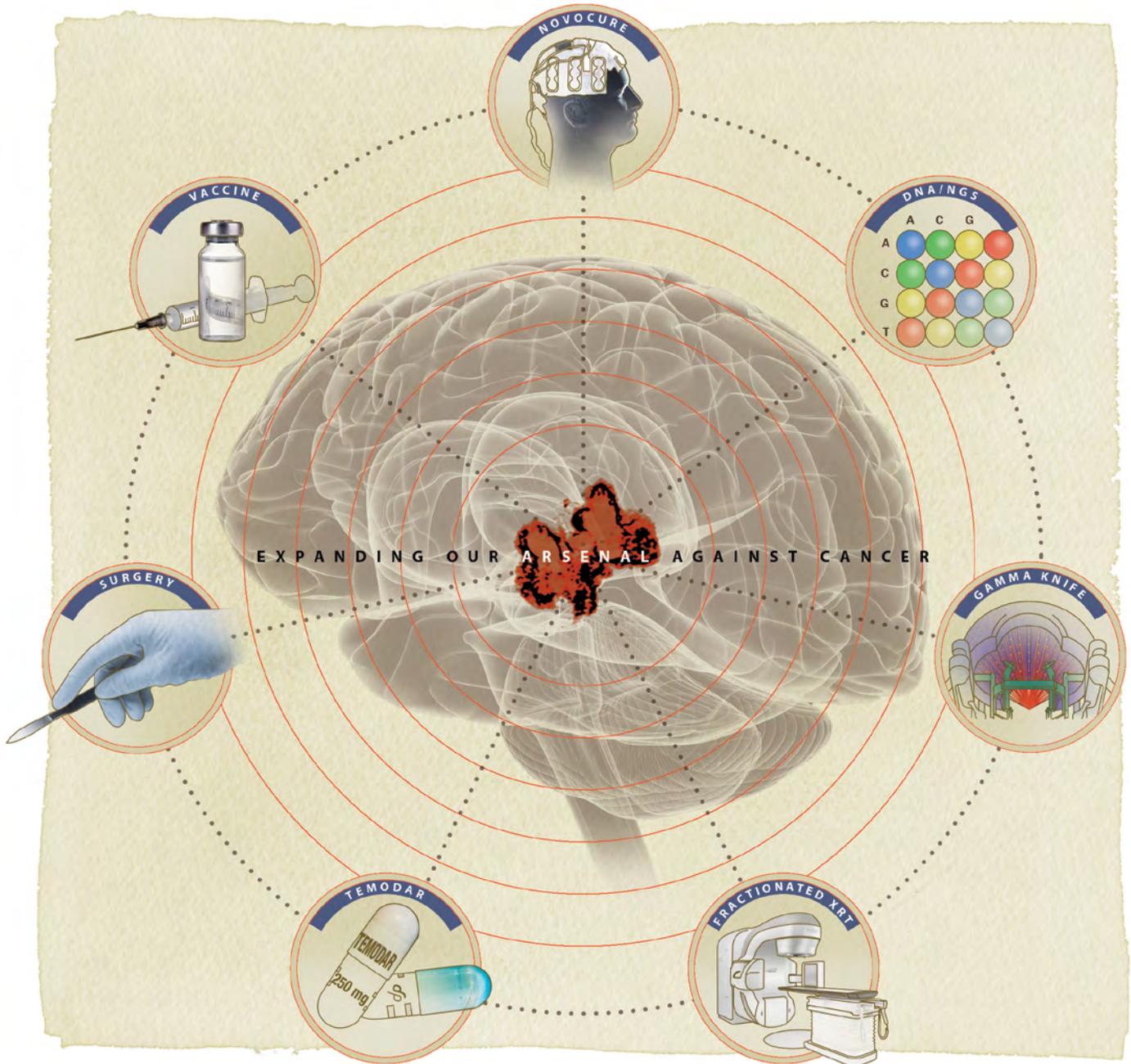


MEMORIAL HERMANN MISCHER NEUROSCIENCE INSTITUTE JOURNAL

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MOVING CLOSER *to the* SILVER BULLET

Since the recruitment of neuro-oncologists Jay-Jiguang Zhu, M.D., Ph.D., in 2010, and Sigmund Hsu, M.D., in 2012, the Mischer Neuroscience Institute (MNI) has expanded the number of innovative treatments offered to brain tumor patients through clinical trials, and increased volumes by nearly 50 percent. Now, as a site for the FoundationOne™ Registry study, physicians affiliated with MNI are using next-generation sequencing (NGS) to personalize cancer treatment and narrow treatment targets. By identifying mutations in 236 cancer-related genes, NGS reveals which unique tumor types are more likely to respond to certain chemotherapeutic agents, or may be a good match for a clinical trial. As genomic profiling moves neuro-oncology away from the shotgun approach to brain tumor treatment and closer to finding the elusive silver bullet, patients at MNI are benefiting from less toxic treatment with greater efficacy.

We'd like to express our gratitude to Michael Sleeper, Dr. Ralph De La Rosa, Brant Gallion and Crystal Perkins for sharing their personal stories in this issue of the journal. As Mr. Gallion observes about cancer treatment, "You always want to ask the doctor what the bottom line is, what will happen next. There's no answer to that and no finality or written script in anyone's case." We are deeply moved by the strength, courage and perseverance with which each of these patients faced their treatment and recovery.

We're very pleased to report that the University HealthSystem Consortium has ranked MNI's neurosurgery program among the top 10 in the nation in mortality. Five years ago the program was ranked 110th in mortality among neurosurgery programs at academic medical schools. We're proud of these gains - made possible by the terrific work of physicians, nurses, researchers and other health professionals who are committed to putting MNI on the map as *the* center for advances in neuroscience through clinical accomplishment and research productivity.

As physicians, it's incredibly rewarding to treat one patient successfully. As laboratory and clinical researchers, we can extend a higher standard of care beyond our walls, our communities and our countries to create a global legacy.

With best wishes,



DONG H. KIM, M.D.

Director, Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center

Professor and Chair, Department of Neurosurgery
UTHealth Medical School



JERRY S. WOLINSKY, M.D.

Co-director, Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center

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"WE ARE COMMITTED TO PUTTING MNI ON THE MAP AS *THE* CENTER FOR ADVANCES IN NEUROSCIENCE THROUGH CLINICAL ACCOMPLISHMENT AND RESEARCH PRODUCTIVITY."

PATIENT-SPECIFIC CANCER CARE:

NEURO-ONCOLOGY ZEROES IN ON SPECIFIC DISEASE PATHWAYS
TO PERSONALIZE BRAIN TUMOR TREATMENT

Anti-cancer agents targeted to work at the cellular level have revolutionized cancer treatment, expanding medicine's arsenal against the disease. By identifying and binding to primary and metastatic cancer cells, the biological agents have improved efficacy and reduced toxicity. Now, neuro-oncologists at the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center and UTHHealth Medical School are taking brain tumor treatment to the next level, typing tumors molecularly and delivering more personalized treatment.

“ADVANCEMENTS MADE THROUGH CANCER RESEARCH HAVE ALLOWED US TO MOVE AWAY FROM THE SHOTGUN APPROACH TO TREATMENT AND MOVED US A STEP CLOSER TO FINDING THE SILVER BULLET.”

“Having the capability to identify specific cancer genetic signatures allows us to choose one chemotherapeutic drug over another, a dramatic change in the way we treat primary and metastatic brain tumors,” says fellowship-trained neuro-oncologist Sigmund Hsu, M.D., an assistant professor in the Vivian L. Smith Department of Neurosurgery at UTHHealth Medical School. “Before the discovery of these signatures, we made decisions about treatment based on the location of the tumor in the body and how it looked under the microscope during pathological examination. Advancements made through cancer research have allowed us to move away from the shotgun approach to treatment and moved us a step closer to finding the silver bullet.”



SIGMUND H. HSU, M.D., FAANS, FACS
Neuro-Oncologist
Assistant Professor,
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Dr. Hsu is principal investigator of one of the first clinical trials to use immunotherapy in combination with standard anti-angiogenic therapy for cancer. Called “ReACT: A Phase II Clinical Trial Targeting the EGFRvIII Mutation in Glioblastoma Patients with Relapsing Disease,” the study is investigating whether adding an experimental vaccine called rindopepimut, also known as CDX-110, to the commonly used chemotherapeutic drug bevacizumab can improve progression-free survival of patients with relapsed EGFRvIII-positive glioblastoma multiforme (GBM).

The ReACT trial is a significant step forward in using next-generation sequencing (NGS) for the treatment of GBM. “Mutations that lead to epidermal growth factor receptor (EGFR) overexpression or overactivity have been associated with a number of cancers including GBM, in which a specific mutation called EGFRvIII is often observed,” says Dr. Hsu, whose clinical and research interests include the discovery of new and more effective therapies for patients with primary brain tumors, treatment of metastatic cancer to the brain and spinal fluid and the evaluation and treatment of neurological problems in cancer patients. “While we’ve used NGS and genetic-based treatment for brain metastases of melanoma, lung cancer and breast cancer, we’re still in the infancy of using genomics for primary brain tumors such as GBM.”

