medical school applicants, students and colleagues.
Ed Dodson on …

the practice of pediatric neurology

“For me, it’s always been about minimizing the impact of the person’s illness or problems so they can pursue their dreams. It’s hard to describe how attached one becomes to patients and their families. I’ve had remarkable continuity with my patients because they tend to have neurological disorders that don’t go away; I see families that I’ve followed for more than 30 years. I feel doubly blessed to be a physician and have such rich relationships.”

being dean of admissions

“It’s easy to understand why people dwell so long in this position — you interact with spectacular colleagues from around the medical school and with students throughout their four years or more. And then you have the opportunity to get to know some of the brightest and best young people in America who are applying to medical school. It’s absolutely a gift, and just a lot of fun.”

some of the hurdles overcome in admissions

“I do think that the medical school and the medical community have addressed the issue of gender imbalance; it’s pretty much become a gender-neutral process.

“The issue of maintaining diversity in the class is an ongoing challenge. There’s a short supply of historically underrepresented minorities in the applicant pool: Mexican-Americans, Puerto Ricans, Native Americans and African Americans. Medicine has not been as attractive to them as it should be, so the competition for underrepresented minority students is very intense.

“There’s a lot of work taking place on bringing young people at the grade school, middle school and high school level into the medical community, but they need academic enrichment to be prepared for the competitive rigors of medical school. So it’s really a pipeline issue, an issue of making certain that the people you bring into this environment have the skills to succeed.”

current and future challenges in admissions

“Medical school admissions is biased toward people from affluent families. These people have the financial resources and come from families who value education. They go to the most selective elementary, middle and high schools and then on to the most selective colleges, so they come out with a substantial advantage. One of the ongoing challenges in medical school admissions is to try to get a class that’s also socioeconomically diverse, people who have life experiences that broaden the experience of the entire class. Medical students spend more time with their classmates than they do with any other group of people. They really have a lot of impact on each other, and they often see the world through each other’s eyes. A diverse class enriches the experience for the students and the faculty.”

why WUSM remains No. 1 in student selectivity

“I think this is a spectacular place. I think incoming students come and talk to our current students and understand that our students are nurtured, supported and encouraged; they recognize that this is a place that tries to bring out the best in everybody in our community. Students come here and expect that because we have such high academic credentials that they’re going to see a bunch of competitive, gnarly people, and in fact, just the opposite is true. They come here and see people who are supportive and are helping each other. They come to an environment where everybody succeeds; no one has to fail.”

his legacy and retirement

“I hope that I’ve communicated to students that it’s OK to do your best, and it’s OK to do something big. The practice of medicine is a privilege and it’s a lot of fun. The hope is that people who come to medicine will be excited by it every day, so they get up and feel happy about the activities that lie ahead. When the opportunities come along to do something big, I hope our students won’t shy away from them.

“I plan to dismiss my patients but look forward to continuing to interact with residents and their patients. I love fly-fishing, and I want to spend time with my great wife, and with friends and my 11 grandchildren in beautiful places.”

Since 1990, W. Edwin Dodson, MD, serving as associate dean for admissions and financial aid, has led the School of Medicine in recruiting remarkable students from all walks of life.

No. 1 in student selectivity
according to U.S. News & World Report

Highest academic credentials
of any class of medical students in the nation

30% to 50% increase in the number of female students

5% to 15% improvement in minority representation
Light already has a major role in medicine — specific wavelengths of light are used in various treatments and research efforts — but that role may be growing. X-rays, which are invisible to the eye, can make the stuff inside us visible. Ultraviolet light can treat skin diseases such as psoriasis. And bright light boxes help stabilize the moods of patients with seasonal affective disorder.

Beyond these applications, investigators at the School of Medicine’s Department of Anesthesiology are using genetic engineering to influence how cells respond to light.

One team is investigating proteins in the eye called opsins, which allow photoreceptor cells to convert light into vision and enable us to see, to activate other types of cells. This allows the scientists to use light to control cell behavior.

Other investigators are working with optogenetics — using light to influence specific neurons in animals in order to map brain circuits and understand complex behaviors related to sleep, depression, anxiety and pain.

Potentially their findings could allow the development of precisely targeted light-based therapies.
Ajith Karunarathne, PhD, activates opsin-expressing cells with a selected wavelength of light in an imaging laboratory.
You can see this page because your eyes have opsins — light-sensitive receptors in cell membranes — responding to varying light. Those subtle, natural responses suggest a daring idea: What if other body cells were modified to respond to light? Immune cells could speed toward a lighted wound; light pulses could regulate a heartbeat. This experimental concept is more useful than a simple on/off toggle; think of it more like a dimmer switch that can control the intensity of the response. Exploring various creatures’ opsins — from pufferfish to mosquitoes — will provide additional insights.

Opsins can do more than “see” in the way we typically think of seeing. In fact, they can activate cells to respond to their environments.

N. Gautam, PhD, professor of anesthesiology and genetics, and postdoctoral research associate Ajith Karunarathne, PhD, are exploring how light can cause opsins to behave in cells. When they inserted opsin proteins, which are G protein-coupled receptors (GPCRs), into cells, they found that by shining light on the cells, they could activate specific areas. This bit of genetic engineering permits opsins to activate other types of cells.

“Some of these opsins have properties that we thought might allow us to localize the signaling activity in a cell to a particular location in the cell,” says Gautam. “So we began experimenting, and we found that we could, in fact, localize the signaling to one side of the cell or another. A great deal of cell behavior results from signaling where the cell will sense something on its right, for example, and then move toward that substance, or move away from it.”

An immune cell, for instance, that receives a signal and senses a bacterial infection or inflammation, will travel in the direction of the bacteria or the inflammatory molecules. When Gautam and Karunarathne inserted opsins into immune cells, the cells moved towards a light beam.

“We can use light as a kind of ‘on-off’ switch to control cell behavior,” says Gautam. “Much of the way cells behave is due to their ability to sense signals in the environment. In our experiments, the cells sense the presence of light.”

In neurons, they have used light to coax the cells into growing new branches called neurites. They are planning similar things in heart cells and in pancreatic cells.

The goal with the heart cells would be to use light to slow down, or speed up, the rate at which the cells pulse. In pancreatic cells, they want to use light to get the cells to secrete insulin.

“We believe that with these techniques, it’s likely that any process that can be controlled by signaling from GPCRs can also be controlled by light,” Gautam says.

Although Gautam believes that inserting opsins into cells has immense therapeutic potential, he says it will be a while before the strategy is ready for clinical use. For one thing, it will require gene therapy in order to introduce the light-sensitive proteins into specific cell populations. For another, it will require a way to introduce light into cells deep inside the body, perhaps using micro-light emitting devices (LEDs).

