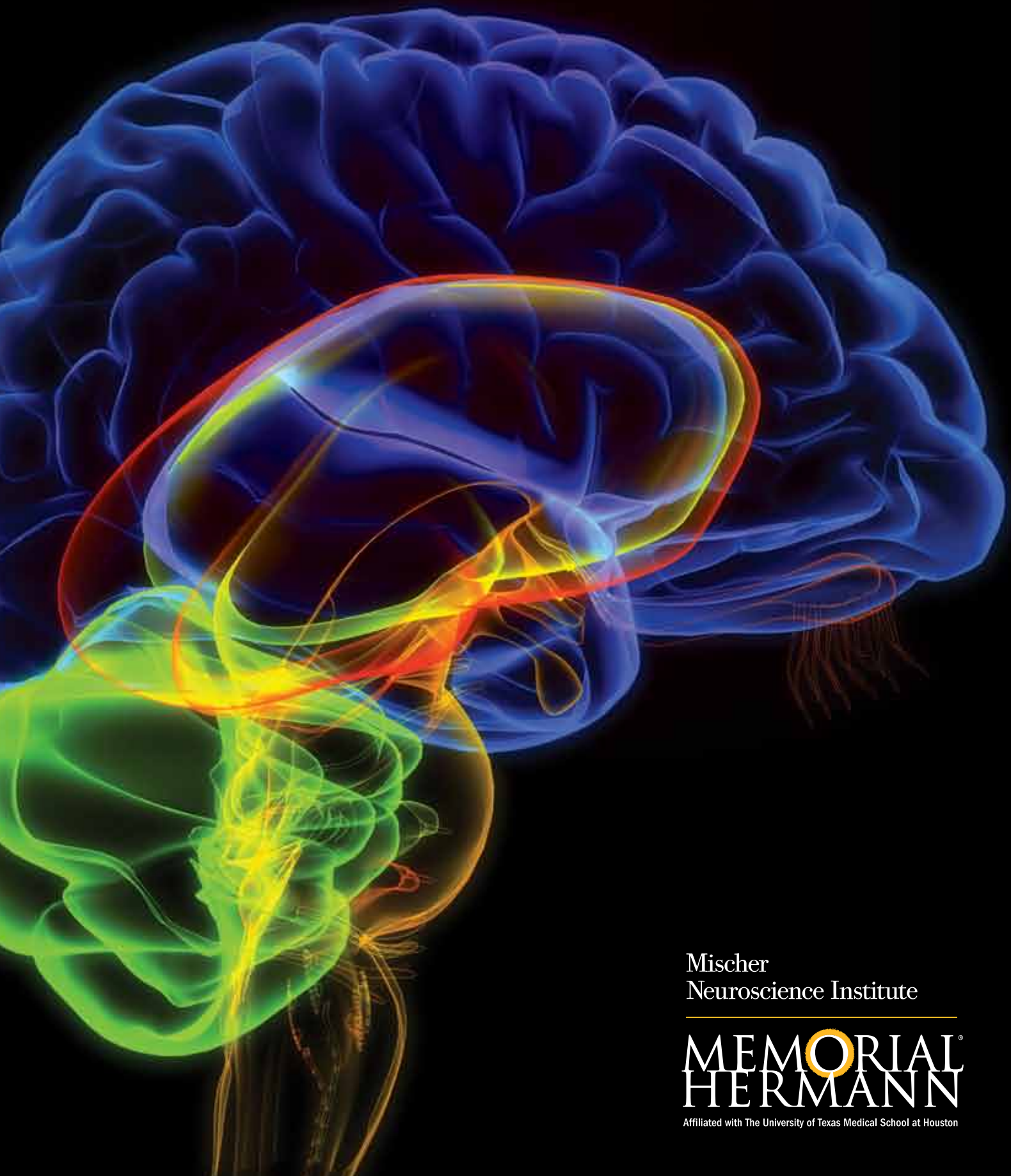
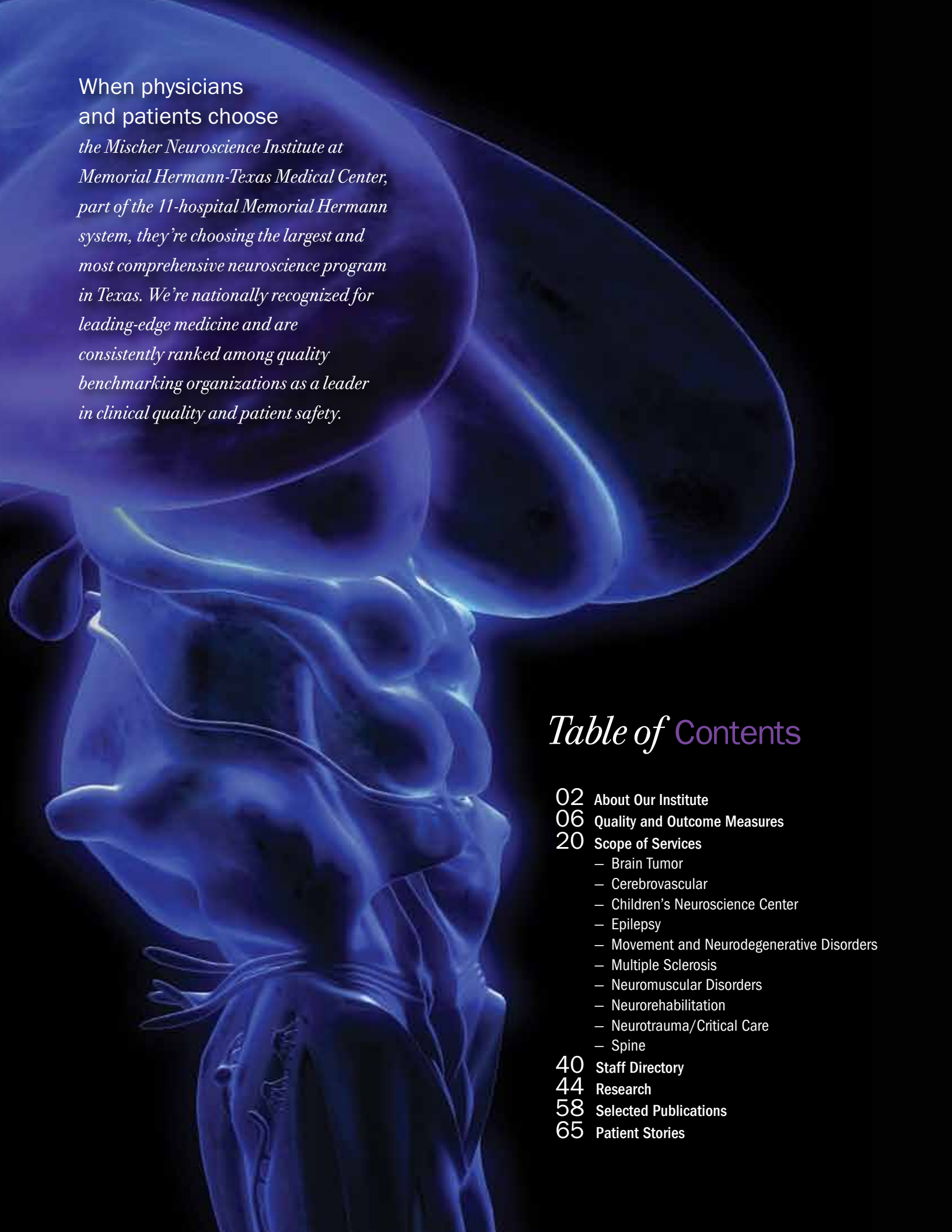
CLINICAL ACHIEVEMENTS REPORT 2009



Mischer
Neuroscience Institute

MEMORIAL HERMANN

Affiliated with The University of Texas Medical School at Houston



When physicians
and patients choose

the Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center, part of the 11-hospital Memorial Hermann system, they're choosing the largest and most comprehensive neuroscience program in Texas. We're nationally recognized for leading-edge medicine and are consistently ranked among quality benchmarking organizations as a leader in clinical quality and patient safety.

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Dr. Kim

Dr. Grotta

Dear Esteemed Colleagues,

We are pleased to present the 2009 Mischer Neuroscience Institute (MNI) Clinical Achievements Report, a publication of MNI, part of the 11-hospital Memorial Hermann system, in collaboration with The University of Texas Medical School at Houston. The report highlights our achievements and accomplishments in quality, patient care, research and clinical expertise.

2009 was a remarkable year for us. Both Memorial Hermann and the UT Medical School invested resources leading to significant growth, allowing us to establish new clinical and academic programs and recruit nationally recognized faculty. Today, MNI is a comprehensive institute that encompasses many centers of excellence, such as the Brain Tumor Center, Cerebrovascular Center, Texas Comprehensive Epilepsy Program, Multiple Sclerosis Center, Spine Center, Neurorehabilitation Program, Neuromuscular Disorders Center, Movement Disorders Center and the Dementia Center. Through these centers, we lead the way in care, research, education and market share.

With our quality outcomes and long history of innovation in the field of neuroscience, we continue to attract accomplished physician faculty members who are committed to raising the bar with first-rate clinical programs, continued growth and breakthrough research applied daily in the operating room and at the bedside. Patients now come to MNI from around the world for treatment of rare and common diseases of the brain and spinal cord. We broadened our commitment to teaching in 2009 with the launch of the UT Medical School's Neurosurgery Residency Program, and to research with the start of a number of new laboratory studies and clinical trials.

We are proud to share our accomplishments with you and hope you find the information in this report valuable and beneficial. We remain committed to quality and safety, the core strategies that underlie our promise to provide the best possible outcomes and exceptional patient care. If you would like any additional information about our services and programs, please feel free to contact us directly.

With best wishes,

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About Our Institute

Leading the way in neuroscience in a city known for medical excellence takes relentless dedication. To accomplish this, Memorial Hermann's Mischer Neuroscience Institute brings together a team of world-class clinicians, researchers and educators. Born from a long-term collaboration between Memorial Hermann-Texas Medical Center and The University of Texas Medical School at Houston, the Mischer Neuroscience Institute is part of the 11-hospital Memorial Hermann system. It is south Texas' largest neuroscience care provider and one of only a few institutions in the country to fully integrate neurology, neurosurgery and neurorehabilitation. This comprehensive approach has resulted in Houston's only dedicated onsite stroke team, the leading epilepsy program in the southwestern United States, and countless innovations in multiple sclerosis, neurotrauma, spine surgery, brain aneurysms and more.

At-a-Glance

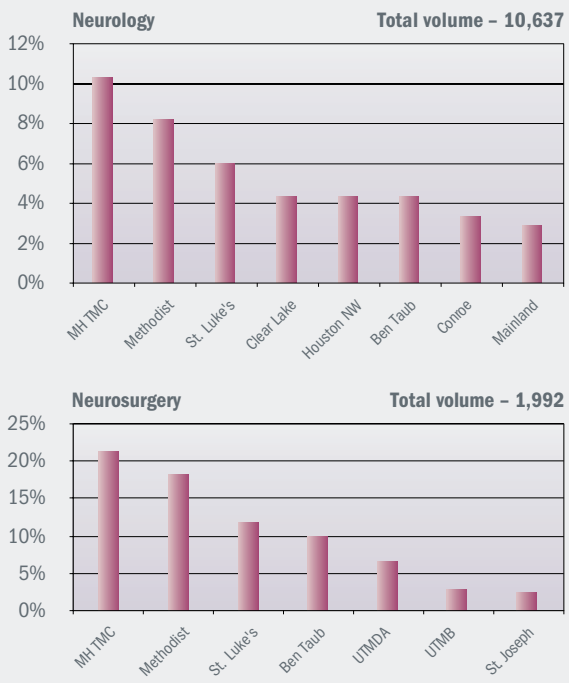
MNI At-a-Glance:

Neuro Beds	140
Dedicated Operating Rooms	5
Medical Students on Rotation	281
Clinical Residents and Fellows	34
Research Projects in Progress	Over 100
Grants Awarded (neurology and neurosurgery)	$12.7 million

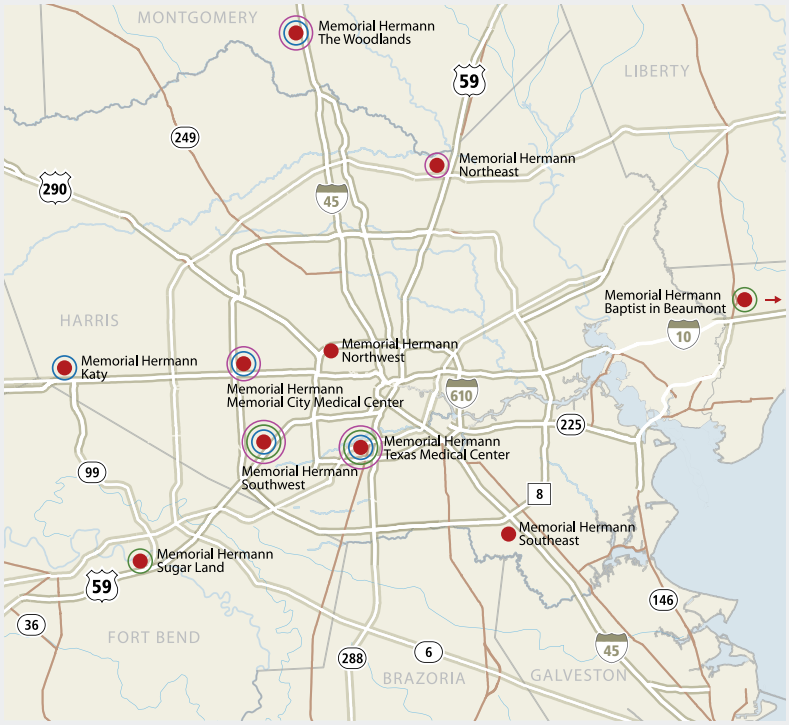
Specialty Equipment includes:

- Leksell Gamma Knife® Perfexion™
- Siemens Artis™ zee (intra-operative angiography suite)
- RP-7™ Remote Presence System
- Philips Healthcare endovascular temperature modulation system
- Simultaneous electroencephalography and polysomnography
- Magnetoencephalography imaging
- MRI capable of advanced spectroscopic and diffusion tensor imaging with tractotomy

Neuroscience Market Share



Source: Texas Hospital Association Patient Data System (CY2006 – CY2009) provided by Thomson Reuters
Texas Hospital Inpatient Discharge Public Use Data File, [CY2006 – Q12009] provided by Texas Department of State Health Services, Center for Health Statistics; Q22009 – Q42009 discharges estimated by using historical data by hospital.



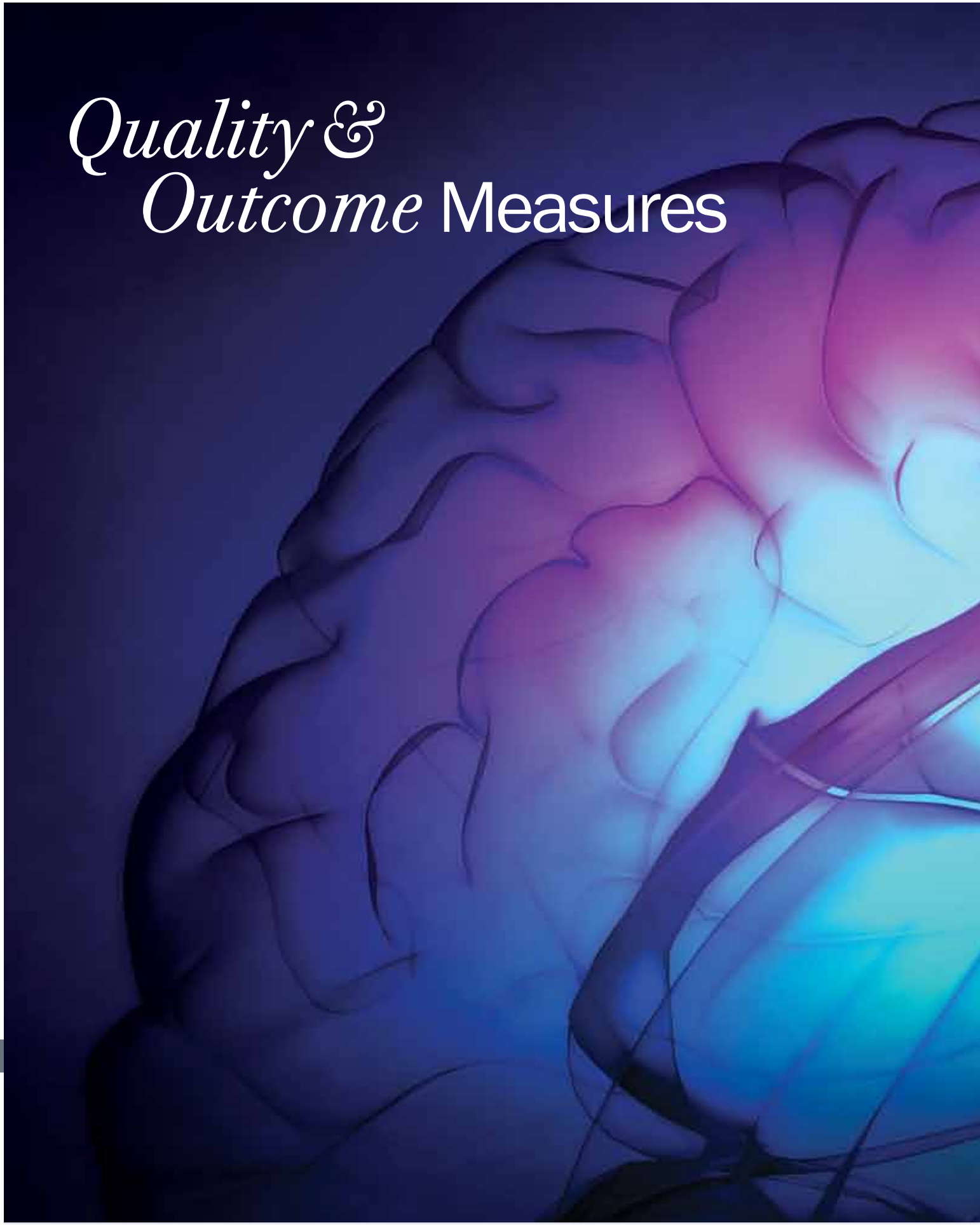
- Hospital
- Hospital with Stroke Center
- Hospital with Telemedicine
- MNA Neurosurgeons

MNI's infrastructure expansion has allowed the Institute to extend its neuroscience expertise and capabilities outside the Texas Medical Center and into the community through the development of neuroscience centers at our Memorial Hermann community Campuses.

A History of Firsts

- The first Stroke Center in Houston and one of the first dedicated stroke programs in the world.
- The first center to conduct a national, multi-center trial for hypothermia in head injury.
- The first neurosurgery center to offer all advanced modalities of treatment – expert microsurgery, interventional neuroradiology/ endovascular surgery and Gamma Knife® – for complex lesions.
- The North American leader in studies of primary progressive multiple sclerosis and the most active center in Texas in the conduct of organized clinical trials of new therapies for MS.
- The first facility in Houston and one of the first in the United States to test the clot-dissolving drug tPA for acute stroke.
- The first center in Houston to test and prove the efficacy of three disparate treatments for stroke prevention: carotid surgery; administration of antiplatelet drugs, including aspirin; and patent foramen ovale closure.
- The first facility in the region to do vagus nerve stimulation, and we remain the No. 1 program in the United States in the number of vagal nerve stimulators implanted in epilepsy patients.
- Brought the first clinical magnetoencephaolgraphy (MEG) sensor to Houston. It remains the only MEG in clinical use throughout Texas, Louisiana, Arkansas and Oklahoma.
- One of only a few inpatient Epilepsy Monitoring Units in the country with the unique capability of simultaneously performing electroencephalography and polysomnography.
- TIRR Memorial Hermann is the only center in Houston – and one of only seven designated centers in the nation – in the Christopher and Dana Reeve Foundation NeuroRecovery Network.

Quality & Outcome Measures



2009 OVERVIEW

The Mischer Neuroscience Institute was the first in Texas and one of only a few in the nation to fully integrate neurology, neuroradiology, neurosurgery and neurorehabilitation in complementary programs offered through distinguished centers of excellence. Together with our team of physician leaders and academic partners at The University of Texas Medical School at Houston, we offer a comprehensive continuum of neurological care that is unrivaled in the region and have remained steadfast in our commitment to providing the highest level of care to every patient we treat.

That dedication has earned the Mischer Neuroscience Institute recognition by several prestigious organizations throughout the years, and our quality data has played an important role in the overall outcomes of the Memorial Hermann-Texas Medical Center Campus and the Memorial Hermann Healthcare System.

In 2009, the University HealthSystem Consortium, a national alliance of more than 100 academic medical centers and 200 affiliated hospitals, ranked our Campus No. 13 in its annual listing of top-performing academic medical centers for quality and accountability. The National Quality Forum also designated the Memorial Hermann Healthcare System as the winner of its prestigious National Quality Healthcare award, which is given to just one organization each year for demonstrating a commitment to quality improvement and accountability.

From treating rare diseases in the brain to complex conditions in the spinal cord, the goal of caregivers at Mischer Neuroscience Institute to provide high-quality care to patients across the spectrum of neurological diseases is evident in our outcomes, and we are proud to share them with you in the pages that follow.

Quality & Outcome Measures

2009 HIGHLIGHTS

In the last three years, the Mischer Neuroscience Institute has established a range of clinical and academic programs and has recruited nearly two dozen nationally recognized specialists and subspecialists. The Institute is now home to 10 centers of excellence that are supported by a state-of-the-art neuroscience intensive care unit with 32 private rooms and several other dedicated inpatient facilities to provide a full continuum of care for neurological patients.

Our Physician Team

Staff Physicians	44
Clinical Residents and Fellows	34
Research Fellows	13
Advanced Practice Nurses	4
Physician Assistants	13

Inpatient Facilities

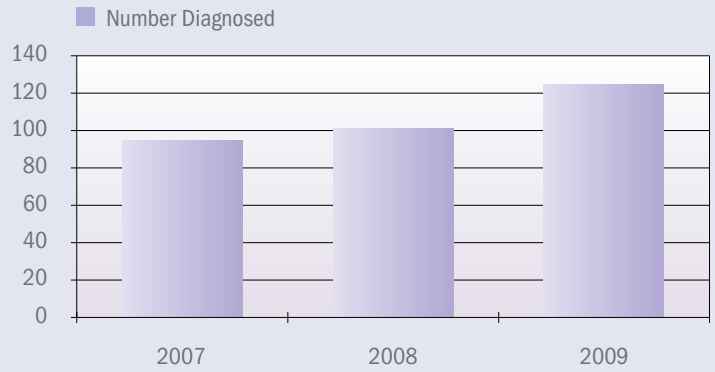
Neuro ICU Beds	32
Neuro Step Down Beds (IMU)	12
Neuro Acute Care Beds	48
Neuro Rehabilitation Beds	23
Stroke Beds	8
Dedicated Operating Rooms	5
EMU Beds – Pediatrics	6
EMU Beds – Adult	6

BRAIN TUMOR

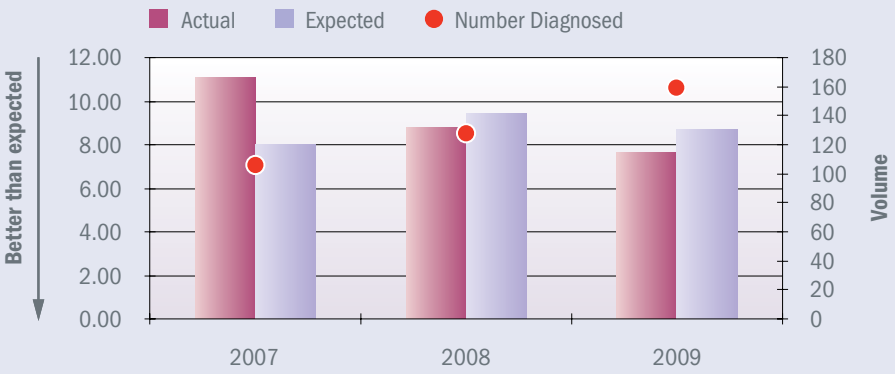
Caregivers at the Mischer Neuroscience Institute are improving outcomes of patients with brain tumors through innovative treatments such as stereotactic radiosurgery, which virtually eliminates the risk of hemorrhage and substantially minimizes the risk of damage to associated vital structures.