The arrival of Dr. Hsu in 2012 added strength to MNI’s expanding neuro-oncology service, which focuses on providing the best state-of-the-art treatment and access to investigational trials for appropriate patients. He was recruited to MNI by fellowship-trained neurologist and neuro-oncologist Jay-Jiguang Zhu, M.D., Ph.D., who is director of the Institute’s Clinical Cancer Program and an associate professor in the Vivian L. Smith Department of Neurosurgery at UTHHealth Medical School.



JAY-JIGUANG ZHU, M.D., PH.D.

Neuro-Oncologist
Associate Professor,
Departments of Neurosurgery and Neurology
UTHealth Medical School

“Thanks to next-generation sequencing, we understand more about the underlying DNA mutations that drive cancer growth, which has allowed us to adapt treatment to the specific genetics of the tumor,” says Dr. Zhu, who 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. “As we learn more, we’re replacing traditional cytotoxic treatments with less toxic, potentially more effective therapies that target changes in a patient’s unique DNA that promote the survival of cancer cells. These breakthrough approaches to treatment with more clinical trials available at MNI have allowed us to increase our volumes by nearly 50 percent since 2009.”

Last year, MNI was chosen as a site for the FoundationOne™ Registry, to which physician researchers report data gathered using the company’s proprietary genomic profiling technology to expand patients’ treatment options. FoundationOne’s next-generation sequencing interrogates the entire coding sequence of 236 cancer-related genes plus 47 introns from 19 genes that are often rearranged or altered in solid tumor cancers. By identifying mutations in these genes, the technology gives physicians more information about which unique tumor types are more likely to respond to certain chemotherapeutic drugs or may be a good match for a clinical trial.

Physicians affiliated with MNI are also investigating other ways to reduce cytotoxicity in the treatment of brain tumors. Dr. Zhu is principal investigator of three clinical trials that give eligible study participants access to new and advanced treatments. The first is a Phase III multicenter, randomized, controlled trial



designed to test the efficacy and safety of an experimental, portable, battery-operated medical device called the NovoTTF-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.

Dr. Zhu is also principal investigator of a randomized, double-blind, controlled Phase IIB clinical trial testing the efficacy of the vaccine ICT-107 for newly diagnosed GBM patients following resection and chemoradiation. ICT-107

The NovoTTF-100A, an experimental, portable, battery-operated device for newly diagnosed GBM patients, provides a low-voltage electric field shown to reduce tumor cell survival.

is an autologous vaccine consisting of dendritic cells from the patient’s own immune system, which are isolated from blood by apheresis and pulsed with synthetic peptides from six GBM-specific stem cell-associated antigens – MAGE-1, HER2, AIM2, TRIP-2, GP100 and interleukin 13 receptor alpha. The sensitized dendritic cells are then returned to the patient by subcutaneous injection as an immunotherapy to attack the tumor.

The third trial, an open-label Phase I/II (Safety Lead-in) study of trans sodium crocetinate (TSC) with concomitant radiation therapy and temozolomide in newly diagnosed GBM, examines the safety and efficacy of the radiation sensitizing effect of TSC in combination with fractionated radiation.

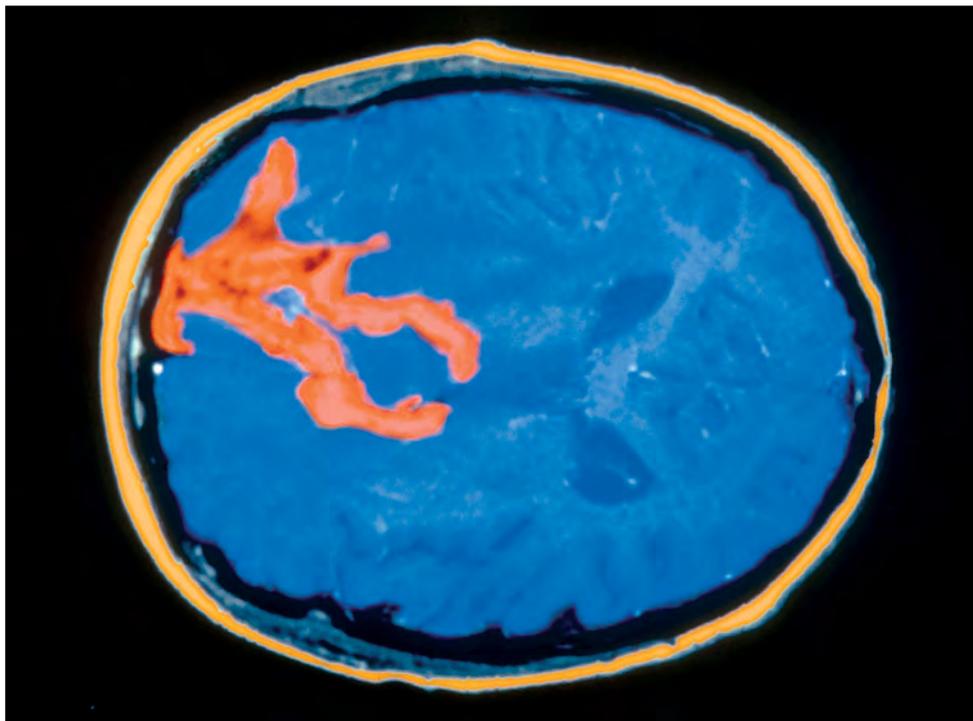
Dr. Zhu and Min Li, Ph.D., director of MNI's Cancer Research Program, work together as part of the Institute's new Brain Tumor Research Program. An associate professor in the Vivian L. Smith Department of Neurosurgery and the department of Integrative Biology and Pharmacology at UTHealth Medical School, Dr. Li directs a laboratory where researchers are investigating molecular and cellular mechanisms of cancer pathogenesis and developing new therapeutics for human cancers, including pancreatic cancer and brain tumor. His research has both basic and translational components and expands in multiple directions, including zinc transport, nutrition uptake and metabolism, protein-protein interaction, microRNA, drug resistance, and cancer prevention and therapy.



MIN LI, PH.D.

Director,
Cancer Research Program
Associate Professor,
Department of Neurosurgery
UTHealth Medical School

“Our objective is to gain understanding of the molecular changes in patient tumor specimens,” Dr. Zhu says. “Understanding those changes will give us prognostic factors that enable us to determine which patients will respond well to a given drug or treatment with multiple drugs. Some genes have already been identified, and Dr. Li is looking for others with prognostic value. Knowledge of the molecular changes that take place in cancer cells will help us define treatment targets for specific patients, and aid in choosing chemotherapies or specific molecular-based treatments. Our ultimate goal is to provide personalized cancer care, maximize efficacy and minimize toxicity for each patient.”



In the pediatric arena, the promising results of translational studies conducted by David Sandberg, M.D., FAANS, FACS, FAAP, director of pediatric neurosurgery at Children's Memorial Hermann Hospital in the Texas Medical Center, have demonstrated the safety of infusing chemotherapeutic agents directly into the fourth ventricle of the brain. These studies led to a pilot clinical trial, available only at Children's Memorial Hermann Hospital and The University of Texas MD Anderson Cancer Center, for children with recurrent tumors in this area of the brain. This radically new approach to chemotherapy allows Dr. Sandberg and team members to circumvent the blood-brain barrier and deliver agents directly to the site of disease, minimizing side effects by decreasing systemic drug exposure.



DAVID SANDBERG, M.D., FAANS, FACS, FAAP

Director, Pediatric Neurosurgery,
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Neurosurgery and Pediatric Surgery
UTHealth Medical School

“The collaboration with MD Anderson is good news for children and adolescents with brain tumors,” says Dr. Sandberg,

An enhanced MRI scan reveals an invasive glioblastoma multiforme. Novel treatments for GBM are under study at the Mischer Neuroscience Institute.

who holds joint appointments as associate professor in the Vivian L. Smith Department of Neurosurgery and the department of Pediatric Neurosurgery at UTHealth Medical School, and is also an associate professor in the department of Neurosurgery at MD Anderson Cancer Center. “Using novel approaches to surgery and chemotherapy, we have the potential to minimize side effects from treatment and achieve better long-term survival rates.”

In addition to the single-center clinical trial for recurrent medulloblastoma, ependymoma and atypical teratoid-rhabdoid tumors using direct infusion of chemotherapy into the fourth ventricle, other novel approaches are being investigated by the combined research team, including administration of natural killer cells into the fourth ventricle to attack tumor cells via cell-directed therapy.

As Mischer Neurosciences continues its expansion across the city, neuro-oncology services are available at several campuses, including Memorial Hermann-TMC, Memorial Hermann Memorial City

MICHAEL SLEEPER: BEATING *the* GLIOBLASTOMA MULTIFORME ODDS

Medical Center, Memorial Hermann The Woodlands Hospital, Memorial Hermann Southwest Hospital and TIRR Memorial Hermann. “MNI’s infrastructure expansion and Memorial Hermann’s acute care presence across Houston have allowed for the extension of neuro-oncology expertise and capabilities outside the Texas Medical Center,” says Dr. Zhu, who also consults on patients with brain tumors at TIRR Memorial Hermann, the top rehabilitation hospital in the southern half of the United States.