While his laboratory is working on ideas to take this strategy from the culture dish into whole animals, they also are creating a library of several different opsin proteins capable of controlling cell behavior.

“As we move forward, one of our goals is to continue testing multiple opsins from different organisms to learn which ones work best,” he says.
Light can influence neurons in animals that have been genetically engineered so that specific neurons will be activated and respond to light. Michael R. Bruchas, PhD, assistant professor of anesthesiology, and Robert W. Gereau IV, PhD, professor of anesthesiology and of neurobiology, are part of a group of scientists working in optogenetics.

Through their work with collaborator John A. Rogers, PhD, and engineers at the University of Illinois, they received a $3.9 million Transformative Research Project award supported by the National Institutes of Health (NIH). The researchers developed microscale, light-emitting devices (LEDs) — the first use of these devices in optogenetics — that allow them to map the properties of neural circuits involved in injury, pain, anxiety and other problems.

Bruchas was able to implant the devices in mice, prodding their neurons to release dopamine, a chemical associated with pleasure. Because the LEDs are wireless and tiny, they don’t interfere with normal behaviors. The mice move freely about their cages and can explore a maze or run on a wheel.

Bruchas and the investigators taught the mice to poke their noses through a specific hole in a maze. Each time, the system wirelessly activated the micro-LEDs, which emitted light, causing neurons to release dopamine.

“The micro-LEDs activated networks’ cells that are influenced by the things humans also find rewarding, like sex or chocolate,” says Bruchas. “When the cells were activated to release dopamine, the mice quickly learned to poke their noses through the hole even though they didn’t receive food as a reward.”

He says the devices should allow scientists to identify and map brain circuits involved in many complex behaviors. “Understanding which populations of neurons are involved in these complex behaviors may allow us to target specific brain cells that malfunction in depression, pain, addiction and other disorders,” Bruchas says.

In Gereau’s laboratory, the devices are implanted near peripheral nerves to interrupt or redirect pain signals. “Rather than identifying specific stimuli, we just want to turn off the cells causing pain,” says Gereau, who is director of the Washington University Pain Center.

But before those devices will relieve pain or stress, patients will need gene therapy that makes certain cells respond to light signals.

Gereau believes a common-sense strategy for doing so lies in a viral attack on the peripheral nervous system. “If we can find a way to use a harmless version of the herpes simplex virus to deliver light-sensitive proteins to peripheral nerve cells, we believe we may be able to control the activity and signaling of those cells,” says Gereau.

Bruchas, Gereau and colleagues hope that someday their work with micro-LEDs may illuminate ways of controlling behavioral disorders and pain in humans. []

Depression, pain, stress, addiction — which cells play a part? Micro-scale lights (smaller than the eye of a needle) can help illuminate these vexing questions. For example, in the mammalian brain at right, only genetically modified, light-sensitive neurons are activated, resulting in modified behaviors. There may be a way — perhaps via a harmless virus — to deliver light-sensitive proteins to human nerve cells. These bright ideas could someday alleviate pain, modify mental disorders and otherwise improve the human condition.
When ultrasound screenings in pregnancy indicate that babies’ tiny systems may be developing irregularly, or family medical histories suggest anomalies may occur, doctors from around the region refer mothers to the Fetal Care Center (FCC). With their hopes badly shaken for an uneventful pregnancy and a healthy baby, families arrive at the center longing for answers, for interventions from medical science, for hope. And they find these things, in their many forms, as they are guided through a compassionate sequence of physical and emotional care.

FCC medical co-director and neonatologist Barbara B. Warner, MD, MSCE, specialized in newborn medicine because she was drawn to working with ill and premature newborns and their families. “Helping and supporting is a great privilege,” says Warner, professor of pediatrics in the Department of Pediatrics, whose neonatal group is ranked among the top three in the United States, according to U.S. News & World Report.

Adds medical co-director and medical geneticist Lisa M. Bernhard, MD, “With our comprehensive, in-depth care, we give babies their very best possible chance. We do all we can to make these terribly stressful months in families’ lives as easy and as seamless as possible.”
Although every major medical center has some type of coordinated fetal care, center founder and director George A. Macones, MD, MSCE, explains the goal of the Fetal Care Center, which is a joint effort of Washington University School of Medicine, Barnes-Jewish Hospital and St. Louis Children’s Hospital.

“We are fully focused on our patients — mother and baby — and the family. We bring very upset parents into the Fetal Care Center, which is part of a complex quaternary medical center made up of world-class physicians and hospitals, but we make sure they get lots of information and know we’re taking complete care of them through this difficult time,” says Macones, the Mitchell and Elaine Yanow Professor, head of the Department of Obstetrics and Gynecology, and that department’s director of maternal–fetal medicine and ultrasound. “That special care isn’t just during the initial evaluation: It extends through pregnancy, delivery and afterward.”

Macones is internationally known as a clinician and perinatal clinical researcher.

Overseeing all the personal attention patients receive is a nurse coordinator at the FCC or, if a cardiac problem is involved, from the Fetal Heart Center, part of the St. Louis Children’s and Washington University Heart Center. Nurse coordinators like Christine Hoover, BSN, RN, are a resource and partner throughout the journey to delivery. “We’re with families from the time they arrive until we walk them to their car,” she says. Nurse coordinators accompany mothers to all tests, meetings and consultations, “making sure everyone is on the same page and answering families’ questions.

“We also tour the facilities to help parents feel comfortable,” Hoover continues. “If we see it’s too much, we stop.” Recently a mother told Hoover, “Yes, I really want to see the NICU.” But when they entered the hushed, darkened room, where sick infants slept next to sophisticated instrumentation and some parents sat crying, she burst into tears.

“We postponed the rest,” Hoover says. “We always act on the patient’s wishes, including rescheduling appointments and obtaining temporary physician privileges at Barnes-Jewish if a patient wants her own obstetrician to deliver her baby. As many as 12 extended family members have attended consultations! We do everything we possibly can to make things better.”

Diagnosing a fetal anomaly that confirms or modifies a referring physician’s finding — or discovering that the fetus is normal — is the work of the ultrasound and genetics side of maternal–fetal medicine. “When we find an abnormality, we look very carefully for other problems, because very often when one exists, other conditions are present that may not have been identified,” says Bernhard, assistant professor of obstetrics in the Department of Obstetrics and Gynecology’s Division of Maternal–Fetal Medicine (MFM). “Then we discuss what, with patient consent, should be done — such as amniocentesis or a fetal MRI — to try to discover why a particular birth defect has occurred.” Following the comprehensive assessment, “We go in right away to talk with the parents, and then we contact the referring physician.”

