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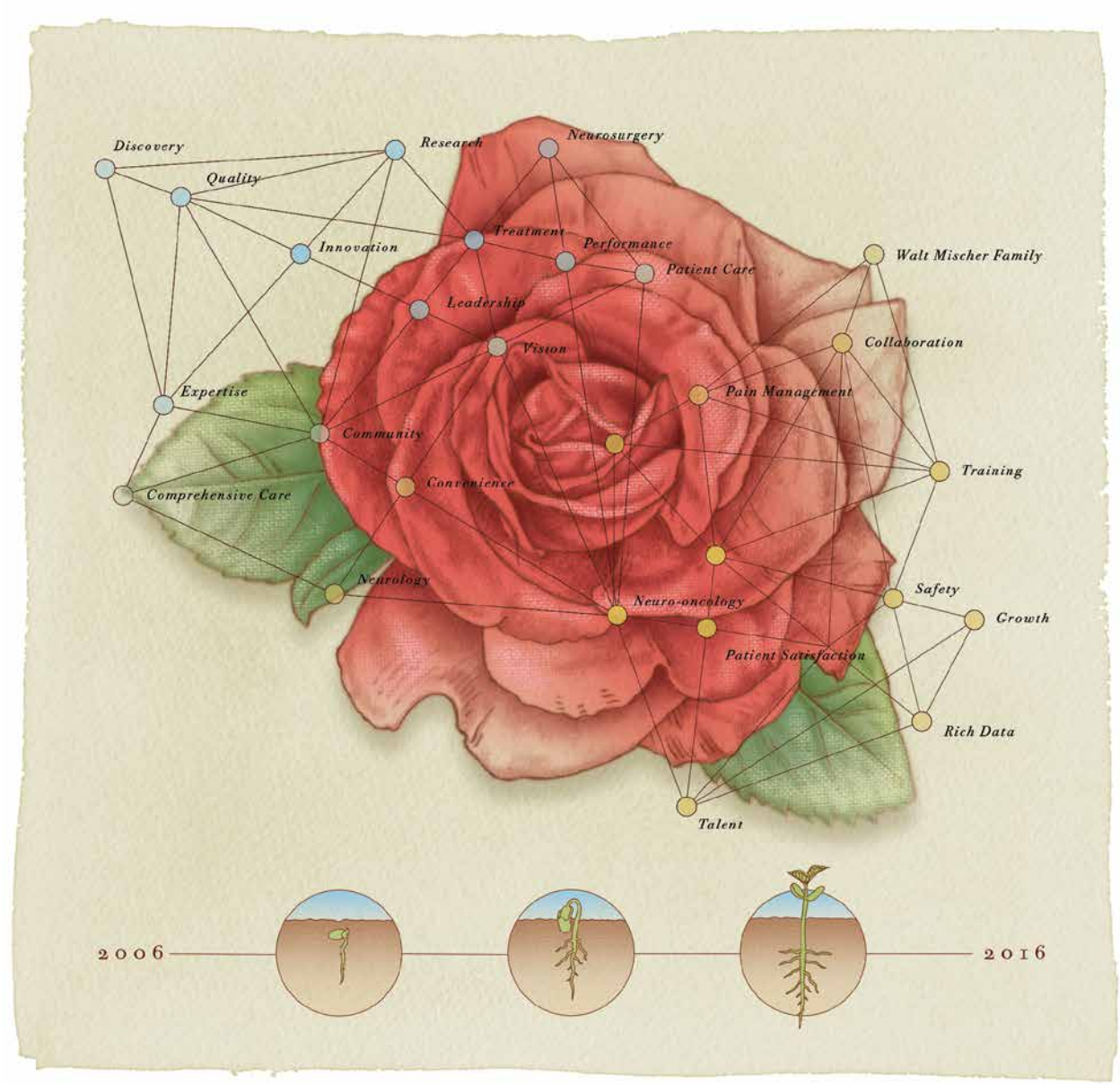
MEMORIAL HERMANN

MISCHER NEUROSCIENCE INSTITUTE

JOURNAL

A publication of Memorial Hermann-Texas Medical Center and McGovern Medical School at UTHealth



UTHealth The University of Texas Health Science Center at Houston | McGovern Medical School

MEMORIAL HERMANN Texas Medical Center

In This Issue

Persistence *in the* Pursuit *of* Discovery

Talent, vision and education are necessary for success, but without persistence, they mean nothing. Almost eight years ago we began the initiative to develop an outstanding neuroscience group to serve the needs of the Greater Houston area. By the end of 2015, we had recruited 109 physicians, research PhDs, advanced practice providers, residents and fellows to Mischer Neuroscience Associates. Of these, the 94 clinicians are part of an expanding citywide neuroscience network. Today, the seeds we planted almost a decade ago are growing and ready to achieve full bloom, allowing us to turn to research with new intensity.

In a special research section, this issue of the *Mischer Neuroscience Institute Journal* explores a few of the ways in which physicians affiliated with Mischer Neuroscience Institute and McGovern Medical School at UTHealth are moving medicine forward into the future. They are developing the world's first tele-robotic microsurgical tool and learning how the brain processes language. They're investigating new treatments for cerebral vasospasm, Alzheimer's disease, stroke and glioblastoma multiforme, and studying a radically new approach to chemotherapy for children that delivers agents directly to the site of brain tumors, decreasing systemic drug exposure.

"BY THE END OF FISCAL YEAR 2015, WE HAD RECRUITED 109 PHYSICIANS, RESEARCH PHDS, ADVANCED PRACTICE PROVIDERS, RESIDENTS AND FELLOWS TO MISCHER NEUROSCIENCE ASSOCIATES. OF THESE, THE 94 CLINICIANS ARE PART OF AN EXPANDING CITYWIDE NEUROSCIENCE NETWORK."

This fiscal year also brought the arrival of our new chair of neurology at McGovern Medical School, Louise McCullough, M.D. As you will see in this issue, she brings with her a strong cerebrovascular research team and will be a great leader for our program.

With seed funding from generous donors, we have established two new research centers: the Will Erwin Headache Research Center and the National Center for Testing Treatments in Chronic Spinal Cord Injury and Traumatic Brain Injury (NCTT). Both centers are unique in their own way – the Will Erwin Center in its focus on cluster headaches and other intractable headaches, and the NCTT in its quest to improve the lives of people who have passed the acute phase of spinal cord injury and traumatic brain injury and are living with a lifelong condition.

We would like to take this opportunity to congratulate Dr. Arthur Day, who was recognized with the prestigious Harvey Cushing Medal; Dr. Bob Fayle, who was named physician of the year by the Texas Neurological Society; and Dr. Kimberly Monday, who was installed as the 2016 president of the Harris County Medical Society. We'd also like to welcome our new physician recruits: Wamda O. Ahmed, M.D.; Spiros Blackburn, M.D.; Angel Blanco, M.D.; Vishnu Brahmandam, M.D.; Robert J. Brown, M.D.; Mark J. Burish, M.D., Ph.D.; Sebastian Herrera, M.D.; Jeremy T. Ragland, M.D.; and Gary Spiegel, M.D.C.M.

We hope the neurosurgeons among you will join us for Grand Rounds on the Green, our 2016 Neurosurgery Symposium and Tournament, to be held in October in Sea Island, Georgia, with co-hosts Emory University School of Medicine and Washington University School of Medicine. Until then, we'll keep moving forward in the spirit of discovery. If you would like to learn more about our services, research and programs, please feel free to contact us directly.

With best wishes,

DONG H. KIM, M.D.

Chief of Neurosurgery and Director, Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center

Professor and Chair, Vivian L. Smith Department of Neurosurgery McGovern Medical School at UTHealth

Mischer Neuroscience Institute Approaches Maturity

After 10 years of growth, the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center has become a strong clinical program and a leader in providing quality care. We now aim to place a strong focus on research, innovation and education of the physicians of the future.

In 2006, when the Mischer Neuroscience Institute was formed with a gift from Houston businessman and philanthropist Walt Mischer and his family, the department of Neurosurgery at McGovern Medical School at UTHealth was small with only nine clinical faculty members – of which six were neurosurgeons – and no neurosurgery residency program or fellowships. Memorial Hermann's neuroscience market share was only 12 percent. Today, the Institute has more than 100 clinical faculty and a market share that has doubled to 28 percent for neuroscience (and 35 percent in neurosurgery).

"It was clear that to perform at the highest level and become the best neuroscience group, we needed to begin by building the clinical enterprise with high-quality physicians and staff, as well as developing residency and fellowship training programs to support our academic mission," Dr. Kim says. "With that goal in mind, we've recruited a comprehensive team of neuroscience specialists, including neurosurgeons, neurologists, critical care specialists, neuro-oncologists, radiation oncologists and pain management physicians, and organized them into a large clinical practice that stretches across the city."

In the past eight years, the Institute has grown 150 percent in volume and reported dramatic reductions in neurosurgery mortality and morbidity, despite increasing patient acuity. A patient-centered approach to providing care has significantly improved patient satisfaction, achieving results above the 75th percentile at both the hospital and 17 clinic locations.

An important component of this growth was the start of education programs. The Neurosurgery department was approved for a one-resident-a-year program in 2008, then two residents a year in 2010. Because neurosurgery training is seven years, we currently have 14 residents. In 2016, the program was allowed to match three residents. This unprecedented growth reflected a major commitment to education. Currently, one in three UTHealth medical students have a two-to four-week rotation on neurosurgery, and our ICU team sponsors eight neurocritical care fellows. This is in addition to the 21 residents and 11 fellows in the department of Neurology. "Teaching is at the heart of an excellent clinical program," says Dr. Kim. "The best physicians want to train the next generation of physicians, so that the art continues to thrive and improve."

With this clinical infrastructure in place, with programs in every area of Houston, Dr. Kim has turned more of his focus to the discovery of new knowledge that will change the face of patient care. "We're thinking much bigger about our future than ever before, especially in terms of innovation that will change the standards of care," he says. "There are many neurological diseases without effective treatments; our fondest hope is to restore function and improve lives."

Clinical research is crucial to optimizing care and providing patients with new treatment options. A large number of clinical trials are being conducted at the Institute. In addition, the majority of our neuroscience patients participate in research by consenting to allow their tissue samples to be banked in the Institute's Neuroscience Research Repository (NRR) for current and future research.

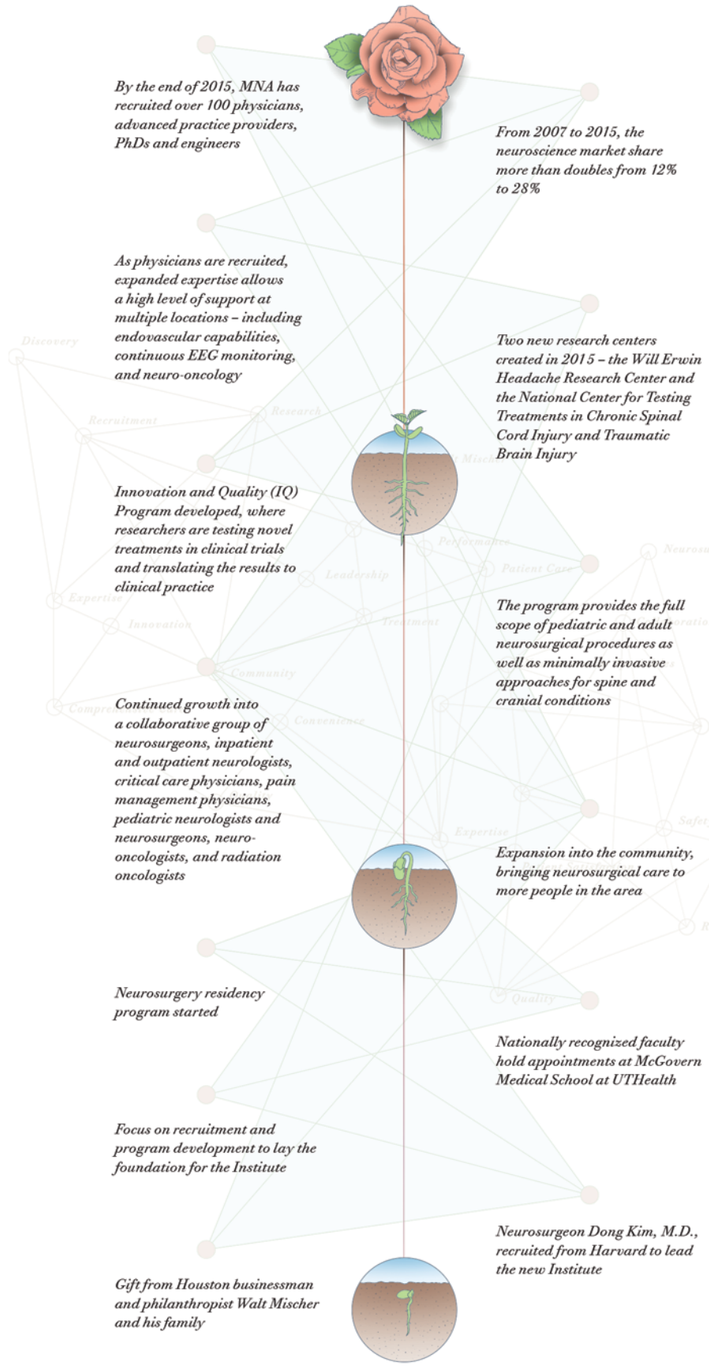
"We've found it to be incredibly beneficial to have patients collaborate with us in our research endeavors through programs like the NRR, which improves the care of future patients as well as their own," Dr. Kim says. "And we continue this collaboration through the Innovation and Quality (IQ) Program, where researchers are testing novel treatments in clinical trials and transitioning the results of that research to clinical practice. As the IQ Program expands, we will design even more trials to help neuroscience patients reach their desired functional potential."