In 2013, TIRR Memorial Hermann extended its cancer rehabilitation programs throughout the Greater Houston community and added survivorship wellness programs at key locations. “Many people return to normal life after cancer treatment, but a growing number, as a result of their diagnoses, are learning to cope with a decline in function related either to the disease or to the effects of chemotherapy and radiation therapy, which have complications of their own,” says Jacob Joseph, M.D., clinical chief of Specialty Rehabilitation Programs at TIRR Memorial Hermann and an assistant professor of physical medicine and rehabilitation at UTHealth Medical School. “We see a lot of people who are excited to be alive after their cancer treatment, but then they discover they’re living with issues that affect their quality of life. These patients have led us to make a concerted effort to address survivorship issues in greater depth.

Dr. Zhu considers the collaboration with TIRR Memorial Hermann an important part of the comprehensive continuum of care offered through the Mischer Neuroscience Institute. “The traditional goal of neuro-oncology has been to ensure that patients live as long as possible with enhanced quality of life,” he says. “We’ve added to that a new goal: to maximize function and help our patients maintain meaningful life roles insofar as possible at every stage of treatment and recovery.”

TIRR IS A REGISTERED TRADEMARK OF TIRR FOUNDATION.



Michael Sleeper is one of many patients to benefit from the clinical trial of a novel vaccine for glioblastoma multiforme (GBM), currently underway at the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center. Led by principal investigator Jay-Jiguang Zhu, M.D., Ph.D., the trial is determining the safety and efficacy of the ICT-107 vaccine in newly diagnosed GBM patients following resection and chemoradiation.

Sleeper began suffering severe headaches on the Fourth of July in 2011. After two days of pain, his wife drove him to the Medical Center of Southeast Texas in coastal Port Arthur, near his home in Nederland, Texas. When the neurologist on call viewed the results of Sleeper’s CT scan, he made an immediate referral to MNI, an hour-and-a-half ambulance ride away.

At the Institute Sleeper underwent an MRI and was seen by neurosurgeon Nitin Tandon, M.D., an associate professor in the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School, who reviewed the results of the imaging study and recommended

Sixty-four-year-old Michael Sleeper is a participant in the ICT-107 vaccine trial.

surgery. The Sleepers agreed, and on July 11, 2011, Dr. Tandon excised the tumor, which was located at the right temporal lobe. On biopsy, neuropathology delivered a diagnosis of GBM.

“On my first follow-up visit after the surgery, Dr. Zhu talked to me about my options for further treatment,” Sleeper recalls. “At that time I qualified for three clinical trials. My wife and family and I decided that the ICT-107 vaccine sounded like the best fit for me. We did the medical paperwork, and I was enrolled in the trial.”

ICT-107 is an autologous vaccine consisting of dendritic cells from the patient’s own immune system, which are isolated from blood by apheresis and pulsed with synthetic peptides from six GBM-specific stem cell-associated antigens – MAGE-1, HER2, AIM2, TRIP-2, GP100 and interleukin 13 receptor alpha. The sensitized dendritic cells are then returned to the patient by subcutaneous injection as an immunotherapy to attack the tumor. The process was supervised by neuropathologist Yu Bai, M.D., an associate

professor in the department of Pathology and Laboratory Medicine at UTHealth Medical School.

Sleeper began treatment with ICT-107 in August 2011 and was administered the vaccine every two weeks for the first eight weeks, then monthly for a year, then every six months. “At the same time, we began chemotherapy treatment with temozolomide, an oral alkylating agent that has been shown to improve progression-free survival and overall survival in glioblastoma multiforme patients,” says Dr. Zhu, director of MNI’s Clinical Cancer Program and an associate professor in the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School.

Dr. Tandon performed a second surgery on Sleeper in May 2012 when a regularly scheduled MRI revealed an area of suspicion. “Imaging is not 100 percent. On MRI we can’t tell if we’re seeing new growth or radiation necrosis, so we have to check,” Dr. Zhu says. “We were happy to see that there were no active tumor cells on biopsy by neuropathology.”

Nearly three years after his diagnosis, Sleeper takes the vaccine every six months and temozolomide five days out of every 28. “It’s remarkable that he has been able to continue on temozolomide for this long, and that the agent continues to control the tumor without major side effects,” Dr. Zhu says. “With the exception of brain-stem gliomas, GBM has the worst statistical prognosis of any central nervous system malignancy – a median survival of 14.6 months. Michael’s regular exams continue to be normal – he’s beating the odds.”

Sleeper, who remains positive about his experience with GBM, commends Dr. Zhu and his team for their caring attitude. “I wish I could say the vaccine is why I’m here today or the Temodar® or both of them, or maybe it’s the way I live life. I believe it’s a combination of everything, including Dr. Zhu’s entire caring team. Along with my family and friends, they’ve helped keep me positive. Every day’s a good day.” ■

SPECIALIZED CANCER CARE THROUGH THREE CLINICS:

CANCER NEUROLOGY, BRAIN METASTASES, PITUITARY AND VISION CHANGE

Fellowship-trained neurologist and neuro-oncologist Sigmund Hsu, M.D., leads the Mischer Neuroscience Institute’s new Cancer Neurology Clinic for the treatment of patients with neurological issues resulting from chemotherapy, and the Brain Metastases Clinic, whose staff of affiliated neuro-oncologists, neuroradiologists, neuropathologists, oncologists and neurosurgeons works closely with oncologists to provide personalized and innovative care to patients with brain tumors.

“Our goal with both clinics is to provide a much-needed niche service to the general oncologic community,” says Dr. Hsu, who provides consultation at Memorial Hermann-Texas Medical Center, Memorial Hermann Memorial City Medical Center and Memorial Hermann The Woodlands Hospital. “Cancer patients present with a complex mix of health issues. The problem itself may be easy to identify but the cause can be more difficult to determine. Is the problem with a breast cancer patient’s leg related to a herniated disk – completely unrelated to the breast cancer – or is it related to radiation or chemotherapy toxicity or to the malignancy itself? As a neurologist I can look at the big picture from a comprehensive perspective.”

The two new clinics extend the range of services for brain tumor patients, an expansion begun in 2011 with the opening of MNI’s Pituitary and Vision Change Clinic, which brings together a diverse range of subspecialists to diagnose, evaluate and treat specific disorders.

Led by Arthur L. Day, M.D., vice chair, program director and director of clinical education in neurosurgery at MNI and a professor in the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School, the clinic uses the same



“Cancer patients present with a complex mix of health issues.” – Sigmund Hsu, M.D., FAANS, FACS

integrative approach that has brought national acclaim to MNI. Physicians at the clinic incorporate neurology, endocrinology, neuro-ophthalmology, stereotactic radiosurgery with Gamma Knife® technology, diagnostic radiology, interventional neuroradiology, radiation oncology and neuropathology for a comprehensive diagnosis and treatment plan. The team’s combined expertise includes pituitary-region tumors, including non-secretory tumors, TSH-secreting tumors, growth hormone-secreting tumors (acromegaly), corticotrophin-secreting tumors (Cushing’s disease), prolactin-secreting tumors, craniopharyngiomas, Rathke’s cleft cysts and pituitary cysts. Parasellar tumors treated include meningiomas arising from the orbit or skull base near the pituitary gland and optic nerves, craniopharyngiomas, germ cell tumors, epidermoid cysts, gliomas and metastatic tumors.

To refer a patient to any of the three clinics or request a consult, please call 713.704.7100.

RALPH DE LA ROSA: *The DOCTOR'S DOCTOR*

They say that physicians are terrible patients,” says Ralph De La Rosa, M.D., recalling his experience at the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center. “I don’t think I was a bad patient, but it is true that it’s very hard to let go of being a doctor when you’re in the healthcare setting.”

A family physician with Gonzaba Medical Group in San Antonio, Dr. De La Rosa has practiced medicine in Texas since 1980, first as a resident at Memorial Medical Center in Corpus Christi, then as a solo practitioner in nearby Calallen, then later with two large group practices in Corpus Christi and San Antonio before joining Gonzaba Medical Group in 2012. When he became mildly confused and somnolent at work in August

2013, he attributed it to the stress of a busy practice.

“I was in denial,” he says. “My colleagues noticed I was having short-term memory problems, and my family saw that I wasn’t behaving or walking normally.”

“SINCE MY SURGERY I’VE BEEN READING ABOUT COLLOID CYSTS AND HAVE BEEN REASSURED BY THE LITERATURE THAT I SHOULD BE DOING WELL. AND I AM.”

The following day, at the insistence of his wife and family, he went to an urgent care clinic near his home in Cibolo, Texas. The physician assistant who examined him expressed concern about his symptoms and referred him urgently to Gonzaba’s main clinic in south San

Antonio for imaging studies. When a CT scan revealed a suspected colloid cyst in the third ventricle, the clinic arranged an immediate referral to neurosurgeon Gerardo Zavala, M.D.

Colloid cysts are relatively rare intracranial lesions usually located posterior to the foramen of Monro, a passage between the lateral and third ventricles of the brain. Because of their location in the third ventricle, they can cause obstructive hydrocephalus and increased

intracranial pressure, which may result in headache, vertigo, memory deficits, behavior disturbances and, in extreme cases, sudden death.