Jacqueline Turner, MD, of West End Ob/Gyn, in St. Louis, sends all her pregnant patients to the ultrasound and genetics group for their early, routine ultrasound. “We prefer that those physicians do the screening,” she says, “because if there’s an issue, we know they’ll find it. If something major is wrong, they actually call me at the time they’re doing the ultrasound.” For families and referring doctors alike, she adds, the FCC is a “great service.”

Leading the ultrasound and genetics team is maternal–fetal medicine specialist Anthony A. Odibo, MD, MSCE, whose ultrasound and fetal-abnormality research is known worldwide. Odibo is also skilled in treating Twin-Twin Transfusion Syndrome (TTTS), which can affect identical twins who share a single placenta. In this condition, one twin transfuses blood to the other, producing anemia and drastically slowed growth in the donor and excessive growth and blood volume in the recipient.

He and his colleagues also use endoscopic surgery to place shunts in tiny obstructed bladders, and they correct amniotic band syndrome, wherein a strand of the amniotic sac membrane has wrapped itself so tightly around the baby that loss of digits or blocked placental blood delivery can occur.
“We provide evidence-based, safe care,” says Odibo, professor of obstetrics and gynecology and vice chair for women and fetal imaging. “Before we use new procedures in which some risk may be involved, the situation must be one in which we know definite evidence exists that prenatal surgery or intervention is better than doing nothing. That’s where we differ from some of our competitors.”

Fetal cardiac problems account for about 50 percent of anomalies seen at the Fetal Care Center. In all cases, once the MFM specialists have examined the heart and the whole baby, fetal cardiac nurse coordinator Kym Galbraith, BSN, RN, accompanies mother and family to the adjacent Fetal Heart Center. There, pediatric cardiologists use echocardiography in a 30- to 60-minute noninvasive test to check cardiac function and structure.

“Our heart center is completely full-service,” says Caroline K. Lee, MD, assistant professor of pediatrics, associate director of the Pediatric Cardiology Fellowship Program and director of fetal cardiology. “Every heart specialty is represented.”

The professional roster at Children’s, a leading transplant center, includes three electrophysiologists, not found at many centers, three cardiac catheterization physicians and 50 specialists who can administer extracorporeal membrane oxygenation (ECMO), an advanced treatment that does the work of heart and lungs. The hospital’s pediatric subspecialists represent every existing category, ready to step in as needed before and after delivery, and newborn neurology provides neurological imaging, monitoring and consultation.

When a sick infant is born at Barnes-Jewish Hospital, with every necessary expert in attendance, the child is stabilized and placed in a life-supporting isolette. A specialist takes the newborn and father to the Newborn Intensive Care Unit (NICU), where a neonatology nurse coordinator waits. The mother and an attendant visit shortly afterward. Seeing their infant for the first time marks the start of a second, hopeful journey for many parents, who have already learned about planned treatments or surgeries.

But about 20 percent of FCC families, says Warner, “have infants with lethal disorders. And while we may not be able to reverse that process, we provide the baby with warmth, pain medication — whatever he or she needs to be comfortable. And if a baby will die, we can still provide the family with a meaningful experience with their child that they’ll always cherish.”

Regardless of the prognosis, Joan L. Rosenbaum, MD, director of palliative care and professor of pediatrics, is central to providing comfort and support. Rosenbaum gets to know the families personally in the months before birth and helps them identify their wishes. Among these may be spiritual requests, such as wanting their infant baptized.

“Joanie writes a beautiful letter detailing the parents’ wishes, so that they are communicated to everyone involved in their infant’s care,” says Hoover, the nurse coordinator. “Just last week, a family from southern Missouri met with her. The first hospital they visited wouldn’t allow them to have a photographer and other simple things that would mean everything to them. They decided to come here for care because they felt, in the mom’s words, that we honored her and her baby and valued them both.”

As the FCC looks to the future, one goal is overarching. And that, as Lisa Bernhard puts it, is further refining and focusing on the patient experience.

“Our physicians and staff care so much more than our patient families even realize,” says Christine Hoover.
The promise of a healthy pregnancy sometimes changes in a heartbeat. The Fetal Care Center (FCC) helps these mothers and families walk their more challenging paths, offering world-class medicine in a sensitive, caring environment.

Visit FetalCare.org

**Cause for concern**
A routine checkup near the end of the first trimester indicates a possible anomaly in the pregnancy. The woman’s physician refers her to the FCC for further evaluation.

**All things considered**
A nurse coordinator welcomes the family and escorts them through the diagnostic sessions. Single problems can signal multiple issues; tests range from imaging to genetics and more.

**Family matters**
The FCC responds with sensitivity and respect to families’ needs during these difficult, stressful days. The prognosis is carefully considered and support provided for making choices and moving forward.
The journey continues

_In utero_ interventions may be essential for further diagnoses or to stabilize the pregnancy. The care team coordinates an evidence-based medical plan that maximizes health benefits and minimizes risks.

The big day arrives

A team of specialists stands ready to deliver skilled care before, during and after delivery. Every baby has a spectrum of special needs; the team works to meet those needs and honor the family’s wishes.

Newborn and beyond

Very sick infants receive optimal care during their too-short lives. Many more babies will benefit from specialty procedures during the months ahead, helping ensure lifetimes of happy birthdays.

Hayden Hoskins is just one of the many infants cared for at the Fetal Care Center. Ultrasound revealed Hayden’s omphalocele; his organs were growing outside his belly. Parents Andy and Kelsea were referred to the FCC. After Hayden was delivered at Barnes-Jewish Hospital, he was rushed to the NICU at St. Louis Children’s Hospital. Five months later, a surgical team placed his organs internally. Today, Hayden has a lot to smile about.

**Go, Team Hayden!**

**Hayden’s Team:** Christine Hoover, BSN, RN, nurse coordinator; Brittany Knipstein, MD, fellow, neonatology; Brad W. Warner, MD, the Jessie L. Ternberg, MD, PhD, Distinguished Professor of Pediatric Surgery and surgeon-in-chief, St. Louis Children’s Hospital; baby Hayden Hoskins; parents Andy and Kelsea Hoskins; Alison G. Cahill, MD, MSCI, assistant professor of obstetrics and gynecology; Shannon Waller-Reed, BSN, RN, nurse coordinator

**ROBE**

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Minimally invasive surgery

CHOIC

Stereotactic body radiation therapy
Week after week, newly diagnosed patients with early-stage lung cancer — mostly men in their mid-60s who are longtime smokers — come to Washington University physicians, seeking a successful form of treatment. If they are otherwise healthy, thoracic surgeons Traves D. Crabtree, MD, and Varun Puri, MD, perform minimally invasive surgery to remove the lesion; if they have complicating conditions that preclude surgery, radiation oncologist Jeffrey D. Bradley, MD, relies on stereotactic body radiation therapy (SBRT). But for patients in the gray area between the two extremes, which treatment is best?