These breakthrough approaches have allowed the Institute to drive continued growth in the number of patients treated each year for brain tumors while at the same time improving quality indicators to be well below the national benchmark established by the University HealthSystem Consortium.

Brain Tumor Volume



Brain Tumor (all types): Length of Stay

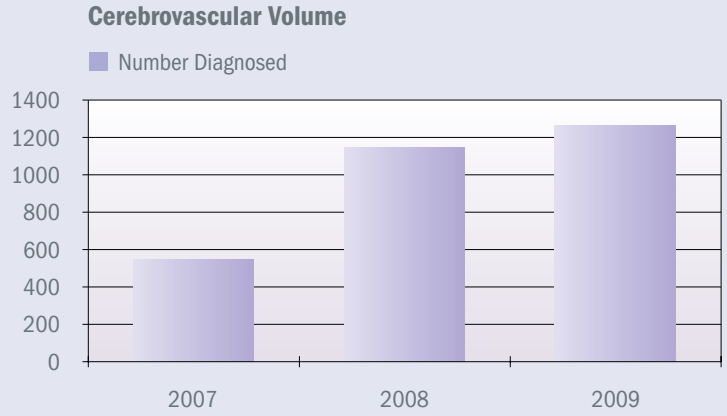


Brain Tumor (all types): Inpatient Mortality

Quality & Outcome Measures

CEREBROVASCULAR

The Mischer Neuroscience Institute has been a long-standing leader in the treatment of patients suffering from cerebrovascular conditions. In the past year, the Memorial Hermann-Texas Medical Center Campus became the first hospital in the Texas Medical Center to be designated as a Primary Stroke Center by the State of Texas for our success in rapidly treating patients with approved therapies shown to reduce paralysis and other disabilities caused by stroke.



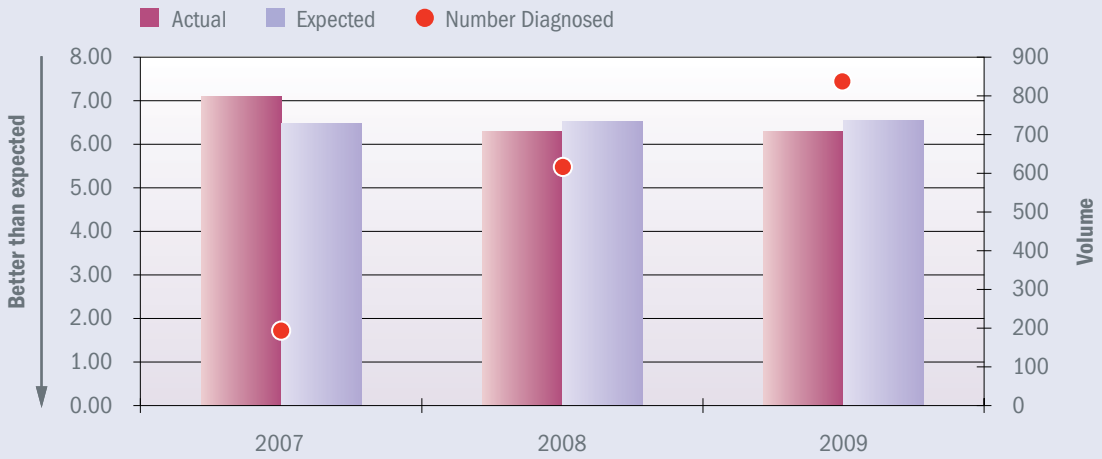
Stroke Core Measures Chart

CLINICAL MEASURE	MEASURE DESCRIPTION	NATIONAL AVERAGE	GWTG STROKE PERFORMANCE MEASURE GOAL	MEMORIAL HERMANN[1]		
				2007	2008	2009[2]
IV tPA use (eligible < 2 hour arrival)	Acute ischemic stroke patients who arrive at the ED within 120 minutes of onset of stroke symptoms and who receive IV tPA within 180 minutes of onset of stroke symptoms	72.8%	85.0%	100%	100%	100%
Early antithrombotics (< 48 hour arrival)	Patients with ischemic stroke or TIA who receive antithrombotic therapy by the end of hospital day 2	97.0%	85.0%	96.5%	100%	99.0%
Antithrombotics at discharge	Patients with ischemic stroke or TIA prescribed antithrombotic therapy at discharge (e.g., warfarin, aspirin, other antiplatelet drug)	98.9%	85.0%	97.5%	98.0%	96.9%
Anticoagulation for atrial fibrillation	Patients with ischemic stroke or TIA with atrial fibrillation who are discharged on anticoagulation therapy	98.4%	85.0%	100%	96.9%	100%
Deep venous thrombosis (DVT) prophylaxis	Percent of patients at risk for DVT who received DVT prophylaxis by the second hospital day	89.5%	85.0%	93.3%	98.3%	100%
Lipids measure (statin at discharge)	Percent of ischemic stroke or TIA patients with LDL > or = 100 mg/dL *or* on cholesterol reducer prior to admission who are discharged on cholesterol-reducing drugs	88.3%	85.0%	88.7%	88.1%	87.1%
Smoke cessation counseling	Percent of smokers who receive smoking cessation advice or medication at discharge	93.6%	85.0%	98.4%	92.2%	92.2%

[1] These numbers are for the fiscal year (July – June)
[2] Data represents July 2008 – December 2008

The highly skilled team at the Mischer Neuroscience Institute is trained to provide the right treatment as quickly as possible to patients suffering from an intracranial hemorrhage. Our outcomes for this patient population have steadily improved throughout the years, and in 2009, we were well below the national benchmark established by the University HealthSystem Consortium.

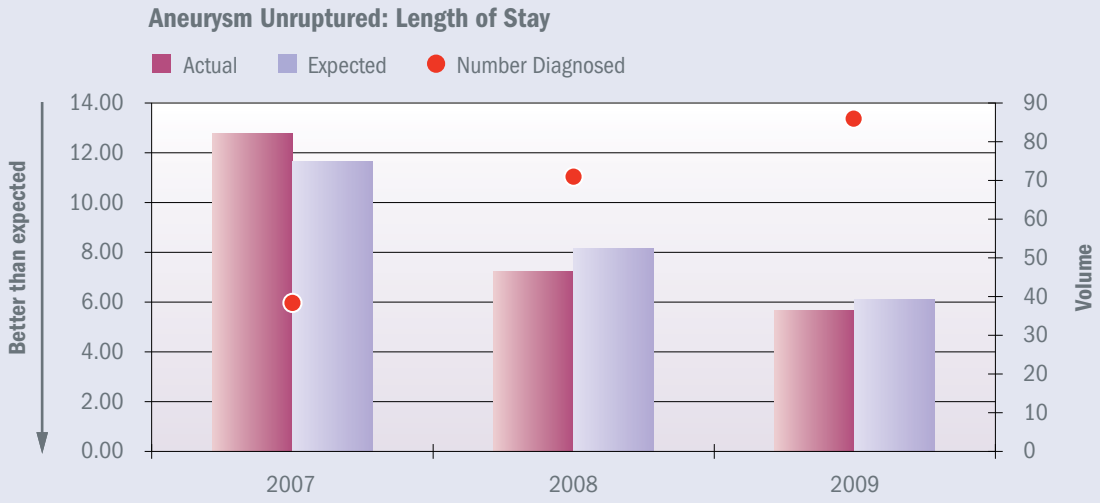
Intracranial Hemorrhage: Length of Stay

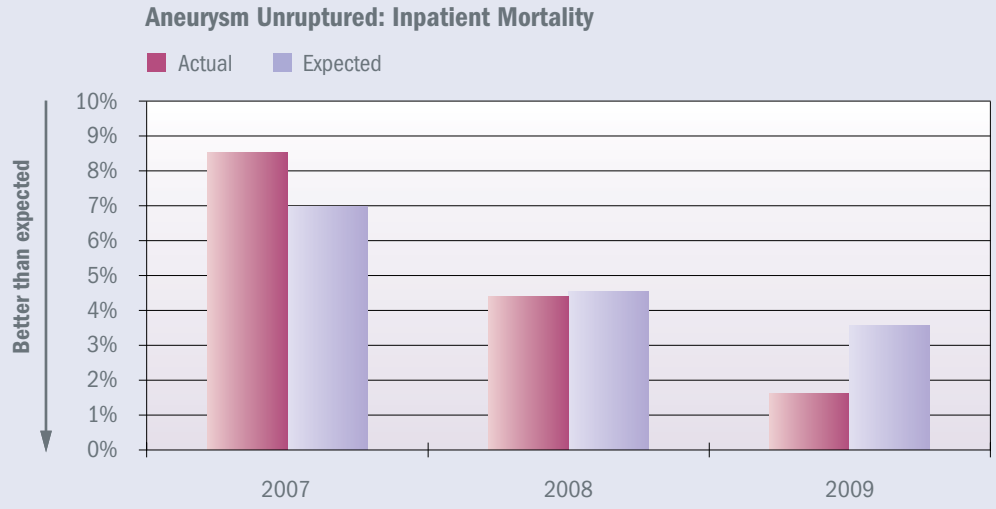


Intracranial Hemorrhage: Inpatient Mortality

CEREBROVASCULAR

Physicians and clinicians at the Mischer Neuroscience Institute employ a broad range of diagnostic approaches to determine the most appropriate treatment method for patients with an unruptured aneurysm. The number of those diagnosed with the condition continues to rise annually, while the average length of stay and inpatient mortality rate remains below the University HealthSystem Consortium's expected standard.

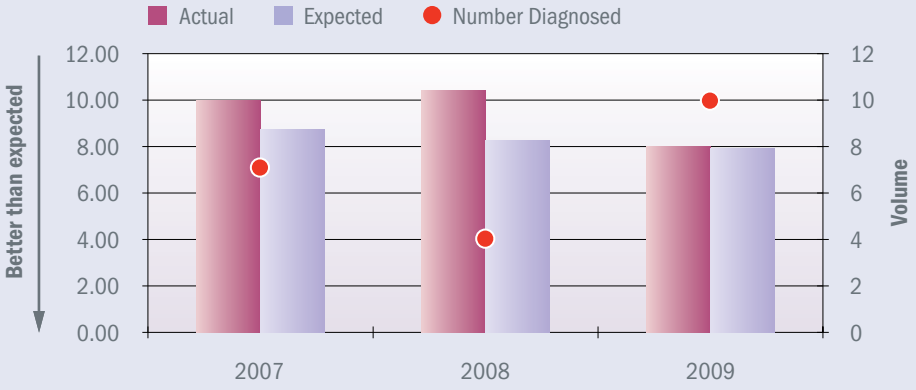




SPINE

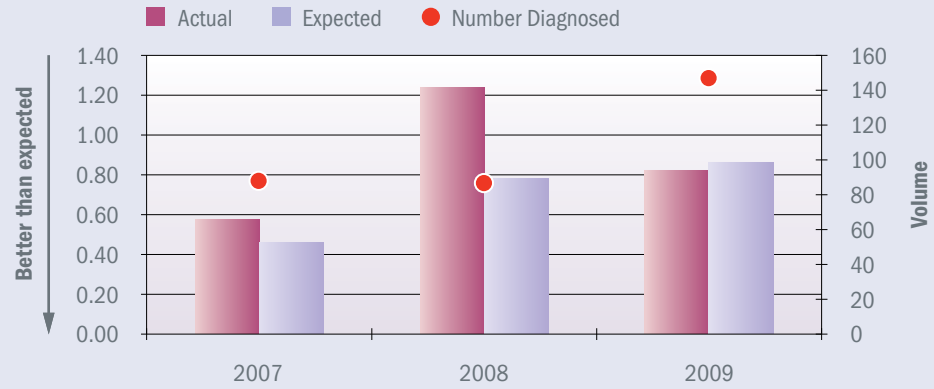
Patients experiencing spinal conditions at the Mischer Neuroscience Institute benefit from innovative treatment and rehabilitation methods designed to minimize damage to the nervous system and restore limited abilities. From the treatment of degenerative spine disorders to caring for those suffering from a traumatic spine injury, our outcomes are a testament to the effectiveness of our comprehensive, multidisciplinary approach.

Spinal Tumor: Length of Stay



Spinal Tumor: Inpatient Mortality

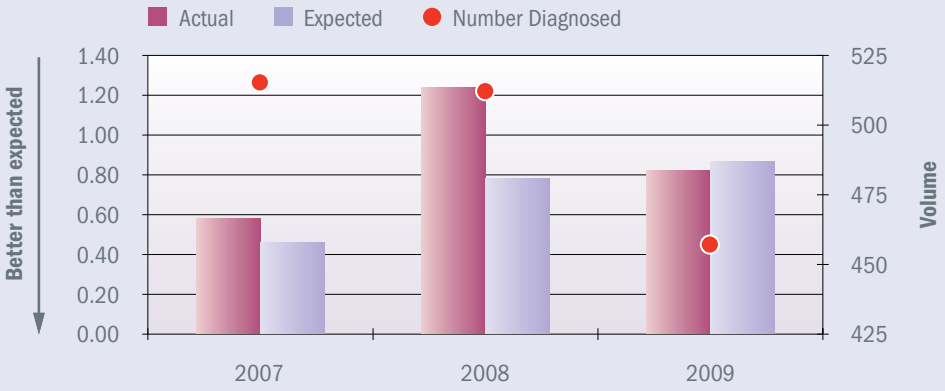
Spine Trauma: Length of Stay



SPINE

Spine Trauma: Inpatient Mortality

Spine Degenerative or Elective: Length of Stay



Spine Degenerative or Elective: Inpatient Mortality

Caregivers at the Mischer Neuroscience Institute and the UT MOVE Clinic at The University of Texas Medical School at Houston are at the forefront of treating patients with movement disorders and are pioneering a number of innovative approaches to manage a range of conditions. Among them is bilateral deep brain stimulation (DBS) targeting the subthalamic nucleus in controlling motor symptoms of Parkinson's disease. One study indicates that executive function is not improved with DBS alone, but adjuvant levodopa therapy combined with DBS provides the best control over motor symptoms, stabilizes executive function and improves quality-of-life outcome measures.

Table 1. Adjuvant Medication Reduces Post-DBS Impulsivity: a Saccade Study in Parkinson's Disease

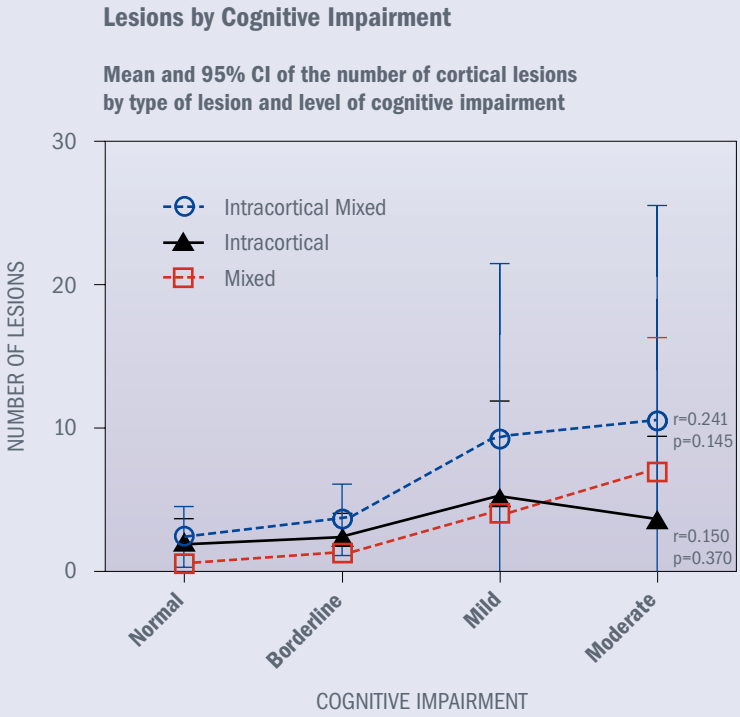
ASHLEY J. HOOD, Ph.D., MYA C. SCHIESS, M.D., ANNE B. SERENO, Ph.D.

	CONTROL	MED-OFF	MED-OFF+DBS	MED-ON+DBS
N	8	8	8	8
Gender	5m / 3f	5m / 3f	5m / 3f	5m / 3f
Age (yrs)	54.1 (10.1)	52.6 (11.5)	–	–
Education (yrs)	14.7 (1.7)	15.4 (1.4)	–	–
MMSE	29.7 (.76)	29.8 (.46)	–	–
Duration of disease (yrs)	–	6.4 (2.6)	7.6 (2.6)	7.6 (.93)
Duration of DBS (mos)	–	–	10.6 (7.1)	10.6 (2.5)
Hoehn & Yahr	–	2.8 (.82)	–	–
UPDRS-Total	–	57.1 (16.8)	32.0 (11.2)	20.0 (9.9)
UPDRS-Motor	–	30.6 (10.5)	14.5 (5.9)	7.3 (4.4)
UPDRS-Cognitive	–	3.1 (2.5)	1.3 (1.5)	1.3 (1.6)

MULTIPLE SCLEROSIS

A collaboration between Memorial Hermann-Texas Medical Center and The University of Texas Medical School at Houston, the Multiple Sclerosis Research Group (MSRG) has established a track record of supporting cutting-edge research to provide the most advanced care for patients.

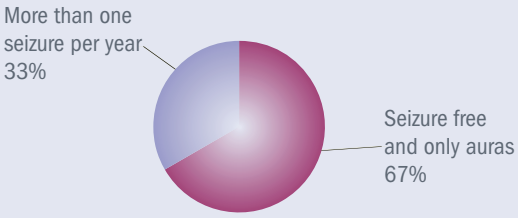
Among these advances is the use of sophisticated MRI techniques to detect intracortical lesions in patients with MS. One study by the MSRG indicates that there is a significant correlation between the presence of cortical lesions (CL) and the degree of cognitive impairment, as well as a trend between cognitive impairment and disease severity. Cortical lesions are not detected on conventional MRI and the MSRG is a pioneer in the field of cortical lesion identification. Flavia Nelson, M.D., the principal investigator of the study in conjunction with Novartis Pharmaceuticals, began conducting a multicenter trial in 2009 to study the effect of fingolimod (FTY-720) on cortical lesions in patients with primary progressive MS (PPMS). fingolimod is the first oral drug recently recommended for FDA approval for the treatment of relapsing forms of MS. The objective is to evaluate the effect of treatment with fingolimod at daily oral doses of 0.5 mg vs. placebo on the number and size of cortical gray matter lesions and to correlate the above findings with measures of disease progression and disability. This will be the first clinical trial to incorporate detection of CL in an ideal patient population, PPMS, known for developing a higher cortical lesion load. It will improve the understanding of CL behavior and response to a novel immunomodulator over an extended period of time. This is the first study of its kind.



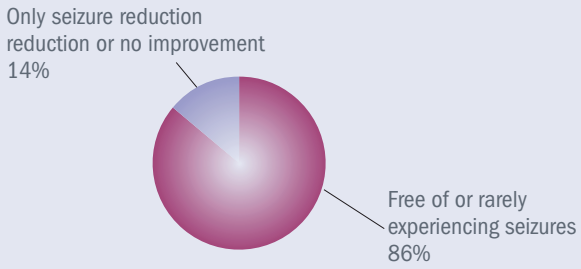
EPILEPSY

The Texas Comprehensive Epilepsy Program team continues to lead the way in improving outcomes for patients with epilepsy, including research, surgeries and therapies. Between October 2004 and April 2010, the epilepsy team treated a total of 177 craniotomies in 110 patients, including 63 invasive electrophysiology cases, 51 unilateral SDE and nine cases awake for resections.

Weizer Class



Engel Class



Available on 42/46 patients > 12 months post-op. follow-up.
Mean 16 months; Median 12 months

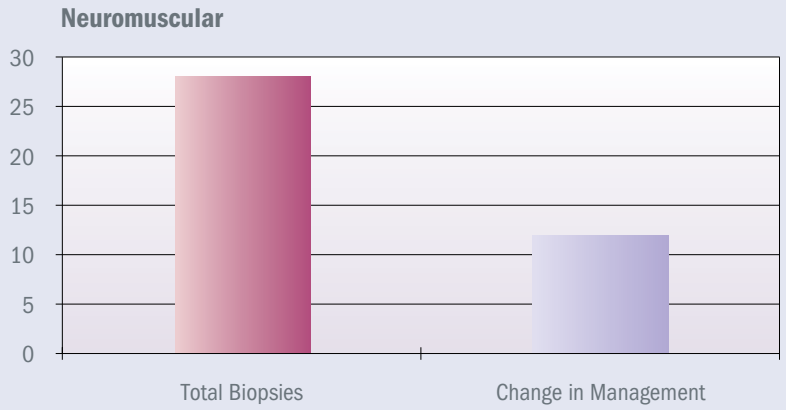
Morbidity

Return to OR – non-union of bone flap	1
CSF leak (return to OR)	2
Possible infn – SDE removal	1
Probable infn – SDE removal	1
Return to OR for evac. of hematoma	2

Data is from 96 craniotomies in first 65 patients.

NEUROMUSCULAR

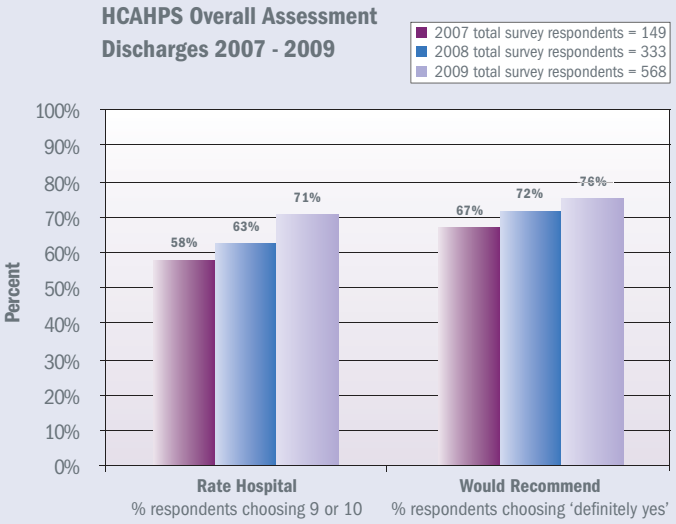
Physicians and clinicians at the Mischer Neuroscience Institute are improving the diagnostic capabilities for patients suffering from neuromuscular disorders through our Muscle and Nerve Laboratory designed to help identify abnormalities at a pathologic/microscopic level. In 2009, biopsies from nearly half of the patients sent to the lab resulted in the initiation of new treatments, alteration or cessation of existing treatments, or the establishment of a new diagnosis.