After reviewing the results of the CT scan, Dr. Zavala admitted Dr. De La Rosa to St. Luke’s Baptist Hospital at the medical center in San Antonio, where he placed a ventriculoperitoneal shunt to drain the accumulation of cerebrospinal fluid (CSF) and relieve intracranial pressure.

“I’d had an MRI by then, and it was becoming increasingly apparent that it was a colloid cyst deep in the third ventricle,” Dr. De La Rosa says. “What made me ill that day in August was the ball-valve effect of the cyst - it would float up and block circulation of CSF, causing worsening hydrocephalus. Given the size of the cyst, Dr. Zavala felt that we needed to remove the obstruction and referred me to Dr. Dong Kim in Houston. We all agreed that it should come out.”

As director of the Mischer Neuroscience Institute and professor and chair of the Vivian L. Smith Department of Neurosurgery, Dong H. Kim, M.D., leads the clinical neuroscience program for the Memorial Hermann Health System and



A family physician, Dr. De La Rosa has practiced medicine in Texas since 1980.



This MRI scan shows a colloid cyst in the third ventricle.

UTHealth Medical School. He is noted for his experience with tumors and cysts, and also leads ongoing investigations into the origin, development and treatment of brain aneurysms, genetic changes in brain tumors and the use of stem cells to treat spinal cord injuries.

On Sept. 25, 2013, Dr. Kim accompanied Dr. De La Rosa to the operating room at Memorial Hermann-Texas Medical Center, where he performed a right frontal craniotomy to resect the large cyst – a complex procedure because of its size, depth and intraventricular location. “Dr. De La Rosa awoke immediately from surgery, did well and went home two days later,” Dr. Kim says. “His memory was intact, and he had no neurological deficits on examination.”

“I’M GRATEFUL TO DR. ZAVALA AND DR. KIM BECAUSE I BELIEVE I WAS IN A SERIOUS CRISIS. THEY ARE BOTH WONDERFUL PHYSICIANS.”

Dr. De La Rosa returned to practice in February 2014. “I’m grateful to Dr. Zavala and Dr. Kim because I believe I was in a serious crisis,” he says. “They are both wonderful physicians. With his exceptional knowledge of the brain, Dr. Kim can do some amazing things. Since my surgery I’ve been reading about colloid cysts and have been reassured by the literature that I should be doing well. And I am.” ■

INTRA-ARTERIAL DELIVERY of CHEMOTHERAPY for RETINOBLASTOMA SAVES EYES



Endovascular neurosurgeon Mark Dannenbaum, M.D., treats a retinoblastoma patient.

Children’s Memorial Hermann Hospital is the only hospital in the south-central United States offering intra-arterial chemotherapy as a routine service for the treatment of retinoblastoma, a rare pediatric eye malignancy that affects only 250 to 350 new patients each year. The treatment requires a large multispecialty team that involves close collaboration between endovascular neurosurgery, ocular oncology and medical neuro-oncology.

“Having the capability to inject chemotherapy directly into the arteries that feed the eye eliminates the side effects of systemic chemotherapy and maximizes the therapeutic dose to the eye,” says endovascular neurosurgeon Mark Dannenbaum, M.D., an expert on cerebrovascular surgery and neurointerventional techniques and an assistant professor of neurosurgery at UTHealth

Medical School. “The technique is very new and a paradigm shift in the treatment of retinoblastoma. Before its development, removal of the eye was the standard-of-care treatment for retinoblastoma that had not metastasized.”

To initiate the procedure, Dr. Dannenbaum places a microcatheter into the ophthalmic artery using a neuroendovascular technique. He collaborates with Amy Scheffler, M.D., an ocular oncologist and retina specialist affiliated with Children’s Memorial Hermann Hospital, who infuses a high concentration of chemotherapy directly into the tumor bed.

“This is exciting and groundbreaking clinical work,” he says. “We’re saving eyes and providing a cure for this treatable type of cancer.”

CRYSTAL PERKINS: A DAY *at a* TIME

When Crystal Perkins was pregnant with her second child, she began having headaches and fainting spells. By the end of her pregnancy, the 36-year-old pastry chef had difficulty standing up. She had memory problems and other health issues during those nine months, and attributed all of them to a rough pregnancy.

After her daughter Laney was born, Perkins felt disconnected from everyone. “We thought it was postpartum depression and went to doctors who prescribed antidepressants, but they didn’t help,” says her husband Lann Perkins.

In mid-November 2012, hoping that a stay at the coast would boost her spirits and help her relax, her mother, Debbie Zambardino, and sister Heather Thibodeaux drove her to Thibodeaux’s beach house in Bolivar, Texas. On Nov. 18, when Perkins became extremely lethargic, the two women took her to Memorial Hermann Baptist Beaumont Hospital in nearby Beaumont, where a CT scan revealed a massive brain tumor. At the hospital, the emergency center staff arranged transport by ambulance to the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center. An MRI confirmed a massive butterfly-shaped tumor involving the frontal lobes, the genu of the corpus callosum, the left thalamus, the left insular cortex and the septal region. Neurosurgeon Nitin Tandon, M.D., an associate professor in the Vivian L. Smith Department of Neurosurgery at UTH Health Medical School, counseled Perkins and her husband on the likely diagnosis of glioblastoma, the most common and aggressive malignant primary brain tumor.

Perkins went to the OR the following day – her 35th birthday. Dr. Tandon removed as much of the tumor as possible

without causing new neurological deficits, and pathology confirmed a diagnosis of bifrontal glioblastoma multiforme. Two days later, Dr. Tandon performed a hemispherectomy, removing a portion of the left side of her skull to relieve pressure caused by swelling.

From a surgical standpoint, the case was challenging. “The tumor had infiltrated both frontal lobes and the basal ganglia in the left hemisphere, producing a lot of mass effect and raising intracranial pressure,” Dr. Tandon says. “The fact that she is young and had recently been pregnant gave us hope. Generally, younger patients do better with these tumors, and pregnancy leads to an immune-suppressed state that can allow certain malignancies to grow unchecked. We hoped that aggressive surgery and adjuvant therapy would lead to a good outcome.”

Perkins remained in the hospital for more than a month. During that time she met the two other physicians who made up her care team: neuro-oncologist Jay-Jiguang Zhu, M.D., Ph.D., director of MNI’s Clinical Cancer Program and an associate professor in the Vivian L. Smith Department of Neurosurgery, and radiation oncologist Angel Blanco, M.D. Under Dr. Blanco’s direction, she began 30 fractions of radiotherapy over a span of 42 days.

In mid-December, she began concurrent chemotherapy with temozolomide under Dr. Zhu’s direction, which was followed by an ongoing regimen of temozolomide five days out of every 28. Later, when there was suspicion of tumor progression, Dr. Zhu added bevacizumab and irinotecan to her chemotherapy regimen.

“We treated Crystal very aggressively, and have seen the benefit of that aggressive therapy in her progress,” Dr. Zhu says.

By October 2013, Perkins was able to

enjoy her baby for the first time since her surgery. “She is really, really precious – a happy baby,” she says. “I would like to thank every doctor, nurse and staff member who made our stay better. It’s never a good time when you’re in the hospital but this is the closest I’ve ever come to having one.”

Dr. Zhu noted the special rapport between Perkins and her husband. “Mr. Perkins has been resilient from the get-go,” he says. “He supported Crystal through surgery and recovery and joined our brain tumor support group while she was in the hospital. They’re both incredibly supportive of each other. They understand the challenges they face but are taking it one day at a time with a strong positive attitude.”

The couple continues to participate in the support group, which meets every second Wednesday at the Mischer Neuroscience Institute. “I don’t know why it helps but it does,” Lann Perkins says. “We hear a lot of success stories in the group, and it’s pretty close to a miracle that Crystal is alive today. She has an incredible team of doctors, which is the real reason she’s here. They’re really on top of their game, and they’re also on the frontlines of research, which gives me hope that one day they might find a cure for this disease.” ■

Temozolomide, an oral medication, is used in combination with radiotherapy to treat specific brain tumors, including GBM.



ZINC TRANSPORTER ZIP₄: A NOVEL MOLECULAR MARKER *for* GLIOMA

Scientists at the Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center and UTHealth Medical School have linked ZIP₄, a molecule that enables the transport of zinc into cells, to the progression of gliomas, which make up about 80 percent of all malignant brain tumors. The results of their research were published in the August 2013 issue of *Neuro-Oncology*.¹

“Dysregulated zinc transport has been observed in many cancers, but the expression profile of zinc transporters in the brain and brain tumors has not been reported previously,” says Min Li, Ph.D., director of the Cancer Research Program at the Vivian L. Smith Center for Neurological Research at UTHealth Medical School and senior author of the first paper to suggest that ZIP₄ may serve as a potential diagnostic and prognostic marker for gliomas. “We’ve found that ZIP₄ is substantially overexpressed in clinical pancreatic adenocarcinoma and in glioblastoma multiforme, the most common and aggressive type of glioma in humans. Our hope is that one day drugs can be developed to block this pathway.”