For several years, these physicians and surgeons have been trying to resolve this question by mining local and national databases of past patients for answers. Further, they have been working collaboratively, without the competition often seen at other institutions. Together, they are not only trying to determine which therapy to use in which cases, but more broadly what characterizes “risk” in such patients. Does it mean diabetes, coronary artery disease or respiratory problems? Which factors really matter in determining a patient’s ability to survive surgery and return to the best possible stamina and function?

“The colleagues we have aligned in thoracic surgery and radiation oncology are unique,” says Bryan F. Meyers, MD, MPH, chief of thoracic surgery and the Patrick and Joy Williamson Professor of Surgery. “We scrutinize each other’s patient data together, we go over each analysis together and we have no shyness about challenging the other’s work. Our papers have truly been joint efforts and represent our best effort to inform the patients about the most likely outcomes from either modality.”

The result has been national prominence in this area for Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine. “Only a handful of other institutions have looked at this problem in as much detail as we have,” says Crabtree, assistant professor of surgery, who was the first author on a 2010 study comparing groups of patients treated with both therapies and tracking long-term outcomes.
Small-incision surgery

Removing the lobe of the lung containing the cancer has long been the recommended treatment for early-stage non-small cell lung cancer, a biologically aggressive disease with a five-year survival of 60 to 75 percent. In recent years, cancer surgery has become safer, with a surgical mortality rate of just 1 percent; recovery is also much easier because of the increasing dominance of minimally invasive techniques. More than 75 percent of lung cancer surgery at Barnes-Jewish Hospital is now done using this approach.

“Large-incision patients will feel much worse than those who have had three small incisions and cancer removal. Small-incision patients go home sooner, feel better, are less likely to need pain medications and are more likely to be independent,” says Puri, assistant professor of surgery.

“Long-term, oncologically, this surgery provides equal benefit to the big operation.”

These minimally invasive techniques mean thoracic surgeons are more likely to offer surgery to a patient with complicating conditions because they can do the operation more safely than they could have a decade ago. Thus, the gray area of patients who may or may not be candidates for surgery has shrunk somewhat because of these surgical innovations.

Before they adopted SBRT as a treatment option in 2004, their results from the previous method — daily radiation for 35 treatments — were “just lousy,” says Bradley, the S. Lee Kling Professor of Radiation Oncology. Intrigued by reports of SBRT, he traveled to Germany and Japan to learn the technique, and he and his colleagues became national leaders in adopting it. They have since treated some 500 patients, and the outcome “has been excellent,” he adds. “Our primary tumor control rate is better than 90 percent, and we’re thrilled with the results.”

SBRT works so well because it is a precisely targeted treatment in which radiation beams are arrayed around a tumor, and the maximum dose is focused directly on the cancer, minimizing the exposure of adjacent tissue. Specialized equipment is necessary for the therapy: body-positioning apparatus to keep the patient immobile for the 30-minute session, and a linear accelerator with multi-slice CT imaging that shows even slight tumor movement. Over a week’s time, a patient has three to five treatments and then is done, with little post-operative discomfort.

Bradley’s early advocacy for SBRT drew the attention of thoracic surgeons, and his team began collaborating with them on widely published multidisciplinary research.

Recently, Clifford Robinson, MD, assistant professor of radiation oncology, became chief of the SBRT service. The service has grown under Robinson’s leadership, and he undertook surgery/SBRT analyses with Crabtree and Puri.

“Without Cliff’s work, we would not have been able to accomplish these studies,” says Crabtree.

Precision radiation

These studies will better inform patients and physicians regarding probable therapeutic outcomes.

For those patients who fall within the puzzling gray zone, further research is needed. After Crabtree’s 2010 paper in The Journal of Thoracic and Cardiovascular Surgery, Puri — who has received support from an NIH Career Development Award and from the Foundation of Barnes-Jewish Hospital — was principal author of an analytic modeling paper that looked at cost-effectiveness for both options. These studies, based on retrospective data, showed that surgery was somewhat more expensive than SBRT but resulted in better overall survival. In the gray-area patients, cancer-specific survival was similar between SBRT and surgery.

For even more conclusive results, the best solution would be to mount a prospective trial, randomizing new patients to SBRT or surgery — but that has proved difficult. Three multicenter national trials have failed to accrue enough patients; the last one, with Bradley as a principal investigator, closed in May 2013. In large part, the reason is that patients have strong opinions about the form of treatment they want.

“On one end of the spectrum, patients say: ‘I want this out of me. Let me have surgery.’ On the other end, they say: ‘I am 75 years old, and you think I want to have a big surgery? If SBRT doesn’t work, I can have surgery afterward.’ It is hard to randomize patients because you’re taking the choice away from them,” says Bradley.

Right now, he and his colleagues continue to plan new studies. Thoracic surgeon Stephen Broderick, MD, is collecting data on the quality of life of lung cancer patients treated either with surgery or with SBRT. In the short term, Crabtree, Puri and Robinson hope to develop one computer-based algorithm for SBRT patients and another for surgery patients, so that physicians will be able to describe their chances of long-term survival with each method.
Why people with Parkinson’s disease may want to put on their dancing shoes.

By Judy Martin Finch

Paradoxically, complex dance moves could benefit patients with movement disorders: Gammon Earhart, PhD, dances with participant Don Burr.
It is fitting that Gammon Earhart began her research career working with a device that resembles a giant turntable. Music — tango music in particular — has become an important component of her work with Parkinson’s disease.

Earhart, PT, PhD, associate professor of physical therapy, neurology and neurobiology, used a rotating treadmill for studies on healthy people while she was a postdoctoral researcher at Oregon Health & Science University. Her research demonstrated that when people walk on a rotating surface for a period of time, then step off, they are unable to walk in a straight line. The process forces them to turn.

She took her research to Washington University School of Medicine when she joined the faculty of the Program in Physical Therapy in July 2004. She began working with people with Parkinson’s disease, a chronic and progressive movement disorder that involves the malfunction and death of neurons. As the disease progresses, people are unable to control movement normally.

“Turning is something that people with Parkinson’s disease are particularly troubled by,” says Earhart, a member of the Movement Disorder Center in neurology. “They try to make a turn but get stuck and feel like their feet are glued to the floor. That can lead to falls and the consequences related to falls.”

One of her key goals is to help them make turns. “It was that interest in turning behavior — in healthy people and in Parkinson’s patients — that eventually led me to the dance floor,” she says.