Pain management is a strong focus at the Mischer Neuroscience Institute. Interventional pain management specialist Nadya Dhanani, M.D., treats a patient in her procedure room.

"A key component of our mission is to design therapeutic intervention strategies that are successful not only in the laboratory but also have real clinical potential," says Louise D. McCullough, M.D., Ph.D., who leads the Cerebrovascular Research Group and is professor and chair of the department of Neurology at the medical school. "To ensure that these strategies are on track from their inception through application, the Group works closely with the neurology and neurosurgery services at Memorial Hermann-Texas Medical Center, as well as others at the Mischer Neuroscience Institute and The University of Texas Health Science Center at Houston. Targets identified in the lab are validated in clinical samples and translated back to animal models where manipulation in a controlled research environment is possible."

In addition, through two new research centers created in 2015 – the Will Erwin Headache Research Center and the National Center for Testing Treatments in Chronic Spinal Cord Injury and Traumatic Brain Injury – leadership at the Institute has committed to investment in discovery in two areas that affect Americans profoundly.

"We can now track a range of outcomes across various subsets of our patient population," Dr. Kim says. "We're creating a rich data source that includes long-term outcomes and enables us to identify the best interventions for a particular condition. The data source is part of our ongoing efforts to improve patient care, ensuring that we are providing the best possible service and follow-up to our patients."



PROFILE

From Bench *to* Bedside *and* Back Again *with* Physician-Scientist Louise McCullough, M.D., Ph.D.

Louise McCullough didn't plan on a career in medicine. As an undergraduate student at the University of Connecticut at Storrs, she changed her major several times before considering science as a profession.

"I accepted a work-study job washing glassware in a research lab and found I liked the laboratory environment and the atmosphere of discovery," says Dr. McCullough, the new co-director of the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and professor and chair of the department of Neurology at the McGovern Medical School at UTHealth. "In my career I've had the luxury of being able to go back and forth between basic science research and clinical practice. Moving between the two worlds keeps things exciting and allows me to bring insights gained from one environment to the other."

"IN MY CAREER I'VE HAD THE LUXURY OF BEING ABLE TO GO BACK AND FORTH BETWEEN BASIC SCIENCE RESEARCH AND CLINICAL PRACTICE. MOVING BETWEEN THE TWO WORLDS KEEPS THINGS EXCITING AND ALLOWS ME TO BRING INSIGHTS GAINED FROM ONE ENVIRONMENT TO THE OTHER."

At the University of Connecticut, Dr. McCullough was on a fast track. After graduating with a bachelor's degree in psychology, she completed a master's degree in experimental psychology at the age of 22 and immediately began work on her doctorate in neuroscience. She took a job in the laboratory of John Salamone, Ph.D., who had just completed his post-doctoral program. Today Dr. Salamone is the Board of Trustees Distinguished Professor in Behavioral Neuroscience and head of the Behavioral Neuroscience Program at the University of Connecticut.

"John was young and very dynamic, and I was his first Ph.D. student," Dr. McCullough recalls. "He had no grants, and we were trying to do multiple experiments with the same five rats. At that time my interests were motivation, drug administration and pharmacology. I loved the experience of working in his lab and so I thought, 'I really love science and this is where I'm going to stay.' Then somewhere along the way I wasn't sure I wanted to spend the rest of my life sitting in a dark room looking at rats. I started studying jaw movements and connecting that work with movement disorders in humans, which is how I got interested in clinical neurology and decided to go to medical school."

Dr. McCullough still had another year to go in her doctoral program when she was admitted to the University of Connecticut School of Medicine in Farmington. After finishing her Ph.D. in neuroscience in 1992 and graduating from medical school in 1996, she completed her internal medicine and neurology training at the Johns Hopkins University School of Medicine and Johns Hopkins Hospital in Baltimore, where she was chief resident.

"Residencies at Johns Hopkins tend to be very research based," she says. "They want to train you to be the best clinician but they also emphasize the importance of research. I found a fantastic mentor in Patricia Hurn at Johns Hopkins and decided I liked stroke as a clinical focus. Stroke is easy to model in the lab, and I believed that in 20 years it would be very treatable."

Dr. McCullough attributes her success at Johns Hopkins to Dr. Hurn, who is now vice chancellor for research and innovation at The University of Texas System and serves as the chief health research officer for the UT System and its six academic health center campuses. She is also an active neuroscientist and is internationally known for her work in understanding the cellular and molecular basis of gender differences in response to experimental brain injury.

"Patti is the reason I became interested in sex differences in stroke," Dr. McCullough says. "The move from residency or fellowship to your first faculty position is one of the toughest transitions you can make. When you're establishing your practice, the burden of clinical care is high. You're very vulnerable and need a good mentor to get your first independent research grant – someone who can help you package your ideas into successful grant proposals and give you protected time to get that first grant. In academic medicine that's what we all worry about. Patti provided that support."

After completing a fellowship in cerebrovascular disease/neurology and anesthesiology at Johns Hopkins, Dr. McCullough held faculty and hospital appointments at the same institution and later at the University of Connecticut, where she rose to the rank of professor. When she joined the Mischer Neuroscience Institute and McGovern Medical School in September 2015, she brought with her 20 people from her research group in Connecticut, including two experienced clinicians and three assistant professors with their own grant funding.

In addition to her administrative roles, Dr. McCullough is a practicing vascular neurologist, heads the Cerebrovascular Research Group and is principal investigator on five grants from the National Institute of Neurological Disorders and Stroke.

In addition to her administrative roles at the Mischer Neuroscience Institute and McGovern Medical School, she is a practicing vascular neurologist, heads the Cerebrovascular Research Group in the department of Neurology, and is principal investigator on five grants from the National Institute of Neurological Disorders and Stroke. Her long-standing clinical and research interests are stroke prevention, acute stroke treatment, vascular physiology, neuro-inflammation, cerebrovascular disease, sex differences in stroke, aging and outcome assessment.

Dr. McCullough has been recognized with numerous awards during her clinical and academic career, and has been named to Best Doctors® continuously since 2007. She is the recipient of multiple grants from the National Institutes of Health, the National Institute of Neurological Disorders and Stroke, and the American Heart Association, and has authored more than 130 studies published in peer-reviewed journals. She has mentored many medical students, residents and junior faculty who now hold leadership roles in academic neurology programs throughout the country.

Because of her personal experience with mentors, education and mentorship continue to be a primary focus. "I want to get people who have an interest in science and technology involved in laboratory research early on," she says. "It's an important part of my job to make sure that people who have the interest, capability and desire to do research are supported. We're losing clinical investigators because of the time demands of practicing medicine and because funding is limited and very competitive. There's quite a lot of value in translating bench research to patient care to enhance human health and wellbeing."

Among her long-term goals is an increase in the size of the neurology residency program at McGovern Medical School. "There are not enough neurologists practicing in Texas – or in the United States for that matter," she says. "We're all aging, which means that neurological conditions will become a larger societal burden. At Mischer Neuroscience Institute, we have one of the largest fellowship programs in the country, and Dr. Sean Savitz has developed a fantastic education and research program for stroke. I'm hoping my translational program – the Cerebrovascular Research Group – will integrate well with the excellent program that's already in place to provide the entire spectrum from the bench to the bedside and back to the lab. I want the faculty in our department to have the infrastructure and support they need to do the very best work, whether it's patient care, community outreach, education or basic science research.

"I'd also like to see us integrate our efforts with other departments at the medical school to improve care for patients," Dr. McCullough says. "Memorial Hermann and McGovern Medical School are providing outstanding support. Over the next year I hope to add even more to an already excellent neurology program."

RESEARCH & INNOVATION

Physicians at the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and McGovern Medical School at UTHealth are engaged in innovative research efforts that are moving medicine forward into the future. The following studies are a few of those currently under way at the Institute.

The Will Erwin Headache Research Center Opens *at the* Mischer Neuroscience Institute

The Will Erwin Headache Research Foundation has teamed up with the Mischer Neuroscience Institute and McGovern Medical School at UTHealth to fulfill its mission of bringing relief to the millions of people around the globe afflicted with debilitating headaches and facial pain syndromes, including migraines and cluster headaches. The foundation's $20 million pledge – $2 million per year over 10 years – provided the initial funding to establish the Will Erwin Headache Research Center in the Vivian L. Smith Department of Neurosurgery.

"CLUSTER HEADACHES CAN OCCUR AT ANY AGE BUT ARE MOST COMMON IN YOUNG ADULTS, AT A TIME WHEN PEOPLE ARE IN SCHOOL OR JUST BEGINNING THEIR CAREERS. THEY TEND TO RUN IN FAMILIES AND AFFECT MORE MALES THAN FEMALES, BUT TO DATE, NO ONE GENE RELATED TO THE DISORDER HAS BEEN IDENTIFIED. WE HOPE TO MAKE PROGRESS TOWARD FINDING THE CAUSE AND A CURE."

The Will Erwin Headache Research Foundation was launched by Houston native Jimmy Erwin in memory of his son Will, who suffered from both migraines and cluster headaches. "This is a condition that impacts the lives of people all over the world," says Erwin, president of the foundation. "It's time for an organization to step up and fix the problem and that's what we intend to do."

Although debilitating headaches affect 12 percent of the American population, research directed toward finding a cure is significantly underfunded. In 2014, the National Institutes of Health earmarked $45 million of annual funding for headache research, which represents only .03 percent of the total $146 billion allocated to medical research. Within that small amount of funding, cluster headache research is especially undersupported. Through its global fundraising efforts, the Will Erwin Headache Research Foundation aims to dramatically increase funding for the study of neurological disorders and, more importantly, to bring an end to the pain they cause.

"The new Will Erwin Headache Research Center has recruited a group of experts dedicated to the study of cluster headaches and conditions arising from the trigeminal nerve," says Dong Kim, M.D., director of Mischer Neuroscience Institute and professor and chair of the Vivian L. Smith Department of Neurosurgery at McGovern Medical School. "The group will develop a national consortium of centers to identify patients with cluster headache and other debilitating types of headaches. Because of the relatively small number of patients in the Greater Houston area, a collaborative consortium is the best way to make progress in understanding and treating the disorders. The nationwide group will also work to educate other caregivers to improve diagnosis and treatment."

The new Center is led by Mark Burish, M.D., Ph.D., a neurologist who is fellowship trained in interventional pain management. A cum laude graduate of Princeton University, Dr. Burish received his M.D./Ph.D. in the Vanderbilt Medical Scientist Training Program at Vanderbilt University School of Medicine and completed his residency in neurology at the University of California at San Francisco, where he was co-chief resident of the UCSF Moffitt-Long Service and was inducted into Alpha Omega Alpha Honor Medical Society. He completed his fellowship in interventional pain management in the department of Anesthesiology at UCSF.

MARK BURISH, M.D., Ph.D.
Director, Will Erwin Headache Research Center; *Interventional Pain Management Specialist*, Mischer Neuroscience Institute; *Assistant Professor*, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

"Cluster headache is a debilitating disease," says Dr. Burish, an assistant professor in the Vivian L. Smith Department of Neurosurgery. "They can occur at any age but are most common in young adults, at a time when people are in school or just beginning their careers. They tend to run in families and affect more males than females, but to date, no one gene related to the disorder has been identified. We hope to make progress toward finding the cause and a cure."

Physicians and researchers working with the Will Erwin Headache Research Center include neurosurgeon Dong Kim, M.D.; researcher Georgene Hergenroeder, B.S.N., M.H.A., RN, CCRC; researcher Pramod Dash, Ph.D.; and genetic counselor Krista Qualmann, M.S.

The Will Erwin Headache Research Foundation is a component fund of the Greater Houston Community Foundation and is a registered 501c3 organization. Donations can be made at cureheadaches.org.

Honorees at the Will Erwin Headache Research Center ribbon cutting were Reynolds Lawnin, Brittany Erwin Lawnin, Jimmy Erwin, Pam Erwin, Robb Erwin, Mark Burish, M.D., Ph.D., Dong H. Kim, M.D.