An associate professor in the Vivian L. Smith Department of Neurosurgery and the department of Integrative Biology and Pharmacology at UTHealth Medical School, Dr. Li directs a laboratory where researchers are investigating molecular and cellular mechanisms of cancer pathogenesis and developing new therapeutics for human cancers, including pancreatic cancer and brain tumor. His research has both basic and translational components and expands in multiple directions, including zinc transport, nutrition uptake and metabolism, protein-protein interaction, microRNA,

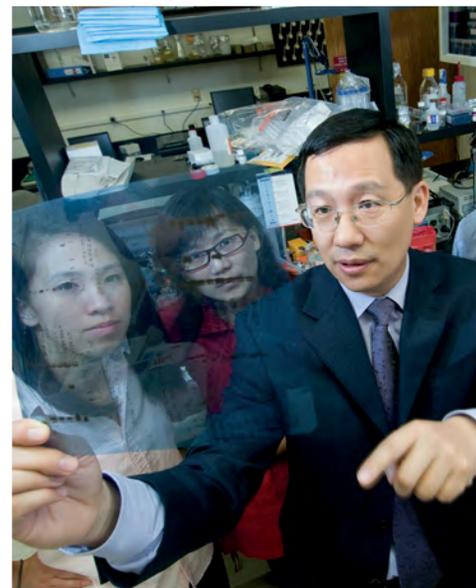
drug resistance, and cancer prevention and therapy.

Dr. Li’s brain tumor investigation builds on his work with pancreatic cancer. A previous molecular profiling study by one of his collaborators, Craig Logsdon, Ph.D., professor in the departments of Cancer Biology and Gastrointestinal Medical Oncology at The University of Texas System MD Anderson Cancer Center, indicated high levels of zinc transporters in pancreatic cancer tissues by microarray analysis. Research conducted by Dr. Li confirmed those findings and also showed that overexpressed ZIP₄ increases zinc uptake by the cell, resulting in significantly increased tumor growth.

In an article published in the September 2013 issue of *EMBO Molecular Medicine*,² the investigators were the first to show that ZIP₄ regulates a key oncogenic microRNA, miR-373, in pancreatic cancer. “When we discovered that ZIP₄ acts as a master switch, we designed experiments to determine what happens when the switch is turned on,” he says.

In an animal model of pancreatic cancer, the scientists observed how the initiation of ZIP₄ triggered the activation of a downstream signaling pathway, which in turn accounts for increased tumor growth. While they demonstrated a novel biological role for ZIP₄ in pancreatic cancer, the molecular pathway that controls the phenomenon remains elusive.

Dr. Li’s team is also investigating the therapeutic potential of ZIP₄ short hairpin RNA (shRNA), a sequence of RNA that can be used to silence gene expression. “In pancreatic cancer we’ve found that silencing of ZIP₄ was associated with decreased cell proliferation, migration and invasion. Our preliminary



Min Li, Ph.D., director of the Cancer Research Program at MNI, has linked the molecule ZIP₄ to the progression of gliomas.

studies also indicate that ZIP₄ shRNA can sensitize pancreatic cancer cells to chemotherapy drug treatment. We think a combination therapy using ZIP₄ shRNA and chemotherapy may further increase the efficacy of treatment for pancreatic cancer. We hope to kill two birds with one stone by targeting ZIP₄ with shRNA in both pancreatic cancer and brain tumor.”

Dr. Li’s laboratory is funded by the National Institutes of Health, the National Cancer Institute and private foundations, including the Memorial Hermann Foundation and the Dr. Marnie Rose Foundation.

¹ Lin Y, Chen Y, Wang Y, Yang J, Zhu VF, Liu Y, Cui X, Chen L, Yan W, Jiang T, Hergenroeder GW, Fletcher SA, Levine JM, Kim DH, Tandon N, Zhu JJ, Li M. ZIP₄ is a novel molecular marker for glioma. *Neuro Oncol.* 2013 Aug;15(8):1008-16.

² Zhang Y, Yang J, Cui X, Chen Y, Zhu VF, Hagan JP, Wang H, Yu X, Hodges SE, Fang J, Chiao PJ, Logsdon CD, Fisher WE, Brunnicardi FC, Chen C, Yao Q, Fernandez-Zapico ME, Li M. A novel epigenetic CRED-miR-373 axis mediates ZIP₄-induced pancreatic cancer growth. *EMBO Mol Med.* 2013 Sept;5(9):1322-34.

BRANT GALLION: LIVING *with* ASTROCYTOMA



In the winter of 2009, Brant Gallion was in Russian territory, climbing a piece of equipment on an oil rig in the Caspian Sea, when he thought he was being electrocuted, lost consciousness and fell 5 feet to the deck on his back. He revived about a half hour later, uninjured and surrounded by crew members. “I rested the next day and thought that was the end of it,” says Gallion, a 35-year-old engineering consultant who lives in Bryan, Texas.

In June 2010, after returning to Texas, he had a second episode. “I collapsed and once again felt like I was being electrocuted, then lost consciousness,” he recalls. “I woke up and went back to work. I didn’t draw any conclusions at the time, but I began to suspect a neurological problem.”

Four months after the second incident, in October 2010, he had a generalized seizure while working in Katy, Texas. A colleague called 911, and he was taken by ambulance to Memorial Hermann Katy Hospital, where he underwent a CT scan and MRI. The following day he was transferred to Memorial Hermann-Texas Medical Center, where he was prescribed an anti-seizure medication and referred to Dong H. Kim, M.D., director of the Mischer Neuroscience Institute (MNI) at Memorial Hermann-TMC and

professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School.

Two days later, Gallion was in the exam room with Dr. Kim, who is noted for his experience with brain tumors and cysts of all types. He recommended a biopsy based on the imaging studies, which showed a diffuse lesion in the right posterior frontal lobe, with MRI characteristics suggestive of a low-grade astrocytoma. Dr. Kim also referred him to neuro-oncologist Jay-Jiguang Zhu, M.D., Ph.D., director of MNI’s Clinical Cancer Program and an associate professor in the Vivian L. Smith Department of Neurosurgery.

Dr. Kim made an immediate impression on his patient. “He has enormous presence, and I had the feeling that I was in the best possible hands. I didn’t have any context for neuroscience then and didn’t understand Dr. Kim’s stature in that world,” says Gallion, who was 31 at the time. “It took me about a year and a half after that initial meeting to put him into context.”

Gallion met with Dr. Zhu a few weeks later. “He discussed the clinical symptoms of seizures and the MRI abnormality through his eyes as a neuro-oncologist,” he says. “I wanted to let all this wash over me, and in the end I passed 2011 and early 2012 with quarterly MRIs but without any surgery. I was busy with a company startup and had other personal obligations. I was afraid it might be the beginning of a downward spiral, and that if I had the biopsy, I wouldn’t recover fast enough to meet those obligations. I had also decided that if it was an aggressive tumor, I’d rather just let it play out.” Surveillance MRIs during those 18 months showed no significant change in the lesion.

In May 2012, Gallion was ready for the biopsy. Dr. Kim performed the surgery and

using motor-mapping techniques, found that the bulk of the tumor was located in the right motor strip, an area that controls movement on the left side of the body. He was able to remove a small amount of tissue for pathological examination; total resection would have resulted in paralysis. In a Neuro-oncology Tumor Board conference attended by Dr. Kim, Dr. Zhu, and radiation oncologist Angel Blanco, M.D., the team recommended radiation and the initiation of chemotherapy.

After recovering from surgery, Gallion began 30 fractions of radiation therapy over a span of 42 days with concurrent daily temozolomide, followed by chemotherapy with temozolomide five days out of every 28, a regimen he continues today. Temozolomide is an oral chemotherapy drug that can be taken at home, with outpatient monitoring for side effects.

“My new normal is a quarterly MRI to check on the tumor, which has been stable,” he says. “I’ve had to make lifestyle adjustments that were for the best – better sleeping and eating habits and eliminating sources of stress. I’m fortunate that my condition doesn’t dominate my life. Even during the time of surgery and recovery, I produced more work than during any other period.”

Gallion, who has had no seizures since February 2013, describes his treatment as “a pretty good experience. Dr. Kim made me want to quit what I’m doing and become a doctor. Unfortunately, that’s not my skill set. Dr. Zhu is also a wonderful doctor and uniquely gifted in his bedside manner and professionalism. Often they bring a resident along to my checkups or a resident sees me first and then reviews the assessment with Dr. Kim or Dr. Zhu. It’s fun being part of the teaching process – even if I am the case study.

“You always want to ask the doctor what the bottom line is, what will happen next,” he adds. “There’s no answer to that and no finality or written script in anyone’s case. For me, that’s made life more exciting and satisfying.” ■

NEWS of NOTE

MNI and UTHealth Medical School Unveil the Nation's First Mobile Stroke Unit

The Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center and UTHealth Medical School have unveiled the country's first mobile stroke unit, made possible by a consortium of partners from the Texas Medical Center, the Houston Fire Department and generous donors.