In 2005, Earhart attended a Society for Neuroscience meeting and saw Canadian researchers present an abstract focused on frail, elderly individuals randomly assigned either to walk in a group for exercise or learn to dance the tango. The researchers’ findings indicated that those assigned to dance had improved their balance more than those assigned to walk.

When Madeleine Hackney, PhD ’09, a professional dancer turned graduate student, began working in Earhart’s lab, it gave Earhart an idea. “I thought, ‘Madeleine can certainly do the tango.’ And after talking to her, Madeleine agreed that we should try a pilot study incorporating the dance for people with Parkinson’s,” she recalls.

It proved difficult to recruit patients at first. Many thought they couldn’t dance — especially the tango — with a disease as limiting as Parkinson’s. But eventually enough patients were recruited, and the pilot study went well.

“The participants were pleasantly surprised at how much they could still do, and they enjoyed it,” Earhart says. “And our outcome measures showed that, when compared with a group of people who had taken a traditional exercise class, there were more significant improvements regarding balance and walking in the people in the tango group.”

Encouraged and excited by the results, Earhart and Hackney moved forward with their research. Subsequent studies have included 10 days of classes over two weeks, which the researchers refer to as “Tango Boot Camp,” to a study that offered classes twice a week for a full year. The most typical design, however, offers classes twice a week for three months.

Their findings have shown that tango-dancing patients experience improvements that are as good as or better than those who exercise using other forms of dance, such as the waltz or fox-trot, or alternative approaches, such as T’ai Chi.

Earhart theorizes that tango’s benefits come from incorporating specific movements that people with Parkinson’s often have difficulty performing, such as walking backward.

The most important finding has come from the year-long study. Participants were evaluated before they started dancing and then again after three months, six months and 12 months. This group was compared with another group of people who had Parkinson’s but were not exercising over the same time period.

“We noted that at three months and then again at six and then 12 months, the people who were participating in tango dancing were improving instead of deteriorating, which is unexpected...
for people with a neurodegenerative disease like Parkinson’s,” Earhart says. “That suggested we were potentially modifying the trajectory of the disease’s progression with participation in the tango exercise program. That could have very positive ramifications.”

Earhart noted other improvements in the study participants’ lives, as well. Some picked up activities they previously had given up, and some engaged in new social activities. Increased activity did not occur in the non-dancing group.

Susan Deusinger, PT, PhD, FAPTA, director of the Program in Physical Therapy, says that Earhart “has emerged as a leader in understanding the neurological foundation of movement and how degenerative diseases of the brain affect movement, health and function in daily life. While her work is especially important for patients with Parkinson’s disease, it also represents a line of inquiry that blends basic and applied themes in creative and innovative ways.”

In a new study, supported by a recent $1.5 million grant from the National Institute of Neurological Disorders and Stroke, Earhart will compare tango dancing to walking on a treadmill. She plans to control for social factors as much as possible by arranging the treadmills in clusters so participants can talk to one another, as dance partners do.

In addition to evaluating each participant’s gait, balance, cognitive function, severity of disease and quality of life, Earhart will utilize neuroimaging with functional MRI (fMRI) as part of the study.

Joel Perlmutter, MD, professor of neurology, radiology, neurobiology, physical therapy and occupational therapy, has a database that includes more than 2,400 Parkinson’s patients, some of whom may be potential candidates for Earhart’s study, which calls for 120 participants.

“We hope to determine whether brain activity or brain connections change as a result of participating in the exercise programs, and whether the changes that result from tango dancing are the same as or different from the changes that result from using a treadmill,” Earhart says. “We want to determine whether the changes we see in the brain are related to changes in physical performance.”

Earhart says her research would be more difficult, if not impossible, if she were somewhere other than the School of Medicine. “There’s no way we could involve so many participants without the resources provided through the Movement Disorder Center and the Greater St. Louis American Parkinson Disease Association.”

“We found that the people who were tango dancing were improving instead of deteriorating, which is unexpected for people with a neurodegenerative disease like Parkinson’s.”

— Gammon Earhart, PT, PhD
1940s

Llewellyn Sale, MD 40
Sale, a resident of St. Louis MO, continued to work part-time until June 2011. In retirement, he enjoys reading, mild exercise and Wii bowling.

Barber Mueller, MD 42
Mueller is retired and resides in Ontario, Canada. He completed the final paragraphs of Excalibur, The Sword of Science that Shaped the World, a book he had been working on for the past eight to 10 years. It brings an overview of ideas generated during the Age of Science that have forever changed our perception of the universe and of man’s place on Earth.

John Wilson, MD 43
Wilson and his wife, Helen, recently celebrated their 69th wedding anniversary. One of his fondest memories from medical school is meeting Helen, a Barnes Hospital dietitian, in the cafeteria.

1950s

Rudenz Douthat, MD 54
Douthat is retired and living in Fredericksburg TX. He has been honored by the American College of Emergency Physicians (ACEP). He looks forward to reuniting and celebrating with fellow 1954 classmates at Reunion 2014.

Robert Winter, MD 58
Winter was honored by the Scoliosis Research Society in 2012 with its Lifetime Achievement Award and the founding of the Robert B. Winter Global Outreach Education Fund.

If you wish to make a tribute gift in honor of any of the above alumni or faculty, please contact: Pamela Buell, Washington University Medical Alumni and Development, Campus Box 1247, 7425 Forsyth Blvd., Suite 2100, St. Louis MO 63105-2161, (314) 935-9691.

1960s

Melvin Dace, MD 62
Dace recently retired as Chief of Stadium Medical Operations for the University of Florida football team — the Florida Gators — after having held the position for 17 years. He also served as assistant medical director of the 1996 Olympics in Atlanta GA and for 25 years as a cardiologist in private practice.

John Crane, MD 64
Crane works two days a week at a mental health clinic. He looks forward to celebrating his 50th wedding anniversary next year with his wife, their three sons and seven grandchildren. Crane and his wife travel often in their small motor home with yellow lab, Lily Pearl. He also enjoys sailing with his sons at Carlyle Lake.

Doris Abrams, NU 67
Abrams retired after 43 years of practice in various areas of pediatric nursing (neonatal ICU, med/surg, rehab, school nursing, home care) and is now enjoying gardening, travel, reading, movies, theater and maintaining “kid-kontact” at a local early childhood center.

1970s

Bruce Fisher, MD 70
After retiring from full-time work in 2011, Fisher has been teaching at Jersey Shore University Medical Center focusing on clinical reasoning and basic bedside skills. In 2012, he co-authored the 3rd edition of Lippincott’s Illustrated Reviews: Microbiology.

Marshall Bloom, MD 71
Bloom maintains an active career at the National Institutes of Health as both chief of the Tick-Borne Flavivirus Section and as associate director for scientific management at Rocky Mountain Laboratories in Montana. In 2011–12, he was chairman of the organizing committee for the American Society for Microbiology Biodefense and Emerging Diseases Conference, and he was elected a Fellow of the American Academy of Microbiology in 2013.