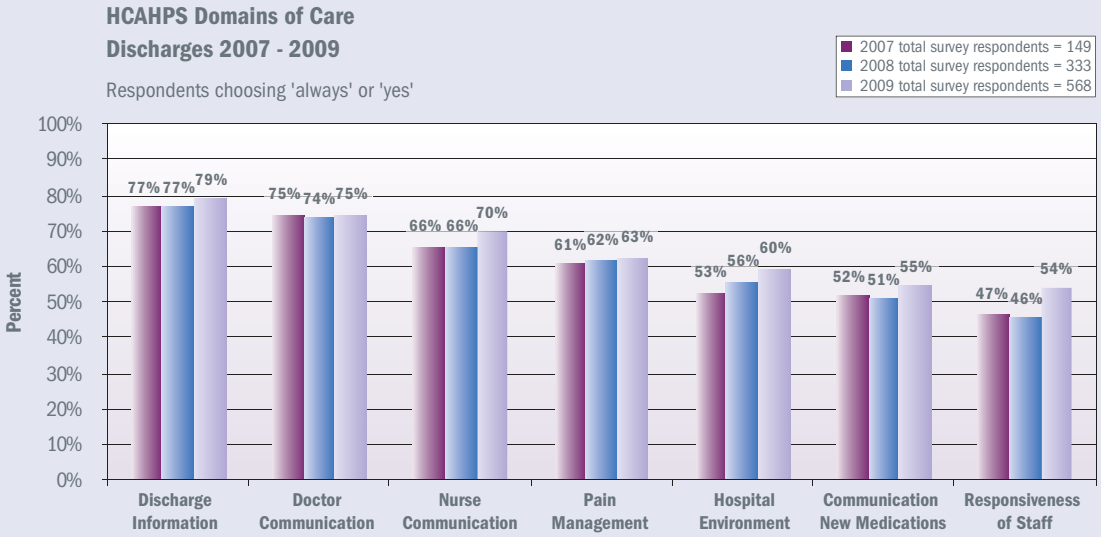
Total number of muscle and nerve biopsies (N=28) evaluated in Muscle and Nerve Laboratory over last 9 months.
Results of biopsies led to change in the management of patients (N=12 (43%)).
The changes include initiation of new treatments, alteration or cessation of existing treatments, or establishing a new diagnosis.

PATIENT SATISFACTION/EXPERIENCE

Patients from around the world choose to receive treatment at the Mischer Neuroscience Institute not only for our high-quality outcomes, but also for our reputation in providing patients with the best possible healthcare experiences. Data gathered by the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey indicates consistent improvements year-over-year in seven domains considered critical to ensuring a high level of satisfaction.



Source: Press Ganey, national hospital survey vendor, for all surveys received from patients discharged from 3 Jones, 7 Jones/NSICU, 4 Jones/NIMU/Stroke and EMU
HCAHPS scores have not been adjusted to account for a survey mode administration change



Source: Press Ganey, national hospital survey vendor, for all surveys received from patients discharged from 3 Jones, 7 Jones/NSICU, 4 Jones/NIMU/Stroke and EMU
HCAHPS scores have not been adjusted to account for a survey mode administration change

Scope of Services

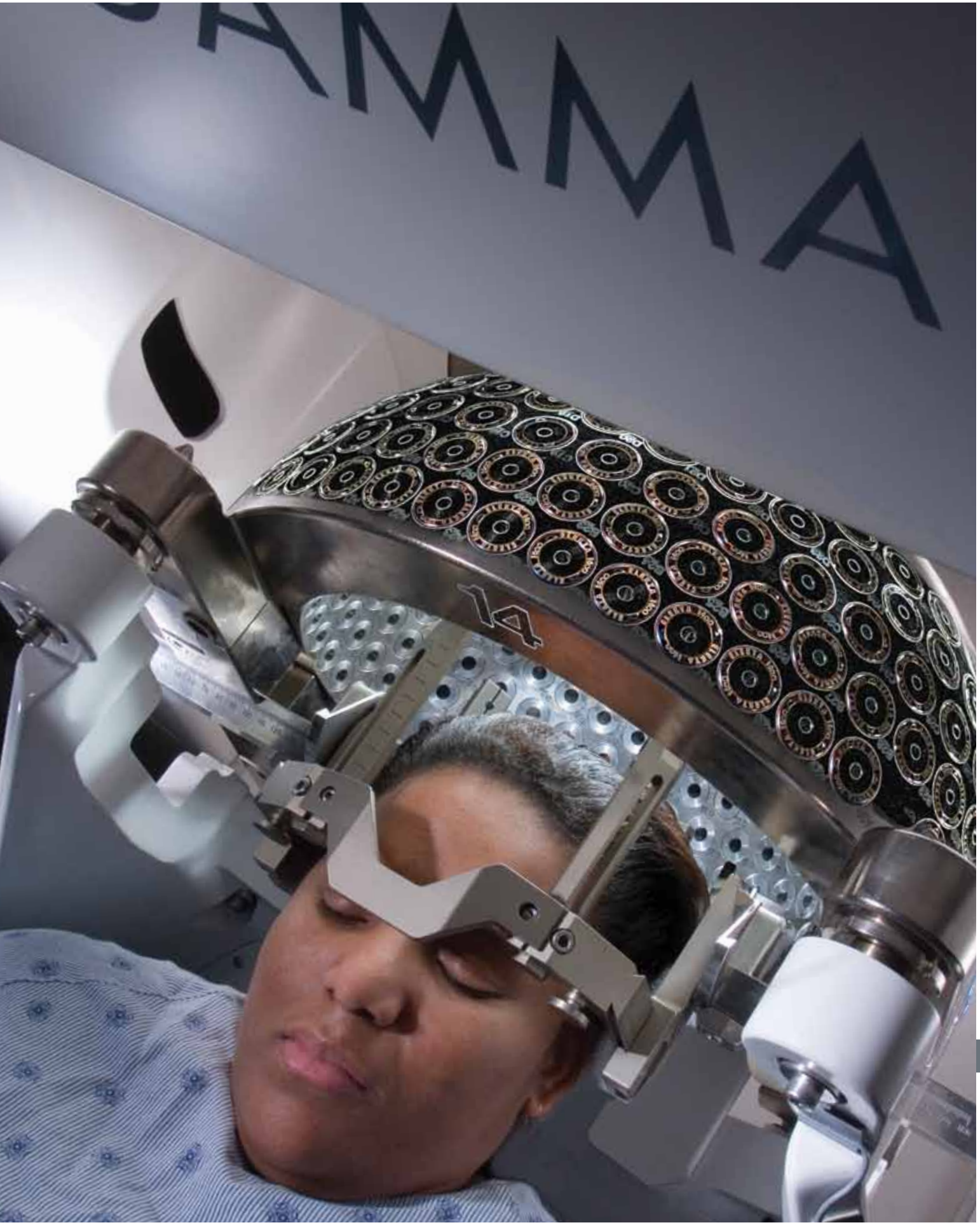
Brain Tumor

Neurosurgeons at the Mischer Neuroscience Institute routinely employ innovative techniques, including motor and language mapping, the use of functional imaging techniques for localizing functional brain regions, the performance of awake craniotomies under local anesthesia and placement of intracavitary chemotherapy for high-grade brain tumors. They also perform minimally invasive procedures including neuroendoscopy and stereotactic radiosurgery.

The Institute acquired the region's first Leksell Gamma Knife® in 1993, and recently acquired the innovative Leksell Gamma Knife Perfexion™, which dramatically expands the technology's reach to a broader scope of treatment and range of anatomical structure. Unlike traditional brain surgery, Gamma Knife requires no incision, virtually eliminating potential surgical risks, including infection, blood loss and the additional risks associated with general anesthesia. Treatment planning is enhanced by sophisticated software that features dose-to-target conformation by specific placement of beams. Indications for Gamma Knife radiosurgery include intracranial tumors such as metastases, meningiomas and vestibular schwannomas; arteriovenous malformations; and medically refractory trigeminal neuralgia. Multiple intracranial metastases can usually be treated in a single outpatient procedure.

Throughout the treatment process, our clinical team works closely with referring physicians. Prior to scheduling, candidates for Gamma Knife radiosurgery are assessed by a neurosurgeon and/or radiation oncologist to determine whether radiosurgical treatment is the best option. In addition, one of our Gamma Knife nurse navigators is assigned to work directly with the patient to facilitate scheduling, provide pretreatment education, answer questions and provide care on the day of treatment. Following the procedure, patients return home the same day and will usually resume all pretreatment activities within 24 hours. Patients who undergo stereotactic radiosurgery have a greatly reduced incidence of potential complications associated with craniotomy and with other forms of radiation. To date, our multidisciplinary team has treated the largest number of patients of any facility in Houston using the stereotactic radiosurgery instrument to resolve brain tumors and other neurological disorders.

In addition, neurosurgeons on staff at the Mischer Neuroscience Institute commonly use frameless stereotactic navigation to approach tumors, increasing accuracy and minimizing the effect on surrounding brain tissue. To further enhance functional outcomes following tumor resection, we are exploring the use of diffusion tensor imaging, a new modality for mapping major brain connection pathways in conjunction with functional MRI. When conventional therapy fails, the Institute provides access for patients to enroll in clinical trials of investigational drugs and procedures.


AMMA

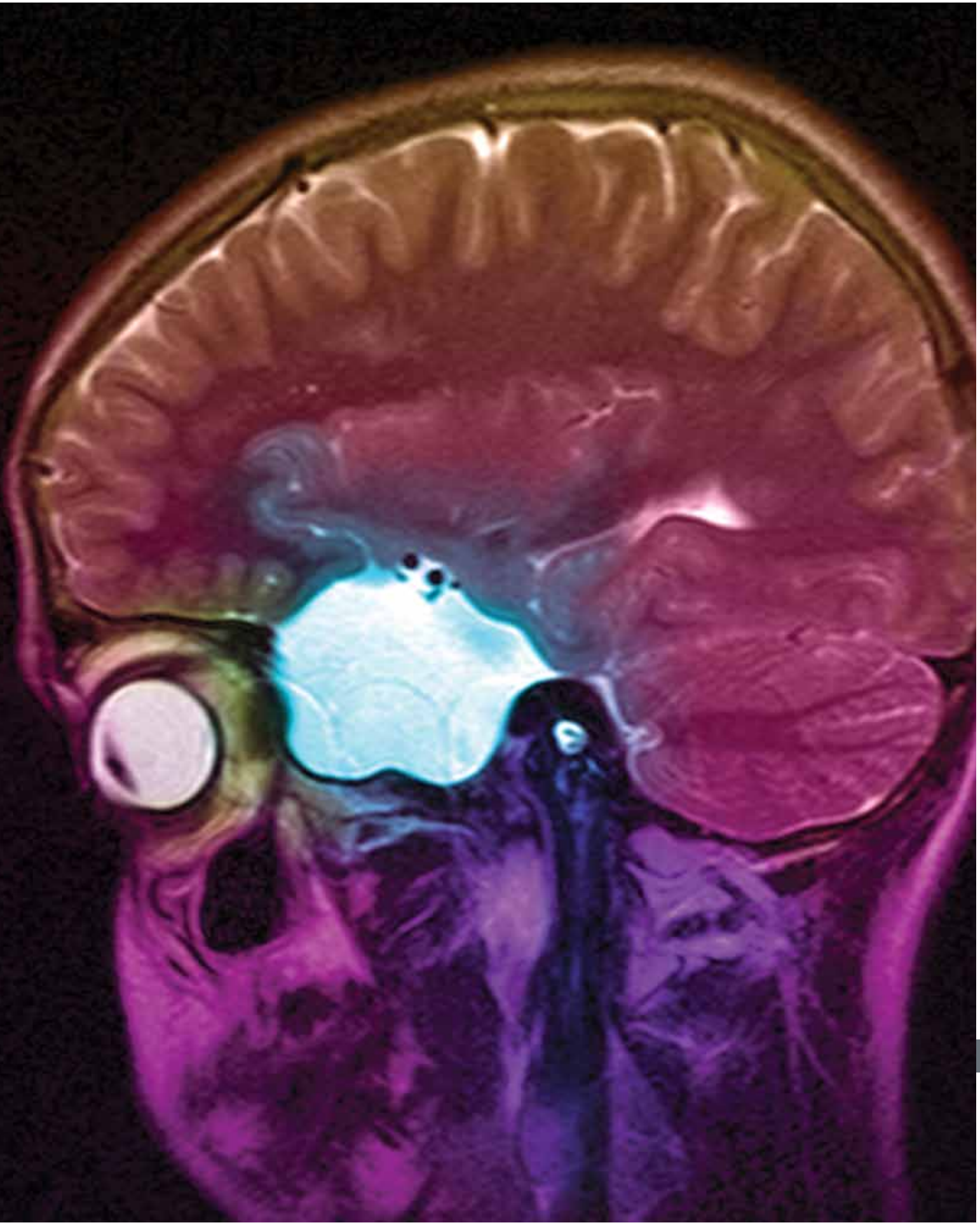
Cerebrovascular

Opened in 1988, our Stroke Center has a solid track record of innovation. Ours was the first such center in Houston, one of the first dedicated stroke programs in the world and the first Joint Commission-accredited Primary Stroke Center in the region. Today, we boast the 10-county greater Houston area's largest and most innovative dedicated onsite stroke team, using leading-edge imaging technology to treat more than 1,000 patients annually, and at the same time conducting more research than any other center in the south or southwestern United States.

We were the first in Houston and one of the first in the United States to test the clot-dissolving drug tPA for acute stroke, and we remain the nation's leader in number of acute stroke patients treated with tPA. Working closely with the Houston Fire Department and local EMS services, our stroke team has logged an impressive record of success in the administration of tPA – more than 10 times the national average of 2 percent. Based on these and other accomplishments, we are the only center in Houston selected by the National Institutes of Health to develop and test other new acute stroke therapies. Among those is the use of therapeutic hypothermia in stroke patients, funded by a five-year grant from the National Institute of Neurological Disorders and Stroke (NINDS) at the National Institutes of Health.

Our telemedicine program extends stroke and neurology expertise to community hospitals throughout Texas. Outlying hospitals are linked electronically to the Stroke Center, providing real-time visual interaction between the stroke team and patients, and allowing neurologists affiliated with MNI to review CT scans and advise local physicians on treatment options.

In addition to breakthrough treatment for stroke, our Cerebrovascular Center provides coordinated care to patients with aneurysms, carotid occlusive disease and vascular malformations. The neurosurgery medical staff is skilled at treatment options for ruptured and unruptured aneurysms, including resection, microvascular clipping and the less-invasive endovascular embolization. In patients with carotid occlusive disease, we continue to produce outstanding outcomes following carotid endarterectomy. Patients with carotid occlusive disease also have the option of participating in an ongoing National Institutes of Health trial testing the efficacy of carotid stenting as an alternative to endarterectomy.



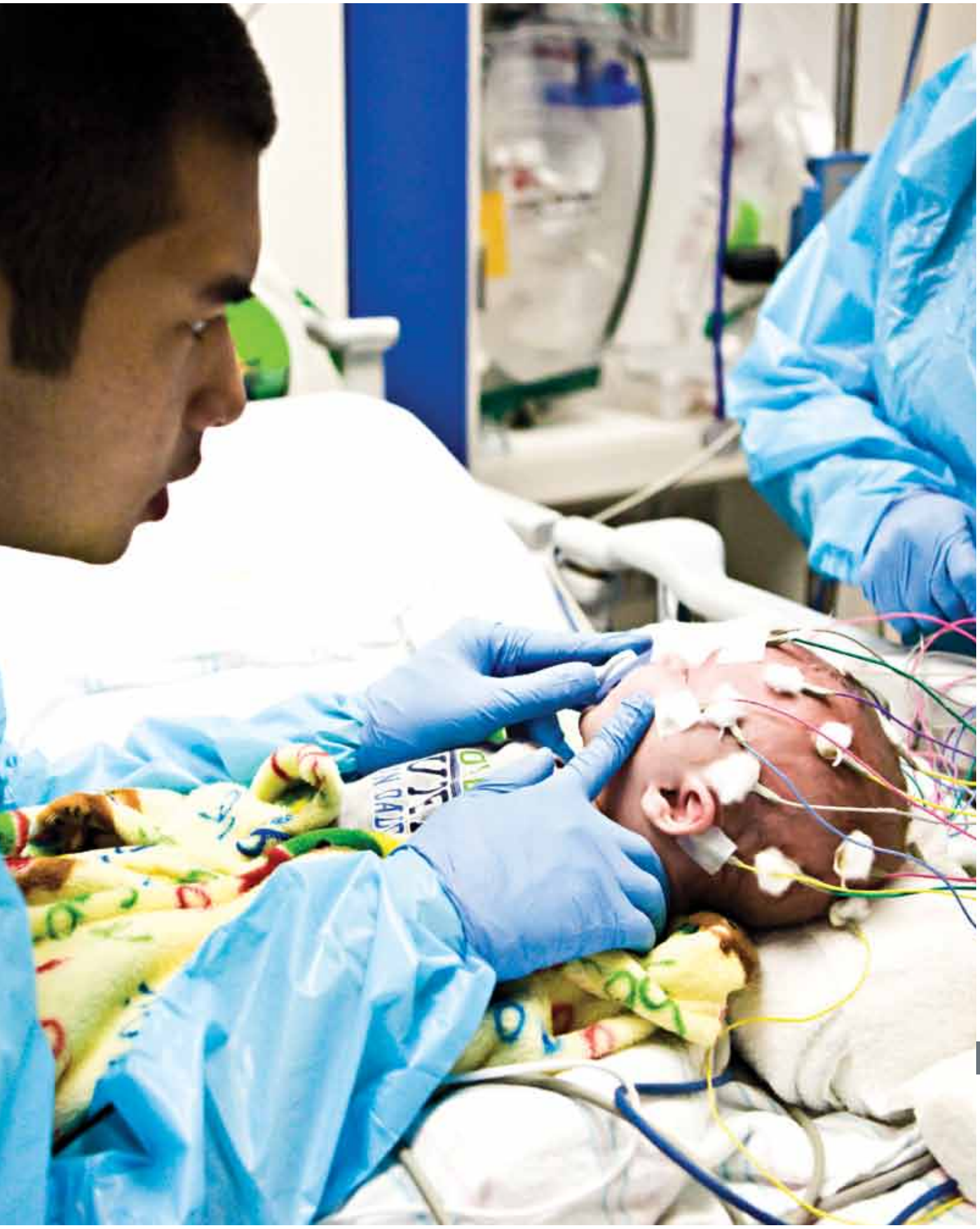
Children's Neuroscience Center

At the Children's Neuroscience Center housed in Children's Memorial Hermann Hospital, our team of pediatric neurologists, epileptologists, neurosurgeons, geneticists, neuroradiologists and neuropsychologists ensures that each pediatric patient receives care in a reassuring environment to promote wellbeing and the best possible outcomes.

We provide a broad range of diagnostic and treatment services for children with complex health problems, including autism, brachial plexus disorders, brain tumors and malformations, cerebral palsy, congenital hydrocephalus, craniofacial disorders, developmental disorders, epilepsy, chronic headache and migraine, head trauma, learning disabilities, mitochondrial disorders, movement disorders, myopathy, neurofibromatosis, neurometabolic disorders, neuromuscular disorders, pediatric stroke, peripheral nerve disorders, sleep disorders, spina bifida, Tourette syndrome and tuberous sclerosis complex.

When surgery is required, we use advanced imaging techniques that minimize patient risk. Onsite sedation is available with care provided by specially trained pediatric anesthesiologists and pediatric nurses. In addition to MRI and CT with low radiation dose protocols for pediatric patients, we use noninvasive magnetoencephalography (MEG) to map brain activity to locate the source of epileptic seizures and minimize risk for children undergoing resective surgery for refractory epilepsy or for brain tumors.

Our cleft-craniofacial team offers conventional and minimally invasive options for the treatment of craniosynostosis. We also offer specialized pediatric neurosurgical expertise in congenital malformations, including Chiari malformation; endoscopic neurosurgery; microsurgical nerve repair; and treatment for pediatric stroke, spinal deformities and traumatic brain and spine injury.



Epilepsy

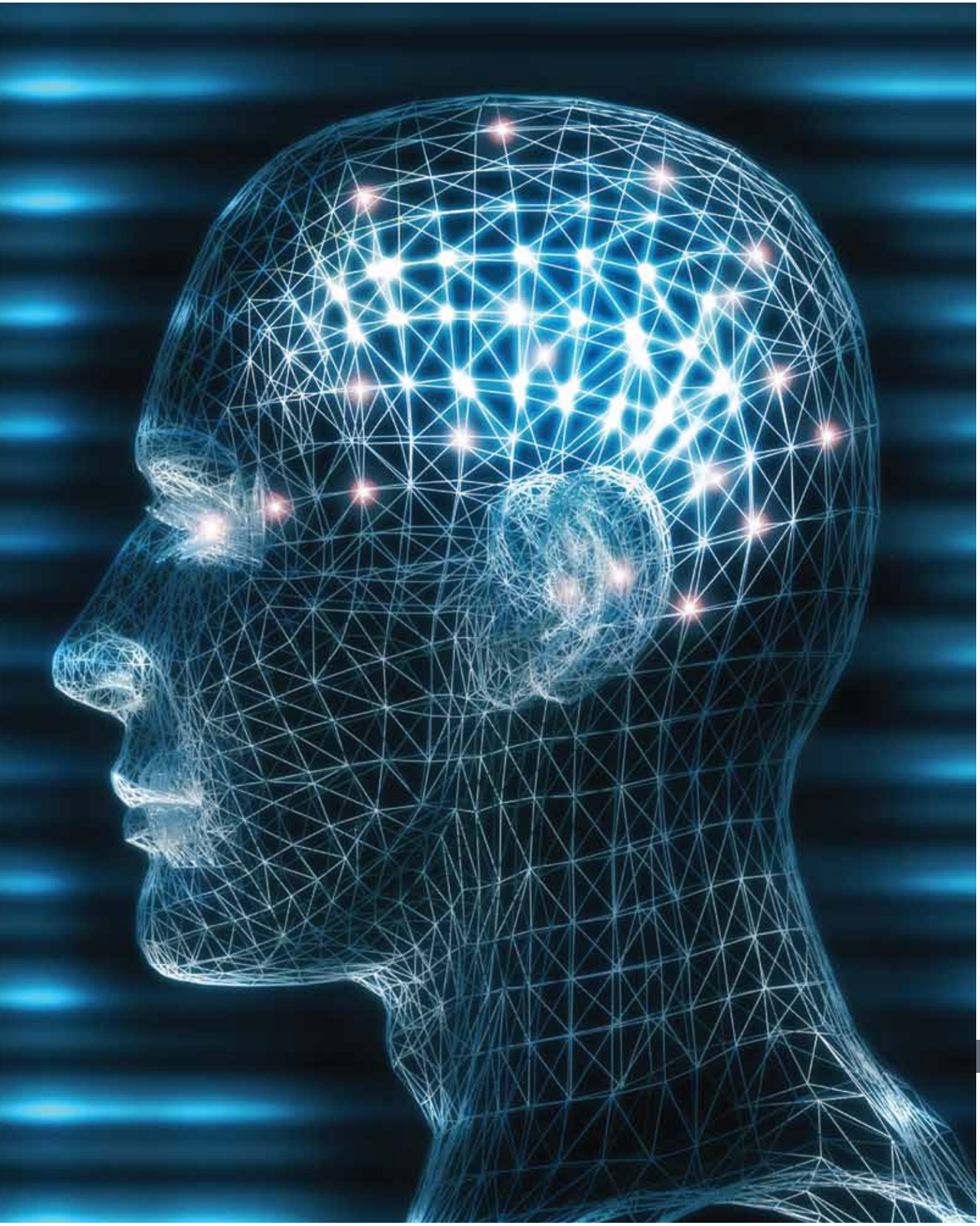
The Texas Comprehensive Epilepsy Program, a collaborative effort between Memorial Hermann-Texas Medical Center, Children's Memorial Hermann Hospital and The University of Texas Medical School at Houston, is the leading medical program in the southwestern United States for the diagnosis and treatment of epilepsy in patients of all ages. It is the only Level IV, National Association of Epilepsy Centers-certified program in Houston. Drawing on the combined expertise of board-certified neurologists and neurosurgeons with subspecialty training and experience in treating patients with seizures and epilepsy, we diagnose and treat more than 350 pediatric and adult patients each year.