Onboard the mobile unit is a CT scanner that allows a technician to quickly assess whether a patient is having an ischemic stroke, allowing for the administration of the thrombolytic tPA. "It takes more than an hour once a stroke patient arrives in the emergency room to receive treatment. So if we can put the emergency room in the ambulance and take the CT scanner to the patient, we can treat the patient at the scene and save over an hour," says neurologist James C. Grotta, M.D., who is director of stroke research in the Clinical Institute for Research & Innovation at Memorial Hermann-TMC and co-principal investigator, along with Elizabeth Noser, M.D., of a UTHealth Medical School trial that

A CT scanner on board the MNI/UTHealth Medical School Mobile Stroke Unit allows for fast diagnosis of ischemic stroke and administration of tPA.

will measure cost savings and outcomes. "That hour could mean saving 120 million brain cells."

Shortly after observing a similar mobile stroke unit in Germany, Dr. Grotta had the opportunity to present his idea to UTHealth Medical School Development Board members. He was surprised when a couple approached him and offered to donate a used ambulance. That couple, John and Janice Griffin, are owners of Frazer Ltd., a third-generation, family-run Houston company that builds emergency vehicles. After looking at the needs of a mobile stroke unit, the Frazer team felt it would need to be engineered from the ground up.

"We really liked the possibilities of moving medicine forward," says Laura Griffin Richardson, CEO and president of Frazer. "Our company likes to push the limits and this has never been done before. We're excited to be located in Houston, the forefront of the medical community. Once everyone sees the possibility of putting a CT scanner in an emergency vehicle, the question is what else can we do?"

Local businesses also generously supported the stroke unit, giving \$1.1 million to UTHealth Medical School, which paid for the scanner and personnel. Operated in conjunction with the call services of the Houston Fire Department, Bellaire Fire Department and West University Fire Department, the mobile unit will be located at The University of Texas Professional Building in the Texas

Medical Center. It will respond to calls within a three-mile radius, transporting patients to comprehensive stroke centers including Memorial Hermann-TMC, Houston Methodist Hospital and St. Luke's Medical Center. The mobile unit will carry a paramedic, neurologist, nurse and CT technician, and run alternate weeks as part of the clinical trial.

MNI Moves to the Top 10 Nationally in Neurosurgery Mortality Rankings

The University HealthSystem Consortium (UHC) has ranked the Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center and UTHealth Medical School's neurosurgery program among the top 10 in the nation in mortality. In average length of stay, neurosurgery moved up to No. 6 nationally.

UHC represents and ranks the top academic medical centers in the nation, fostering collaboration among its 120 medical centers and 300 affiliated member hospitals and helping them achieve excellence in quality, safety and cost effectiveness. To generate the listing, the consortium assesses quality and safety performance using an acuity-adjusted outcomes-based approach across six domains of care: mortality, effectiveness, safety, equity, patient centeredness and efficiency. The organization also takes into account Agency for Healthcare Research and Quality (AHRQ) patient safety measures, Joint Commission core measures and publicly reported patient satisfaction rankings from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

"Competition continues to grow among academic medical centers, and hospitals across the country are successfully raising the bar in terms of quality and patient safety," says Amanda Spielman, chief operating officer for neurosciences at Memorial Hermann Health System.

The success of MNI and Memorial Hermann-TMC, which was once again ranked among the 25 top-performing



Dr. Reza Sadeghi sees patients at Memorial Hermann Northwest Hospital, where he is stroke medical director, and at Memorial Hermann Southwest Hospital.

academic medical centers in the nation, is driven by physicians and a strong collaboration between the hospital and UTHealth Medical School. “At MNI and UTHealth, we’ve worked to develop a culture of patient safety, which has resulted in significantly improved outcomes,” says Dong H. Kim, M.D., director of MNI and professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School. “Five years ago MNI was ranked 110th in mortality among neurosurgery programs at academic medical centers. We’re proud of the gains we’ve made in neurosurgery and hope to improve further going forward.”

Mischer Neuroscience Institute and UTHealth Medical School Welcome 14 New Recruits

Fourteen physicians have joined the staff of the Mischer Neuroscience Institute (MNI) and UTHealth Medical School. “Our aim is to extend the exceptional care we provide in the Texas Medical Center to patients across Houston through Mischer Neurosciences, our citywide neuroscience network,” says Dong H. Kim, M.D., director of MNI, chief of neurosurgery at Memorial Hermann-Texas Medical Center and professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School. “The presence of these team members ensures that our patients receive the highest quality services through the entire neuroscience continuum of care.”



RYAN KITAGAWA, M.D.
Assistant Professor,
Department of Neurosurgery
UTHealth Medical School

Ryan Kitagawa, M.D., has joined the MNI neurosurgery team as director of neurotrauma at Memorial Hermann-TMC.



An assistant professor in the Vivian L. Smith Department of Neurosurgery, Dr. Kitagawa received his medical degree with high honors at Baylor College of Medicine, followed by a neurosurgery residency at the same institution and a fellowship in neurosurgery/neurotrauma and critical care at the University of Miami Miller School of Medicine.



BARAA AL-HAFEZ, M.D.
Clinical Assistant Professor,
Department of Neurosurgery
UTHealth Medical School

Baraa Al-Hafez, M.D., has also joined the neurosurgery team, providing exceptional care at three Mischer Neuroscience Associates locations – Memorial Hermann Katy Hospital, Memorial Hermann Memorial City Medical Center and Memorial Hermann Sugar Land Hospital. After receiving his medical degree at Tishreen University Medical School in Syria, Dr. Al-Hafez completed an internship in general surgery in Riyadh, Saudi Arabia. He completed two years of postdoctoral research at KUMC-Kansas City and went on to complete general surgery and neurosurgery residencies at the University of Arkansas for Medical Sciences in Little Rock and a neurosurgery residency at Baylor College of Medicine in Houston. He is a clinical assistant professor in the Vivian L. Smith Department of Neurosurgery.

“New additions to the growing MNA Neurology team allow us to provide a

broad range of neurology services in the community, including diagnostic tools such as sleep studies, EMG and EEG, and treatments that include infusion, deep brain stimulation, and Botox® and other nerve blocks,” says Jerry Wolinsky, M.D., co-director of MNI and interim chair of the department of Neurology at UTHealth Medical School.



REZA SADEGHI, M.D.
Neurologist and Clinical Neurophysiologist,
Mischer Neuroscience Associates Northwest

Among the new neurology recruits are Reza Sadeghi, M.D., Usha Aryal, M.D., and Jack Ownby, M.D. A board-certified neurologist and clinical neurophysiologist, Dr. Sadeghi sees inpatients and outpatients at Memorial Hermann Northwest Hospital and Memorial Hermann Southwest Hospital. He earned his medical degree at Tehran University of Medical Sciences in Tehran, Iran, followed by a master’s in epidemiology at the University of Guelph in Ontario, Canada. He joined the University of Toronto Neuromuscular Clinic as a research fellow focusing on neuromuscular diseases, particularly motor neuron diseases. He completed his neurology residency at Baylor College of Medicine in Houston, where he was chief resident in neurology, and a subsequent fellowship in clinical neurophysiology/epilepsy at the same institution.

**USHA ARYAL, M.D.**Neurologist and Clinical Neurophysiologist,
Mischer Neuroscience Associates Northwest

Usha Aryal, M.D., who also sees inpatients at Memorial Hermann Southwest Hospital and outpatients at Mischer Neuroscience Associates Northwest, is a board-certified neurologist and clinical neurophysiologist with expertise in electroencephalography, evoked potentials, intra-operative monitoring and epilepsy. Dr. Aryal earned her medical degree at Manipal College of Medical Sciences in Pokhara, Nepal, followed by residencies in internal medicine at St. Barnabas Hospital in Bronx, New York, and neurology at The Methodist Hospital in Houston. She completed a fellowship in clinical neurophysiology at the Cleveland Clinic Foundation in Cleveland, Ohio.

**MARY ELLEN VANDERLICK, M.D.**Neurologist,
Neurology Consultants of Houston

At Neurology Consultants of Houston, which is now affiliated with Mischer Neurosciences, Mary Ellen Vanderlick, M.D., William Irr, M.D., and Leanne Burnett, M.D., provide outpatient neurology services. Dr. Vanderlick received her medical degree at Louisiana State University Medical Center in Shreveport and completed her residency in neurology at Baylor College of Medicine, where she subsequently completed a fellowship in electromyography. She is board certified in neurology.

**JACK OWNBY, M.D.**Neurologist,
Mischer Neuroscience Associates Northwest

Jack Ownby, M.D., who treats inpatients at Memorial Hermann Southwest Hospital, is a board-certified specialist in

internal medicine, neurology and critical care medicine. After receiving his medical degree at the University of Tennessee Colleges for the Health Sciences, he completed his residency in internal medicine at Tulane University in New Orleans. He was accepted to the National Institutes of Health in Bethesda, Maryland, for fellowships in neurological experimental therapeutics and critical care medicine, after which he completed a residency in neurology at Baylor College of Medicine in Houston, where he was recognized with the Baylor Neurology Excellence in Teaching Award.

**WILLIAM IRR, M.D.**Neurologist,
Neurology Consultants of Houston

William Irr, M.D., received his medical degree from West Virginia University and completed his neurology residency at UTHealth Medical School, where he was chief resident. He completed his EMG/neuromuscular fellowship at the same institution. Dr. Irr is certified by the American Board of Psychiatry and Neurology.