1980s

Charles Ettelson, MD 78
Ettelson has retired from clinical practice and started a second phase of his career as a medical director at UnitedHealthcare, St. Louis. He recently appeared as a contestant on “Jeopardy,” and his performance is viewable on YouTube.

Chris Pool, HA 83
Pool is with UnitedHealthcare Military & Veterans Services as chief executive officer for the Northwest region. He is responsible for TRICARE field operations for Washington, Oregon, Idaho, Montana, Alaska and Northern California.

Margaret Steinhoff, MD 83
Steinhoff is director of surgical pathology and chair of the cancer committee at Women and Infants Hospital of Rhode Island.

1990s

Joan Blomquist, MD 92
Blomquist is chief of the Division of Urogynecology and Reconstructive Pelvic Surgery at Greater Baltimore Medical Center. Additionally, she travels annually with the International Organization for Women and Development to Niger and Rwanda to perform and teach fistula surgery.

Jane Chen, MD 93
Chen is an associate professor of medicine in cardiology at Washington University School of Medicine. She focuses her practice on patients with diagnosed or suspected heart rhythm abnormalities, pacemakers or defibrillators and was recognized as a “Best Doctor” in 2011 by St. Louis Magazine. She enjoys spending time with family (sons Marcus and Harrison), reading and playing the piano.

Marc Seidman, MD 98
Seidman is a pediatrician living in Fort Collins CO. He and his wife have two daughters, Gabi and Anna.
2000s

Jared Hershenson, MD 04
After completing a pediatric cardiology fellowship at Nationwide Children’s Hospital in Columbus OH, Hershenson is now working in the greater Washington DC area with Child Cardiology Associates.

Andrew Zimolzak, MD 07
Zimolzak completed an internal medicine residency and chief resident year at Saint Louis University. He is now enrolled in a master’s program in medical informatics at Harvard Medical School. He and Elizabeth Moulton, GM 11, MD 11, are engaged.

Michelle Moniz, MD 08
Moniz has been selected as a 2013 Robert Wood Johnson Foundation Clinical Scholar. She will conduct innovative research and work with communities, organizations, practitioners and policymakers to take a leadership role in improving health and health care in the United States. Her fellowship begins at the University of Michigan in fall 2013.

In Memory

Jane Arax Erganian, BA 37, MD 41
Erganian died on March 3, 2013. She was 96. She pursued a specialty in pediatrics. While a resident at New York Hospital, she met her husband, Armig G. Kandoian. With him she raised three daughters and eventually returned to her profession, enjoying many years as Senior Public Health Physician for the New Jersey State Department of Health.

Vergil Slee, MD 41, MPH
Slee died at age 94 on July 31, 2012. After completing a medical internship at Barnes Hospital, he became a flight surgeon for the U.S. Air Force, then earned an MPH from the University of Michigan. He founded the Professional Activity Study (PAS), the prototype of computerized hospital discharge systems used today.

John Farrar, MD 45
Farrar died on June 26, 2012, at age 92. After serving in the U.S. Army Medical Corps, he trained in gastroenterology. He taught at Boston University School of Medicine and Cornell University College of Medicine before becoming the chair of the Division of Gastroenterology at the Medical College of Virginia (now VCU Medical Center). He served in several positions for the U.S. Department of Veterans Affairs. After retiring, he remained active in medicine and in his community.

Henry Hosford, MD 51
Hosford died on June 13, 2012. A World War II U.S. Army veteran and New Mexico native, he moved to St. Louis to attend Washington University School of Medicine and receive medical training. He returned to New Mexico and practiced medicine there for more than 50 years.

Prudence D’Angelo, NU 52
D’Angelo died on Sept. 18, 2012, at age 83. She was a pediatric nurse.

John Commerford, MD 53
Commerford died on Feb. 4, 2012. He served as a medical officer in the Public Health Service. He moved to St. Charles MO, where he was a partner in a private medical practice, practiced with Boonslick Medical Group, and had hospital privileges at St. Joseph’s Hospital where he served as chief of family practice and chief of staff.

Andrew McCanse, MD 54
McCanse died on July 21, 2012. He served in the U.S. Army in Korea before returning to Jewish Hospital for a surgical residency. He practiced general surgery for 22 years and became the first chair of the Department of Surgery at the University of Missouri-Kansas City School of Medicine. Later he switched his specialty to occupational medicine, which he practiced until his retirement.

Richard Braun, MD 55
Braun died on Dec. 2, 2012. After medical school, Braun and his wife, Gertrude Braun, NU 54, served together at hospitals in Ghana caring for patients and training nurses and medical students. Later he worked on the board of the Tennessee Health Care Campaign.

Patricia Simpson, NU 55
Simpson died on Jan. 2, 2012, in Memphis TN. She spent 42 years as a registered nurse and was a nursing home administrator for 22 of them.

John Vander Woude, MD 78, HS 85
Vander Woude died on July 10, 2012. He was 58. After graduation, he entered the surgical residency program at Washington University School of Medicine. He moved to Texas for a cardiovascular surgery fellowship and completed a fellowship in pediatric cardiac surgery at the University of California, San Francisco. He was director of cardiothoracic surgery at Sanford USD Medical Center in Sioux Falls SD. He participated in surgical and medical missions in Kenya, China and Ecuador as well as volunteer work in his home community.

Ira C. Gall, MD, HS
Gall died on March 29, 2013. After completing his medical degree at the University of Cincinnati, Gall served as a physician in the U.S. Air Force before moving to St. Louis to complete a residency in obstetrics and gynecology. He went on to practice medicine at Barnes Hospital and later co-created Obstetrics and Gynecology, Inc., and Medicine Shoppe International. He was a philanthropist and strong community supporter.

Faculty

George Sato, MD 47, LA 96
Sato died on Feb. 5, 2013. In addition to his private pediatrics practice, Sato was a clinical professor at Washington University School of Medicine. He received the Washington University Medical Center Alumni Association Alumni Achievement Award in 1982.

Benje Boonshaft, LA 57, MD 61
Boonshaft died on June 24, 2012, at age 76. An assistant professor emeritus of clinical medicine, he served in the U.S. Air Force Hospital during the Vietnam War. He helped build and co-found Willowbrook Medical Center in Creve Coeur MO and was an internist for the St. Louis Blues.

outlook.wustl.edu

Outlook 27
Cancer and Personalized Medicine

BY STEPHANIE STEMMLER

We are redefining how cancer is diagnosed and treated.