At the heart of the program is our state-of-the-art Epilepsy Monitoring Unit (EMU), the largest and most comprehensive unit of its kind in the region. Our full suite of diagnostic tools includes video EEG, CT, 3-Tesla MRI, PET, SPECT, magnetoencephalography (MEG), memory and speech (Wada) testing and neuropsychological testing. We are one of only a few inpatient units in the country with the capability to simultaneously perform electroencephalography and polysomnography.

PET and SPECT scans visualize brain function by examining metabolic activity and identifying blood flow patterns. MEG maps neurological function and localizes epileptic spike discharges by tracking tiny changes in brain magnetic fields. This provides our specialists with clear data to help locate the source of seizures and minimize operative risk by defining the regions of the brain critical to speech and motor function. These diagnostic tools have contributed to our track record of successful resective surgery in lesional and non-lesional patients.

The Mischer Neuroscience Institute is a national leader in combining the use of MEG and functional MRI to fully map the brain and record brain activity. We remain the only center in Texas, Louisiana, Arkansas and Oklahoma to offer this service since bringing the first MEG imager to Houston in 1997.

For more than a decade, our team has been involved in research related to every epilepsy treatment approved in the United States to date, including a number of drug and intravenous therapies, and vagus nerve stimulation (VNS) therapy.



Movement and Neurodegenerative Disorders

Physicians with our Movement Disorders and Neurodegenerative Program are at the forefront of research in congenital, acquired and trauma-induced movement disorders and neuroregenerative diseases. Current research is focused on disease pathogenesis and neuromodulation, with the ultimate goal of identifying new medical and surgical interventions.

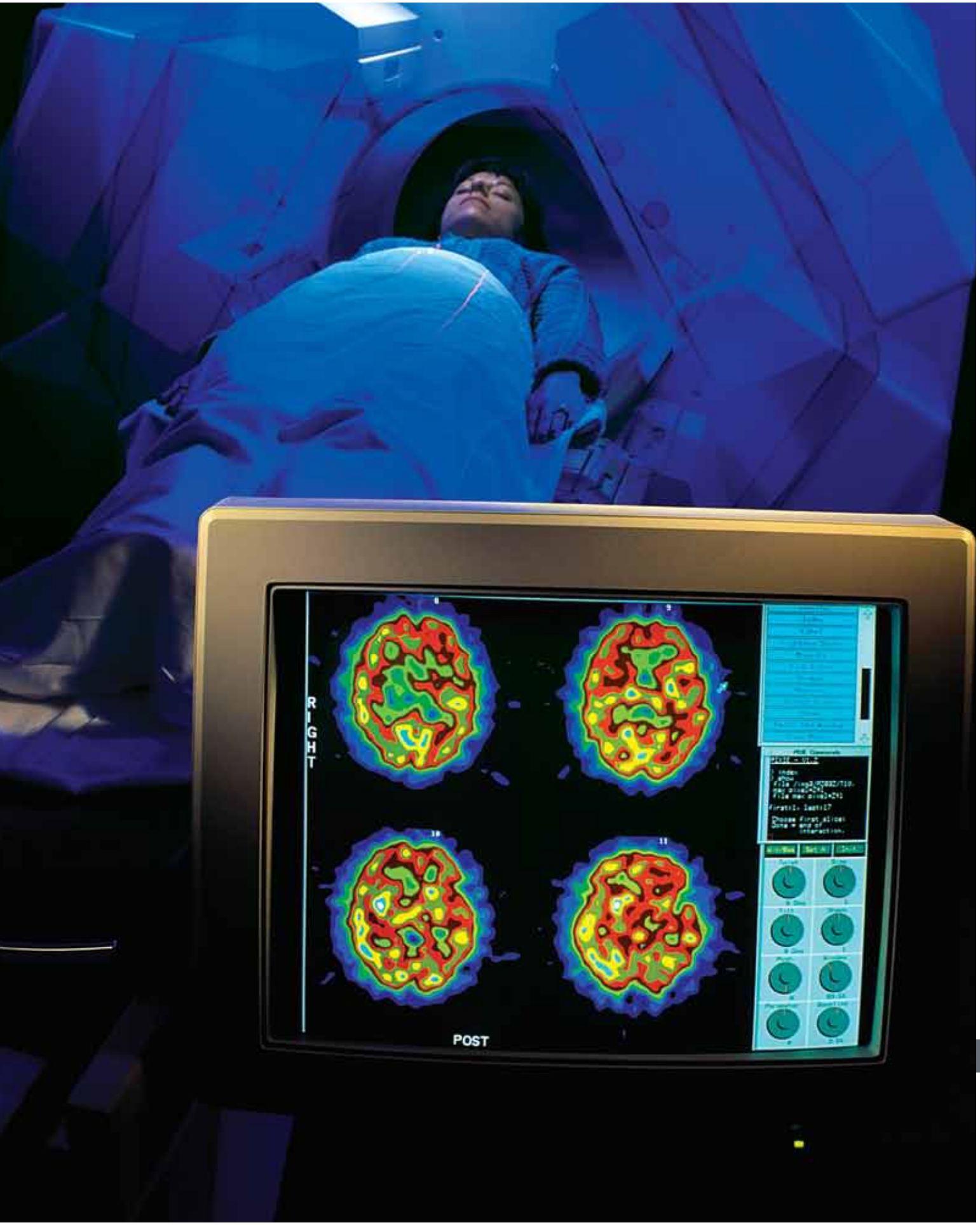
Our medical team uses the latest medications and interventional methods to manage Parkinson's disease, Parkinsonian disorders, generalized and focal dystonia, essential tremor, Huntington's chorea, Alzheimer's disease, cortical and subcortical dementias, cerebral palsy, spasticity, ataxias, gait disorders, spinal and brain trauma-related movement abnormalities, multiple sclerosis-related movement abnormalities and other inherited and acquired neurodegenerative diseases.

We have an active deep brain stimulation (DBS) program for Parkinson's tremor, dystonia and essential tremor. Based on the skill of our neurological and neurosurgical team, low complication rates, our expertise at programming and our track record of outstanding outcomes, we advocate for early use of deep brain stimulation in appropriate patients. We also apply innovative strategies to the treatment of spasticity, or abnormal tone, especially in post-stroke, multiple sclerosis, brain and spinal cord injury patients.

Patients undergo detailed testing using rating scales, timed tests and video documentation at the Clinical Research Center at Memorial Hermann-Texas Medical Center. Therapeutic goals are symptom driven and focused on maintaining patients at the highest level of function possible. Our treatment philosophy is based in the early identification of disease and early use of neuromodulating or neuroprotective approaches.

Rehabilitation is integral to our outcomes. We work closely with the physical, occupational and speech therapists at TIRR Memorial Hermann and our inpatient and outpatient clinics to research new approaches to rehabilitation that enhance treatment. We encourage our patients to stay mentally and physically active and to have fun. We also emphasize education and consider the whole person, their environment and their support groups as we develop and adjust our treatment plans.

The Movement and Neurodegenerative Disorders Program is a collaborative effort between the Mischer Neuroscience Institute and UT MOVE, with specialty clinics that include the Spasticity Management Clinic, DBS Selection and Programming, Botox® Injection Clinic and Intrathecal Baclofen Pump Therapy Clinic, as well as our comprehensive examinations of the nervous systems and cognitive function.


RIGHT
POST

Multiple Sclerosis

The Mischer Neuroscience Institute is a leader in the development of new therapies for multiple sclerosis. Physicians here are at the forefront of investigator-initiated research in oral protein medications for the treatment of MS, immune regulation in MS, infection as a cause of MS, MS-related MRI findings and MS-related cognitive impairment. Ours was the first center in the world to conduct preclinical studies on the effects of combined therapy with immunomodulating drugs and to explore the effects of oral cytokines in modulating MS and Type 1 diabetes. We are a global leader in advanced image analysis for MS and the first and only center in Houston to direct national and international clinical trials in MS.

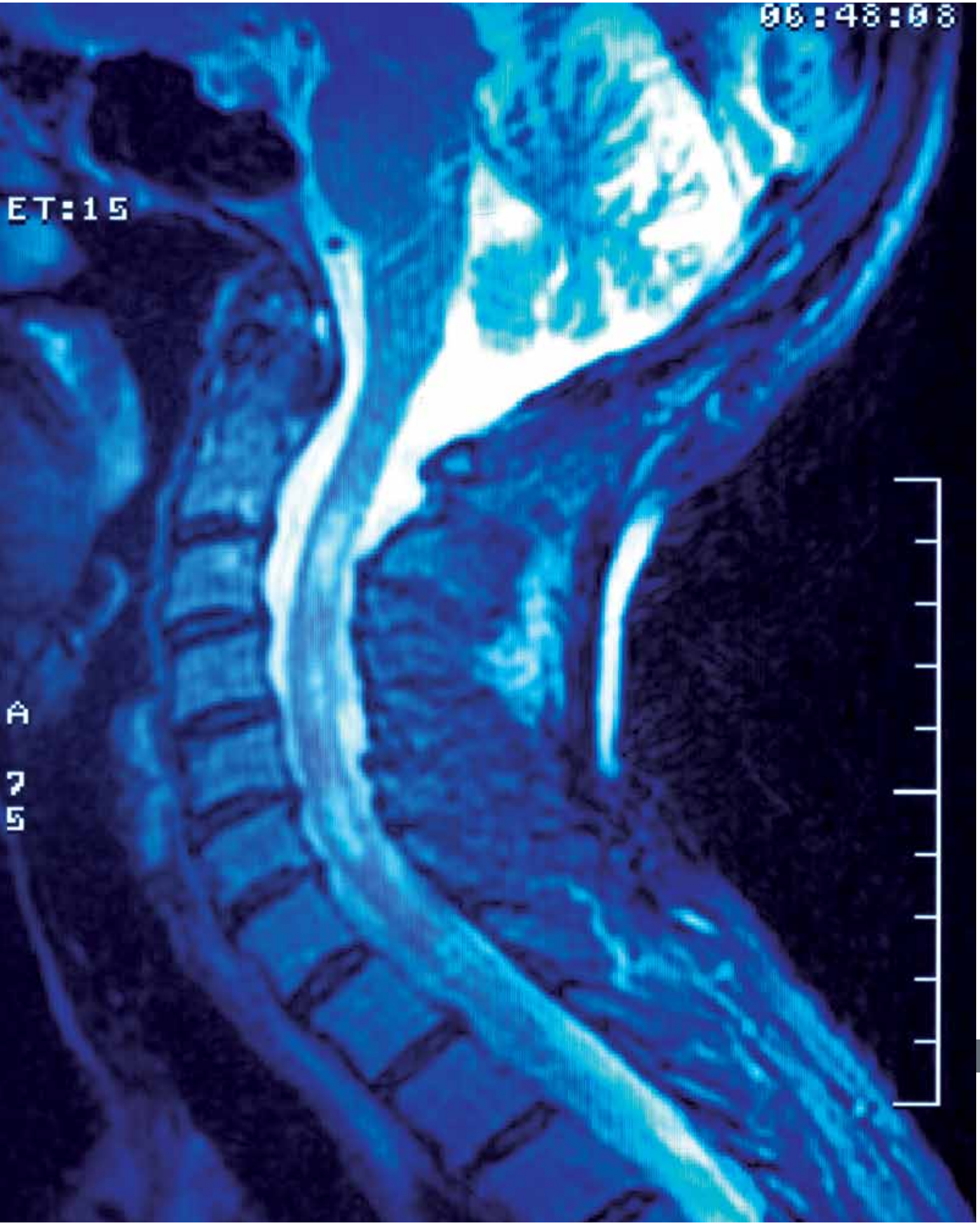
Organized in 1983, our team has participated in more than 25 clinical trials of potential novel symptomatic and disease-modifying therapies, serving as the lead center for a number of international studies, several of which were pivotal in supporting FDA approval of currently available treatments for MS.

We use state-of-the-art techniques in the diagnosis, evaluation, management and treatment of adult patients with multiple sclerosis and demyelinating diseases including neuromyelitis optica, transverse myelitis and optic neuritis. We see patients in all stages of MS, from the earliest symptoms through established disease. Our state-of-the-art MRI facilities are capable of advanced spectroscopic and diffusion tensor imaging with tractotomy, and can perform all the other useful diagnostic testing.

Once a diagnosis is made, our team has at its disposal the most advanced treatment options available, including injectable immunomodulators, immunosuppressives and agents to treat debilitating symptoms of MS such as fatigue, bladder dysfunction, spasticity and development of neurorehabilitation planning. We are experienced in the appropriate use of more aggressive therapies, which are sometimes required for more severe cases.

Therapeutic goals are driven by the maintenance of function at the highest level possible, and our treatment philosophy is based on the early identification of disease and early use of immunoactive agents to prevent progression.

Rehabilitation is an integral part of our treatment plan. To optimize rehabilitation and evaluate new approaches that may enhance patient outcomes, we work closely with physical and occupational therapists and refer our patients to state-of-the-art facilities specializing in neurological conditions, including TIRR Memorial Hermann and the Mischer Neuroscience Institute's Neurorehabilitation Program.



Neuromuscular Disorders

Our Neuromuscular Disorders Program records more than 2,000 patient visits annually. We use comprehensive diagnostic services housed in advanced neurodiagnostic facilities to design individualized treatment plans for a broad range of neuromuscular disorders, from amyotrophic lateral sclerosis to muscular dystrophy to various types of neuropathies and myopathies. Our patients are primarily adults age 18 and older. Approximately two-thirds are over the age of 50.

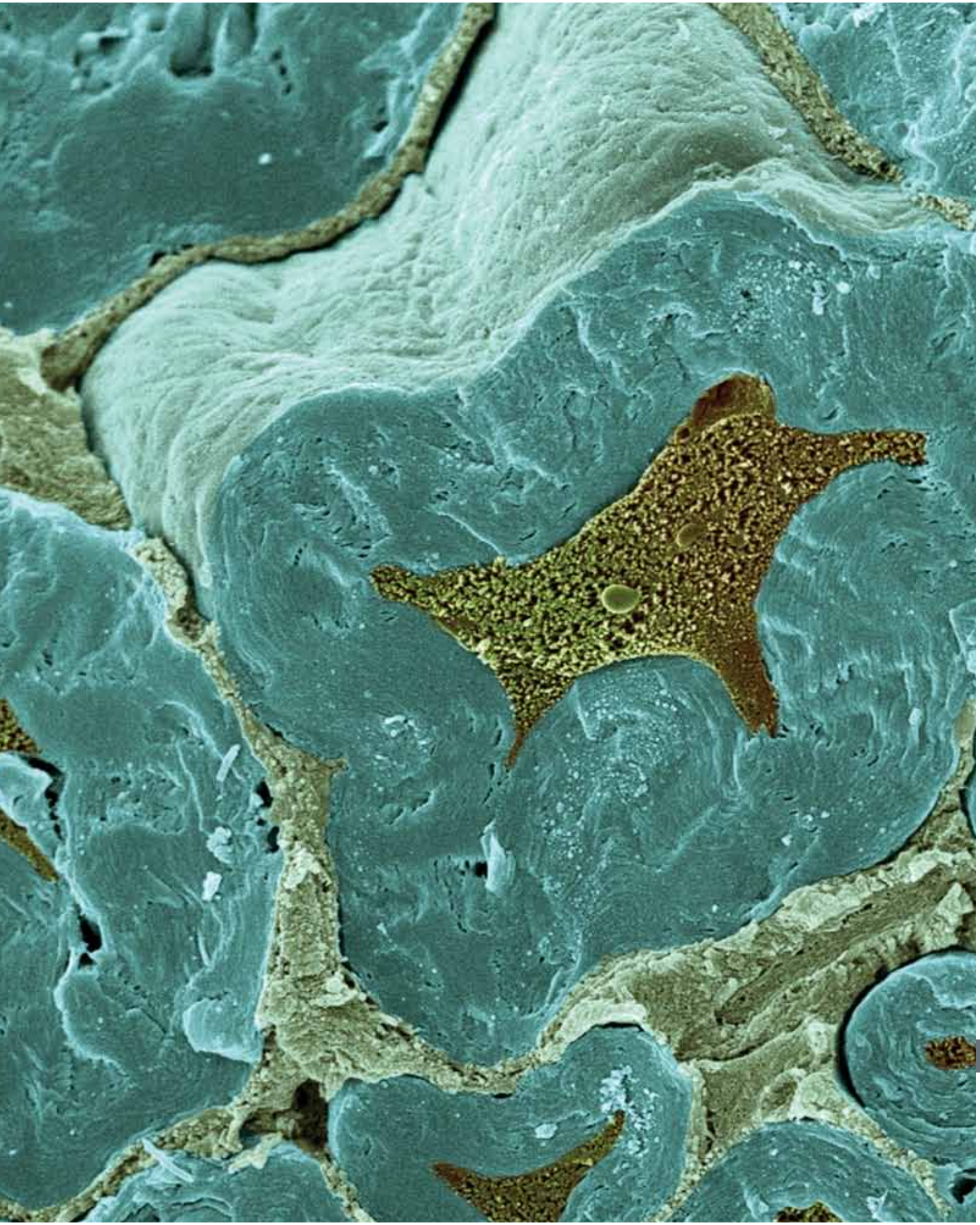
Our affiliated physicians are subspecialized in complex neuromuscular disorders that are difficult to diagnose and treat, including neurodegenerative disorders, inflammatory nerve and muscle disorders, autoimmune neuromuscular junction disorders, traumatic nerve injuries and toxic metabolic disorders of the peripheral nerves and muscles.

Our Electromyography (EMG) Laboratory conducts electrical studies of the lower motor neurons, including anterior horn cell, nerve root, plexus, peripheral nerves, neuromuscular junction and muscles, to aid in understanding and evaluating neuromuscular disorders. In addition to EMG, studies include nerve conduction, repetitive nerve stimulation, blink reflexes, cranial nerve studies, and facial/trigeminal neuropathy.

In cases with limited neuromuscular findings, our Muscle and Nerve Laboratory helps improve diagnosis by finding abnormalities at a pathologic/microscopic level. Muscle, nerve and skin biopsies are performed by specialists trained in neuromuscular pathology.

Once a diagnosis is made, we use advanced treatment options ranging from immunosuppressive therapies to plasmapheresis to robotic-assisted thymectomy. We consult with a range of subspecialties in evaluation and treatment.

Research in neuromuscular disorders is a pivotal part of our program, focused on developing new therapeutic strategies to treat neuropathic disorders and enhance nerve repair. With funding from the National Institutes of Health and GBS/CIDP Foundation International, our research team is studying the pathogenesis of autoimmune neuropathies, immune effectors and nerve repair, novel strategies to enhance axon regeneration and nerve repair and the development of MRI technology to assess neuromuscular disorders in preclinical and clinical studies.



Neurorehabilitation

We extend our neuroscience continuum of care through inpatient and outpatient neurorehabilitation in our 23-bed rehabilitation unit at Memorial Hermann-Texas Medical Center,, as well as at TIRR Memorial Hermann, a top-tier, 116-bed rehabilitation hospital. Subspecialists affiliated with these programs focus on hemorrhagic and ischemic stroke; neurological disorders such as multiple sclerosis, Parkinson's disease and Guillain-Barré syndrome; traumatic brain injury; spinal cord injury; neurodegenerative disorders; and general neurorehabilitation. Our patients benefit from comprehensive inpatient and outpatient services, state-of-the-art technology and innovative therapies and techniques.

Upon admission to the Neurorehabilitation Program at Memorial Hermann-TMC, patients and their families discuss their goals with our interdisciplinary team. Together, we develop a treatment plan to identify goals and plan of care. We also offer intensive medical care for associated medical problems, such as hypertension, diabetes, chronic renal failure and cardiopulmonary disease.

Our team is committed to innovation in therapeutic techniques, technology and patient care. We provide innovative and evidence-driven rehabilitation by merging manual and technological therapies, including Korebalance™, Bioness® and IREX® Virtual Reality.

In addition, we offer outpatient programs and services in collaboration with TIRR Memorial Hermann Kirby Glen, located just outside the Texas Medical Center. Kirby Glen offers a staff of 52 therapists with neurological expertise, neurorehabilitation day programs and technology that includes upper- and lower-extremity Bioness and a Lokomat®. It is the top-rated cognitive and community reintegration program in the region.

Recognized as a national leader in medical rehabilitation and research, TIRR Memorial Hermann is one of only six rehabilitation hospitals in the United States designated as model systems by the National Institute on Disability and Rehabilitation Research (NIDRR) for both our spinal cord injury and traumatic brain injury programs. Since 1989, *U.S.News & World Report* has named TIRR to the list of "America's Best Hospitals."