**LEANNE BURNETT, M.D.**Neurologist,
Neurology Consultants of Houston

Leanne Burnett, M.D., graduated from Baylor College of Medicine, where she also completed her neurology residency. She went on to complete fellowships in restorative neurology and movement disorders at the same institution. Dr. Burnett is certified by the American Board of Psychiatry and Neurology.

**BOB FAYLE, M.D.**Neurologist,
Houston Neurological Institute

Bob Fayle, M.D., has joined the outpatient neurology team at Houston Neurological

Institute, which serves nearby Pasadena and Pearland. Dr. Fayle received his medical degree and completed his residency in neurology at UTHealth Medical School, and is certified in sleep medicine by the American Board of Sleep Medicine and in neurology by the American Board of Psychiatry and Neurology.

**RONY NINAN, M.D.**Assistant Professor,
Department of Neurology
UTHealth Medical School**ANJAIL SHARRIEF, M.D.**Assistant Professor,
Department of Neurology
UTHealth Medical School**RAJA MEHANNA, M.D.**Assistant Professor,
Department of Neurology
UTHealth Medical School

Three outpatient neurologists have joined UT Physicians and UTHealth Medical School. Rony Ninan, M.D., and Anjail Sharrief, M.D., are affiliated with Memorial Hermann-TMC. Raja Mehanna, M.D., specializes in movement disorders at Memorial City Medical Center, Memorial Hermann-TMC and Memorial Hermann The Woodlands Hospital.

Dr. Ninan earned his medical degree at St. George's University School of Medicine in Grenada, West Indies, followed by residency in neurology at UTHealth Medical School, where he was chief resident, and a fellowship in neurophysiology at the same institution. Dr. Sharrief received her medical degree at Columbia University College of Physicians and Surgeons in New York City, followed by residency at Johns Hopkins Hospital Department of Neurology where she was chief resident and faculty liaison. She received her master's in public health at Johns Hopkins School of Public Health. Dr. Mehanna received his medical degree at St. Joseph University School of Medicine in Beirut, Lebanon, followed

by neurology residencies at Hotel Dieu de France University Hospital in Beirut, and UTHealth Medical School in Houston. He completed movement disorders fellowships at UTHealth Medical School and the Cleveland Clinic. He is certified by the American Board of Psychiatry and Neurology.



TIFFANY CHANG, M.D.

Assistant Professor,
Departments of Neurosurgery and Neurology
UTHealth Medical School



NANCY EDWARDS, M.D.

Assistant Professor,
Departments of Neurosurgery and Neurology
UTHealth Medical School

In addition, two neuro-intensivists have joined the inpatient neurology team at Memorial Hermann-TMC: Tiffany Chang, M.D., and Nancy Edwards, M.D. An assistant professor in the Vivian L. Smith Department of Neurosurgery, Dr. Chang received her medical degree at the University of Hawaii at Manoa in Honolulu. After completing a combined residency in internal medicine and neurology at Tulane University in New Orleans, she completed a fellowship in neurocritical care at Johns Hopkins University in Baltimore. She is certified by the American Board of Internal Medicine and the American Board of Psychiatry and Neurology.

After receiving her medical degree at Duke University in Durham, North Carolina, Dr. Edwards completed her neurology residency and a fellowship in neurocritical care at the University of California, San Francisco. An assistant professor in the Vivian L. Smith Department of Neurosurgery, she is certified by the American Board of Psychiatry and Neurology.

Eight Physicians Named Among Houston's Top Doctors for 2013

Eight physicians affiliated with the Mischer Neuroscience Institute (MNI)



and UTHealth Medical School have been named to *Houstonia* magazine's inaugural listing of Top Doctors in Houston. They include neurologist James C. Grotta, M.D., and neurosurgeons Dong H. Kim, M.D., Arthur Day, M.D., Stephen A. Fletcher, D.O., Daniel H. Kim, M.D., David I. Sandberg, M.D., Scott Shepard, M.D., and Nitin Tandon, M.D. Physicians named to the 2013 list were selected based on nominations solicited from nearly 16,000 medical professionals practicing in eight counties in the Greater Houston area.



JAMES C. GROTTA, M.D.

Neurologist,
Memorial Hermann Medical Group

Dr. Grotta has played a leadership role in clinical research studies of both thrombolytic drugs and cytoprotective agents following stroke. In 1988, he was instrumental in founding MNI's Stroke Center, one of the first dedicated stroke programs in the world and the first Joint Commission-accredited primary stroke center in the region. He orchestrated the development of a highly successful collaborative network between the MNI Stroke Center, Memorial Hermann-TMC, Houston Fire Department Emergency Medical Services and other regional

Eight MNI-affiliated physicians were named among Houstonia magazine's inaugural Top Doctors in Houston list.

stroke centers to increase the delivery of appropriate therapy to a large number of acute stroke patients in Houston. He has extended these efforts to rural areas through regional educational programs and telemedicine.



DONG H. KIM, M.D.

Director, Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center
Professor and Chair, Department of Neurosurgery at UTHealth Medical School

Dr. Dong Kim is director of the Mischer Neuroscience Institute at Memorial Hermann-TMC and professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School. As director of MNI, he leads the clinical neuroscience efforts for the Memorial Hermann Health System as well as UTHealth Medical School. Dr. Kim is noted for his experience with brain tumors and cysts of all types, and also leads ongoing investigations into the origin, development and treatment of brain aneurysms, genetic changes in brain tumors and the use of stem cells to treat spinal cord injuries. He is one of five physicians whose work was highlighted in

feature articles in *Houstonia's* September issue. Entitled "The Man Who Would Reverse Paralysis," the article focuses on his pioneering work with stem cells to treat spinal cord injuries.



ARTHUR DAY, M.D.

Director of Clinical Education,
Mischer Neuroscience Institute
Professor and Vice Chair,
Department of Neurosurgery
UTHealth Medical School

Arthur Day, M.D., specializes in cerebrovascular and skull base neurosurgery and in microsurgical treatments of brain tumors and minimally invasive spinal surgery. A professor of neurosurgery and vice chair and director of clinical education in the Vivian L. Smith Department of Neurosurgery, 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, prior to joining MNI, he moved to Boston as a professor of surgery at Harvard Medical School with a clinical practice at Brigham and Women's Hospital. He is past president of the Society of Neurological Surgeons and has held leadership positions in many other medical professional societies, and received numerous awards and honors.



DANIEL H. KIM, M.D., FAANS, FACS

Director, Reconstructive Spinal and
Peripheral Nerve Surgery,
Mischer Neuroscience Institute
Professor, Department of Neurosurgery
UTHealth Medical School

Daniel H. Kim, M.D., FAANS, FACS, is director of reconstructive and peripheral nerve surgery at MNI and professor of neurosurgery at UTHealth Medical School. An expert in minimally invasive spinal surgery – both endoscopic and robotic – peripheral nerve surgery and complex spinal reconstruction, Dr. Kim has won numerous awards and honors, authored hundreds of papers published in peer-reviewed journals and is the author of 16 surgical textbooks. He is a preeminent researcher in peripheral nerve repair through nerve

transfer and nerve graft, and is also recognized for his work in neurorehabilitation through robotics and cortical stimulation, spinal biomechanics and innovative neuromodulation treatments for chronic pain.



STEPHEN A. FLETCHER, D.O.

Associate Professor, Division of Child &
Adolescent Neurology
Department of Pediatrics
UTHealth Medical School

Stephen Fletcher, D.O., is an associate professor in the department of Pediatric Surgery at UTHealth Medical School, with a special interest in brain tumors and vascular disorders in children. Dr. Fletcher's research interests include Chiari malformation in children, comparative studies of canine and pediatric brain tumors, medical management of trauma-associated brain swelling and attempts at culturing brain tumor cell lines in collaboration with The University of Texas MD Anderson Children's Cancer Hospital.



DAVID SANDBERG, M.D., FAANS, FACS, FAAP

Director, Pediatric Neurosurgery,
Mischer Neuroscience Institute
Associate Professor, Departments of
Neurosurgery and Pediatric Surgery
UTHealth Medical School

David Sandberg, M.D., FAANS, FACS, FAAP, holds joint appointments as an associate professor in the departments of Neurosurgery and Pediatric Surgery at UTHealth Medical School, and is co-director of the combined pediatric brain tumor program based at The University of Texas MD Anderson Cancer Center and Children's Memorial Hermann Hospital. Dr. Sandberg's major clinical interests include pediatric brain tumors, minimally invasive endoscopic approaches to brain tumors and hydrocephalus, congenital spinal anomalies, vascular malformations of the brain, spasticity and craniofacial disorders in children. His research interests focus on novel means of delivering therapeutic agents into the brain for the treatment of childhood brain tumors, and he is principal investigator of

a clinical trial investigating, for the first time in humans, chemotherapy administration into the fourth ventricle of the brain. Dr. Sandberg is a member of the board of directors of the Foundation for International Education in Neurological Surgery. He is editor of the *ISPN Guide to Pediatric Neurosurgery, Tumor Section*, and an ad hoc reviewer for a number of neurosurgery and neuroscience journals.