Brain Networks *of* Noun Generation: Learning How *the* Brain Processes Language

The National Institute on Deafness and Other Communication Disorders has awarded a $1.8 million R01 grant to neurosurgeon Nitin Tandon, M.D., to study how the brain processes language, specifically the production of names. The research may one day help people who lose the ability to communicate.

"PEOPLE OFTEN ASK, 'WHAT DOES THIS DO IN THE BRAIN? WHAT DOES THAT DO?' BUT NOTHING IN THE BRAIN DOES ANYTHING IN ISOLATION. THE AREAS THAT CAN LOAD AN ABSTRACT CONCEPT INTO A WORD AND THEN TELL YOUR MOUTH TO MOVE ARE DISTRIBUTED THROUGHOUT THE BRAIN. AND THEY HAVE TO COMMUNICATE WITH EACH OTHER. WE WANT THE ABILITY TO INTERCEPT AND TRANSLATE THOSE SIGNALS."

"The human vocabulary is large, yet we are able to select the most appropriate words at very high speeds and assemble them in a way that conveys meaning," says Dr. Tandon, a professor in the Vivian L. Smith Department of Neurosurgery at McGovern Medical School at UTHealth. "How we do so is not well understood. We do know that speech production relies on a distributed network that is disrupted in many people who suffer neurological disorders, including trauma, stroke, neurodegeneration and neoplasms, and that name production is the single most common deficit associated with speech impairment. Through our research we hope to gain real insight into how humans choose the right individual words and string them together into a logical and understandable sequence."

As director of epilepsy surgery at Mischer Neuroscience Institute, Dr. Tandon has performed hundreds of surgeries to implant electrodes in patients with epilepsy to localize their seizures. "Invasive intracranial EEG offers a unique opportunity to study human cognitive networks at a speed and resolution unattainable using fMRI and other modalities," he says. "We ask patients who are admitted for studies if they're willing to participate in a variety of language experiments so we can study how various brain regions are engaged in the process of producing language."

NITIN TANDON, M.D.
Director, Epilepsy Surgery, Mischer Neuroscience Institute; *Professor*, Vivian L. Smith Department of Neurosurgery; *Associate Professor*, Department of Pediatric Surgery, McGovern Medical School at UTHealth

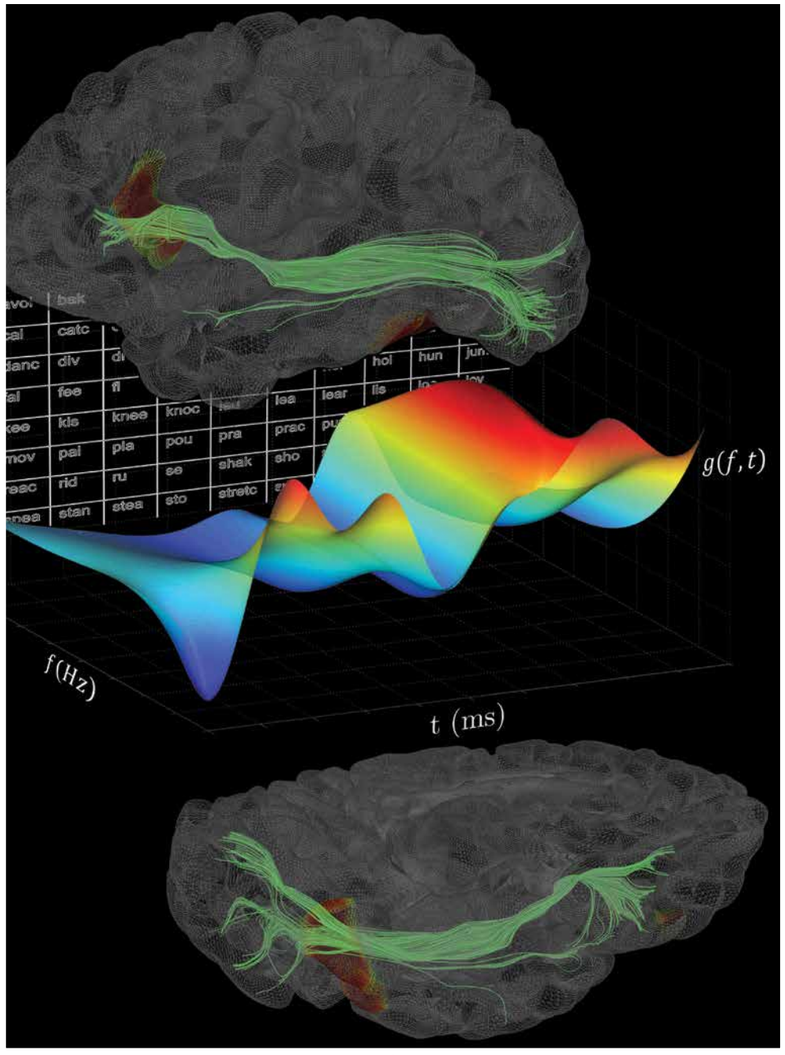
Until now, intracranial recordings have focused chiefly on the spatial and temporal characteristics of individual regions of the brain in isolation, with limited analysis of network behavior during language formation. The researchers believe that a network-based understanding of the dynamics of language regions is crucial to understanding the neural basis of word production. Using high spatial and temporal resolution direct cortical recordings, they aim to quantify the cortical dynamics involved in picture naming from early primary visual perception, through selection, to word output.

For the five-year study, which began in fall 2015, Dr. Tandon assembled a collaborative team of experts in intracranial EEG analysis, psycholinguistics and neural data modeling. They include Gregory Hickok, Ph.D., at the University of California, Irvine; Robert Knight at the University of California, Berkeley; Xaq Pitkow, Ph.D., at Rice University; and Joshua Breier, M.D., at Memorial Hermann-Texas Medical Center and McGovern Medical School.

"People often ask, 'What does this do in the brain? What does that do?'" Dr. Tandon says. "But nothing in the brain does anything in isolation. The areas that can load an abstract concept into a word and then tell your mouth to move are distributed throughout the brain. And they have to communicate with each other. We want the ability to intercept and translate those signals."

While data collection will be limited to relatively few of the brain's 100 billion neurons, it will be enough to advance knowledge of how they communicate with each other. "Each person can give us only a small sample of information, but if we get hundreds of people together, we'll be able to gather enough data from all parts of the brain to make a composite map – an atlas – of brain function during speech production," he says.

Dr. Tandon says his motivation stems from the fact that each year 100,000 Americans suffer brain injuries that impair speech. "We hope one day to be able to provide wireless brain implants that will help these patients communicate via computer programs," he says. "Using the incomplete language network that remains, these prosthetics could reconstruct speech and allow people to communicate their basic needs and emotions."



How humans select the most appropriate words at high speeds and assemble them in a way that conveys meaning is not well understood. With a $1.8 million R01 grant from the National Institutes of Health, Dr. Nitin Tandon hopes to gain insight into how we choose individual words and put them together in a logical sequence.

The World's Smallest Surgical Robot

A powerful creative collaboration between researchers in South Korea and the United States has positioned both countries at a new frontier of medicine: tele-robotic microsurgery.

"Imagine a world in which minimally invasive single-port surgery is available anywhere at any time," says Daniel H. Kim, M.D., FAANS, FACS, a professor in the Vivian L. Smith Department of Neurosurgery at the McGovern Medical School at UTHealth and director of spinal and peripheral nerve surgery at the Mischer Neuroscience Institute. "In this new world, spina bifida and other fetal defects could be treated safely before birth, and stroke patients living in remote locations would have fast access to the same care available in large cities. That world is within our reach."

"OUR MINIATURIZED ROBOT WILL ACCESS SITES DEEP IN THE BODY UNREACHABLE WITH OTHER ROBOTIC DEVICES. TELE-ROBOTICS WILL ENABLE PHYSICIANS TO TREAT PATIENTS ANYWHERE IN THE WORLD. THIS NEW TECHNOLOGY IS COST-EFFECTIVE AND HIGH IMPACT."

Researchers in Houston – at Mischer Neuroscience Institute and McGovern Medical School at UTHealth – and at KAIST in South Korea are the frontrunners in an international race to develop the first tele-robotic microsurgical tool – the world's smallest surgical robot. The new system will make robotic surgery possible in any location, performed by surgeons in medical hubs in the United States, South Korea and other countries. The end result: a global healthcare model for advanced care delivered tele-robotically to rural locations and less developed countries.

The limitations of open surgery led to the development of laparoscopic surgery through four small incisions. From there, physicians developed single-incision surgery, operating through one entry point. The domain of the future is single-port tele-robotic surgery enabling microscopic manipulation beyond the surgeon's skill anywhere in the world.

DANIEL H. KIM, M.D., FAANS, FACS
Director, Reconstructive Spinal and Peripheral Nerve Surgery; *Professor*, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

"The da Vinci® Surgical System, the only medical robot in use today, is expensive and bulky," Dr. Kim says. "Designed for access through four small incisions, it lacks the small scale and flexibility needed to operate through a single port. Our new miniaturized tele-robotic system for microsurgery, designed in collaboration with KAIST, is small, mobile, versatile and agile – a model for the future of surgery."

The new miniaturized tele-robot allows physicians to move the system's four arms to accommodate the patient and the procedure. Its frame fits on an existing operating table. Instrumentation is jointed – with wrists and elbows that allow additional degrees of motion – and miniaturized to allow for the use of four surgical instruments through a single incision. Unlike the current technology, which requires frequent replacement of expensive parts, each instrument may be removed for sterilization and reused. Dr. Kim and his team expect the robot to outperform the da Vinci in cost, stability and dexterity.

The researchers have taken the miniaturization of technology a step further and developed a steerable micro-robot that can maneuver through small spaces between organs in a snake-like motion. Only 10 millimeters in diameter, this "snake robot" has two tiny graspers, one microsurgical instrument and the world's smallest lighted camera. The micro-snake has novel robotic clinical applications for fetal surgery, as well as for spine and cranial surgery.

"Since the 1930s, the first step in the treatment of newborns with spina bifida has been surgery to close the incompletely developed portion of the spinal cord a few days after birth," Dr. Kim says. "In-utero open and minimally invasive repair are now possible, but both procedures have high morbidity and mortality rates for mother and baby. The microsurgical robot enables precise fetal surgery through a single incision, lowering risk during procedures to repair heart defects, esophageal atresia and other abnormalities."

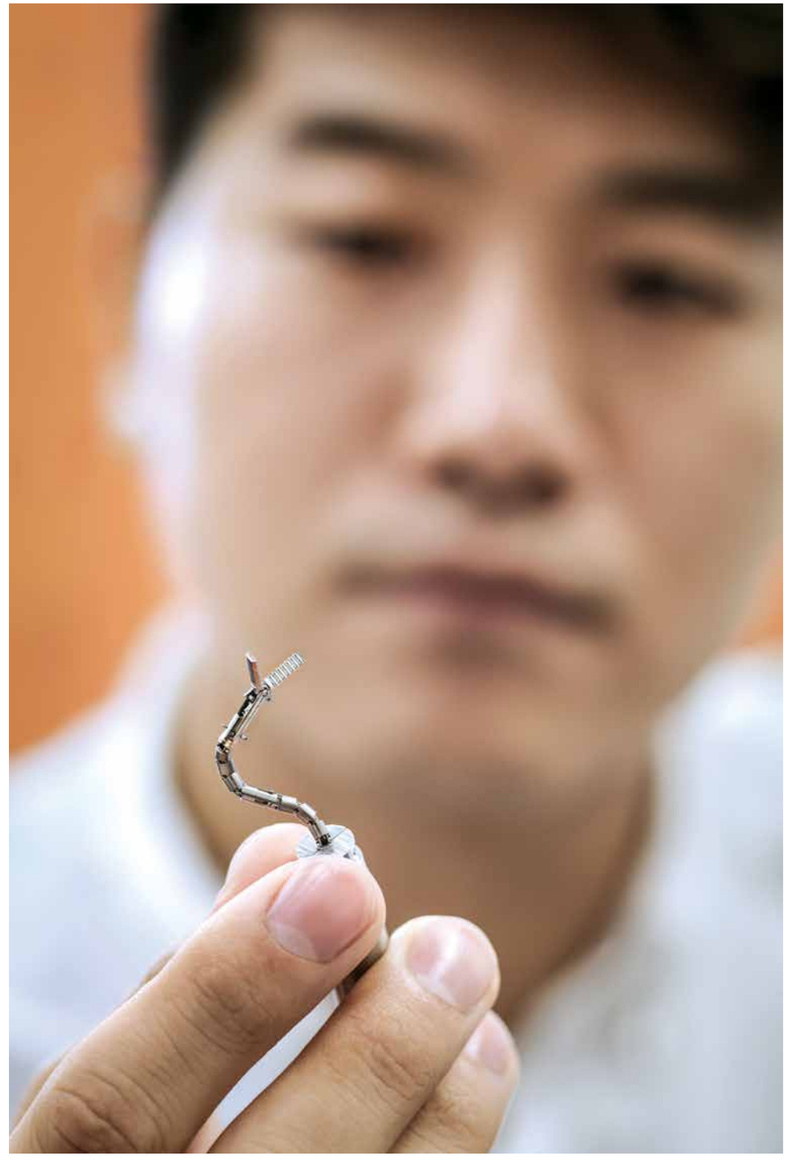
Also under development is a steerable tele-robotic microcatheter with life-changing potential for stroke patients worldwide. For those living in remote locations, access to fast care may not be possible. With tele-robotics, an emergency physician in a rural community can access the femoral artery, and a skilled endovascular neurosurgeon working in a tele-robotic hub can manipulate the microcatheter via computer to retrieve the clot.