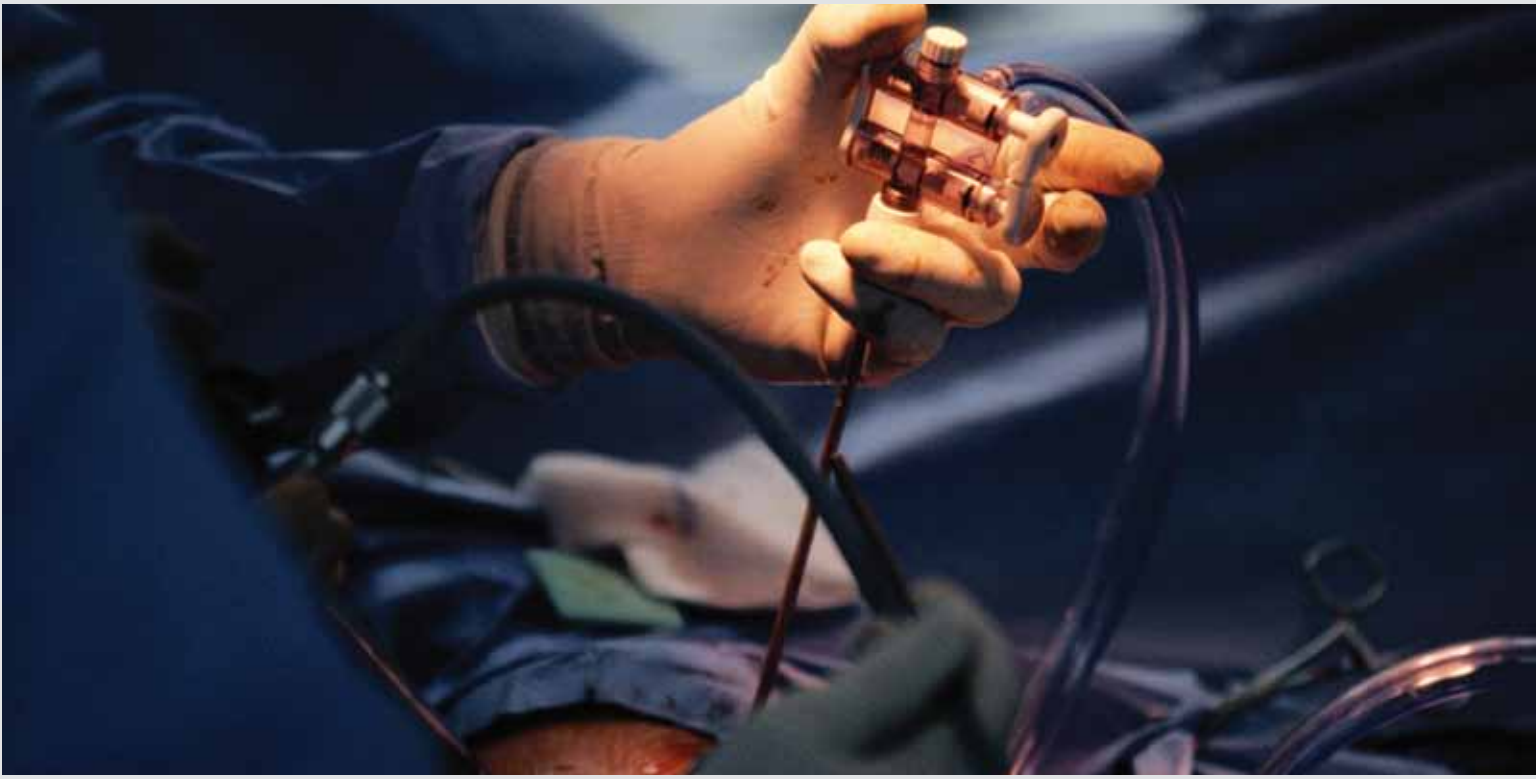
Neurotrauma/ Critical Care

Patients with acute neurological injuries also benefit from Memorial Hermann-Texas Medical Center's Level I Trauma Center – one of only two in the area and the busiest in the nation – and from Memorial Hermann Life Flight® air ambulance service, the first air ambulance program in Texas and the second in the nation.

Memorial Hermann Life Flight provides high-quality, safe air transport for critically ill and injured patients via helicopter and fixed-wing aircraft. Our helicopter service responds within a 150-mile radius of Memorial Hermann-TMC. Fixed-wing service is available beyond 150 miles with world operating authority. Memorial Hermann Life Flight is the only hospital-based air ambulance service in Houston.

Mischer Neuroscience Institute houses the largest and busiest Neuro Intensive Care Unit of its kind in the region. Neurointensivists and experienced mid-level practitioners staff our dedicated Neuro ICU around the clock to provide ongoing intensive care to critically ill patients.

Spine



Highly skilled spine surgeons affiliated with the Mischer Neuroscience Institute perform more than 1,000 surgeries annually in new, state-of-the-art facilities equipped with advanced tools and dynamic imaging systems. They offer outstanding care for patients suffering from traumatic spine injury, including the 10 percent to 20 percent of admissions through our Level I Trauma Center that involve neurological damage. We also offer innovative procedures for the relief of neck and back pain, including minimally invasive procedures, disk replacement surgery and spinal fusions.

Staff Listing

Led by neurosurgeon Dong H. Kim, M.D., and neurologist James C. Grotta, M.D., the Mischer Neuroscience Institute brings together a team of world-class physicians, researchers and educators whose insights and research findings are transforming the field of neuroscience. In collaboration with The University of Texas Medical School at Houston, this group of recognized specialists and subspecialists is driving growth in key academic and clinical programs and is expanding the Institute's comprehensive scope of services.

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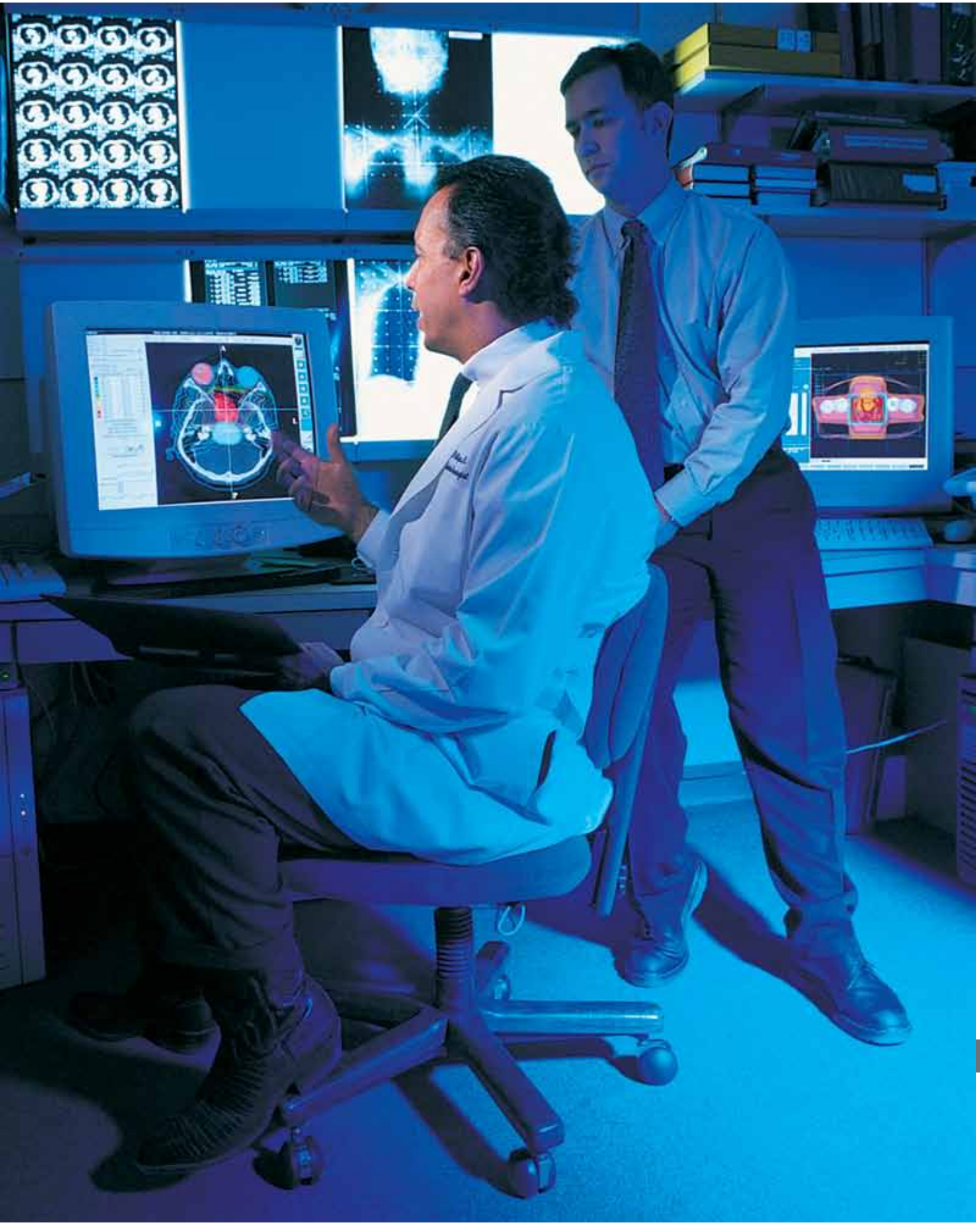

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Research

Working together with The University of Texas Medical School at Houston, investigators at the Mischer Neuroscience Institute are shaping the future of medicine through clinical discovery and the development of new, breakthrough treatments.

Since September 2008, researchers at the Institute and UT Medical School have received more than $8.7 million in grants for clinical trials and laboratory research in neurology and more than $4 million in grants for studies related to neurosurgery. The department of Neurosurgery at Memorial Hermann-Texas Medical Center and the UT Medical School is currently listed as No. 3 in the country in the National Institutes of Health research awards.

The following is a sample of the research currently in progress or recently completed by investigators affiliated with the Mischer Neuroscience Institute.

Neuroscience Research Repository

PRINCIPAL INVESTIGATOR: **DONG H. KIM, M.D.**

The Neurosciences Research Repository (NRR) is a prospective database and tissue sample bank that will improve knowledge of neurological illness and injury, and ultimately change the way patient care is delivered. The NRR collects samples from consenting patients for clinical, genomic and proteomic analysis. Researchers began enrolling patients in the NRR at Memorial Hermann-TMC in the spring of 2009.

Patient data for the NRR is gathered electronically through Neurocore, a clinical documentation and communication program developed by Clearpath Solutions with funding from Memorial Hermann. Standardized electronic health data and samples are collected in a uniform manner, which makes the information in the database very consistent and extensive. The data is de-identified to protect patient privacy and ensure HIPAA compliance. Every neurosurgical patient admitted to the MNI is a candidate for this study. The patient is approached for consent; if granted, all clinical data as well as blood samples are obtained. In addition, all tissues discarded during treatment, such as operative tissue or drained cerebrospinal fluid, are collected and maintained in this bio-bank for future studies. The NRR provides a unique resource, combining detailed clinical data with blood, CSF, and tissue samples. At present, 2,052 samples have been collected in the NRR.

The NRR is one of many research projects at Memorial Hermann-TMC and the UT Medical School benefiting from the support of the Vivian L. Smith Foundation for Neurologic Research.

CEREBROVASCULAR

AHA Clinical Research Program Award

PRINCIPAL INVESTIGATOR: **Nicole Gonzales, M.D.**

This study explores MRI evaluation of hematoma resolution as a surrogate marker of clinical outcome in intracerebral hemorrhage.

ASSIST - Assessment of Spleen Size Reduction and Inflammatory Markers in Acute Stroke over Time

PRINCIPAL INVESTIGATOR: **Preeti Sahota, M.D.**

An observational study to evaluate the changes in spleen size and blood flow over time using ultrasound and corresponding changes in inflammatory cytokines in acute stroke patients presenting within six hours of symptom onset. The results of the study may provide insight into potential future therapies for acute stroke targeting the immune processes within the spleen.

Blood-Brain Barrier Permeability Changes as a Predictor of Complications in tPA-Treated Patients

PRINCIPAL INVESTIGATOR: **Tzu-Ching Wu, M.D.**

Hemorrhagic transformation and cerebral edema can be devastating complications of stroke. This retrospective study is investigating the relationship between permeability of the blood-brain barrier and stroke complications.

Bugher Foundation Center for Stroke Prevention

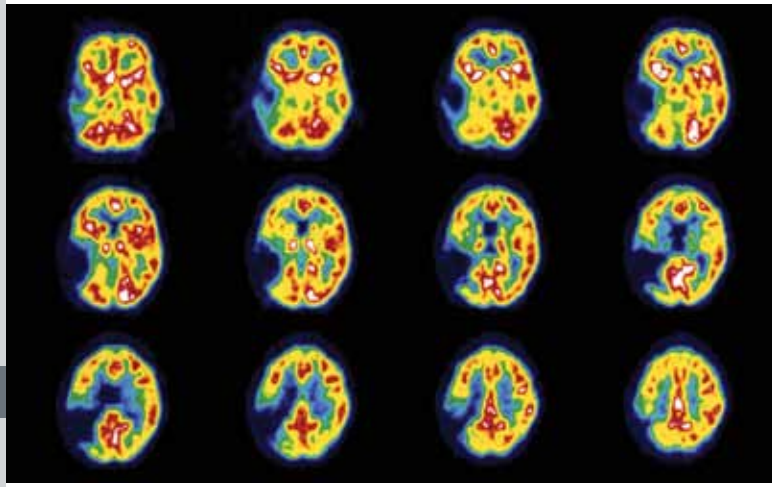
PRINCIPAL INVESTIGATOR: **Dong H. Kim, M.D.**

This project is focused on identifying gene mutations associated with cerebral aneurysm formation and understanding molecular mechanisms that lead to disease.

Carotid Revascularization Endarterectomy versus Stenting Trial (CREST)

PRINCIPAL INVESTIGATOR: **Nicole Gonzales, M.D.**

In an effort to find better ways to prevent strokes in people with carotid stenosis, this national, multi-center research study is comparing carotid endarterectomy to the study procedure, carotid artery stenting. Researchers are evaluating the relative effectiveness of both treatments in preventing stroke, myocardial infarction and death in the 30-day period immediately following the procedure.



CLOTBUST-HF Combined Lysis of Thrombus in Brain Ischemia with Transcranial Ultrasoundand Systemic T-PA-Hands-Free: A Phase I/II Pilot Safety Trial

PRINCIPAL INVESTIGATOR: **James Grotta, M.D.**

The safety of a novel, external hands-free transcranial Doppler ultrasound system is being tested in two study groups: normal subjects and people with ischemic stroke.

Defining Genetic and Environmental Modifiers of Vascular Disease

PRINCIPAL INVESTIGATOR: **Hariyadarshi Pannu, Ph.D.**

This research focuses on defining molecular differences between vascular beds, the role these differences play in conferring differential susceptibility to vascular diseases and the identification of factors that lead to variable gender-specific vascular disease susceptibility.

DIAS 4 - Desmoteplase In Acute Stroke 4-DIAS

PRINCIPAL INVESTIGATOR: **Sean Savitz, M.D.**

An efficacy study to determine whether the potent IV clot busting drug desmoteplase improves outcome in patients who arrive too late for IV tPA but within nine hours of stroke onset. Desmoteplase is derived from vampire bat saliva and previous studies suggest benefit in patients with normal CT scans and persisting arterial occlusion beyond three hours.

Factors Associated with Patients Not Accessing Follow-Up Care with Their Admitting Stroke Physicians at a Comprehensive Stroke Center in a Large Metropolitan Area

PRINCIPAL INVESTIGATOR: **Susan Alderman, R.N.**

This study is assessing the reasons why acute ischemic stroke patients fail to comply with outpatient follow-up appointments with their admitting neurologists after hospitalization.

Genetic Analysis of Cerebral Aneurysms

PRINCIPAL INVESTIGATOR: **Teresa Santiago-Sim, Ph.D.**

Researchers are identifying genetic alterations that predispose individuals to cerebral aneurysms as well as potential cerebral aneurysm biomarkers that can aid in diagnosis of individuals at increased risk of developing disease.

ICTUS 2/3 - Phase 2/3 Study of Intravenous Thrombolysis and Hypothermia for Acute Treatment of Ischemic Stroke. The Intravascular Cooling in the Treatment of Stroke 2/3 (ICTuS 2/3) Trial.

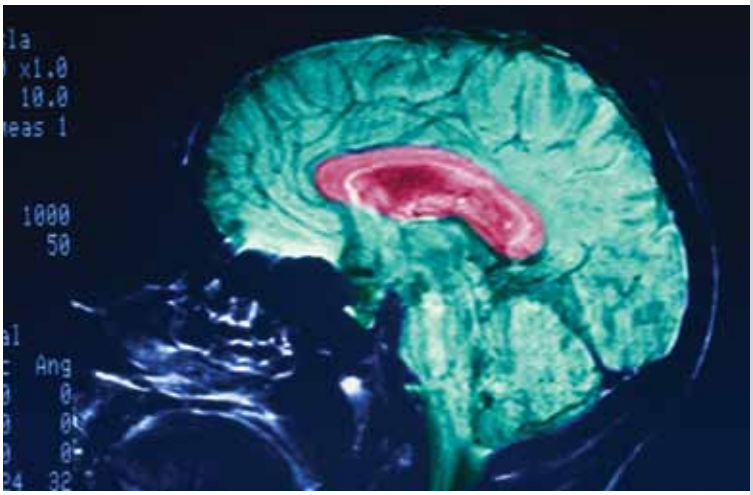
PRINCIPAL INVESTIGATOR: **James Grotta, M.D.**

A two-stage safety and efficacy study to determine whether the combination of thrombolysis and hypothermia is superior to thrombolysis alone for the treatment of acute ischemic stroke.

IMS III: Interventional Management of Stroke Trial - A Phase III, Randomized, Multicenter, Open-Label, 900-Subject Clinical Trial Examining Whether a Combined Intravenous and Intra-arterial Approach to Recanalization is Superior to Standard IV rtPA (Activase) Alone When Initiated Within Three Hours of Acute Ischemic Stroke

PRINCIPAL INVESTIGATOR: **James Grotta, M.D.**

This study compares two different ways of treating patients who have had massive strokes in an effort to determine which treatment produces the better outcome. Patients in the first treatment group will be given intravenous tPA within three hours of the onset of stroke symptoms. Patients in the second treatment group will be given intravenous tPA at a lower dose and also through a catheter at the site of the occlusion in the brain artery.



Merci® Registry

PRINCIPAL INVESTIGATOR: **Andrew Barreto, M.D.**

This prospective, multi-center, multinational registry is assessing the real-world use of the Merci Retriever for clot removal in patients with acute ischemic stroke.

Mild Stroke Treated with Thrombolytic Therapy

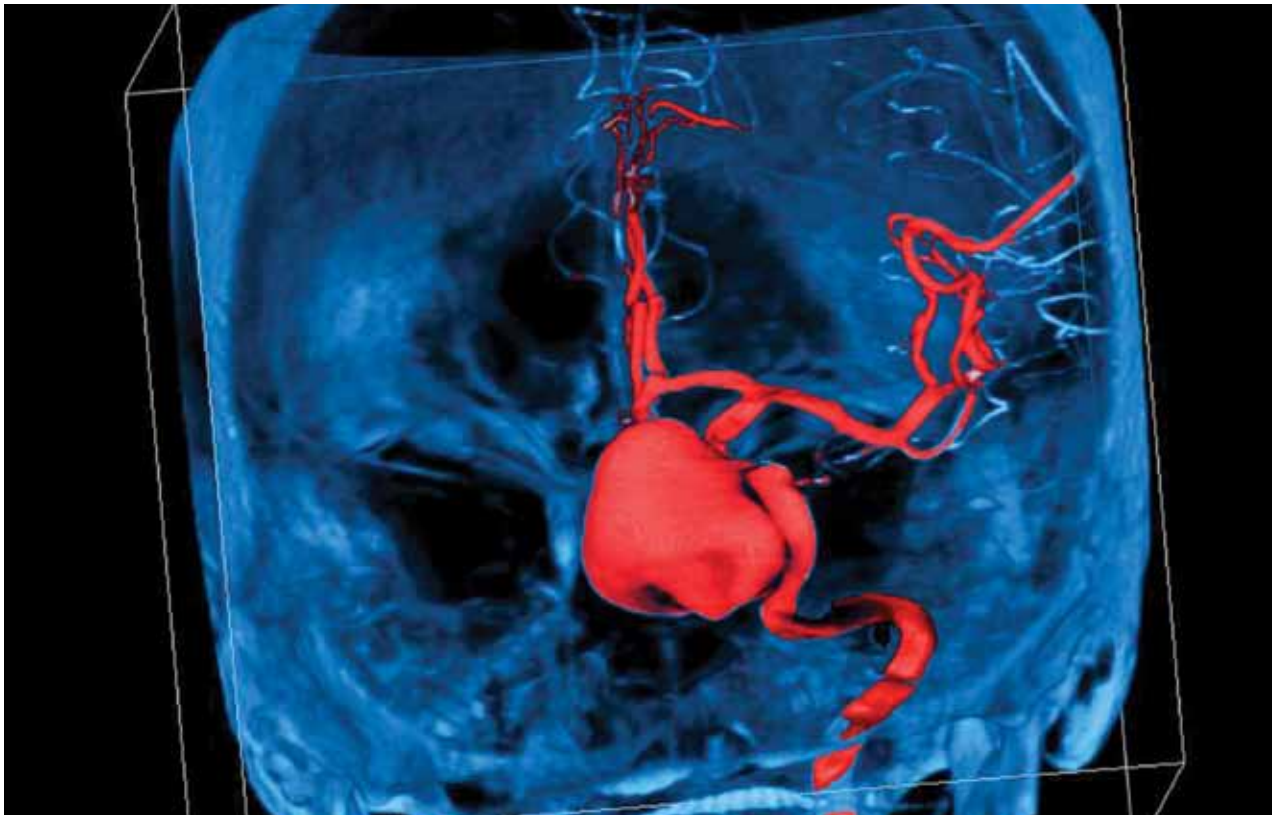
PRINCIPAL INVESTIGATOR: **Nicole Gonzales, M.D.**

Many patients with mild acute ischemic stroke who would be eligible for intravenous recombinant tPA are excluded from treatment because of mild symptoms and the assumption that they will do well without it. This retrospective study is reviewing outcomes of patients with mild acute ischemic stroke who received intravenous rtPA against outcomes of patients who did not.

MR and Recanalization of Stroke Clots Using Embolectomy (MR RESCUE)

PRINCIPAL INVESTIGATOR: **James Grotta, M.D.**

A clot-retrieval device is being used to treat patients who are having an acute ischemic stroke caused by a proximal large vessel anterior circulation occlusion. This Phase IIB clinical trial includes patients who arrive at the hospital within three hours of stroke onset but who are ineligible for intravenous tPA therapy, as well as patients who arrive three to eight hours after the onset of symptoms.



Patients eligible for tPA who present within three hours of symptoms onset will receive the drug rather than being enrolled in the trial. Patients who enroll will be randomly selected to receive embolectomy versus conventional medical care.

Neurofluctuations in Patients with Subcortical Ischemic Stroke

PRINCIPAL INVESTIGATOR: **Sean Savitz, M.D.**

Patients with subcortical stroke who receive standard care are the subjects of this prospective study.

Neuroimaging of Cerebrovascular Function

PRINCIPAL INVESTIGATOR: **Timothy Ellmore, Ph.D.**

Researchers in this study are 1) using high-resolution structural and functional neuroimaging to measure aspects of brain anatomy and function in humans at risk for cerebrovascular disease and 2) studying patients who have had hemorrhagic strokes in order to assess the extent of damage, impact on cognitive function, and risk for additional cerebrovascular incidents.

New Target for Stroke: Peroxisome Proliferator Activated Receptor-Gamma

PRINCIPAL INVESTIGATOR: **Jaroslaw Aronowski, Ph.D.**

This study examines the role of PPAR in neurons and microglia as a factor protecting these cells from insult produced by ischemic stroke.

Pleiotropic Transcription Factors as a Target for Intracerebral Hemorrhage Treatment

PRINCIPAL INVESTIGATOR: **Jaroslaw Aronowski, Ph.D.**

Researchers are evaluating the role of transcription factor Nrf2 in regulating cytoprotection, antioxidative defense and detoxification of brains injured by intracerebral hemorrhage.