NITIN TANDON, M.D.

Associate Professor,
Departments of Neurosurgery and Pediatric
Neurosurgery
UTHealth Medical School

Nitin Tandon, M.D., is an associate professor in the Vivian L. Smith Department of Neurosurgery. His clinical interests focus on epilepsy surgery, including placement of subdural grid electrodes, amygdalo-hippocampectomy, anterior temporal lobectomy and neo-cortical resections; brain mapping and awake craniotomies; brain tumor surgery, including tumors in speech and motor cortex, insular tumors, intra-ventricular tumors, pineal tumors, pituitary and parasellar tumors; cavernous malformation surgery; and microvascular decompression for trigeminal neuralgia. Dr. Tandon's research interests include brain mapping with functional MRI, electrical stimulation and diffusion tractography, and intracranial electrophysiology. His research has been published widely in peer-reviewed journals.



SCOTT SHEPARD, M.D.

Director, Gamma Knife Radiosurgery Program
Mischer Neuroscience Institute
Clinical Assistant Professor, Department of
Neurosurgery
UTHealth Medical School

Scott Shepard, M.D., an assistant professor in the Vivian L. Smith Department of Neurosurgery, has expertise in brain and spinal cord tumors as well as spinal and pituitary tumors. Prior to joining MNI he was on the faculty at Robert Wood Johnson Medical School in New Brunswick, New Jersey. He has published

numerous journal articles and book chapters, and presented nationally and internationally on a variety of topics in the field of neurosurgery.

MNI Named a Willis-Ekbom Disease Foundation Quality Care Center



The Mischer Neuroscience Institute was recently named a Willis-Ekbom Disease (WED) Foundation Quality Care Center – the third neuroscience program in the country to receive the prestigious designation. The WED Foundation, formerly known as the Restless Legs Syndrome (RLS) Foundation, launched the program in 2013 to improve diagnosis and treatment for individuals living with Willis-Ekbom disease.

Willis-Ekbom Foundation Quality Care Centers are recognized leaders in providing comprehensive care for the WED/RLS community and serve as liaisons to patients' primary care providers. Institutions granted the three-year certification are selected because they adhere to the WED Foundation's high standards of care, track and report patient outcomes and share findings through presentations at professional meetings and publications.

"We're honored to be named a Willis-Ekbom Disease Foundation Quality Care Center, and look forward to helping advance understanding of this common disease to improve patient outcomes," says William Ondo, M.D., professor of neurology at UTHealth Medical School.

Dr. Ondo, a diplomate of the American Board of Psychiatry and Neurology who is also certified by the American Board of Sleep Medicine, has clinical interests that include Parkinson's disease, generalized and focal dystonias, tremor, Huntington's

chorea and other choreas, ataxic disorders, and drug-induced movement abnormalities and gait disorders.

ACCOLADES

Arthur Day, M.D., Honored by Neurosurgical Association



ARTHUR DAY, M.D.
Director of Clinical Education,
Mischer Neuroscience Institute
Professor and Vice Chair,
Department of Neurosurgery
UTHealth Medical School

Arthur L. Day, M.D., professor of neurosurgery at UTHealth Medical School and a neurosurgeon at the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center, has received one of the top honors awarded by the Congress of Neurological Surgeons.

At the association's annual meeting in San Francisco Oct. 19-23, 2013, Dr. Day was presented the Founders' Laurel Award in recognition of his exceptional service, lifelong dedication and meritorious accomplishments in the field of medical education.

Dr. Day is recognized internationally for his expertise in cerebrovascular and skull base neurosurgery and directs the neurosurgery residency training program at UTHealth Medical School. He is a past president of the association, which is dedicated to advancing neurosurgery by providing members with educational and career development opportunities. Day has also served as chair of the American Board of Neurological Surgery and recently concluded his presidency of the Society of Neurological Surgeons.

He received his medical degree from Louisiana University School of Medicine in New Orleans and completed a neurosurgery residency and a brain tumor immunology/neuropathology fellowship at the University of Florida at Gainesville.

Dr. Day leads the Pituitary Tumor and Vision Change Clinic at MNI.



Dr. Arthur Day received one of the Congress of Neurological Surgeons' top honors at the association's annual meeting last October.

Nneka Ifejika, M.D., Selected for AAPMR's Academy Leadership Program



NNEKA IFEJIKA, M.D.
Director, Neurorehabilitation
Memorial Hermann-Texas Medical Center
Assistant Professor
UTHealth Medical School

Nneka Ifejika, M.D., assistant professor in the department of Neurology at UTHealth Medical School, has been selected for the inaugural class of the American Academy of Physical Medicine and Rehabilitation's (AAPMR) Academy Leadership Program.

Dr. Ifejika-Jones is one of only 10 academy members selected from a national pool to participate in the two-year program, which is designed to identify and train early-career physical medicine and rehabilitation physicians to assume future leadership positions. A member of the Stroke Team at UTHealth Medical School, she has served as director of the institution's Neurorehabilitation Program since 2007.

Dr. Ifejika-Jones received her medical degree and master's of public health, with honors, at the University of North Carolina in Chapel Hill. She completed her residency in physical medicine and rehabilitation at Baylor College of Medicine in Houston and is certified by the American Board of Physical Medical and Rehabilitation.

As director of neurorehabilitation, Dr. Ifejika-Jones has established a research

program in stroke outcomes and health disparities. In 2010, she received a grant from the National Institute of Neurological Disorders and Stroke (NINDS) to study the impact of intravenous thrombolysis and healthcare-associated infections on rehabilitation care. Within a two-year period, she published five articles as first author in peer-reviewed journals and received the AAPMR’s Best Neurological Rehabilitation Research Award.

Dr. Ifejika-Jones’ primary focus is to advance the field of neurorehabilitation through clinical research that addresses age- and ethnicity-related disparities in stroke care, from acute onset of symptoms through the post-stroke continuum. Her work focuses on the disability gap between minorities and non-minorities in stroke outcomes. She subspecializes in stroke and multiple sclerosis rehabilitation and has received training in measurements of disease severity and disability in both conditions. Her interests include treatment of neurologic disease-related complications, including musculoskeletal, behavioral, spasticity and gait abnormalities.

Karl Schmitt, M.D., and Scott Shepard, M.D., Named TIRR Memorial Hermann Consultants of the Year

Neurosurgeons Karl Schmitt, M.D., and Scott Shepard, M.D., were selected as Consultants of the Year, an annual recognition granted by TIRR Memorial Hermann. In keeping with the rehabilitation hospital’s tradition, the Consultant of the Year award recognizes and celebrates outstanding healthcare providers who embody TIRR Memorial Hermann’s model of patient-centric care.

“Our consultants contribute daily to our successes as the healthcare provider of choice for rehabilitation in our community,” says Gerard E. Francisco, M.D., chief medical officer at TIRR Memorial Hermann and professor and chair of the department of Physical Medicine and Rehabilitation at UTHealth Medical

School. “Dr. Schmitt and Dr. Shepard provide outstanding service to our patients and families through a neurosurgery clinic at TIRR Memorial Hermann that brings surgical care to our patients. The clinic is part of our medical home model, a rarity among freestanding rehabilitation hospitals.”

Dr. Schmitt, who is certified by the American Board of Neurological Surgery, specializes in complex spinal surgery, minimally invasive spine surgery, spinal cord and spinal column tumors, spinal and cranial trauma and general neurosurgery. He received his medical degree and completed his neurosurgery residency at The University of Texas Medical Branch at Galveston, followed by the Yale Comprehensive Spinal Fellowship at Yale University Medical School in New Haven, Connecticut. Dr. Schmitt is an assistant professor in the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School.

A board-certified neurosurgeon with expertise in brain and spinal cord tumors as well as spinal and pituitary surgery, Dr. Shepard is an assistant professor in the Vivian L. Smith Department of Neurosurgery. He received his medical degree at Weill Cornell Medical College in New York City, where he received several prestigious honors recognizing his outstanding scholastic performance. He completed his residency at the University



KARL SCHMITT, M.D.
Assistant Professor,
Department of Neurosurgery
UTHealth Medical School



SCOTT SHEPARD, M.D.
Director, Gamma Knife Radiosurgery Program
Mischer Neuroscience Institute
Clinical Assistant Professor, Department of
Neurosurgery
UTHealth Medical School

of California, San Francisco, where he served as chief resident in neurosurgery. He was also a research fellow at CNS Injury and Edema Center and Brain Tumor Research Center at the University of California, San Francisco, and he completed a fellowship in surgical neuro-oncology at Memorial Sloan Kettering Hospital in New York City. Prior to joining the Mischer Neuroscience Institute, Dr. Shepard was on the faculty at Robert Wood Johnson Medical School in New Brunswick, N.J., where he served as an assistant professor of neurosurgery.

Consultants of the Year are nominated by TIRR Memorial Hermann attending physicians and selected by the hospital’s Medical Executive Committee.

TIRR IS A REGISTERED TRADEMARK OF TIRR FOUNDATION.

TIRR Memorial Hermann is the highest ranked rehabilitation hospital in the southern half of the United States by U.S. News & World Report.



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