"Stroke is a time-sensitive emergency," says Mark Dannenbaum, M.D., a fellowship-trained neurosurgeon with expertise in vascular and endovascular neurosurgery. "Our goal is to design a highly specialized microcatheter – the first of its kind – that can overcome the anatomic limitations of traditional embolectomy and retrieve the clot with precision. We hope to change the landscape of stroke treatment worldwide through tele-robotics."

The novel microcatheter uses smart materials – an electroactive polymer that can bend to accommodate anatomy. That same technology can be adapted for minimally invasive spine procedures, brain surgery and other intricate operations.

The researchers have refined their first prototype. Preclinical animal studies began in late 2015, with the first human studies expected by the summer of 2016.

At the heart of this new technology is a desire to improve quality of life and outcomes that connects researchers on two continents. "Through our collaboration with innovative scientists in South Korea, we're leading the future of surgery," Dr. Kim says. "Our miniaturized robot will access sites deep in the body unreachable with other robotic devices. Tele-robotics will enable physicians to treat patients anywhere in the world. This new technology is cost-effective and high impact. When tele-robotic hubs are completed, we'll bring the world something entirely new – a model for truly global health care."



Single-part telerobotic surgery will enable microscopic manipulation beyond the surgeon's skill – anywhere in the world.

Mischer Neuroscience Institute Launches *the* National Center *for* Testing Treatments *in* Chronic Spinal Cord Injury *and* Traumatic Brain Injury

As part of its growing research program, Mischer Neuroscience Institute recently established the National Center for Testing Treatments in Chronic Spinal Cord Injury and Traumatic Brain Injury (NCTT). The new Center is unique in its focus on research to improve the lives of people who have passed the acute phase of spinal cord injury (SCI) and are living with the injury as a lifelong condition.

"ONCE WE'VE GENERATED A DATABASE OF PATIENTS WHOSE RECOVERY HAS PLATEAUED AND WHOSE DEFICITS ARE STABLE, WE'LL BE IN A POSITION TO TEST TREATMENT IDEAS SYSTEMATICALLY, ONE AT A TIME IN EXPERIMENTALLY CONTROLLED CIRCUMSTANCES. WE BELIEVE OUR APPROACH HAS THE BEST CHANCE OF RAPIDLY IMPACTING PATIENTS' LIVES."

"While other national organizations focus their investigations on spinal cord injury and traumatic brain injury in the acute phase of treatment, the NCTT will focus on clinical trials for patients with chronic injury," says Dong Kim, M.D., director of the Mischer Neuroscience Institute and professor and chair of the Vivian L. Smith Department of Neurosurgery at McGovern Medical School at UTHealth. "By freeing ourselves from the time pressure of identification and enrollment of patients in the acute period, we can accurately identify people with a similar experience of trauma, similar injuries and similar deficits. Once we've generated a database of patients whose recovery has plateaued and whose deficits are stable, we'll be in a position to test treatment ideas systematically, one at a time in experimentally controlled circumstances. We believe our approach has the best chance of rapidly impacting patients' lives."

DONG H. KIM, M.D.
Chief of Neurosurgery and Director, Mischer Neuroscience Institute; *Professor and Chair,* Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Seed money for the Center is provided by the Staman Ogilvie Fund for Spinal Cord Injury, Recovery, Rehabilitation and Research, created through the Memorial Hermann Foundation to fund innovative research to assist people whose lives have been disrupted by spinal cord injury, brain injury or neurological disorders. Ogilvie created the fund after suffering a spinal cord injury in a cycling accident in June 2009, and has since led a crusade to generate practical solutions to increase movement and provide hope for people with neurological disabilities.

"The Mischer Neuroscience Institute has a strong group of scientists doing substantial lab research in spinal cord injury and traumatic brain injury, and we're also aware that great research is being done in other places around the country," Ogilvie says. "The NCTT will ensure that we have a front-row seat for the best work being done by allowing us to actively participate in trials of potentially healing therapies. In addition to testing the hypotheses of our own researchers, we'll be able to corroborate the discoveries of others by replicating them in the lab. Our great hope is to bring about significant functional improvement after SCI."

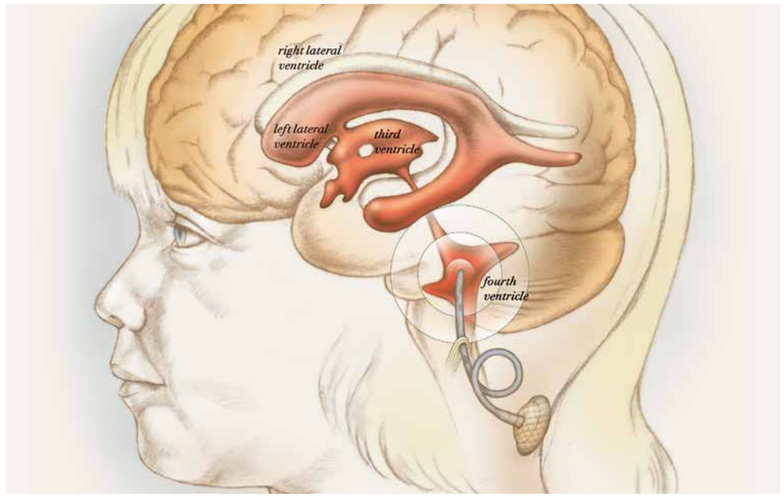
Researchers at the NCTT are currently working with the Houston chapter of the National Spinal Cord Injury Association to create a database of chronic SCI and TBI patients in the Greater Houston area. "The database will include all of us in the area who are willing to be considered for trials for which we as individuals are particularly well suited based on the nature of our injury, its duration and our lifestyles," Ogilvie says. "Once we've accomplished that, the NCTT will be in a position to clinically test its own discoveries and share the database with other researchers who want to replicate successes they've shown in their own labs. Ultimately, we'd like to find three or four other groups around the country to join us in creating their own geographic databases. There is great power in a national cross-referenced database that will allow researchers to connect with willing study participants who have been carefully selected as appropriate for a specific trial."

Dr. Dong Kim heads the National Center for Testing Treatments in Chronic Spinal Cord Injury and Traumatic Brain Injury (NCTT). The new Center conducts research to improve the lives of people who have passed the acute phase of SCI.

The NCTT's novel approach will complement acute intervention networks like the North American Clinical Trials Network (NACTN), of which the Mischer Neuroscience Institute is a member, and the Neurological Emergencies Treatment Trials (NETT), funded by the National Institutes of Health. Founded in 2004 with support from the Christopher and Dana Reeve Foundation, NACTN was initiated as a registry that would record the natural progression of acute SCI with the immediate goal of identifying and testing potential therapies and putting them to clinical use. To date, the network has tested only one agent, riluzole, in a safety study of 36 participants. NETT recently completed a study in acute TBI showing that progesterone was safe but provided no significant benefit to patients, despite success in numerous experiments using animal models.

Dr. Kim expects the NCTT's plan to study chronic patients to be more cost effective by eliminating the need for on-call teams required in studies of acute SCI and TBI. "Patients can be enrolled in a small number of centers located around the country, instead of 20 or more as in NACTN and NETT," he says. "A few researchers working systematically will be able to identify and classify many patients, allowing us to perform studies to better characterize and understand these patients. This is a huge, long-term endeavor to commit energy, talent and research dollars to help people with SCI and TBI recover and participate more fully in life."

Methotrexate Infusion Directly *into the* Fourth Ventricle *in* Children *with* Malignant Fourth Ventricular Brain Tumors



Prior to his arrival in Houston in 2012, David I. Sandberg, M.D., FAANS, FACS, FAAP, conducted translational studies that demonstrated the safety of infusing chemotherapeutic agents directly into the fourth ventricle to treat children with recurrent malignant brain tumors in this location. The promising results of those studies led to a pilot clinical trial completed in August 2015 and a new methotrexate dose-escalation study available only at Children's Memorial Hermann Hospital in collaboration with the Children's Neuroscience Center at the Mischer Neuroscience Institute.

"This radically new approach to chemotherapy allows us to circumvent the blood-brain barrier and deliver agents directly to the site of disease while minimizing side effects by decreasing systemic drug exposure," says Dr. Sandberg, who is director of pediatric neurosurgery at Children's Memorial Hermann Hospital and the Mischer Neuroscience Institute. "Now that we've determined that methotrexate can be infused into the fourth ventricle without causing neurological toxicity, and that some patients with recurrent medulloblastoma experience a beneficial anti-tumor effect both within the fourth ventricle and at distant sites, our next step is to determine the optimum dose of the agent."

Delivering chemotherapeutic agents directly to the site of disease minimizes the side effects for children by decreasing systemic drug exposure.

The pilot clinical trial was conducted at Children's Memorial Hermann Hospital and The University of Texas MD Anderson Cancer Center, where Dr. Sandberg is co-director of the Pediatric Brain Tumor Program. Five patients – three with medulloblastoma and two with ependymoma – received 18, 18, 12, 9 and 3 cycles of chemotherapy, respectively, through a catheter surgically placed into the fourth ventricle and attached to a ventricular access device. No serious adverse events or new neurological deficits were attributed to treatment with methotrexate. The results were published in the *Journal of Neuro-Oncology* in 2015.[1]

The new dose-escalation study will enroll a minimum of 12 patients at Children's Memorial Hermann Hospital. To date, three patients are participating in the clinical trial, the only such study under way in the world.

DAVID I. SANDBERG, M.D., FAANS, FACS, FAAP
Director, Pediatric Neurosurgery, Mischer Neuroscience Institute; *Associate Professor*, Vivian L. Smith Department of Neurosurgery; *Associate Professor*, Department of Pediatric Surgery; *Dr. Marnie Rose Professorship in Pediatric Neurosurgery at the McGovern Medical School*, McGovern Medical School at UTHealth

"Despite advances in pediatric oncology, we're still seeing too many children die of malignant brain tumors, and the treatments currently available are not satisfactory for children," says Dr. Sandberg, an associate professor with joint appointments in the Dr. Marnie Rose Professorship in Pediatric Neurosurgery and the Vivian L. Smith Department of Neurosurgery at McGovern Medical School. "Many suffer extreme toxicity from chemotherapy and radiation, and I believe we can do better. I hope to improve on what we can currently offer as treatment – with fewer complications."

[1] Sandberg DI, Rytting M, Zaky W, Kerr M, Ketonen L, Kundu U, Moore BD, Yang G, Hou P, Sitton C, Cooper LJ, Gopalakrishnan V, Lee DA, Thall PF, Khatua S. Methotrexate administration directly into the fourth ventricle in children with malignant fourth ventricular brain tumors: a pilot clinical trial. Journal of Neuro-Oncology. 2015 Oct;125(1):133-41. doi: 10.1007/s11060-015-1878-y. Epub 2015 Aug.

The Search *for the* Best Intra-arterial Treatment *for* Vasospasm

Neurosurgeon P. Roc Chen, M.D., is co-investigator of a multicenter randomized study aimed at finding the best intra-arterial medical treatment regimen for cerebral vasospasm, a devastating health problem and a major contributor to poor outcomes following subarachnoid hemorrhage (SAH). Dr. Chen is an associate professor in the Vivian L. Smith Department of Neurosurgery at McGovern Medical School at UTHealth, the lead center in the 12-site national study, which began in January 2015.

P. ROC CHEN, M.D.
Associate Professor, Vivian L. Smith Department of Neurosugery, McGovern Medical School at UTHealth

"Up to 70 percent of patients who survive the initial subarachnoid hemorrhage develop some evidence of vasospasm, which if left untreated can lead to devastating strokes," says Dr. Chen, who specializes in open cerebrovascular, endovascular and skull base neurosurgery and has expertise in the treatment of brain aneurysms, arteriovenous malformations, carotid disease, acoustic neuroma and skull base tumors. "Despite improvements in microsurgical and endovascular techniques, neurosurgeons have not made significant strides in the treatment of cerebral vasospasm."