Safety of Autologous Bone Marrow Cell Treatment for Acute Ischemic Stroke

PRINCIPAL INVESTIGATOR: **Sean Savitz, M.D.**

Can stem cells taken from a patient's own bone marrow be safely administered intravenously to adults who have had an acute ischemic stroke? Animal data have shown promising results in numerous studies. This Phase I, single-center study aims to conduct a comprehensive assessment of the safety and feasibility of using autologous bone marrow in humans with acute stroke.

Safety of Pioglitazone for Hematoma Resolution in Intracerebral Hemorrhage (SHRINC) and MRI Evaluation of Hematoma Resolution as a Surrogate Marker of Clinical Outcome in Intracerebral Hemorrhage

PRINCIPAL INVESTIGATOR: **Nicole Gonzales, M.D.**

This study compares the safety of pioglitazone with standard of care for patients with spontaneous cerebral hemorrhage. The drug is administered in increasing doses from 0.1 to 2 mg/kg/d for three days, followed by a lower maintenance dose, within 24 hours of the start of symptoms.

SPOTRIAS Project 2: A Pilot Study to Determine the Safety of Argatroban Injection in Combination with rtPA in Patients with Acute Ischemic Stroke

PRINCIPAL INVESTIGATOR: **James Grotta, M.D.**

This clinical trial is assessing the safety of combining the anticoagulant Argatroban and recombinant tPA to treat patients who have had acute ischemic stroke.

Targets and Functional Consequences of Altered MicroRNAs Following Stroke

PRINCIPAL INVESTIGATOR: **Meredith L Moore, Ph.D.**

The goals of this project are to 1) characterize altered microRNA expression profiles and elucidate the molecular pathways targeted and 2) confirm direct microRNA regulation of potential targets.

Targets and Functional Consequences of Altered MicroRNAs in Models of Acute and Chronic SCI

PRINCIPAL INVESTIGATOR: **Meredith L Moore, Ph.D.**

The goals of this project are to 1) characterize altered microRNA expression profiles and elucidate the molecular pathways targeted 2) confirm direct microRNA regulation of potential targets and 3) identify longitudinal expression patterns of miRNAs.

TEG – Prospective Analysis of the Use of Thrombelastography in Prediction of Hemorrhage in Stroke Patients

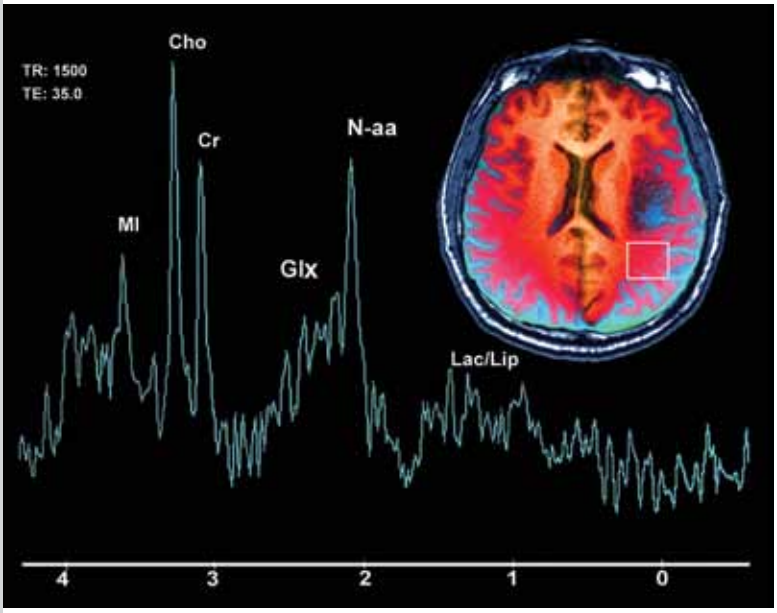
PRINCIPAL INVESTIGATOR: **James Grotta, M.D.**

An observational study to evaluate the use of thrombelastography (TEG) analysis to assess the coagulation status of patients with acute stroke presenting within three hours of symptom onset. The purpose of the study is to evaluate the efficacy of TEG as a means of identifying those ischemic and hemorrhagic stroke patients at increased risk for bleeding.

Utilization of Intensive Care Resources in Severe Intracranial Hemorrhage

PRINCIPAL INVESTIGATOR: **Nicole Gonzales, M.D.**

Researchers are identifying all patients with intracranial hemorrhage treated by the Mischer Neuroscience Institute stroke team from 2004 to January 2009. This review of medical charts is capturing information that will help describe characteristics that predict whether patients should receive prolonged care or hospice care.



EPILEPSY

A Multicenter, Open-Label Extension Trial to Assess the Long-Term Use of Lacosamide Monotherapy and Safety of Lacosamide Monotherapy and Adjunctive Therapy in Subjects with Partial-Onset Seizures

PRINCIPAL INVESTIGATOR: **Jeremy Slater, M.D.**

This study is demonstrating the effectiveness and safety of administering lacosamide, an investigational anticonvulsant, to patients with partial-onset seizures who are withdrawn from one to two established antiepileptic drugs.

Correlation of Waking Background Alpha Frequency with Measures of Attention and Reaction

PRINCIPAL INVESTIGATOR: **Jeremy Slater, M.D.**

Researchers are studying alpha brainwave frequency and its relationship to varying levels of alertness.

Diffusion Imaging for Seizure Focus Localization

PRINCIPAL INVESTIGATOR: **Timothy Ellmore, Ph.D.**

This project is evaluating the feasibility of using diffusion-weighted MRI (DW-MRI) to localize the seizure onset zone in epilepsy patients.

E2080-A001-302: An Open Label Extension Study of Rufinamide Given as Adjunctive Therapy in Patients with Refractory Partial-Onset Seizures

PRINCIPAL INVESTIGATOR: **Jeremy Slater, M.D.**

The safety and effectiveness of long-term administration of rufinamide for the control of epileptic seizures is being evaluated in adolescents and adults between 12 and 80 years of age who have refractory partial-onset seizures and are being maintained on a maximum of three approved antiepileptic drugs.

ITSE-Initial Treatment of Status Epilepticus: A Preliminary Study for FIRST: Comparison of Fosphenytoin and Levetiracetam

PRINCIPAL INVESTIGATOR: **Omotola Hope, M.D.**

This retrospective review of charts is being undertaken in preparation for a pilot study comparing two drugs, fosphenytoin and levetiracetam, for the control of status epilepticus unresponsive to lorazepam.

Oxygen-Enhanced Magnetic Resonance Imaging in Non-lesional Focal Epilepsy

PRINCIPAL INVESTIGATOR: **Giridhar Kalamangalam, M.D.**

This ongoing study is evaluating how effective oxygen-enhanced MRI scan is at identifying subtle brain lesions in patients with refractory focal epilepsy.

Quantitative Analysis of the Electroencephalogram in Epilepsy

PRINCIPAL INVESTIGATOR: **Giridhar Kalamangalam, M.D.**

By analyzing EEG and video-EEG data already collected for clinical purposes, this study seeks new ways of understanding brain function in normal subjects and in people with neurological problems such as seizures.

SP902: A Historical-Controlled, Multicenter, Double-Blind, Randomized Trial to Assess the Efficacy and Safety of Conversion to Lacosamide 400mg/day Monotherapy in Subjects with Partial-Onset Seizures

PRINCIPAL INVESTIGATOR: **Jeremy Slater, M.D.**

Lacosamide is an investigational anticonvulsant drug. This study is demonstrating the effectiveness and safety of administering lacosamide to patients with partial-onset seizures who are withdrawn from one to two established antiepileptic drugs.

MULTIPLE SCLEROSIS

A Multicenter, Double-Blind, Randomized Study Comparing the Combined Use of Interferon Beta-1a and Glatiramer Acetate to Either Agent Alone in Patients with Relapsing-Remitting Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

This Phase III study investigating whether combined treatment with the drugs interferon beta-1a intramuscular given once weekly and glatiramer acetate subcutaneous given daily is more effective than either drug alone in treating relapsing-remitting multiple sclerosis.

Acorda Protocol MS F203: Double-Blind, Placebo-Controlled, 21-Week, Parallel-Group Study to Evaluate the Safety and Efficacy of Oral Fampridine-SR (10mg BID) in Subjects with Multiple Sclerosis and Acorda F203 Extension: An Open Label Extension Study to Evaluate the Safety, Tolerability and Activity of Oral Fampridine-SR in Subjects with Multiple Sclerosis Who Participated in the MS F203 Trial

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

In this placebo-controlled study, researchers are assessing the safety and efficacy of Fampridine-SR in patients diagnosed with multiple sclerosis.

At-Risk for MS: Clinical Conversion of Female Monozygotic Twins Discordant for CIS/MS

PRINCIPAL INVESTIGATOR: **Staley Brod, M.D.**

Identical twins have the highest rate of shared multiple sclerosis. This study is recruiting identical female twins, one with MS and the other without MS, to determine if the presence of characteristic MS-like lesions on baseline MRI indicates susceptibility to MS and if specific proteins in the blood or cerebrospinal fluid predispose a patient to MS.

Automated MR Image Analysis in MS: Identification of a Surrogate

PRINCIPAL INVESTIGATOR: **Jerry Wolinsky, M.D.**

Researchers are developing a general, PC-based automated image analysis system and applying it to determine those MRI metrics that best predict near-term clinical change in multiple sclerosis.

CCSVI and its relationship to MS - first phase

PRINCIPAL INVESTIGATOR: **Jerry Wolinsky, M.D.**

This NMSS-funded study is an ongoing interdisciplinary project at The University of Texas Health Science Center at Houston and includes four overlapped steps to develop an understanding if chronic cerebrospinal venous insufficiency (CCSVI) may have a unique role in MS. First, to determine if neurosonography provides information on brain venous outflow patterns reliable enough to screen for CCSVI in a sequential group of 100 subjects reflecting all major clinical MS phenotypes compared to 175 non-MS controls. Second, to learn if these findings are supported by noninvasive visualization of the body's venous system with 3T magnetic resonance venography on 100 of the participants. Third, to see if the noninvasive tests accurately reflect the 'true' anatomy of the subject's venous system using 'gold standard' transluminal venography in 50 subjects, and to use advanced MRI to seek evidence of actual brain perfusion deficits. Validating a reliable diagnostic approach and demonstrating an MS-specific association is a prerequisite to any randomized, blinded therapeutic trial of venoplasty for MS.

Combination Therapy in Multiple Sclerosis

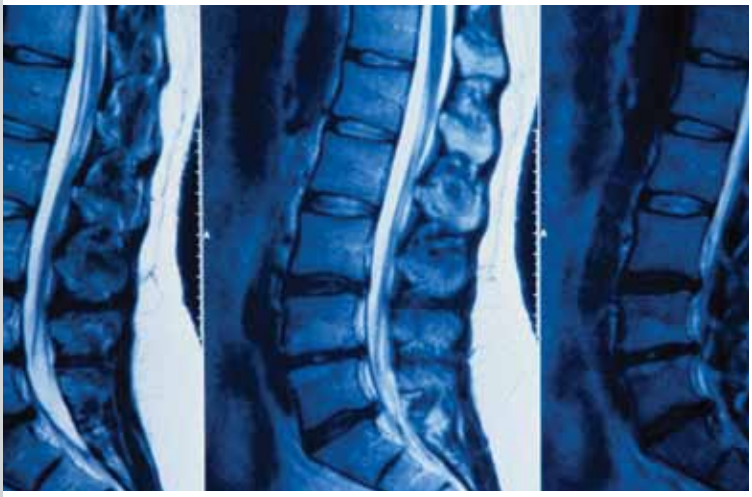
PRINCIPAL INVESTIGATOR: **Jerry Wolinsky, M.D.**

This study is determining if the combination of interferon beta-1a and glatiramer acetate is superior to either drug as monotherapy in relapsing-remitting multiple sclerosis.

Double-Blind, Placebo-Controlled, 20-Week, Parallel-Group Study to Evaluate Safety, Tolerability and Activity of Oral Fampridine-SR in Subjects with Multiple Sclerosis and Open Label Extension Study to Evaluate Safety, Tolerability and Activity of Oral Fampridine-SR in Subjects with Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

Researchers are investigating the safety and efficacy of three dose levels of Fampridine-SR – 20 mg, 30 mg and 40 mg – in patients diagnosed with multiple sclerosis.



Novartis Protocol CFTY7200D2301: A 24-Month Double-Blind, Randomized, Multi-center, Placebo-Controlled, Parallel-Group Study Comparing the Efficacy and Safety of FTY720 1.25mg and 0.5mg Administered Orally Once Daily Versus Placebo in Patients with Relapsing-Remitting Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **Flavia M. Nelson, M.D.**

Researchers are collecting data on the efficacy, safety and tolerability of fingolimod (FTY720) compared to placebo in patients with relapsing-remitting multiple sclerosis.

Novartis Protocol CFTY720D2306: A Double-Blind, Randomized, Multicenter, Placebo-Controlled, Parallel-Group Study Comparing the Efficacy and Safety of 1.25mg FTY720 Administered Orally Once Daily Versus Placebo in Patients with Primary Progressive Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **Flavia M. Nelson, M.D.**

This clinical trial is comparing the effectiveness of fingolimod (FTY720) to placebo in slowing the progression of disability in multiple sclerosis patients in the absence of relapses.

Open Label Study to Evaluate the Safety of Copaxone® and to Monitor the Neurologic Course of the Disease in Multiple Sclerosis Patients Treated with Copaxone

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

Researchers are seeking to better understand the long-term efficacy and side effects of the drug Copaxone® (glatiramer acetate) therapy in multiple sclerosis patients.

Serial Magnetic Resonance Spectroscopy in Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **Jerry Wolinsky, M.D.**

Researchers are using serial magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) to gather data to better understand disease processes in patients with multiple sclerosis.

The Cellular Immune Response Against Epstein-Barr Virus in Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

This study is measuring the cellular immune response against Epstein-Barr virus in patients with multiple sclerosis and in subjects without the disease.

The Immune Response to Epstein-Barr Virus in Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

Epstein-Barr virus (EBV) is a common infection associated with multiple sclerosis and may trigger the disease in some people. In this pilot study, researchers are developing methods to measure the response of the immune system to EBV infection.

Viral Mimicry and Multiple Sclerosis

PRINCIPAL INVESTIGATOR: **Jerry Wolinsky, M.D.**

This study investigates immunopathogenic mechanisms relevant to the pathogenesis of multiple sclerosis in animal models of the human demyelinating disease.

SPINE

Anterior Cervical Fusion Outcome Study

PRINCIPAL INVESTIGATOR: **Guy Clifton, M.D.**

Researchers are assessing the outcomes of patients after anterior cervical fusion using dynamic ABC plating (Aesculap AG, Tuttlingen, Germany) by evaluating neck pain in patients pre- and postoperatively. They are also documenting the rate of fusion following surgery.

NEUROREHABILITATION

Deep Venous Thrombosis in Post-Stroke Hemiplegia: Associated Factors Placing Patients at Increased Risk

PRINCIPAL INVESTIGATOR: **Nneka Ifejika, M.D.**

Researchers are gathering preliminary data on acute stroke patients who have developed a deep venous thrombosis (DVT) during hospitalization for inpatient neurorehabilitation, despite having received preventive medication.

Improving Ambulation Post Stroke with Robotic Training

PRINCIPAL INVESTIGATOR: **Elizabeth Noser, M.D.**

The Lokomat® is a new robotic device that uses a harness to maintain the patient in a standing position over a moving treadmill and robotic-driven orthotic supports to move the legs through a walking pattern. This study is examining the effectiveness of rehabilitation therapy using the Lokomat.

NEUROMUSCULAR DISORDERS

Aseptic Meningoencephalitis Syndrome in Adults

PRINCIPAL INVESTIGATOR: **Rodrigo Hasbun, M.D.**

This study is establishing a simple and cost-effective procedure for early diagnosis and effective management of aseptic meningoencephalitis syndrome in patients who present at the emergency department.

GBS/CIDP Foundation Grant

PRINCIPAL INVESTIGATOR: **Kazim A. Sheikh, M.D.**

Researchers are engineering chimeric proteins to enhance nerve repair in antibody-mediated preclinical models of autoimmune neuropathy.

Phenotypic Differences in Motor and Sensory Neuron Regeneration in Inbred Mice

PRINCIPAL INVESTIGATOR: **Kazim A. Sheikh, M.D.**

This study is determining the genetic drivers of phenotypic differences in nerve regeneration in inbred mice.

MOVEMENT AND NEURODEGENERATIVE DISORDERS

A Natural History of Rapid Eye Movement Sleep Behavior Disorder as Prognostic for Parkinson's Disease

PRINCIPAL INVESTIGATOR: **Mya Schiess, M.D.**

Researchers are validating a combination of biological and clinical markers in people with rapid eye movement (REM) sleep behavior disorder as an indicator of the stage of idiopathic Parkinson's disease before symptoms appear.

Cross-Sectional Cohort Study of Laboratory and Clinical Patterns in Early Parkinson's Disease

PRINCIPAL INVESTIGATOR: **Mya Schiess, M.D.**

This study is designed to characterize and define serum and cerebrospinal fluid values for inflammatory cytokines in early idiopathic Parkinson's disease (IPD). Researchers are also looking for patterns in early IPD, hoping that they may lead to early diagnosis before symptoms occur.

Cyclic Amplification of Prion Protein Misfolding

PRINCIPAL INVESTIGATOR: **Claudio Soto, Ph.D.**

The major goals of this project are to understand the mechanism of prion replication and the nature of the infectious agent, and to develop novel strategies for diagnosis of prion diseases.

Evaluation of the Effectiveness of Subthalamic Deep Brain Stimulation and its Effect on Neuropsychological Function in the Treatment of Medically Intractable Parkinson's Disease

PRINCIPAL INVESTIGATOR: **Gage Van Horn, M.D.**

This study is using clinical examination, a quality-of-life questionnaire and neuropsychological testing to evaluate the effects of deep brain stimulation in patients with medically intractable Parkinson's disease.

Neurodegeneration in Prion Diseases

PRINCIPAL INVESTIGATOR: **Claudio Soto, Ph.D.**

This study is investigating the mechanism of brain degeneration in prion diseases and in particular, the role of the endoplasmic reticulum chaperon protein Grp58.

Pathogenesis, Transmission and Detection of Zoonotic Prion Diseases

PRINCIPAL INVESTIGATOR: **Claudio Soto, Ph.D.**

Researchers are studying the pathogenesis and routes of propagation of bovine spongiform encephalopathy and chronic wasting disease, and developing novel strategies for the detection of infected animals.

Pathogenic Mechanism of Prion Disease

PRINCIPAL INVESTIGATOR: **Claudio Soto, Ph.D.**

This Program Project grant involves several groups. Our major goal is to understand the molecular basis of human prion replication and to develop novel strategies for diagnosis.

Peripheral and Central Protein Biomarkers of Brain MR Activity in Demyelinating Disease

PRINCIPAL INVESTIGATOR: **Staley Brod, M.D.**

By studying patients with new or disappearing brain lesions, it may be possible to identify protein markers that repair damage to the brain and can be used as future therapies. This sub-study is investigating whether specific proteins in the blood and spinal fluid change in the presence of new brain lesions.

Prion Transport Across the Blood-Brain Barrier

PRINCIPAL INVESTIGATOR: **Claudio Soto, Ph.D.**

This project's major goal is to evaluate the mechanism by which prions enter the brain, and in particular the contribution of the blood-brain barrier.

Small-Molecule Beta-sheet Breaker Peptidemimetics for Alzheimer's Therapy

PRINCIPAL INVESTIGATOR: **Claudio Soto, Ph.D.**

This project seeks to identify small chemical molecules mimicking the structure and activity of ß-sheet breaker peptides previously demonstrated to be active in inhibiting and disassembling amyloid fibrils.

NEUROTRAUMA/CRITICAL CARE

Biomarkers for Pain in Spinal Cord Injury

PRINCIPAL INVESTIGATOR: **Gigi Hergenroeder, R.N.**

Investigators in this clinical trial believe that spinal cord injury (SCI) patients who develop chronic pain have biomarkers in their blood that can predict their condition. Patients two or more years post injury, who have been identified as having neuropathic pain or no pain, will be asked to donate blood samples that will be evaluated for biomarkers. The goal of the research is early intervention to prevent the onset of chronic pain.

Combinatory Strategies to Functional Remyelination After Spinal Cord Injury

PRINCIPAL INVESTIGATOR: **Qi Lin Cao, Ph.D.**

Researchers are identifying optimal strategies to genetically modify oligodendrocyte precursor cells prior to transportation to promote remyelination and functional recovery after spinal cord injury (SCI).

Cranioplasty Outcome Following Decompressive Craniectomy

PRINCIPAL INVESTIGATOR: **Mary Ruppe, M.D.**

This multidisciplinary collaborative study is identifying risk factors for bone resorption following decompressive craniectomy in patients with traumatic brain injury (TBI).

North American Clinical Trials Network for the Treatment of Spinal Cord Injury: Spinal Cord Injury Registry

PRINCIPAL INVESTIGATOR: **Michele Johnson, M.D.**

Researchers hope to bring promising therapies for spinal cord injury (SCI) patients from the laboratory to clinical trials in a manner that will provide evidence of effectiveness, with maximum safety, to patients undergoing treatment. This is an observational study charting the natural course of SCI.

Norepinephrine and TBI-Associated Prefrontal Dysfunction - Research Supplement to Promote Diversity in Health-Related Research

PRINCIPAL INVESTIGATOR: **Nobuhide Kobori, M.D.**

The overall goal of the grant is to identify the biochemical and cellular mechanisms underlying prefrontal cortex (PFC) dysfunction following traumatic brain injury.

Novel Neuroprotection Therapeutic Approaches for Spinal Cord Injury

PRINCIPAL INVESTIGATOR: **Qi Lin Cao, Ph.D.**

The goal of this grant is to study the molecular mechanism to regulate the blood-brain barrier of normal adult CNS after SCI, and to identify new therapeutic targets for SCI and other neurological diseases by protecting the blood-brain barrier.

Novel Restorative Therapy for Spinal Injury

PRINCIPAL INVESTIGATOR: **Qi Lin Cao, Ph.D.**

This study is examining the therapeutic potential of ApoE peptides for spinal cord injury.

Project 2-Effects of Erythropoietin on Anemia and Need for Transfusion (a component of the Program Project "Vascular Mechanisms of Secondary Injury after Traumatic Brain Injury")

PRINCIPAL INVESTIGATOR: **Imoigele Aisiku**

This study examines the effects of TBI on cerebral blood flow (CBF) and the effect of erythropoietin in CBF.

OTHER

A Cross-model Synthetic Approach to Eloquent Cortical Regions

PRINCIPAL INVESTIGATOR: **Nitin Tandon, M.D.**

An integrated application of functional MRI, diffusion tensor imaging tractography and intra-cranial electrophysiology to understanding the mechanisms of language production.

Brain Mapping with MEG

PRINCIPAL INVESTIGATOR: **Andrew Papanicolaou, M.D.**

This study is using noninvasive MEG imaging to compare the structure and function of the nervous system of subjects who have developed normally and people with learning disabilities or neurological diseases such as epilepsy, stroke, autism and other disorders.

Cerebrospinal Fluid Specimen Bank

PRINCIPAL INVESTIGATOR: **John William Lindsey, M.D.**

Study researchers are developing a bank of cerebrospinal fluid specimens, collected from patients undergoing lumbar puncture as part of their routine care, to serve as a resource for future research.