At the forefront of personalized medicine, Washington University is conducting groundbreaking research to identify genetic and molecular changes that trigger cancer. We are translating that research into innovative diagnostic tools for individualized treatment. Our oncologists and radiologists are inventing better technologies to identify cancers and pinpoint their treatments. The result? Patients receive personalized care that is more effective and easier to tolerate.

More than 350 Washington University physicians and researchers are engaged in cancer treatment and research. And the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine serves more than 50,000 cancer patients annually. From prevention to care, education, research and outreach, Siteman Cancer Center is recognized as one of the great Comprehensive Cancer Centers in the United States by the National Cancer Institute. Our physicians help set national and global standards for cancer treatment as one of only 23 centers in the National Comprehensive Cancer Network.

Physicians at the School of Medicine and Siteman use a collaborative, multidisciplinary team approach to tackling cancer. Through investments in prevention, education, care and research, they say, the day will come when most cancers are preventable or treatable. Partner with us to reach that attainable goal.
Wanting to make a difference in the fight against cancer, Harvey Saligman and his wife, Linda, saw an ideal opportunity. Diagnosed with multiple myeloma seven years ago, Saligman discovered that even though his disease was one of the most common types of blood cancer (lymphoma and leukemia among them), most research dollars went to other types of cancer.

“I’m convinced that this particular cancer can be cured,” Saligman says. “We wanted to accelerate that time frame by supporting research efforts.”

The Harvey and Linda Saligman Multiple Myeloma Research Fund, established in 2009, is paying dividends in terms of cancer research accomplishments. In the past year, two new drugs have received federal approvals to treat multiple myeloma, both the result of clinical trials in which Washington University was a leading research site.

“Thanks to support from the Saligmans, we’ve been able to get a critical mass of basic science researchers to focus on this disease and broaden our multifaceted effort to study the biology of multiple myeloma,” says Ravi Vij, MD, associate professor of medicine in the Division of Oncology. “It also enables us to conduct clinical trials, which are leading to new medications, such as the two that were recently approved.”

“We’ve already made great strides in improving the life expectancy of patients with multiple myeloma by helping to find new therapies as a result of this gift,” says Division of Oncology Chief John F. DiPersio, MD, PhD, the Virginia E. and Sam J. Golman Professor of Medicine in Oncology.

“It is so exciting to see the young scientists who actually are doing this work,” says Linda Saligman. “Because of their efforts, there is hope. Now that some of the research is also focused on the potential inherited aspect of this disease, there is hope for generations to come.”

Adds Harvey Saligman, “I’ve seen unbelievable advances in myeloma research here. The best part about going public about our own experience with this disease is that hopefully it will attract other people to give so that the momentum we have going can really make a difference.”

The university also has established a large myeloma tissue bank for ongoing research and is a member of the Multiple Myeloma Research Consortium — 13 U.S. academic centers focused on speeding the development of new therapies.
As genomic discovery research finds more genes that are commonly altered, leading to various types of cancer, treatment will focus not only on the body part being treated — breast, colon or prostate, for example — but also on the genetic blueprint of the disease.

"Precision cancer medicine will mean that therapeutic decisions are based on the underlying mutations in each patient's tumor," says Elaine R. Mardis, PhD, co-director of The Genome Institute at Washington University.

More than 10 years ago, Institute scientists played a leading role in an international effort, the Human Genome Project, that decoded the complete sequence of human DNA. Today, the Institute is one of only three U.S. large-scale genomic centers funded by the National Institutes of Health (NIH).

In the fight against cancer, research at the Institute has breathtaking consequences. In 2008, a team of researchers led by Timothy J. Ley, MD, the Lewis T. and Rosalind B. Apple Professor of Oncology, was the first to sequence the entire genome of a cancer patient, a woman diagnosed with acute myeloid leukemia (AML), thanks to a generous gift from Alvin J. Siteman. By comparing her cancer genome to similar data obtained by sequencing the patient's healthy cells, the team identified 10 mutated genes, setting the stage for using next-generation sequencing and analysis to decode hundreds of cancer cases.

Now Institute researchers have completely sequenced the DNA from paired tumor cells and healthy cells of more than 1,000 patients, effectively transforming the field of cancer genomics. The resulting data has had profound consequences for understanding the genetic basis of cancer, has identified key genes related to predicting outcome in several cancer types and has helped researchers consider how to make cancer therapy choices more precise, based on the mutations underlying individual tumors.

Researchers say more funding could speed up whole genome sequencing for oncology. Six years ago, sequencing the whole genome of the AML patient took eight months. Today, it takes 28 hours. "I envision going from completing whole genome sequencing for 12 patients a year to hundreds of patients a day," says Institute director Richard K. Wilson, PhD. "We need to make this process more efficient; you can’t do precision medicine without the basic genome work happening first."
Sitting at a kitchen table one night years ago, Jeffrey D. Milbrandt, MD, PhD, and Herbert “Skip” W. Virgin IV, MD, PhD, hashed out an idea that would help revolutionize medicine. Milbrandt, the head of the department of genetics, and Virgin, the head of pathology and immunology, would combine their departments’ strengths in genetics and genomics and clinical laboratory testing to change the way diseases are diagnosed and patients are treated.

Melding their expertise, faculty, staff and resources, the two established Genomics and Pathology Services, or GPS, a clinical genomics testing service that provides a distinct road map for physicians on how best to treat a person’s specific disease based upon his or her own genetic variation. They call it “precision or personalized medicine.”

“This is not research, this is actual clinical care,” stresses Milbrandt, the James S. McDonnell Professor of Genetics. “We wanted to take genomics research and make it matter to patients today.”

Testing can identify gene mutations that impact the course of treatment. Once identified, available targeted drug therapies can be used. They started with cancer and saw results almost immediately. They found that one patient whose metastatic cancer was unresponsive to treatment had uncommon genetic mutations. When they offered a different class of drugs targeting those mutations, the tumors decreased in size within one month.

“We’ve proven we can impact care with this type of testing,” says Virgin, the Edward Mallinckrodt Professor of Pathology and Immunology. “We’ve done more than 1,000 cases of cancer already, and we’re finding mutations in those cancers that we didn’t expect to find.”

More resources could expand the testing platform to include other genes. Funding also could help the team expand translational research trials to identify more targeted drug therapies and allow them to evaluate long-term patient outcomes.

“We know what to do, and we’re moving beyond cancer to include sudden cardiac death, kidney disease and congenital birth defects, to name a few,” says Milbrandt.

Says Virgin, “The issue now is how fast can we do this and how many patients and diseases can we impact? This is a game-changer.”
The time is coming when all patients diagnosed with cancer will undergo a biopsy to identify the genetic fingerprint of their specific tumor, then receive tailored therapy to kill it.