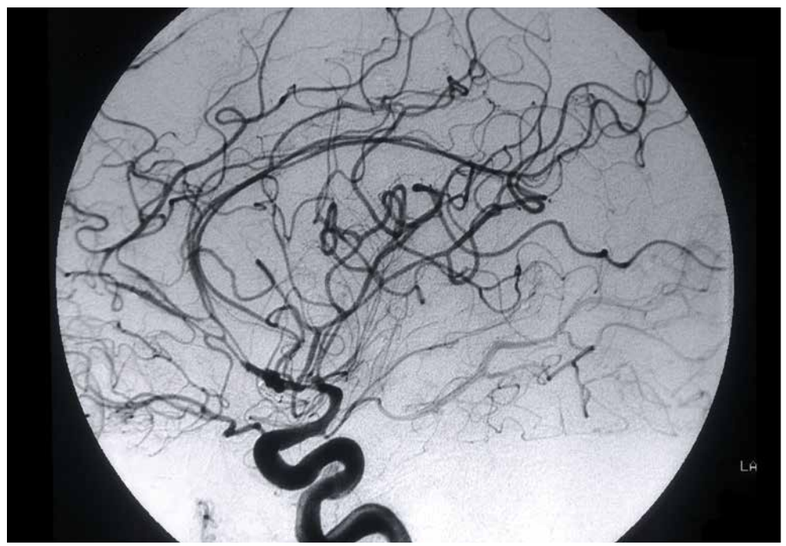
Endovascular treatments such as angioplasty and administration of intra-arterial drugs, particularly calcium channel blockers, are considered a standard treatment to reduce the potential for ischemic stroke from delayed cerebral vasospasm. The commonly used intra-arterial drugs are single agents: verapamil, nicardipine and nitroglycerin.

"But there is no conclusive literature suggesting which of the agents or combination of agents is the most effective, and treatment results have been generally unsatisfactory," Dr. Chen says. "The estimated case fatality following a subarachnoid hemorrhage is 25 to 50 percent with a large proportion of these being secondary to the consequences of cerebral vasospasm. Our ability to optimize outcomes following severe vasospasm remains limited because we don't fully understand the underlying pathogenesis."

After a retrospective review of consecutive patients treated for cerebral vasospasm at Memorial Hermann-Texas Medical Center, the researchers concluded that treatment of cerebral vasospasm with an intra-arterial cocktail of nitroglycerine, verapamil and nicardipine provides significantly better angiographic improvement of vasospasm than single-agent therapy. The results were presented at the International Stroke Conference 2014, held in San Diego, California.

Based on these results, Dr. Chen and the research team pursued their current study, a prospective evaluation of the efficacy of multi-agent vasodilator infusion therapy versus the current typical single-agent therapy. "We hope to determine the optimal intra-arterial drugs and the most effective regimen for treating cerebral vasospasm," he says. "We also hope that combining these medications for intra-arterial infusion will lead to cerebral vasodilation and minimize the cardiovascular risks associated with a high dose of a single agent."

"UP TO 70 PERCENT OF PATIENTS WHO SURVIVE THE INITIAL SUBARACHNOID HEMORRHAGE DEVELOP SOME EVIDENCE OF VASOSPASM, WHICH IF LEFT UNTREATED CAN LEAD TO DEVASTATING STROKES."



A lateral view taken from an internal carotid artery angiogram shows severe vasospasm secondary to aneurysmal SAH.

Unraveling *the* Mysteries *of* Alzheimer's Disease

Three new studies under way in the laboratory of Claudio Soto, Ph.D., are investigating potential new ways to diagnose and treat Alzheimer's disease (AD). Dr. Soto directs a team of researchers focused on the investigation of the molecular basis of protein misfolding disorders, mainly AD, Parkinson's disease and prion-related disorders.

"Aβ OLIGOMERS MAY BE CIRCULATING IN THE BODY YEARS, IF NOT DECADES, BEFORE COGNITIVE SYMPTOMS ARISE. WE'RE HOPING THE RESULTS GENERATED BY THIS PROJECT WILL DETECT THEM AND LEAD TO THE FIRST BIOCHEMICAL TEST FOR BLOOD-BASED DIAGNOSIS OF AD."

"A hallmark event in AD is the misfolding of the amyloid-beta protein, which then is deposited in the brain in the form of amyloid plaques," says Dr. Soto, a professor in the department of Neurology at McGovern Medical School at UTHealth. "These plaques, or some of the precursor misfolded oligomeric particles, are thought to cause neuronal death and synaptic loss, resulting finally in dementia."

CLAUDIO SOTO, Ph.D
Director, The George and Cynthia W. Mitchell Center for Alzheimer's Disease and Other Brain Related Illnesses; *Professor*, Department of Neurology, McGovern Medical School at UTHealth

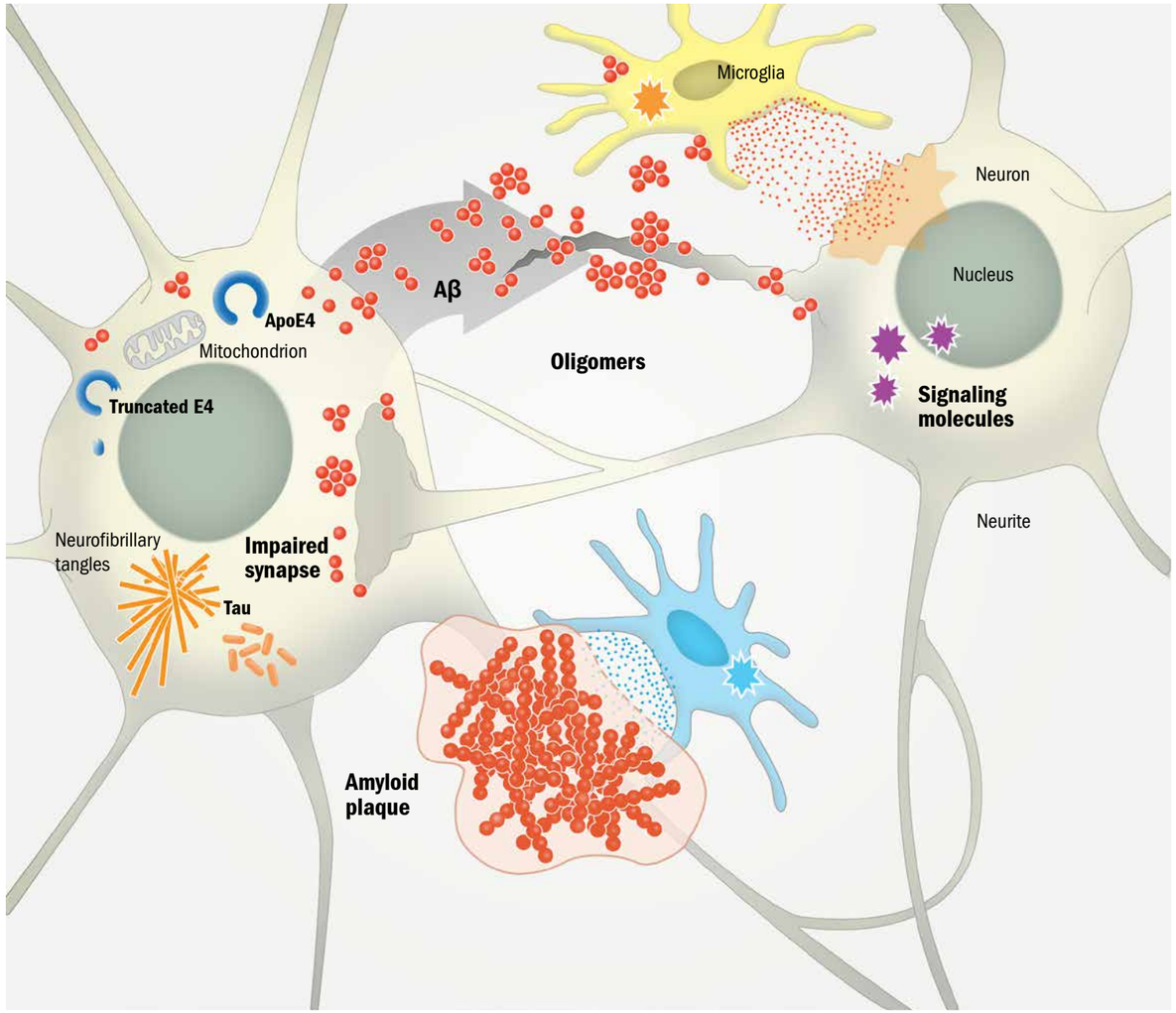
Over the past 20 years, Dr. Soto has focused his research on understanding the mechanism and factors involved in the conversion of a normal protein into the disease-associated abnormal form that accumulates in the brain to produce some of the most devastating neurodegenerative diseases. "Our studies combine basic science investigations with a permanent effort to translate these discoveries into novel approaches for early diagnosis and treatment," he says.

With a new grant from the National Institutes of Health, Dr. Soto and his team are investigating a blood-based diagnosis for AD. A fast-track combined phase I and II Small Business Technology Transfer (STTR) project in partnership between Amprion, Inc. and the McGovern Medical School, the project may offer a way to diagnose AD before extensive brain damage and dementia set in.

"For this purpose we're adapting the protein misfolding cyclic amplification (PMCA) technology invented in our lab for specific and highly sensitive detection of misfolded Aβ oligomers in human blood," Dr. Soto says. "Aβ oligomers may be circulating in the body years, if not decades, before cognitive symptoms arise. We're hoping the results generated by this project will detect them and lead to the first biochemical test for blood-based diagnosis of AD."

Dr. Soto is also principal investigator in two studies funded by UTHealth Brain Initiative Awards: "Chimeric Mice Harboring Human Nerve Cells as a Model of Alzheimer's Disease" and "Traumatic Brain Injury Promotes Alzheimer's Disease Through Seed Formation." The first study, conducted in collaboration with Brian Davis, Ph.D., of the Brown Foundation Institute of Molecular Medicine for the Prevention of Human Diseases, aims to develop new models of AD by grafting into the mouse brain human-derived cells from healthy individuals, as well as from AD patients affected by inherited and sporadic forms of the disease. Human nerve cells have been generated in Dr. Soto's lab by reprogramming adult fibroblast into induced pluripotent stem cells, and were later converted into different types of neurons.

"Our working hypothesis is that chimeric mice harboring human nerve cells will reproduce the complete cerebral abnormalities observed in AD patients," he says. "As a result, chimeric mice may be more relevant and predictable models of AD and may become great tools to investigate the molecular bases of neurodegenerative processes. This model may also help us discover new pharmaceutical targets and biomarkers for the much-needed development of new drugs to treat or even prevent the onset of the disease."



Amyloid plaques are thought to cause neuronal death and synaptic loss, resulting in dementia. Dr. Soto's research team is investigating the molecular basis of protein misfolding disorders, mainly Alzheimer's disease and prion-related disorders.

In the second UTHealth Brain Initiative study, Dr. Soto and his team, in collaboration with Pramod Dash, Ph.D., of the Department of Neurobiology and Anatomy, posit that traumatic brain injury induces the formation of the first misfolded oligomeric seeds composed of either or both amyloid-beta and Tau protein, which then spread the pathology throughout the brain by a prion-like mechanism, resulting in the development of AD. They will test the theory in various transgenic mice models.

The research has the potential to change the face of diagnosis and treatment of AD. "Alzheimer's disease is the most common form of dementia in late life, and at present it does not have a cure or an effective treatment," Dr. Soto says. "It is a leading cause of death in the developed world and currently affects more than 10 million people worldwide. Its treatment is hampered by the lack of early, sensitive and objective laboratory tests. We hope to change that."

Chromosomal *and* Hormonal Contributions *to* Sex Differences *in* Ischemic Stroke

Recent clinical trials have shown variable effectiveness of medications in male and female patients, suggesting that sex-specific therapeutic targets may improve physicians' ability to treat stroke patients of both sexes. Funded by a $2.2 million grant from the National Institute of Neurological Disorders and Stroke, Louise D. McCullough, M.D., Ph.D., and her team are conducting laboratory research to determine genetic and hormonal contributions to stroke sensitivity across the lifespan. Their ultimate aim is to translate basic science findings to bedside care that improves recovery from stroke.

LOUISE D. McCULLOUGH, M.D., Ph.D.
Co-director, Mischer Neuroscience Institute; *Professor and Chair,* Department of Neurology; *The Huffington Distinguished Chair in Neurology*

"There is considerable evidence from both clinical and experimental studies that outcomes after stroke differ in males and females," says Dr. McCullough, who is co-director of the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center, professor and chair of the department of Neurology and head of the Cerebrovascular Research Group at McGovern Medical School at UTHealth. "New experimental data has shown that brain cells die differently in males and females, and that each sex responds to neuroprotective strategies in different ways. Because stroke is now the No. 1 cause of disability, new treatments are urgently needed."

Most international databases consistently demonstrate that women have lower stroke incidence than men until advanced age. But elderly women have higher morbidity and mortality compared to age-matched men once a stroke occurs.