Clinical Interventions to Increase Organ Procurement, Nutritional Status and Enteral Absorption Capability After Brain Death

PRINCIPAL INVESTIGATOR: **Gigi Hergenroeder, R.N.**

This study is gathering preliminary data evaluating the effect on donor organ outcome of enteral feeding with immunomodulating nutrition containing omega-3 and omega-6 fatty acids, antioxidants and glutamine.

Clinical Neurobiology of Serotonin and Addiction

PRINCIPAL INVESTIGATOR: **Frederick Moeller, M.D.**

Researchers are examining the relationship between serotonin2 receptor (5-HT2R) function, impulsivity and reaction to certain cues in cocaine-dependent patients and in normal subjects. They are also examining the specific effects of the drugs escitalopram and mirtazapine on impulsivity and reactivity to cues.

Cognitive Activated Functional MRI of the Brain

PRINCIPAL INVESTIGATOR: **Joel Steinberg, M.D.**

The researchers are using a new type of experimental study design, called event-related design, to measure the functional MRI (fMRI) response to individual trials or events, as opposed to the more traditional design that measures the response to blocks of trials or events. Investigators are using event-related fMRI to compare and evaluate memory in schizophrenic patients and normal subjects.

Comparative Analysis of Structural and Functional Characteristics of Language Regions as Measured by Functional Imaging and Invasive Electrophysiology

PRINCIPAL INVESTIGATOR: **Nitin Tandon, M.D.**

Researchers are working to accurately locate regions of the brain involved in the making of language. Functional MRI (fMRI) will be used to detect activity in various regions of the brain during tasks performed by patients with brain tumors or epilepsy, as well as normal subjects. The second part of the study is focused on patients being evaluated for epilepsy surgery. As part of the evaluation, they will undergo electrical brain stimulation using the same safety guidelines as used in standard medical care, to closely study the areas of the brain involved in language, movement and vision.

Evaluation of Oral Administration of ACTH (Corticotropin) in Normal Volunteers: A Pilot Study

PRINCIPAL INVESTIGATOR: **Staley Brod, M.D.**

This clinical trial is evaluating the effectiveness of the drug HP Acthar Gel (ACTH) on the immune system and endocrine glands of normal subjects.

Fronto-Basal-Ganglia Circuits for Selective Stopping and Braking

PRINCIPAL INVESTIGATOR: **Nitin Tandon, M.D.**

This project uses intra-cranial brain recordings and fMRI to understand the dynamics of the brain substrates involved in cognitive control.

Functional Brain Reorganization in Stroke Recovery

PRINCIPAL INVESTIGATOR: **Andrew Papanicolaou, M.D.**

Investigators are using MEG to assess how the brain reorganizes itself during spontaneous recovery from stroke. They are also studying the effects of constraint-induced therapy in the recovery process of language, sensory and movement functions.

Nano-Engineered, Multi-Channel Scaffolds for Axon Regeneration

PRINCIPAL INVESTIGATOR: **Qi Lin Cao, Ph.D.**

Researchers are identifying the optimal nano-scaffolds for axonal growth in vitro.

Chart Review of Patients Who Underwent Craniotomies for Tumor Resection and Epilepsy Surgery

PRINCIPAL INVESTIGATOR: **Nitin Tandon, M.D.**

This retrospective review of patients who have undergone craniotomies will be used to create a database of patients who have previously undergone surgery by the principal investigator for central nervous system tumors or epilepsy.

San Antonio Lupus Study of Neuropsychiatric Disease

PRINCIPAL INVESTIGATOR: **John Reveille, M.D.**

Researchers are gathering information on the functional impact of cognitive dysfunction in patients with systemic lupus erythematosus (SLE) and health-related quality of life measures. Data from this study is highly likely to identify biomarkers or combinations of biomarkers that can be used to identify people at high risk for SLE for treatment trials.

The Neural Substrates of Common and Proper Naming

PRINCIPAL INVESTIGATOR: **Nitin Tandon, M.D.**

This project uses intra-cranial brain recordings to understand the location and interaction between the substrates involved in fluent generation of nouns and verbs, and in their failure to do so, so called “tip-of-tongue” phenomena.

Visual Attention: Interactions and Dissociations Between Reflexive and Voluntary Processes and Neural Substrates of Attention and Orienting

PRINCIPAL INVESTIGATOR: **Anne Sereno, Ph.D.**

Investigators are seeking to understand the neural systems involved in attention and disorders that affect attention. Using patient populations with brain lesions, certain psychiatric or neurodegenerative disorders such as Alzheimer’s disease and Parkinson’s disease, they are examining how damage to specific neural systems affects the processes related to attention.

Selected Publications

Dong Kim

Santiago-Sim, T, Depalma, SR, Ju, KL, McDonough, B, Seidman, CE, Seidman, JG, Kim, DH: Genomewide linkage in a large Caucasian family maps a new locus for intracranial aneurysms to chromosome 13q. Stroke. 40[suppl 1] S57-S60, 2009.

Santiago T, Mathew S, Pannu H, Milewicz DM, Seidman CE, Seidman J, Kim DH: Sequencing of TGF-beta pathway genes in familial dases of intracranial aneurysm (submitted). Stroke. 40:1604-1611, 2009.

Guo DC, Papke CL, Tran-Fadulu V, Regalado ES, Avidan N, Johnson RJ, Kim DH, Pannu H, Willing MC, Sparks E, Pyeritz RE, Singh MN, Dalman RL, Grotta JC, Marian AJ, Boerwinkle EA, Frazier LQ, LeMaire SA, Coselli JS, Estrere AL, Safi HJ, Veeraraghavan S, Munzy DM, Wheeler, DA, Willerson JT. Mutations in smooth muscle alpha-actin (ACTA2) cause coronary artery disease, stroke, and Moyamoya disease, along with thoracic aortic disease. Am J. Hum Genet. 84(5):617-617, 2009. Epub 2009 Apr 30.

Tran-Fadulu V, Pannu H, Kim DH, Vick GW 3rd, Lonsford CM, Lafont AL, Boccaladro C, Smart S, Peterson KL, Hain JZ, Willing MC, Coselli JS, LeMaire SA, Ahn C, Byers PH, Milewicz DM: Analysis of multigenerational families with thoracic aortic aneurysms and dissections due to TGFBR1 or TGFBR2 mutations. J Med Genet. 46(9):607-613, 2009. Epub 2009 June 18.

Xiaoxin Cheng, Yaping Wang, Qian He, Yiyan Zheng, Dong Kim, Scott Whittemore, and Qilin Cao: Astrocytes from the contused spinal cord inhibit oligodendrocyte differentiation of adult OPCs by increasing the expression of bone morphogenetic proteins. J Neuroscience in press.

James Grotta

Hallevi H, Albright KC, Martin-Schild S, Barreto AD, Savitz SI, Escobar MA, Gonzales NR, Noser EA, Illoh K, Grotta JC. Anticoagulation After Cardioembolic Stroke: To Bridge or Not to Bridge? Archives of Neurology 65(9):1169-73, 2008.

Hallevi H, Albright KC, Martin-Schild S, Barreto AD, Grotta JC, Savitz SI. The Complications of Cardioembolic Stroke: Lessons From the VISTA Database. Cerebrovascular Diseases 26(1):38-40, 2008

Martin-Schild S, Hallevi H, Albright KC, Khaja AM, Barreto AD, Gonzales N, Grotta JC, Savitz SI. Aggressive Blood Pressure Lowering before IV tPA treatment for Acute Ischemic Stroke. Archives of Neurology 65(9):1174-8, 2008.

Barreto AD, Albright KC, Hallevi H, Grotta JC, Noser EA, Khaja AM, Shaltoni HM, Gonzales NR, Illoh K, Martin-Schild S, Campbell MS, Weir RU, Savitz SI. Thrombus Burden is Associated with Clinical Outcome After Intra-Arterial Therapy for Acute Ischemic Stroke. Stroke 39:3231-5, 2008.

Martin-Schild S, Baretto AD, Hallevi H, Gonzales NR, Aronowski J, Savitz SI, Grotta JC. Combined Neuroprotective Modalities Coupled with Thrombolysis in Acute Ischemic Stroke: A Pilot Study of Caffeional and Mild Hypothermia. Journal of Stroke and Cerebrovascular Disease 18:86-96, 2009.

Ali M, Atula S, Bath PM, Grotta J, Hacke W, Lyden P, Marler JR, Sacco RL, Lees KR; VISTA investigators. Stroke Outcome in Clinical Trial Patients Deriving From Different Countries. Stroke 40:35-40, 2009.

Martin-Schild S, Albright KC, Hallevi H, Barreto AD, Grotta JC, Savitz SI. Does Study Enrollment Delay Treatment with Intravenous Thrombolytics for Acute Ischemic Stroke? Stroke 40:663, 2009.

Barreto AD, Martin-Schild S, Hallevi H, Morales MM, Abraham, AT, Gonzales, NR, Illoh, K, Grotta, JC, Savitz, SI. Thrombolytic Therapy for Patients Who Wake-up with Stroke. Stroke 40:827-32, 2009.

Hallevi H, Dar NS, Barrreto AD, Morales MM, Martin-Schild S, Abraham AT, Walker KC, Gonzales, NR, Illoh K, Grotta JC, Savitz SI. The IVH score: A Novel Tool for Estimating Intraventricular Hemorrhage Volume: Clinical and Research Implications. Critical Care Medicine 37:969-74, 2009.

Albright KC, Hallevi H, Raman R, Ernstrom K, Martin-Schild S, Meyer BC, Matherne-Meyer D, Grotta JC, Lyden PD, Savitz SI. Can Comprehensive Stroke Centers Erase the “Weekend Effect”? Cerebrovascular Diseases 27:107-13, 2009.

Grotta JC, Barreto AD. Is it Ethical to Have a Placebo Arm in Reperfusion Trials in the 3-6 Hours Time Window – Yes. Stroke 40:1541-2, 2009.

Hallevi H, Barrreto AD, Liebeskind DS, Morales MM, Martin-Schild S, Abraham A, Gadia J, Saver JL, Grotta JC, Savitz SI. Identifying Patients at High Risk for Poor Outcome After Intra Arterial Therapy for Acute Ischemic Stroke. Stroke 40:1780-85, 2009.

Martin-Schild S, Morales M, Khaja AM, Barreto AD, Hallevi H, Abraham A, Sline MR, Grotta JC, Savitz SI. Is the Drip-and-Ship Approach to Delivering Thrombolysis for Acute Ischemic Stroke Safe? J Emergency Med epub ahead of print, March 2009.

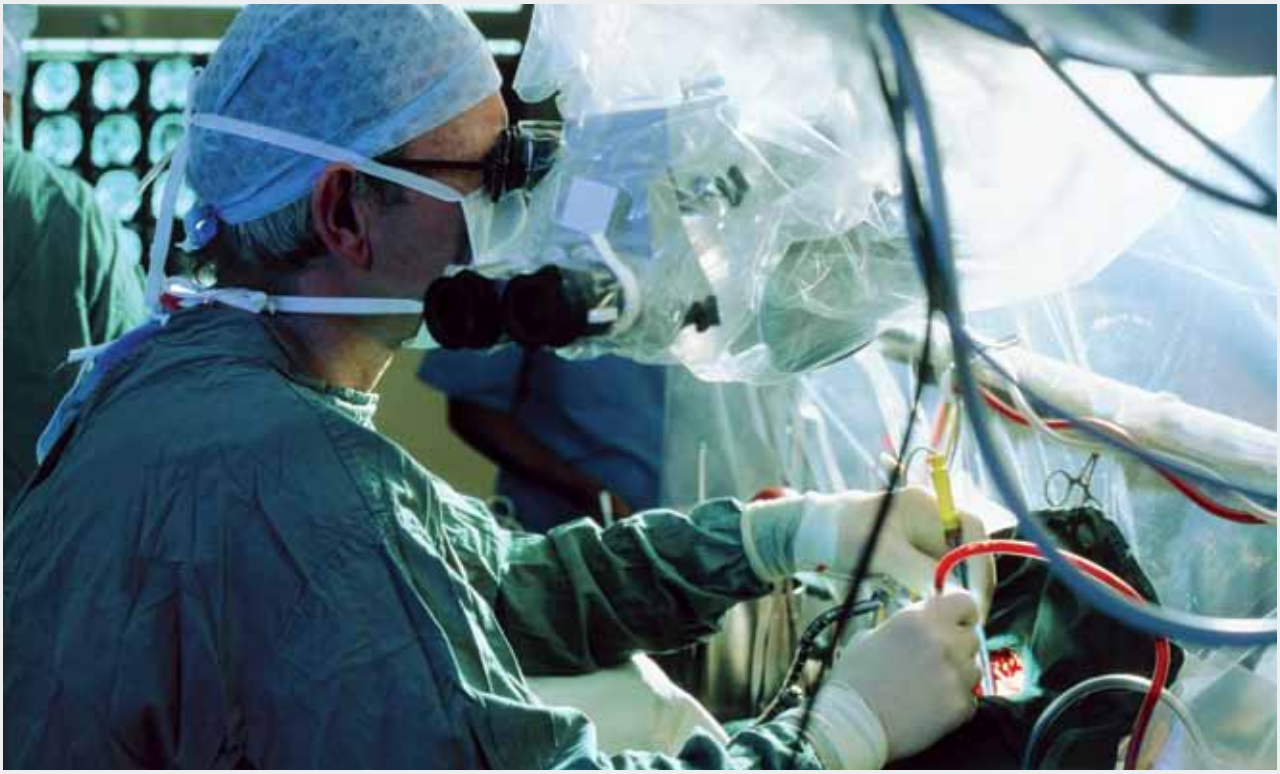
Harting MT, Cox CS, Day MC, Walker P, Gee A, Brenneman MM, Grotta JC, Savitz SI. Bone Marrow-Derived Mononuclear Cell Populations in Pediatric and Adult Patients. Cytotherapy 22:` 1-5, 2009.

Guo DC, Papke CL, Tran-Fadulu V..... Grotta JC(#13 Of 27 authors)..... Milewicz DM. Mutations in Smooth Muscle Alpha-Actin (ACTA2) Cause Diffuse and Diverse Vascular Diseases. Amer J Human Genetics 84:617-27, 2009.

Zhao X, Strong R, Zhang J, Sun G, Tsien J, Cui Z, Grotta J, Aronowski J. Neuronal PPARg Deficiency Increases Susceptibility to Brain Damage After Cerebral Ischemia. J Neuroscience 29:6186-96, 2009.

Saver JL, Gornbein J, Grotta J, Liebeskind D, Lutsep H, Schwamm L, Scott P, Starkman S. Number Needed to Treat to Benefit and to Harm for IV TPA Therapy in the 3-4.5 Hour Window: Joint Outcome Tabel Analysis of the ECASS-3 Trial. Stroke 40:2433-2437, 2009.

Hallevi H, Albright KC, Martin-Schild SB, Barreto AD, Morales MM., Bornstein N, Ifejika NL, Shuaib A, Grotta JC, Savitz SI. Recovery after Ischemic Stroke: Criteria for Good Outcome by Level of Disability at Day 7. Cerebrovasc Dis 28:341-48, 2009.



Staley Brod

KI Rother, RJ Brown, M. Morales, E. Wright, Z. Duan, C Campbell, DM Harlan, PR Orlander, SA Brod. Ingested IFN-Alpha2a Prolongs the 'Honeymoon' Phase in New Onset Type 1 Diabetes Mellitus (T1D) in a phase II Randomized clinical trial (RCT).LATE ABSTRACT ISICR Montreal CA Oct 12-15, 2008.

KI Rother, RJ Brown, M. Morales, E. Wright, Z. Duan, C Campbell, DM Harlan, PR Orlander, SA Brod. Ingested IFN-Alpha2a Prolongs the 'Honeymoon' Phase in New Onset Type 1 Diabetes Mellitus (T1D) in a Phase II Randomized Clinical Trial (RCT). 10th IDS Congress. Malmo, Sweden, May 2009.

Qilin Cao

Titsworth WL, Cheng XX, Ke Y, Deng LX, Burckardt KA, Pendleton C, Liu NK, Shao H, Cao QL, and Xu XM (2009) Differential expression of sPLA2 following spinal cord injury and a functional role for sPLA2-IIA in mediating oligodendrocyte death. Glia 57(14):1521-37.

Arthur L. Day

Hodi FS, Oble DA, Drappatz J, Velazquez EF, Ramaiya N, Ramakrishna N, Day AL, Kruse A, Mac Rae S, Hoos A, Mihm M: CTLA-4 blockade with ipilimumab induces significant clinical benefit in a female with melanoma metastases to the CNS. Nat Clin Pract Oncol 2008 Sep 5; (9) 557-61.

Wang X, Figueroa BE, Stavrovskaya I, Zhang Y, Sirianni A, Zhu S, Day AL, Kristal BS, Friedlander RM: Methazolamide and melatonin inhibit mitochondrial cytochrome c release and are neuroprotective in experimental models of ischemic injury. Stroke 2009 May 40: (5)1877-85.

Cahill K, Chi J, Day AL, Claus E: Prevalence, Complications, and Hospital Charges Associated With Use of Bone-Morphogenetic Proteins in Spinal Fusion Procedures. JAMA 2009 July 1; 302 (1): 58-66.

Day, AL, Du R, Maher, C: Ophthalmic Segment Aneurysms. Vascular Neurosurgery, 2nd Edition, Thieme Medical Publishers, 2008.

Timothy Ellmore

Ellmore, T.M., Stouffer, K., Nadel, L.: Divergence of explicit and implicit processing speed during associative memory retrieval. Brain Research 1229, 155-166, 2008.

Omotola Hope

Hope OA, Zeber JE, Kressin NR, Bokhour BG, Vancott AC, Cramer JA, Amuan ME, Knoefel JE, Pugh MJ: "New-onset geriatric epilepsy care: Race, setting of diagnosis, and choice of antiepileptic drug." Epilepsia. 2009 May;50(5):1085-93. Epub 2008 Nov 17.

Nobuhide Kobori

Hoskison, M.M., Moore, A.N., Hu, B., Orsi, S. Kobori, N., Dash, P.K. Persistent working memory dysfunction following traumatic brain injury: Evidence for a time-dependent mechanism. Neuroscience.159(2):483-91, 2009.

Giridhar Kalamangalam

Kalamangalam GP. Hypergraphia in temporal lobe epilepsy. Ann Indian Acad Neurol. 2009 Jul;12(3):193-4.

Kalamangalam GP, Morris HH 3rd, Mani J, Lachhwani DK, Visweswaran S, Bingaman WM. Noninvasive correlates of subdural grid electrographic outcome. J Clin Neurophysiol. 2009 Oct; 26(5):333-41.

Flavia Nelson

"Hasan KM, Halphen C, Kamali A, Nelson F, Wolinsky JS, Narayana PA. Caudate Nuclei Volume, Diffusion Tensor Metrics, and T2 Relaxation in Healthy Adults and Relapsing-Remitting Multiple Sclerosis Patients: Implications to Understanding Gray Matter Degeneration. J. Magn. Reson. Imaging 2009; 29: 70-77.

Teresa Santiago-Sim

Santiago-Sim T, DePalma SR, Ju KL, McDonough B, Seidman CE, Seidman JG, Kim DH. Genomewide Linkage in a Large Caucasian Family Maps a New Locus for Intracranial Aneurysms to Chromosome 13q. Stroke. 40:S57-S60, 2009.

Santiago-Sim T, Mathew-Joseph S, Pannu H. Milewicz DM, Seidman CE, Seidman JG, Kim DH. Sequencing of TGF-beta pathway genes in familial cases of intracranial aneurysm. Stroke. 40:1604-1611, 2009.

Mya Schiess

Dinh K, Poindexter BJ, Barnes JL, Schiess MC, Bick R. Fluorescence Microscopy and 3D image reconstruction of cytokine initiated disruption of the Parkinson disease associated proteins alpha-synuclein,tau and ubiquitin in cultured glial cells. Cytokine, 45, 2009, 179-183.

Yaltho T, Schiess MC, Furr Stimming E, Acute bilateral basal ganglia lesions and chorea in a diabetic-uremic patient: Clinical Imaging Correlation. Archives of Neurology, in press, 2009.

Kazim Sheikh

Zhang J, Jones M, Deboy C, Reich D, Farrell J, Hoffman P, Griffin J, Sheikh K, Miller M, Mori S, Calabresi P. Diffusion Tensor Magnetic Resonance Imaging of Wallerian Degeneration in Rat Spinal Cord after Dorsal Root Axotomy. J Neurosci 2009 29: 3160-71.

Jeremy Slater

Slater JD. A definition of drowsiness: one purpose for sleep? Med Hypotheses. 2008 Nov;71(5):641-4. Epub 2008 Aug 19.

Nitin Tandon

Tandon N, Alexopoulos AV, Warbel A, Najm IM, Bingaman WE. Occipital Epilepsy: spatial categorization and surgical management. Journal of Neurosurgery 110(2) Feb 2009.

Ellmore TM, Beauchamp MS, O'Neill TJ, Dreyer SE, Tandon N. Relationships between Essential Cortical Language Sites and Subcortical Pathways: Journal of Neurosurgery. 111:755–766, Oct 2009

Swann N, Tandon N, Canolty R, Ellmore TE, McEvoy L, Dreyer SE, DiSano M, Aron AR - Intracranial EEG reveals time-specific and frequency-

specific role for right inferior frontal gyrus and primary motor cortex in stopping initiated responses. Journal of Neuroscience • 29(40): 12675–12685, October 7, 2009

Jerry Wolinsky

Cofield SS, Cutter GR, Lublin F, Wolinsky J, Conwit R (2008) Variability in the EDSS: What does it mean for progression? Neurology 70(S1):A213.

Conwit R, Cofield SS, Cutter GR, Wolinsky J, Lublin F (2008) The modified Rankin Score, EDSS and MRI measures using CombiRx baseline assessments.Neurology 70(S1):A270.

Wolinsky J (2008) Clinical trial design: the present and future. Multiple Sclerosis 14:S22.

Ford C, Johnson K, Kachuck N, Lindsey JW, Lisak RP, Luzzio C, Myers L, Panitch, H, Preiningerova J, Pruitt A, Rose JW, Rus H, Wolinsky J, for Copaxone Study Group Continuous long-term immunomodulatory therapy in relapsing multiple sclerosis: results from the 15-year analysis of the US prospective open-label study of glatiramer acetate. Multiple Sclerosis 14:S41-42.

Cofield SS, Jenkins TM, Conwit R, Cutter G, Wolinsky J, Lublin F (2008) Optic neuritis and contrast letter acuity at baseline in CombiRx. Multiple Sclerosis 14:S62.

Cofield SS, Cutter G, Conwit R, Wolinsky J, Lublin F (2008) Race, ethnicity, country of origin and infections in CombiRx. Multiple Sclerosis 14:S62.

O'Connor P, Confavreux C, Comi G, Kappos L, Wolinsky J , Olsson TP, Miller A,Freedman MS, for TEMSO investigator study group (2008) Oral teriflunomide in patients with relapsing MS: baseline clinical features of patients in the TEMSO phase III trial. Multiple Sclerosis 14:85.

Nelson F, Perez FI, Morales M, Narayana PA, Wolinsky J (2008) Intracortical lesion detection by advanced magnetic resonance imaging and correlation with cognitive impairment related to multiple sclerosis. Multiple Sclerosis 14:S297-298.