Groundbreaking research at Washington University School of Medicine is focused on attacking breast cancer at its genetic roots. Last year, a team of researchers, including Matthew Ellis, MB, BChir, PhD, chief of breast oncology at Washington University and the Anheuser-Busch Professor of Medical Oncology, discovered that breast cancer could be divided into four distinct types, all genetically different and all of which respond differently to various treatments.

"Not all breast cancers are alike. We know that certain medications are highly effective against broad types of breast cancer, but some women don't respond well to those treatments," Ellis says.

"Instead of relying on a general 'recipe' for combating breast cancer, we need to individualize treatment. We can do that by looking at the genetic components of each patient's cancer."

Already Ellis and other researchers have found that a form of breast cancer is genetically more similar to ovarian cancer than to breast cancer, which has striking implications for treatment strategies. Clinical trials here led to the development of a diagnostic test now under review by the U.S. Food & Drug Administration. The test, currently for patients with hormone receptor-positive (HR+) early-stage breast cancer, classifies the cancer and the risk for recurrence based on the biologic components of each patient’s tumor. Ellis hopes the test will receive federal approval later this year.

"Just in the last three years, the research has undergone dramatic advances," says Jeanne Imbs Weitzel, who benefited from clinical trials. Gene analysis revealed that her cancer would likely not respond to chemotherapy following a mastectomy. Instead she was prescribed an estrogen-suppressing drug. "I wish every woman with breast cancer could experience this kind of personalized approach. Dr. Ellis gave me complete confidence that the treatment he prescribed was the most appropriate to combat my type of breast cancer." Weitzel goes on to say, "Dr. Ellis is both brilliant and compassionate; at every appointment I felt like his only patient. His caring approach has had a tremendous impact on my ability to heal."
Innovative imaging

It's all about targeting in the battle against cancer. The arsenal to deliver highly targeted radiation therapy for patients with prostate or bladder cancer will soon include new technology evaluated by Washington University radiation oncologists. “There’s no technology today that allows us to see inside a patient and treat a tumor at the same time. Instead, we use images obtained before radiation treatments to determine a tumor’s size and location,” says Jeff M. Michalski, MD, the Carlos Perez Professor of Radiation Oncology and vice chair of radiation oncology. “The problem is that tumors can shift due to breathing or other movement. Just as neurosurgeons need to see a tumor as they remove it, radiation oncologists need to see the tumor while they radiate.”

Radiation oncologists here are evaluating a first-of-its-kind, combined MRI imaging and intensity-modulated radiation therapy (IMRT) system that provides continuous images of a tumor during treatments. Clinical trials, exclusive to the Alvin J. Siteman Cancer Center, are seeking to measure the value of the technology in cancer therapy.

“We have a long-standing reputation for innovation in imaging and radiation therapy,” says Michalski, an internationally recognized radiation oncologist who has multiple studies under way to enhance treatment outcomes for prostate cancer patients. His latest clinical trials focus on combining radiation and hormone-suppression therapy (androgen deprivation) to try to pinpoint the optimal duration and amount of each while minimizing side effects.

Michael Pulitzer recognizes the strength of Michalski’s research and its impact on patients like him. He characterizes Washington University as having one of the best radiation therapy centers in the world. “The care I received was seamless,” says Pulitzer, who made an unrestricted donation to support Michalski’s research. “As a result, I have what could be called ‘grateful patient’ syndrome. Dr. Michalski cured me, and I want to help him cure others.”

Michalski wants to collaborate with other researchers to find specific genes that impact treatment. “Each patient’s tumor biology may uniquely respond to radiation therapy, and we could tailor the treatment to maximize its benefits. We need to push ourselves beyond what we already know because that results in better, more effective cancer treatments and outcomes,” he says.
“I don’t have time for cancer,” says Ina Sachar, who has lived with cancer for 20 years. Instead, the 66-year-old St. Louis resident has four grandchildren to spoil and places she wants to travel. She embodies the strength of the human spirit and the advances made to eradicate cancer.

Sachar has battled cancer since 1993 — first breast cancer, then ovarian, endometrial and colon cancer. While the ovarian cancer has recurred, she has fought back each time with new drug therapies that have become available over the past two decades.

“I’ve been the beneficiary of targeted therapies and the research that’s been done at Washington University and the Siteman Cancer Center,” Sachar says.

The university currently has 35 different gynecologic oncology clinical trials open and active. Washington University researchers are among the largest contributors to a national consortium, the Gynecologic Oncology Group.

“We have very good therapies because of all the clinical trials and genomic research done at Washington University,” says David G. Mutch, MD, chief of the division of gynecologic oncology, where six oncologists all work together. “We can practice state-of-the-art care because we are at a great university where all areas are excellent.”

Because of their record of excellence in patient care and research, Washington University and Siteman Cancer Center received the National Cancer Institute’s first Specialized Program of Research Excellence (SPORE) grant to accelerate research into causes and treatments for endometrial cancer. The multi-year grant, awarded in 2010, is showing results.

“We’ve identified more accurate, cost-effective ways to screen patients for an inheritable form of endometrial cancer that could be available to the public in the next year or so,” says Mutch, the Ira C. and Judith Gall Professor of Obstetrics and Gynecology. “We’re also learning more about the molecular makeup of this cancer and the gene mutations that impact the success or failure of treatment options.”

Research has correlated a genetic link between ovarian and breast cancer and between inherited versions of endometrial cancer and colon cancer. More effective, targeted treatments for gynecologic cancers might benefit all cancer patients.

Says Sachar, “The reason to fund research like this is that they will find secrets to many cancers.”
We are redefining how cancer is diagnosed and treated. Please consider funding this or other opportunities to advance human health.

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On May 18, 2013, Gosia Borchardt, a Washington University nurse anesthetist at Barnes-Jewish Hospital, fulfilled a long-time goal: She reached the top of the world, the summit of Mt. Everest. Her quest to climb the highest peaks on all seven continents — the Seven Summits — has taken her to the top of Mt. Kilimanjaro in Africa (2007), Mt. Elbrus in Europe (2009) and Mt. Aconcagua in South America (2010). An injury on the Aconcagua climb resulted in thoracic outlet syndrome (TOS), surgery by Washington University vascular surgeon Robert Thompson, MD, and a long recovery. The Everest climb was the culmination of five years of planning and training. On her way back to base camp, she posted on Facebook: “I still can’t believe I made it all the way up to the summit.”
Lung cancer therapy
When is it best to use targeted radiation, and when should physicians advocate minimally invasive surgery? Research will provide a better basis for making the optimal decision in each case. This scan of a patient’s body shows the paths of the radiation beams planned for his therapy. The precise convergence of multiple beams amplifies their effects on the tumor. For more on this story, please turn to page 20.