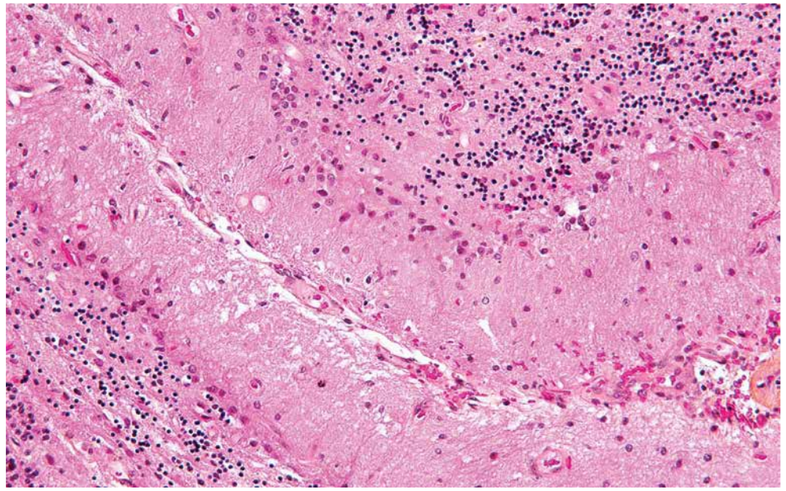
"Aging enhances the inflammatory response to stroke, and recent data demonstrate that this effect is significantly more pronounced in females," says Dr. McCullough, a physician-scientist with a long-standing interest in vascular physiology, neuro-inflammation, cerebrovascular disease, sex differences in stroke, and aging. "Reproductive hormones clearly contribute to the difference, but we know that biologic sex is also a factor based on our studies of tissue damage and functional outcome after induced stroke in an animal model. In addition, emerging data have shown that the mechanisms that trigger cell death differ in males and females."

Using genetically manipulated mice, the researchers aim to dissociate the effects of chromosomal sex from that of hormones on stroke outcome in young animals, determine the effect of manipulating neonatal hormone levels on adult infarct damage and investigate sex and hormone contributions to post-stroke inflammation in the mice using a well-established middle cerebral artery occlusion model of stroke.

"Identification of sex-selective cell death mechanisms has significant translational relevance, as neuroprotective agents that are effective in one sex may actually exacerbate the injury in the other," Dr. McCullough says. "We hope to better define these differences and develop sex-specific therapies that will result in better outcomes in stroke patients of both sexes."

Dr. McCullough and her team are conducting laboratory research to determine genetic and hormonal contributions to stroke sensitivity across the lifespan.

Identifying Novel Molecular Targets *for* Chronic Spinal Cord Injury



Recent advances in RNA-sequencing technology make it possible to map affected regions and analyze gene expression at an unprecedented level of sensitivity and specificity.

In the laboratory of Jiaqian Wu, Ph.D., researchers are investigating stem cell neural differentiation with the ultimate goal of translating basic science research into safe and effective treatments for spinal cord injury (SCI). With a five-year R01 grant from the National Institutes of Health, Dr. Wu has launched the first study to investigate the mechanisms of chronic SCI at the systems level using RNA-sequencing technology.

"BASED ON OUR PRELIMINARY STUDIES USING RNA-SEQUENCING DURING THE ACUTE AND SUB-ACUTE PHASES OF SCI IN MOUSE MODELS, WE BELIEVE THAT INVESTIGATING THE INTRICATE RELATIONSHIP OF GENES AND PATHWAYS IN SPINAL CORD TISSUE WILL GIVE US A BETTER UNDERSTANDING OF THE PROGRESSION OF SCI PATHOPHYSIOLOGY."

"The majority of patients with spinal cord injury are in the chronic phase, which remains the most difficult to treat," says Dr. Wu, an assistant professor in the Vivian L. Smith Department of Neurosurgery and Center for Stem Cell and Regenerative Medicine at the McGovern Medical School at UTHealth. "Our understanding of how molecules that hinder axon regeneration are regulated and maintained in the chronic SCI state remains unclear. Current treatment for gliosis – the reactive change of glial cells in response to injury – is not ideal, and new molecular targets are urgently needed."

JIAQIAN WU, Ph.D.
Assistant Professor, Vivian L. Smith Department of Neurosurgery and Center for Stem Cell and Regenerative Medicine, McGovern Medical School at UTHealth

Previous molecular studies of SCI have focused on a small number of genes and pathways at a time, failing to provide a comprehensive view of the complex mechanisms underlying SCI pathology. "Microarray studies done during the past decade have provided valuable insights into SCI, but the technique has limitations in resolution, range and accuracy," she says. "Recent advances in RNA-sequencing technology make it possible to map affected regions and analyze gene expression at an unprecedented level of sensitivity and specificity. Based on our preliminary studies using RNA-sequencing during the acute and sub-acute phases of SCI in mouse models, we believe that investigating the intricate relationship of genes and pathways in spinal cord tissue will give us a better understanding of the progression of SCI pathophysiology."

The researchers also believe that by using the innovative strategy of integrated network analysis, they can identify critical missing links in disease processes that have not been previously noted. "We hope that the discovery of novel molecular targets will shift the research and clinical paradigms for spinal cord injury," she says. "We also expect to create a comprehensive data resource of SCI gene expression that will be valuable to the research community."

Investigating New Treatments *for* Patients *with* Glioblastoma Multiforme

With funding from the National Cancer Institute, principal investigator Jay-Jiguang Zhu, M.D., Ph.D., is leading a phase II/III clinical trial studying the efficacy of veliparib with temozolomide compared to temolozomide alone in treating patients with glioblastoma multiforme (GBM) or gliosarcoma. The trial is currently enrolling patients at the Memorial Hermann Mischer Neuroscience Insitute at the Texas Medical Center and McGovern Medical School at UTHealth.

JAY-JIGUANG ZHU, M.D., Ph.D.
Associate Professor, Vivian L. Smith Department of Neurosurgery and Department of Neurology, McGovern Medical School at UTHealth

"Drugs used in chemotherapy, such as temozolomide, work in different ways to stop the growth of tumor cells, either by interfering with DNA replication of the cells, by stopping them from dividing or by stopping them from spreading," says Dr. Zhu, director of neuro-oncology at the Mischer Neuroscience Institute and an associate professor in the Vivian L. Smith Department of Neurosurgery at the McGovern Medical School. "Veliparib, a poly(ADP-ribose) polymerase (PARP) -1 and -2 inhibitor, may stop the growth of tumor cells by blocking some of the DNA repair enzymes needed for cell growth and survival. We want to know if temozolomide is more effective with veliparib in treating glioblastoma multiforme."

More than 400 patients will be enrolled in the eight-year study at sites located around the country. The trial, "A Phase II/III Randomized Trial of Veliparib or Placebo in Combination with Adjuvant Temozolomide in Newly Diagnosed Glioblastoma with O-6-methylguanine-DNA methyltransferase (MGMT) Promoter Hypermethylation," will run through June 2022.

Dr. Zhu is principal investigator in several other trials that give eligible study participants access to new and advanced treatments. Memorial Hermann-TMC is the only Houston site for a study of 4-Demethyl-4-cholesteryloxycarbonylpenclome (DM-CHOC-PEN) in patients with brain tumors. DM-CHOC-PEN is a polychlorinated pyridine cholesteryl carbonate, which exerts antineoplastic activity through cross-linking DNA strands in patients with brain tumors.

"During a phase I study, DM-CHOC-PEN demonstrated the capability of high CNS penetration to inhibit or halt the development of tumors in patients with advanced cancers, including melanoma, lung cancer and breast cancer involving the central nervous system, and glioblastoma multiforme," says Dr. Zhu, who is fellowship trained at Massachusetts General Hospital and focuses his practice on primary brain tumors and primary central nervous system (CNS) lymphomas, as well as brain metastases and leptomeningeal spread of systemic malignancies. "These findings support the preclinical responses seen in mice, and no hematological, renal or cardiovascular toxicities or cognitive impairment was noted in the phase I human trial or in previous preclinical studies." The trial is open to patients with advanced lung, breast and melanoma cancers that have spread to the central nervous system as well as those with primary CNS malignancies. The expected study completion date is August 2016.

Two other trials led by Dr. Zhu are ongoing but not currently enrolling participants. A phase III multicenter, randomized, controlled trial is testing the efficacy and safety of a medical device called Novo TTF-100A for newly diagnosed GBM patients in combination with temozolomide, compared to temozolomide alone. The device, which patients wear on their scalp, provides a constant, safe, low-voltage electric field that has been shown to reduce tumor cell survival and division capacity. The device was approved by the FDA for progressive GBM in April 2011. The interim analysis of the trial data showed significant improvement of progression survival time and overall survival duration in participants randomized to the treatment arm of the study. Based on this trial result, the FDA approved the device for newly diagnosed GBM in October 2015. The expected study completion date is July 2016.

In addition, he is leading an open-label phase I/II (safety lead-in) study of trans sodium crocetinate (TSC) with concomitant treatment of fractionated radiation therapy and temozolomide in newly diagnosed GBM patients. The trial examines the safety and efficacy of TSC as a radiation sensitizer for the treatment of malignant tumors. The study is ongoing but not currently recruiting participants.

Dr. Zhu was also principal investigator in a randomized, double-blind, controlled phase IIB clinical trial testing the safety and efficacy of the vaccine ICT-107 for newly diagnosed GBM patients following resection and chemoradiation. The trial, which began enrollment in August 2011 and was completed in December 2015, showed improved, progressive-free survival of patients who are human leukocyte antigen (HLA) A2 positive. HLA genes are key to the activity of the immune system in identifying the body's own proteins versus proteins of foreign origin. A phase III trial for HLA A2 positive GBM patients has just opened at Memorial Hermann-TMC, and patients are now being enrolled.

Sigmund Hsu, M.D., who is fellowship trained at The University of Texas MD Anderson Cancer Center, is principal investigator in several studies, including in the trial of a novel taxol chemotherapy compound, TPI 287, which crosses the blood-brain barrier and will be administered in combination with bevacizumab, versus bevacizumab alone in adults with recurrent glioblastoma. In addition, he is leading a phase II dose-escalation study of TPI 287 in combination with bevacizumab in adults with recurrent or progressive glioblastoma following a bevacizumab-containing regimen.

Dr. Hsu is also the lead physician in the FoundationOne™ Registry study, a prospective observational study to examine practice patterns and impact on clinical decision-making associated with the FoundationOne next-generation sequencing test. The study enables physicians affiliated with the Mischer Neuroscience Institute to recommend optimal personalized treatment for patients with cancer. Patients benefit from other innovative and advanced technologies, including motor and language mapping, functional neuroimaging, frameless stereotactic navigation in surgery and awake craniotomies performed under local anesthesia, as well as minimally invasive procedures, including neuroendoscopy and stereotactic radiosurgery.

Both studies are aligned with Dr. Hsu's clinical and research interests in the discovery of new and more effective therapies for patients with primary brain tumors, treatment of metastatic cancer to the brain and spinal cord, and the evaluation and treatment of neurological problems in cancer patients.

Every other month Carlos Velázquez and his wife make the round trip from their home in Asunción, Paraguay, to participate in the NovoTTF-100A trial led by Dr. Jay Zhu.

Open and Upcoming Brain Tumor Trials

Phase II Trial of SMO/AKT/NF2 Inhibitors in Progressive Meningiomas with SMO/AKT/NF2 Mutations
Lead Physician: Jay-Jiguang Zhu, M.D., Ph.D.

Phase 1a/1b Study of FPA008 in Combination with Nivolumab in Patients with Selected Advanced Cancers
Lead Physician: Jay-Jiguang Zhu, M.D., Ph.D.

A Randomized, Placebo Controlled Phase 2b/3 Study of ABT-414 with Concurrent Chemoradiation and Adjuvant Temozolomide in Subjects with Newly Diagnosed Glioblastoma (GBM) with Epidermal Growth Factor Receptor (EGFR) Amplification
Lead Physician: Sigmund Hsu, M.D.

A Phase 2/3 Randomized, Open-Label Study of Toca 511, a Retroviral Replicating Vector, Combined With Toca FC versus Standard of Care in Subjects Undergoing Planned Resection for Recurrent Glioblastoma or Anaplastic Astrocytoma
Lead Physician: Jay-Jiguang Zhu, M.D., Ph.D.

A Phase II/III Randomized Trial of Veliparib or Placebo in Combination with Adjuvant Temozolomide in Newly Diagnosed Glioblastoma with MGMT Promoter Hypermethylation
Lead Physician: Jay-Jiguang Zhu, M.D., Ph.D.

Phase I Study of Methotrexate Infusion into the Fourth Ventricle in Children with Recurrent Malignant Fourth Ventricular Brain Tumors
Lead Physician: David Sandberg, M.D.

Cortice 17, NCT01933815
Lead Physician: Sigmund Hsu, M.D.

ICT-107 Brain Tumor Vaccine for Patients with Newly Diagnosed Glioblastomas
Lead Physician: Jay-Jiguang Zhu, M.D., Ph.D.