Chin P, Waubant E, Cutter G, Wolinsky J , Hawker K, Zhang J, Smith C (2009) Baseline Expanded Disability Status Score (EDSS) Variation in a randomized controlled trial in primary progressive (PP) MS. Neurology 72(S3):A84.

Fred Lublin, Stacey S. Cofield, Gary R. Cutter, Robin Conwit, Ponnada Narayana, Flavia Nelson and Jerry Wolinsky. The Combi-Rx Cohort at baseline with clinical and MRI differences by diagnostic criteria. Neurology 2009, 72 (11) A255.

Traboulsee A, Stone L, Simon J, Wolinsky J, O'Connor P, Radue E-W, Li D (2009) Consortium of Multiple Sclerosis Centers (CMSC) guidelines for a standardized MRI protocol for the diagnosis and follow-up of multiple sclerosis: 2008 Revision. Neurology 72(S3):A141-2.

Nelson F, Morales M, Gaurav P, Perez F, Narayana PA, Wolinsky J (2009) Intracortical lesion detection by advanced MRI techniques and correlation with MS related cognitive impairment. Neurology 72(S3):A140.

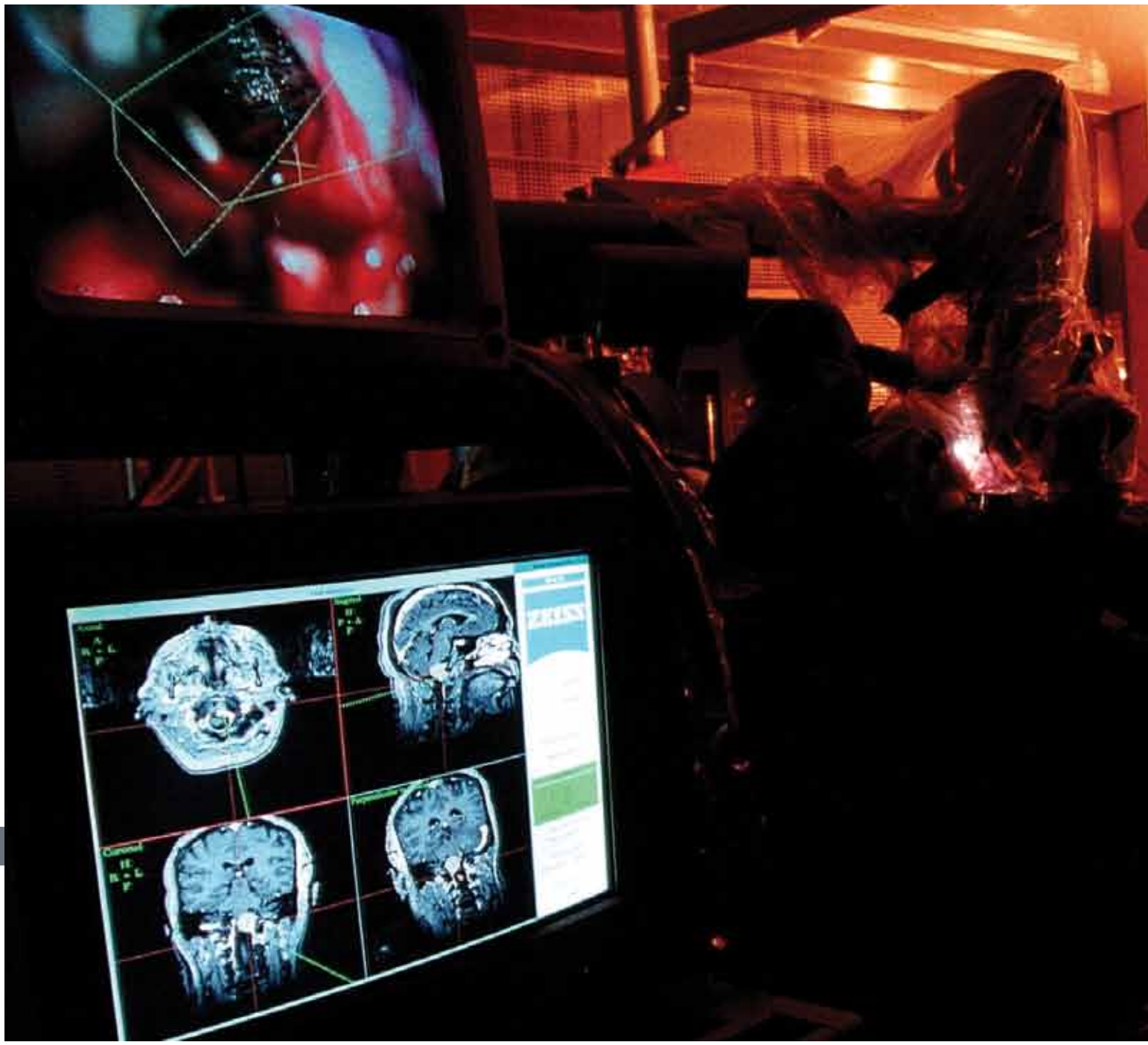
Frank Yatsu

Halkes PHA, Gray LJ, Bath PMW, Bousser M-G, Diener H-C, Guiraud-Chaumeil B, Yatsu FM, Algra A. Dipyridamole plus aspirin alone in secondary prevention after TIA: a meta-analysis by risk. J. Neurol. Neurosurg. Psych. 2008; 79: 1218-1228

Nichols FT, Shaltoni HM, Yatsu FM. A cerebrovascular perspective of atherosclerosis. Handbook of Clinic Neurology 2008; 92:215-238

Xiurong Zhao

X Zhao, JC Grotta, N Gonzales, J Aronowski. Princeton Conference: Hematoma resolution as a therapeutic target: the role of microglia/ macrophages. Stroke 40, S92-S94, 2009.



Patient Stories

Deep Brain Stimulation Offers a Young Patient a Life-Changing Option for Early-Onset Idiopathic Parkinson's Disease

Based on low complication rates and outstanding outcomes, Dr. Mya Schiess and her colleagues at Mischer Neuroscience Institute and UT MOVE advocate for early use of deep brain stimulation in appropriate patients.

A little more than 10 years ago, when Jonathan Van Pelt was in his late twenties, he developed a twitch in his head and arm that manifested during periods of stress. The twitch led to his first visit to a neurologist and a diagnosis of left temporal lobe epilepsy.

"I was prescribed Lamictal® and Dilantin® but the medications only made matters worse. I became moody and cried at TV commercials," Van Pelt says with a laugh. "About that time the Internet was starting to become a useful tool for information, and there was a lot of talk about Parkinson's disease (PD) when Michael J. Fox announced he had it. I read several magazine articles, stopped taking Lamictal and started seeing other neurologists in search of a diagnosis."

It was a difficult time for the Van Pelts. "My wife and I were young and scared, and we didn't know what was happening to me," he says. "We had two young kids and no answers, and I was getting worse. I'd been an athlete in high school and was in good shape, so I didn't understand why I was getting so fatigued."

When he consulted a second neurologist, the doctor told Van Pelt he didn't think he had epilepsy but also said he couldn't diagnose the problem. By the time he saw his third neurologist, Van Pelt's tremor had worsened, his right arm was stiffened toward his body and he was having trouble walking. "I remember the doctor saying, 'I don't know what you've been told but you present like you have Parkinson's disease. It's really unusual for a 30 year old although it's not unheard of.' He prescribed carbidopa-levodopa and told me that if I responded to the drug, it was a clear indication that I had Parkinson's. I responded almost immediately. I felt like I was 10 feet tall and bullet proof."


We had two young kids and no answers, and I was getting worse. I'd been an athlete in high school and was in good shape, so I didn't understand why I was getting so fatigued.

Based on his response to the drug, Van Pelt's neurologist told him he had good news and bad news. "The good news was that I had responded to the Sinemet®. The bad news was that he had to take it away," he says. "Carbidopa-levodopa is the silver bullet for Parkinson's but he wouldn't prescribe it because of my age. Most patients get only 10 good years from the drug."

He also told Van Pelt that he needed a lifelong doctor and gave him the names of two specialists, one of whom was neurologist Mya Schiess, M.D., who is professor and vice chair of the department of Neurology and holds the Adriana Blood Endowed Chair at The University of Texas Medical School at Houston. Dr. Schiess is affiliated with the Mischer Neuroscience Institute at Memorial Hermann and is also the director of UT MOVE, a program focused on clinical care, education and basic science research on the neurological conditions of motor systems disruption, including movement disorders, cerebral palsy, spasticity, neurodegenerative diseases and dementias.

Van Pelt made an appointment with the other specialist, and five years would pass before he met Dr. Schiess at a meeting of the Houston Area Parkinson's Society (HAPS). During those years, he sampled the full range of available agonists and participated in a clinical trial that was stopped two years after his enrollment.

"Each time we started a new medication, I was fine but the higher the dosage, the worse I felt," he says. "To sum it up, I was taking medications that helped me somewhat with my symptoms and improved my motor skills but I felt like I had the flu all the time. It started to become a question of whether the side effects outweighed the benefits of the medication. When I met Dr. Schiess, I liked what she said to me about her approach to treating Parkinson's disease, so I made an appointment."

"At the UT MOVE clinic, we had Jonathan maximized and optimized on medical management but before he got into severe trouble with motor fluctuations, we talked with him about deep brain stimulation (DBS)," Dr. Schiess says. "Many neurologists won't consider intervention with DBS until Parkinson's disease is more advanced than we might like to see at the Mischer Neuroscience Institute. We consider the procedure right up front because we know that it delivers. When done correctly with appropriate patients, it's just as good, if not better than medical management of Parkinson's disease. We're very comfortable with the procedure and work closely with the neurosurgeons. We have a phenomenally low complication rate and good outcomes. We're also very good DBS programmers. Why wait until a patient is debilitated to offer an option that we know will work?"

In March 2008 at the age of 39, Van Pelt underwent testing to determine whether he was a candidate for DBS. "One of the indications for the potential success of DBS is a sustained and robust effect of levodopa, the biologically active precursor to the neurotransmitter dopamine, which is used to increase brain concentrations in patients with Parkinson's disease," Dr. Schiess says.

"The primary transmitter is low in patients with PD. If you take patients off levodopa for 12 hours and evaluate fine motor skills, postural ability, muscle tone and the presence or absence of tremors using the Unified Parkinson's Disease Rating Scale (UPDRS), then reevaluate them while they're on their medication, a high rate of improvement is proof positive that the patient will respond to DBS." Van Pelt showed a 68 percent improvement on the UPDRS between his off- and on-medication states.

In November and December 2008, Van Pelt's two deep brain stimulators, which target the subthalamic nucleus, were implanted by Richard Simpson, M.D., a neurosurgeon affiliated with Memorial Hermann-Texas Medical Center. "He's now more than one year out from the surgery and with his current DBS stimulation settings and very slimmed-down medication regimen, he has control over all the motor symptoms of his disease with no fluctuations," Dr. Schiess says. "This is a 40-year-old man with no difficulty with his motor function, who does a full day's work, and more and is very involved with his family life. He is functioning 100 percent."

Van Pelt, who is pleased with the outcome, describes Dr. Schiess as "a great doctor who's not afraid to think outside the box. When you have a condition you have to live with, you really have to be your own advocate," he says. "You have to make decisions in life that aren't always easy. Having someone there to play devil's advocate and say, 'Yes, you can do that, but then this will happen' is very important. That's the role Dr. Schiess has played for me. It's a good partnership."

Parkinson's is a very treatable disease, which makes staying positive important, Dr. Schiess says. "We encourage our patients to stay mentally and physically active and have fun. We also emphasize education because people do much better when they understand their disease. We consider the whole person, so we always keep an eye out for anxiety, disrupted sleep, depression, problems with concentration or forgetfulness – and take these things into consideration as we develop and adjust our treatment plans."

Van Pelt has made a personal commitment to maintaining a positive perspective. "As a parent, I can make a big difference in my kids' experience of my disease," he says. "My kids are so funny, and when I crack jokes on my bad days, they laugh and tell me I'm inappropriate. But if you can't laugh at yourself, who can you laugh at? I used to get upset at work when I was first diagnosed. Now I feel like it's all about keeping things as simple as possible. Life is a gift to enjoy while it's here. I plan on living it to the fullest."

Resective Surgery for Refractory Epilepsy Opens Doors for Carrie Tackett

A young Houston woman benefits from the full suite of diagnostic tools in Memorial Hermann's Epilepsy Monitoring Unit and the Texas Comprehensive Epilepsy Program's track record of successful resective surgery in lesional and non-lesional patients.

When Carrie Tackett was 3, she lived through every mother's nightmare. She fell out of a grocery cart, hit her head and was hospitalized with a severe concussion. "I was in a deep sleep for a couple of days. The doctors told my parents I seemed fine, but they also alerted them that there might be repercussions in the future," Tackett says.

On Easter Sunday in 1996, during her freshman year in college, Tackett had her first grand mal seizure. Testing revealed that the seizure activity was originating from her right frontal lobe, the site of her earlier head injury. She was prescribed anti-seizure medications, which worked initially.

Two years later, during her junior year she had another grand mal seizure, an isolated event. "By 1999, I was taking carbamazepine and doing well," she says.

"My neurologist suggested that we might want to consider trying to wean me off my medication eventually. I took things into my own hands – a crazy idea – and tried decreasing the dose myself and had a seizure. I went back on carbamazepine and things were fine for a few more years."

Tackett married in August 2000 and had her first child, a son, in January 2002. The following year, while living in St. Louis and pregnant with her second child, her seizures recurred, manifesting as staring episodes and blanking-out spells. "My neurologist told me that I couldn't drive. Shortly afterwards, we found out our son had trisomy 18. He passed away in December 2004, soon after birth. My staring spells continued, and so my neurologist increased the dosage of my medications. But it didn't have any effect."


There would be no way
we'd have considered trying
to get pregnant again had
my seizures continued.
So I can say that my surgery
has been life altering.
We feel very, very grateful.

In April 2005, the Tacketts moved to Houston. Her new neurologist changed her medications, and after living six months seizure-free, she had permission to drive again. “Then a few months later, I began having complex partial seizures and switched to another neurologist, who started tacking on more medications to my treatment regimen,” she says. “By September 2007, I was still having seizures and was fed up and ready to try another neurologist, when my doctor told me she’d like to refer me to the Epilepsy Monitoring Unit (EMU) at Memorial Hermann-Texas Medical Center. She thought I might be a good candidate for resective surgery.”

Tackett spent seven days in the EMU undergoing Phase 1 testing conducted by epileptologist Jeremy Slater, M.D., director of the Texas Comprehensive Epilepsy Program, which staffs the EMU, and an associate professor of neurology at The University of Texas Medical School at Houston. “On average we like to record at least four or five typical events on video EEG monitoring,” Dr. Slater says. “Sometimes we have to make a decision about whether the patient is a good candidate for surgery based on fewer seizures, but we want to feel that we’ve captured the event they’re concerned about. We may also find seizures they haven’t described, originating from a different area of the brain.”

A 3-Tesla MRI scan of Tackett’s brain using imaging protocols specifically designed to localize epileptic foci produced results consistent with her video EEG findings: a focal defect in the right frontal lobe. Magnetoencephalography (MEG), which maps neurological function and localizes epileptic spike discharges by tracking tiny changes in brain magnetic fields, revealed spikes in the cortex around the affected area.

“Research, some of which has been conducted at the Mischer Neuroscience Institute and UT Medical School, has shown MEG to be reliable at helping to locate the source of seizures and possibly minimizing operative risk by defining the regions of the brain critical to speech and motor function,” Dr. Slater says. “If we can find a focal area with MEG, the odds are good that the seizures are originating there. When video EEG, MRI and MEG all point to the same epileptogenic zone, we’ve amassed some very strong evidence.”

Tackett met with neurosurgeon Nitin Tandon, M.D., an assistant professor of neurosurgery at the UT Medical School, to discuss surgery. “Given all the concordant data from her noninvasive studies, Carrie was an excellent candidate for epilepsy surgery,” Dr. Tandon says. “Her MRI suggested an area of gliosis in the basal frontal region. We thought she would do well.”

Phase 2 electrocorticographic testing and surgery were scheduled for January 2008. In the interim, she underwent a functional MRI scan to localize eloquent cortex.

“So, prior to Phase 2 testing, we already had a great deal of information from MEG and functional MRI about parts of the brain that are critical for function,” Dr. Slater says. “The more information you have, the better off the patient will be following surgery. We don’t want to remove any more of the brain than is absolutely necessary. Having all of these diagnostic tools available has contributed to our track record of successful resective surgery in lesional and non-lesional patients.”

On January 15, 2008, Tackett was admitted to Memorial Hermann-TMC for surgery. She was less concerned about the surgery than about having her long hair shaved before the procedure. To show their support, her husband Sean and 7-year-old son J. T. also shaved their heads.

Later that morning, Dr. Tandon placed subdural grid electrodes over the right hemisphere of Tackett's brain to record electrical activity from the cortex. A week later, she was back in the operating room to have the electrodes removed and undergo resection of the epileptic focus in her right orbital-frontal cortex.

"This region of the brain sometimes masquerades as the temporal lobe, producing the same kind of seizure," says Dr. Tandon, who is engaged in research on orbital-frontal epilepsy and has seen more patients whose seizures originate in this area of the brain than many contemporary neurosurgeons.

Tackett was discharged from the hospital three days later. "My recuperation went quickly," she says. "The doctors did a good job of preparing me for what to expect, and the nurses were great. We have nothing but the utmost respect for Dr. Slater and Dr. Tandon. I bombarded both of them with questions and they took the time to answer all of them. We really appreciated that. It made the decision to go forward with the surgery so easy for us."

"At the end of the day, it's miraculous to me that patients undergo a procedure in which we remove a portion of their brain, and they come out of anesthesia and are fine," Dr. Slater says. "Carrie is a very gratifying success. She had a more complicated type of epilepsy that required testing with implanted electrodes. Since the surgery, she's been seizure free on a single medication. We feel we achieved our target outcome."

"The challenge in all epilepsy surgery is to eliminate the epilepsy without affecting normal function," Dr. Tandon says. "We work to optimize our outcomes for all our patients through precise functional localization and functional preservation. Carrie is an excellent example of the success of our approach to resective surgery."

When Tackett saw Dr. Slater for her annual follow-up in July 2009, she was 13 weeks pregnant. Her simplified medical regimen and freedom from seizures improves the likelihood that her pregnancy will be normal.

"I'm due in January and doing fine," says Tackett, who is now 33. "I can't say enough about the people at Memorial Hermann and UT. There would be no way we'd have considered trying to get pregnant again had my seizures continued. So I can say that my surgery has been life altering. We feel very, very grateful."

The Joseph Santos Story

A surgical cure for an inoperable patient.

Joseph Santos celebrated his 23rd birthday on February 25, 2008. It's just short of a miracle that he's still alive. Diagnosed in 1998 with a giant right parietooccipital arteriovenous malformation, Santos had been told by three neurosurgeons – two in Houston and one near his home in San Antonio – that his AVM was inoperable.

Untreated AVMs can hemorrhage over time. In the 10 years that followed his diagnosis, Santos underwent serial glue embolizations at another hospital in Houston to prevent the abnormal blood vessels from rupturing. During an embolization, an interventional neuroradiologist threads a catheter through a small incision in the groin to the site of the AVM. Various materials, including glue, may be injected into the blood vessels to close them in an attempt to prevent hemorrhage. But embolization alone is usually ineffective and should be accompanied by resection of the AVM by a surgeon.

On November 21, 2007, despite the embolizations, Santos' AVM ruptured. "It was the day before Thanksgiving," recalls his mother, Karen Walls. "We drove him to the ER at a hospital in San Antonio. The doctor who examined Joseph told us that, normally, people who have this kind of rupture are dead. He called every hospital in San Antonio, but no one had a neurosurgeon capable of treating the AVM. One of the last ERs he called recommended Dr. Dong Kim."

Santos was transported by air ambulance from San Antonio to Memorial Hermann-Texas Medical Center, arriving at 1:30 a.m., comatose and paralyzed on the left side. By the time his parents drove in two hours later, he'd been stabilized. Dong H. Kim, M.D., had placed an emergency ventriculostomy and Santos' neurological status improved slowly to the point that he could follow commands.

> I looked at the AVM very carefully and felt that it was resectable," Dr. Kim says. "It was a high-risk situation but I also felt that, given the traumatic nature of the rupture, we had to move forward with the surgery to prevent future hemorrhages.

"I looked at the AVM very carefully and felt that it was resectable," Dr. Kim says. "It was a high-risk situation, but I also felt that given the traumatic nature of the rupture we had to move forward with the surgery to prevent future hemorrhages."

"Dr. Kim discussed the risks and benefits of surgery with us," says Karen Walls. "After having been told by other neurosurgeons that Joseph's AVM was inoperable, I was surprised and I have to admit kind of leery. But Dr. Kim told us he'd trained extensively for this specific kind of surgery, so we decided to go forward with it."

During the following week and a half, interventional radiologist Shuichi Suzuki, M.D., a member of Dr. Kim's neurosurgical team and an assistant professor in the department of Radiology at the UT Medical School, performed preoperative embolizations to reduce surgical risk. On December 6, Santos was wheeled into the OR at 8:30 a.m. to be prepped for what would turn out to be a 24-hour procedure. After placement of a sheath for intraoperative angiography and connection of EEG and other key monitoring equipment, Dr. Kim made a large occipitoparietal craniotomy in two pieces, spanning the superior sagittal sinus, using microdissection techniques performed with an operating microscope.

He began by dissecting along the lateral margin of the AVM, away from the majority of the vessels feeding into it. Next, he went in superiorly, dissecting and coagulating the ACA and MCA feeders and detaching them from the AVM. From there, he proceeded more medially, entering the clot cavity to remove a large portion of the intracranial hemorrhage. For each part, Dr. Kim had to individually identify tiny arteries connected to the AVM, then individually disconnect them so that the lesion could be removed safely.

"Once the superior margin was done, I was able to come across the medial margin to disconnect the feeders from the posterior cerebral artery," Dr. Kim says. "Finally, we began the medial dissection deep around the AVM." Once he had 90 percent of the AVM dissected, he disconnected it from its main venous drainage to work around the last remaining remnants. A final intraoperative angiogram showed complete resection.

"We were discharged on the 21st of December," Walls says. "It was my birthday, and I remember telling Dr. Kim that it was the best birthday present I'd ever had."

Santos was transferred home to San Antonio for inpatient rehabilitation. He was discharged on New Year's Eve and began outpatient rehabilitation on January 7.

"He's doing very well," Walls says. "In addition to his outpatient therapy, we've been working with Joseph at home. He's just beginning to walk around our house without his walker. We have 14 steps, and he can climb with minimal assistance and walk down as well. In a short time, he's gone from being paralyzed on the left side to walking. His rehab team is amazed."

"Joseph's prognosis is good," Dr. Kim says. "He's cured of the AVM and getting over the effects of the hemorrhage. Every year that a patient lives with an AVM, there's a 4 percent chance that it will rupture. Over the 10 years that passed between Joseph's diagnosis and the resection, his chance of rupture had been 40 percent. He's a young man with a life ahead of him. Had we prevented the hemorrhage in the first place, he wouldn't have had to overcome paralysis with a long course of rehab. It's our goal to prevent stories like this from happening by diagnosing AVMs early and removing them before they cause devastating damage."

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