A Phase 3, Randomized, Controlled, Double-Arm, Open-Label, Multi-center Study of VB-111 Combined with Bevacizumab vs. Bevacizumab Monotherapy in Patients with Recurrent Glioblastoma
Lead Physician: Sigmund Hsu, M.D.

News *of* Note

Mischer Neuroscience Institute and Mischer Neuroscience Associates Welcome 11 New Physician Recruits

Eleven physicians have joined the medical staff of the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and the faculty of McGovern Medical School at UTHealth.

LOUISE D. MCCULLOUGH, M.D., Ph.D.
Co-director, Mischer Neuroscience Institute; *Professor and Chair*, Department of Neurology; *The Huffington Distinguished Chair in Neurology*

Neurologist Louise D. McCullough, M.D., Ph.D., co-director of the Mischer Neuroscience Institute and professor and chair of the department of Neurology at McGovern Medical School, is a physician-scientist with a longstanding interest in vascular physiology, neuro-inflammation, cerebrovascular disease, sex differences in stroke, and aging. A practicing vascular neurologist, she has clinical expertise in stroke prevention, acute stroke treatment, sex differences in stroke and outcome assessment.

Dr. McCullough has been recognized with numerous awards during her clinical and academic career, and has been named to Best Doctors® continuously since 2007. She is the recipient of multiple grants from the National Institutes of Health, the National Institute of Neurological Disorders and Stroke, and the American Heart Association, and has authored more than 130 studies published in peer-reviewed journals.

Dr. McCullough received her Ph.D. in neuroscience at the University of Connecticut at Storrs. After earning her medical degree at the University of Connecticut School of Medicine in Farmington, she completed neurology training at the Johns Hopkins University School of Medicine and Johns Hopkins Hospital in Baltimore, Maryland, where she was chief neurology resident. She completed a fellowship in cerebrovascular disease/neurology and anesthesiology at the same institution. Prior to joining the Mischer Neuroscience Institute and McGovern Medical School, she held faculty and hospital appointments at the Johns Hopkins University School of Medicine and the University of Connecticut, where she rose to the rank of professor. At McGovern Medical School she holds the Huffington Distinguished Chair in Neurology and heads the Cerebrovascular Research Group.

WAMDA O. AHMED, M.D.
Assistant Professor, Department of Neurology and Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Wamda O. Ahmed, M.D., is board certified in neurology with special interest and expertise in neurocritical care.

Dr. Ahmed received her medical degree at Stony Brook School of Medicine in Stony Brook, New York. She completed her neurology residency at Mount Sinai Medical Center in New York City, where she was elected by faculty to be academic chief resident and named Physician of the Year for 2012–2013. She subsequently completed a fellowship in neurocritical care at Emory University Hospital in Atlanta. She provides neurocritical care at Memorial Hermann Memorial City Medical Center, Memorial Hermann Northwest Hospital, Memorial Hermann Southwest Hospital and Memorial Hermann-Texas Medical Center. Dr. Ahmed is an assistant professor in the Vivian L. Smith Department of Neurosurgery at McGovern Medical School.

SPIROS BLACKBURN, M.D.
Associate Professor, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Spiros Blackburn, M.D., specializes in cerebrovascular, skull base surgery and endovascular neurosurgery. A summa cum laude graduate of Old Dominion University in Norfolk, Virginia, Dr. Blackburn received his medical degree at The University of Texas Southwestern Medical School in Dallas. After concluding his residency as chief resident in neurosurgery at Washington University in St. Louis, he completed a cerebrovascular fellowship at Emory University in Atlanta and a neurointerventional endovascular fellowship at Mallinckrodt Institute of Radiology at Washington University. Prior to joining Mischer Neuroscience Associates, he held a faculty appointment as assistant professor of neurosurgery at the University of Florida in Gainesville.

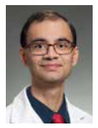
The recipient of numerous academic awards, Dr. Blackburn has lectured nationally on the management of cerebral aneurysms, surgical anatomy, arteriovenous malformations and stroke, and his research has been published in peer-reviewed journals. His clinical research interests include biomarkers for cerebral vasospasm and translational research for patients with subarachnoid hemorrhage, as well as a number of clinical trials for the treatment of brain aneurysms. He is an associate professor in the Vivian L. Smith Department of Neurosurgery.

ANGEL I. BLANCO, M.D.
Director, Radiation Oncology and Stereotactic Radiosurgery, Mischer Neuroscience Institute; *Assistant Professor*, Vivian L. Smith Department of Neurosurgery and Department of Neurology, McGovern Medical School at UTHealth

Angel I. Blanco, M.D., specializes in adult radiation oncology with an emphasis on breast, central nervous system and body stereotactic cases, and has expertise in Gamma Knife® radiosurgery, intensity-modulated radiation therapy (IMRT) and high-dose rate brachytherapy for cancer patients.

A Phi Beta Kappa graduate of Emory University, Dr. Blanco received his medical degree at Baylor College of Medicine in Houston. He completed his residency in radiation oncology at Washington University in St. Louis, where he served as chief resident. Prior to joining Mischer Neuroscience Associates-Texas Medical Center, he served as junior faculty in the head and neck service at The University of Texas MD Anderson Cancer Center, and was subsequently in community practice at Memorial Hermann Southwest Hospital.

Dr. Blanco has lectured nationally and internationally on topics in radiation oncology, and has authored three textbook chapters and 30 articles and abstracts in peer-reviewed medical journals. He serves as a reviewer for the *International Journal of Radiation Oncology - Biology - Physics, Cancer, Journal of Radiation Oncology,* and *Radiotherapy and Oncology.*



VISHNU BRAHMANDAM, M.D.
Neurologist, Mischer Neuroscience Associates The Woodlands

Neurohospitalist Vishnu Brahmandam, M.D., provides inpatient care at Memorial Hermann The Woodlands Hospital.

Dr. Brahmandam received his medical degree at the University of California, San Diego School of Medicine and completed his residency in neurology at Kaiser Permanente Los Angeles Medical Center. The recipient of numerous academic awards, Dr. Brahmandam was nominated for Physician of the Year at Memorial Hermann The Woodlands Hospital in 2011 and 2014. Prior to joining Memorial Hermann The Woodlands, he was a neurohospitalist with IPC Healthcare in Los Angeles and an attending neurologist on the stroke service at Kaiser Permanente Los Angeles Medical Center.

ROBERT J. BROWN, M.D.
Assistant Professor, Department of Neurology and Vivian L. Smith Department of Neurosurgery

Robert J. Brown, M.D., is a diplomate of the American Board of Psychiatry and Neurology and of the United Council for Neurological Subspecialties in neurocritical care. He specializes in neurocritical care and neurology.

A graduate of Cornell University, Dr. Brown received his medical degree at SUNY Upstate Medical University in Syracuse, New York, where he was inducted into Alpha Omega Alpha Honor Medical Society. Following completion of his residency in neurology at the Hospital of the University of Pennsylvania in Philadelphia, he completed a fellowship in neurocritical care at Washington University in St. Louis. Prior to joining Mischer Neuroscience Associates, he served as a neurointensivist in the department of Surgical Critical Care at Hartford Hospital and an assistant clinical professor of neurology at the University of Connecticut School of Medicine in Hartford. He provides neurocritical care at Memorial Hermann Memorial City Medical Center, Memorial Hermann Northwest Hospital, Memorial Hermann Southwest Hospital and Memorial Hermann-Texas Medical Center, and is an assistant professor in the Vivian L. Smith Department of Neurosurgery.

MARK J. BURISH, M.D.
Director, Will Erwin Headache Research Center; *Interventional Pain Management Specialist*, Mischer Neuroscience Institute; *Assistant Professor*, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Mark J. Burish, M.D., Ph.D., joins the Mischer Neuroscience Institute as director of the new Will Erwin Headache Research Center. A neurologist who is fellowship trained in interventional pain management, Dr. Burish specializes in the treatment of neck pain, back pain and neuropathic pain. His research interests focus on headaches and facial pain.

A cum laude graduate of Princeton University, Dr. Burish received his M.D./Ph.D. in the Vanderbilt Medical Scientist Training Program at Vanderbilt University School of Medicine. He completed his residency in neurology at the University of California at San Francisco, where he was co-chief resident of the UCSF Moffitt-Long Service and was inducted into Alpha Omega Alpha Honor Medical Society. During his residency, he was also honored with the Core Clerkship Teaching Award, voted by third-year medical students as one of five residents who went "above and beyond in terms of dedication to teaching, mentorship, community-building, patient care and medical student development and support." He completed his fellowship in interventional pain management in the department of Anesthesiology at UCSF. Dr. Burish is an assistant professor in the Vivian L. Smith Department of Neurosurgery.

SEBASTIAN R. HERRERA, M.D.
Neurosurgeon, Mischer Neuroscience Associates; *Assistant Professor*, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Sebastian R. Herrera, M.D., specializes in neurological surgery and the minimally invasive treatment of brain and spine disorders.

Dr. Herrera received his medical degree at Pontificia Universidad Javeriana School of Medicine in Bogota, Colombia. He completed his neurosurgical residency at the University of Illinois at Chicago Medical Center, where he was chief resident. Prior to joining Mischer Neuroscience Associates, he served as staff neurosurgeon at Southern Arizona VA Health Care Systems and

held a concurrent appointment as clinical professor of surgery in the division of Neurosurgery at the University of Arizona College of Medicine. Fluent in English and Spanish, Dr. Herrera is an assistant professor in the Vivian L. Smith Department of Neurosurgery.

JOSEPH MARTINEZ, M.D.
Neurosurgeon, Mischer Neuroscience Institute; *Assistant Professor,* Vivian L. Smith Department of Neurosurgery McGovern Medical School at UTHealth

Joseph Martinez, M.D., is a neurological surgeon who specializes in the treatment of spine disorders. Dr. Martinez received his medical degree at the University of New Mexico School of Medicine in Albuquerque. He completed his neurosurgical residency at Baylor College of Medicine and The University of Texas MD Anderson Cancer Center, followed by a fellowship in complex spine surgery at the University of Miami in Miami, Florida.

He is the co-author of articles published in the *Journal of Neurosurgery: Spine,* and of chapters on anterior lumbar interbody fusion and lumbar disk arthroplasty in the textbook *Essential Techniques of Operative Surgery.* He was the 2001 recipient of the William J. von Liebig Research Fellowship in Vascular Surgery at Harvard Medical School and has been listed among *Who's Who Among Students in American Universities and Colleges.*

JEREMY T. RAGLAND, M.D.
Assistant Professor, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Jeremy T. Ragland, M.D., is a board-certified neurologist specializing in neurocritical care with a particular interest in ethics and end-of-life care.

After graduating from Emory University in Atlanta, Dr. Ragland received his medical degree from Columbia University College of Physicians and Surgeons in New York City. He completed his neurology residency and later, a fellowship in neurocritical care at the same institution. He is a member of the American Academy of Neurology and the Neurocritical Care Society and an assistant professor in the Vivian L. Smith Department of Neurosurgery.

GARY SPIEGEL, M.D.C.M.
Director of Endovascular and Interventional Neurology, Mischer Neuroscience Associates; *Associate Professor*, Department of Neurology, McGovern Medical School at UTHealth

Gary Spiegel, M.D.C.M., is fellowship trained in surgical neuroangiography and diagnostic neuroradiology. His practice encompasses the full scope and breadth of adult and pediatric neurointerventional treatments for brain, spine, head and neck conditions, with a focus on endovascular treatments for brain aneurysms, brain and spinal arteriovenous malformations and stroke.

An associate professor of neurology and director of endovascular and interventional neurology at McGovern Medical School, Dr. Spiegel earned his medical degree at McGill University in Montreal, Canada. After completing his residency in diagnostic radiology at New York University Medical Center in New York City, he completed fellowships in neuroradiology and surgical neuroangiography at the same institution. Upon entering professional practice, he initiated and directed neurointerventional surgery programs at Yale University's Hospital of Saint Raphael in New Haven, Connecticut, and later at Hartford Hospital, where he co-directed the Stroke Center. Dr. Spiegel's efforts led the Hartford Hospital Stroke Center to become the most active acute stroke care and endovascular aneurysm treatment center in New England. He has held teaching appointments at Yale-New Haven Hospital in New Haven, Connecticut, and at the University of Connecticut's John Dempsey Hospital in Farmington, Connecticut.

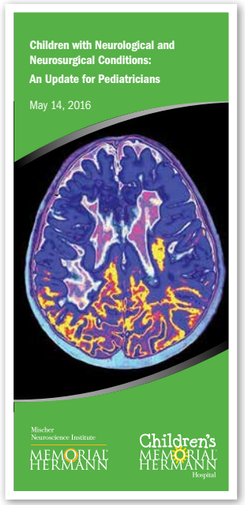
Grand Rounds on the Green: 2016 Neurosurgery Symposium

Mark your calendars for a weekend of golf and continuing medical education at Grand Rounds on the Green, to be held Oct. 14-16, 2016, in Sea Island, Georgia. Hosted by Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and McGovern Medical School at UTHealth, Emory University School of Medicine and Washington University School of Medicine, this intimate gathering will be held at The Cloister at Sea Island and its sister hotel, The Lodge at Sea Island.

For more information about the event, visit neuro.memorialhermann.org/events/sea-island.

Pediatric Neuroscience Symposium Attracts Providers from Around the Region

More than 80 healthcare providers attended "Children with Neurological and Neurosurgical Conditions: An Update for Pediatricians," a symposium sponsored by Memorial Hermann Mischer Neuroscience Institute and Children's Memorial Hermann Hospital and held last May at Memorial Hermann-Texas Medical Center. Designed for pediatricians, neonatologists, family practitioners, nurses and



medical assistants, the daylong educational event included an overview of current and changing concepts in the care of children with neurological conditions.

Topics focused on epilepsy, common movement disorders of childhood, management of spasticity in children, neurocardiogenic syncope and dysautonomia, tuberous sclerosis complex, pediatric brain tumors, fetal management of spina bifida, surgical management of Chiari malformation, minimally invasive pediatric neurosurgery and neuroradiologic imaging techniques. Course directors were David I. Sandberg, M.D., FAANS, FACS, FAAP, director of pediatric neurosurgery at Children's Memorial Hermann Hospital and the Mischer Neuroscience Institute, associate professor in the departments of Neurosurgery and Pediatric Surgery and Dr. Marnie Rose Professor in Pediatric Neurosurgery at McGovern Medical School at UTHealth, and co-director of the Pediatric Brain Tumor Program at The University of Texas MD Anderson Cancer Center, and Ian J. Butler, M.D., director of the division of Child and Adolescent Neurology, professor of pediatrics and Distinguished Chair in West Syndrome Research at McGovern Medical School.

ACCOLADES

Dr. Arthur Day Awarded the Highly Coveted Harvey Cushing Medal

ARTHUR DAY, M.D.
Director of Clinical Education, Mischer Neuroscience Institute; *Professor and Vice Chair*, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

Arthur L. Day, M.D., vice chair, program director and director of clinical education in neurosurgery at the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and professor of neurosurgery at McGovern Medical School at UTHealth, has received the prestigious Harvey Cushing Medal, the highest honor awarded by the American Association of Neurological Surgeons. Dr. Day was selected as recipient of the honor for his many years of outstanding leadership, dedication and contributions to the field of neurosurgery.

"I am incredibly honored to be recognized with the Harvey Cushing Medal," Dr. Day says. "Many world-renowned, well-respected physicians have received this award in the past, and it is deeply humbling to be added to a group with such great medical legacies."

Dr. Day is a board-certified, fellowship-trained neurosurgeon with specific expertise in cerebrovascular and skull base neurosurgery. He also specializes in microsurgical treatment of brain tumors and minimally invasive spinal surgery.

Dr. Arthur Day is an expert in cerebral and skull base neurosurgery, the microsurgical treatment of brain tumors and minimally invasive spinal surgery.

Dr. Day was awarded his medical degree from Louisiana State University in New Orleans. He completed his internship training in Birmingham, Alabama, and subsequently completed his neurological surgery residency and fellowship in brain tumor immunology at the University of Florida College of Medicine in Gainesville.

Before joining the Mischer Neuroscience Institute, Dr. Day practiced at the University of Florida for 25 years, ultimately rising to the positions of professor, co-chair and program director of the department of Neurosurgery. In 2002, he moved to Boston to assume a position as a professor of surgery at Harvard Medical School and was also program director and chair of the department of Neurological Surgery at the Brigham and Women's Hospital.

He has held leadership positions in many medical professional societies, including serving as president of the Society of Neurological Surgeons and the Congress of Neurological Surgeons, as well as chair of the American Board of Neurological Surgery. He has received numerous awards and honors, including being named multiple times to Best Doctors in America®. Dr. Day has published more than 170 journal articles and book chapters, and co-edited two books about neurological sports injuries.

The Harvey Cushing Medal is named for Dr. Harvey Cushing, a pioneer of brain surgery who was the first to describe Cushing's disease. He is often referred to as the father of modern neurological surgery.

Dr. Bob Fayle Named Physician of the Year by the Texas Neurological Society

ROBERT W. FAYLE, M.D.
Neurologist, Houston Neurological Institute

Neurologist Robert W. Fayle, M.D., has been honored as Physician of the Year by the Texas Neurological Society. The society promotes the interest of patients with neurologic disease by supporting the development and delivery of quality medical care to these patients.

Board certified in adult neurology and sleep medicine, Dr. Fayle is a past-president of the Texas Neurological Society and currently serves as chair of the organization's Education Committee. He has held multiple leadership positions with Memorial Medical Center in Livingston, Memorial Clinics, the Harris County Medical Society, the Texas Medical Association, the American Academy of Sleep Medicine, the Diagnostic Center Hospital Board of Trustees, the Diagnostic Clinic of Houston Executive Committee and the Park Plaza Hospital Medical Executive Committee.

Dr. Fayle received his medical degree at McGovern Medical School at UTHealth and completed his residency in neurology at UTHealth-affiliated hospitals in Houston. His research in the field of sleep and stroke, including CPAP compliance and adherence, treatment of insomnia and the role of sleep apnea in diabetic patients, has been published widely.

Dr. Fayle, who is on the medical staff at Memorial Hermann Southeast Hospital, provides neurological consultations and follow-up at the Houston Neurological Institute's Pasadena and Pearland locations.

Harris County Medical Society Installs Dr. Kimberly Monday as President

KIMBERLY E. MONDAY, M.D.
Neurologist, Houston Neurological Institute; *Clinical Assistant Professor*, Vivian L. Smith Department of Neurosurgery, McGovern Medical School at UTHealth

The Harris County Medical Society (HCMS), the professional society for physicians in Harris County and the largest county medical society in the nation, installed into office board-certified neurologist Kimberly E. Monday, M.D., as the 115th President on Jan. 22, 2016, in Houston. Dr. Monday is in private practice at the Houston Neurologic Institute (HNI), which she co-founded in 1997. HNI is affiliated with Memorial Hermann Mischer Neuroscience Associates.

Dr. Monday completed her medical training, neurology residency and chief residency at Baylor College of Medicine in Houston, followed by fellowship training in clinical neurophysiology at Emory University in Atlanta where she specialized in intra-operative monitoring, diagnostic sleep medicine, EMG and EEG. Board certified by the American Academy of Psychiatry and Neurology in adult neurology, clinical neurophysiology and sleep medicine, she provides state-of-the-art electrophysiological therapy for movement disorders, including deep brain stimulation programming, baclofen pump programming and vagal nerve stimulation for epilepsy treatment. She provides neurological consultation for patients with epilepsy, movement disorders and sleep disorders, and directs both the EEG and sleep laboratories at the Houston Neurological Institute.

Dr. Monday has been named a Super Doctor by *Texas Monthly* magazine and Top Doctor by both *H Texas* magazine and *The Consumer's Guide to Top Doctors.* She serves on the Board of the Texas Neurological Society, is a delegate to the Texas Medical Association and chairs the Clinical Ethics Care Committee for MHMD, the Memorial Herman Physician Network. In addition, she serves on the Medical Advisory Board for the Houston Area Parkinson's Society. She also is a clinical assistant professor in the Vivian L. Smith Department of Neurosurgery at McGovern Medical School at UTHealth. She was recently appointed to serve on the Harris Health System Board of Managers and is chair of compliance. In 2015, she was appointed to The University of Texas College of Liberal Arts Advisory Council.

During her medical career, Dr. Monday has held many hospital and leadership positions, including chair of the Bioethics Committee at Bayshore Medical Center (1999-2002) and chair of the Bioethics Committee at Memorial Hermann Southeast Hospital (2003-2010). She has hospital affiliations with Memorial Hermann Southeast Hospital, Memorial Herman-Texas Medical Center, Memorial Hermann Southwest Hospital, Memorial Hermann Memorial City Medical Center, Memorial Hermann Greater Heights Hospital, St. Luke's Patient Medical Center, Bayshore Medical Center and Clear Lake Regional Medical Center.

HCMS, established in 1903, is the professional society for physicians in Harris County. It is the largest county medical society in the nation, with a membership of more than 11,000 physicians and medical students. Its mission is to be the leading advocate for its member physicians, their patients and the community, in promoting the highest standards of ethical medical practice, access to quality medical care, medical education, research and community health.

Thirty Neuroscience Specialists Named to Top Doctors Lists for 2015

A total of 30 neurologists, neurosurgeons and pediatric neurosurgeons affiliated with the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and McGovern Medical School at UTHealth were named to top doctors lists for 2015

Twenty-five physicians were named to *Houstonia* magazine's 2015 listing of Top Doctors in Houston. Their selection was based on nominations solicited from nearly 16,000 medical professionals practicing in eight counties in the Greater Houston area. Neurosurgeons included on the *Houstonia* magazine list are Peng Roc Chen, M.D.; Arthur L. Day, M.D.; Daniel H. Kim, M.D.; Dong Kim, M.D.; and Nitin Tandon, M.D. Pediatric neurosurgeons among the Top Doctors are David I. Sandberg, M.D., and Manish Shah, M.D. Neurologists on *Houstonia* magazine's list are Andrew Barreto, M.D.; Suur Biliciler, M.D.; José M. Diaz, M.D.; William G. Irr, M.D.; Giridhar P. Kalamangalam, M.D.; John A. Lincoln, M.D.; Raymond A. Martin, M.D.; Ankit Patel, M.D.; Sean I. Savitz, M.D.; Mya C. Schiess, M.D.; Jeremy D. Slater, M.D.; Sudha S. Tallavajhula, M.D.; and Mary Ellen Vanderlick, M.D. Pediatric neurologists listed are Ian J. Butler, M.D.; Mary Kay Koenig, M.D.; Jeremy Lankford, M.D.; Pedro Mancias, M.D.; and Gretchen Von Allmen, M.D.

Nine physicians affiliated with the Mischer Neuroscience Institute were selected by their peers as Texas Super Doctors. Following an extensive nomination and research process conducted by Key Professional Media Inc., the results were published in the June 2015 issue of *Texas Monthly* magazine. They include Dr. Dong Kim, Dr. Ian Butler, Dr. Mya Schiess, Dr. John Lincoln, and Dr. Raymond Martin, who were also named to *Houstonia*'s Top Doctors list, and neurologists James Ferrendelli, M.D.; Nicole Gonzales, M.D.; Omotola Hope, M.D.; and Jerry Wolinsky, M.D. Recognized as a Texas Super Doctors Rising Star was neurologist Melissa Thomas, M.D.

Dr. Nneka Ifejika Spotlighted in National Physical Medicine and Rehabilitation Publication

NNEKA L. IFEJIKA, M.D., MPH
Director of Neurorehabilitation, University of Texas Stroke Team; *Associate Professor*, Department of Neurology; *Associate Professor*, Department of Physical Medicine and Rehabilitation, McGovern Medical School at UTHealth

The Physiatrist, the official membership publication of the American Academy of Physical Medicine and Rehabilitation (AAPM&R), featured Nneka Ifejika, M.D., M.P.H., in its inaugural June 2015 member spotlight. Dr. Ifejika is director of neurorehabilitation at McGovern Medical School at UTHealth, where she holds joint appointments as an associate professor in the department of Neurology and the department of Physical Medicine and Rehabilitation.

A former AAPM&R Leadership Program Fellow (2013-2015), Dr. Ifejika completed a dual M.D./M.P.H. program at the University of North Carolina at Chapel Hill with a focus in health policy and administration. She is currently pursuing a Master of Science degree in clinical research at McGovern Medical School, where her research program focuses on stroke outcomes and health disparities with a goal of closing the disability gap between minorities and non-minorities in patients with cerebrovascular disease.

Dr. Ifejika is principal investigator of a National Institutes of Health-funded clinical trial called Swipe Out Stroke, which uses a mobile application to monitor diet and physical activity in high-risk stroke patients and their family members.

"Minority compliance with obesity management has been a long-standing concern in the stroke community," Dr. Ifejika says. "Unfortunately, structured weight loss programs are expensive, and compliance significantly decreases after completion of the program. At the same time, minorities spend more than $4.5 billion annually on consumer electronics, making studies that use media ideal for health outreach and health promotion efforts in minority communities. We believe that many patients will benefit from a low-cost smartphone-based application that facilitates personal contact, provides positive reinforcement and gives support."

Dr. Ifejika, who is an active member of the AAPM&R, recently began a three-year term on the Health Policy and Legislation Committee. She volunteers on the Medical Education Committee as a question writer and reviewer for the AAPM&R Certification Exam Prep Question Bank. She recently completed a webinar presentation on evidence-based medicine (EBM) for the EBM Committee and serves as a manuscript reviewer for *PM&R,* the official scientific journal of the AAPM&R.

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