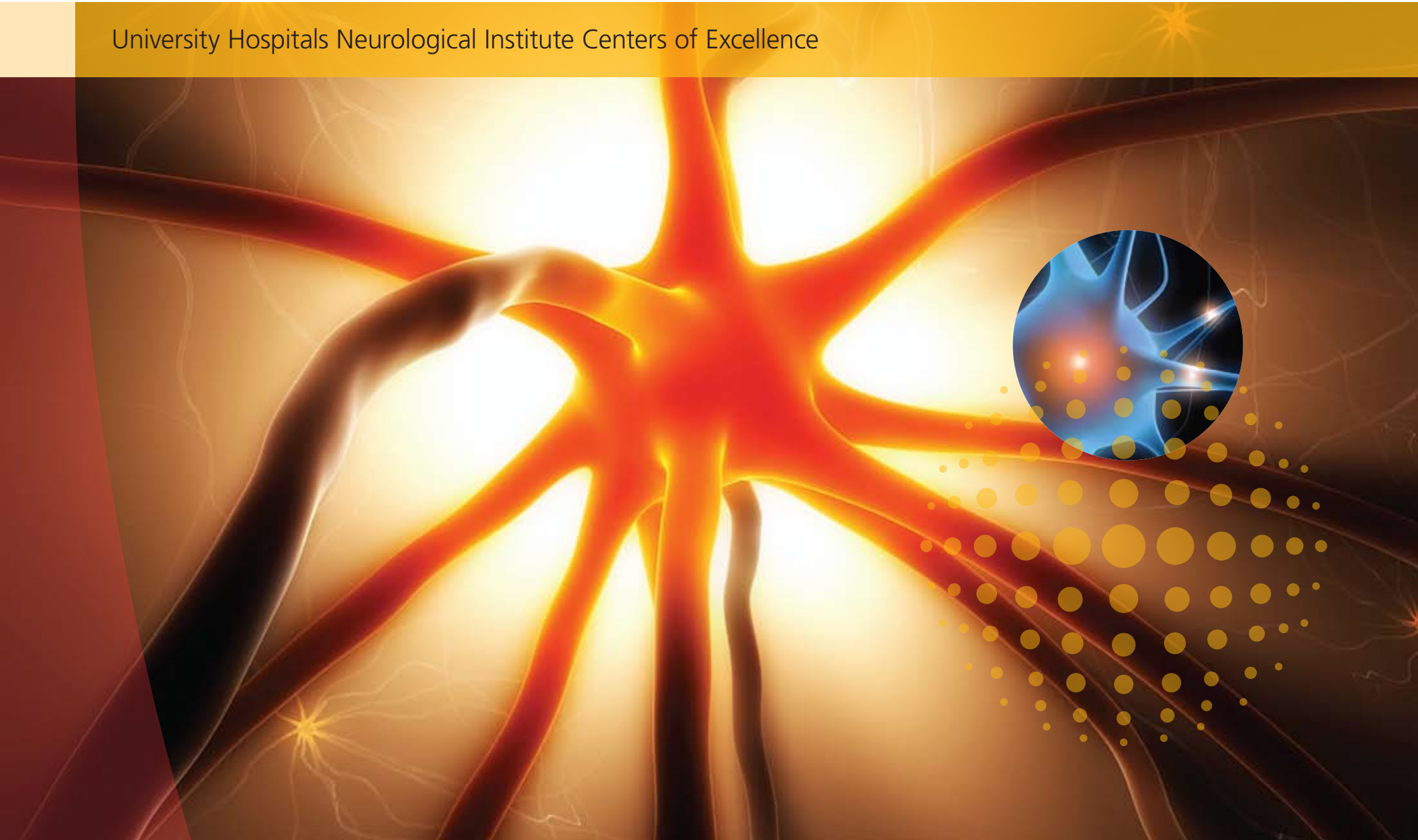


University Hospitals Neurological Institute Centers of Excellence



# UH NEUROLOGICAL INSTITUTE CENTERS OF EXCELLENCE

The UH Neurological Institute includes 14 Centers of Expertise with programs designed to support clinical services and treat a broad variety of neurological diseases and disorders.

Brain Tumor and Neuro-Oncology Center

Epilepsy Center

General Neurology Center

Memory and Cognition Center

Minimally Invasive Neurosurgery Center

Movement Disorders Center

Neurocritical Care Center

Neuromuscular Center

Neuropsychiatry Center

Neuroscience Nursing Practice Center

Rainbow Neurological Center

Spinal Neurosurgery Center

Stroke and Cerebrovascular Center

Translational Neurosciences Center

## Health System Approach

University Hospitals (UH) Neurological Institute is the first fully integrated multidisciplinary institute in Northeast Ohio dedicated to improving outcomes in patients with diseases of the nervous system. With a team of more than 100 specialists representing some of the country's foremost experts in neurology, neurosurgery, neuropsychiatry, neuroradiology, neuro-oncology, neuro-ophthalmology, neurotology, and related medical and surgical specialties, the UH Neurological Institute is dedicated to advancing the philosophy of the interdisciplinary approach to highly individualized therapies.

Currently, the UH Neurological Institute offers access for all of our system wide locations to treatment options using advanced technology such as neurostimulators for movement disorders, invasive monitoring and magnetoencephalography for epilepsy, epilepsy surgical options, minimally invasive spine surgery and artificial disc replacement, image guided neurosurgery, and endovascular therapy. All sites have access to leading-edge stereotactic radiosurgery services, including Gamma Knife and CyberKnife® therapy.

## OUR MISSION

**TO HEAL**

WITH COMPASSIONATE, LEADING-EDGE CARE

**TO TEACH**

FUTURE GENERATIONS OF CLINICIANS & SCIENTISTS

**TO DISCOVER**

NOVEL TREATMENTS & BEST PRACTICES

## National Recognition

**The expertise and quality outcomes within the University Hospitals Neurological Institute are recognized nationwide:**

- First in North America to perform deep brain stimulation of the thalamus to successfully treat symptoms of Tourette syndrome
- First in the world to test the diaphragm pacing stimulation system on patients with amyotrophic lateral sclerosis (ALS)
- One of only 25 centers in the United States offering surgical therapy for dystonia, and the region's only provider of pterygoid botox injections for treatment of movement disorders
- Neuroscience Intensive Care Unit is one of only 25 centers in the nation offering fellowships in neurocritical care
- University Health System Consortium: University Hospitals Case Medical Center Neurosurgery mortality ranked third out of 120 academic medical centers (July 2005 – June 2006)
- National Association of Epilepsy Centers: UH Neurological Institute's Epilepsy Center given highest designation as a Level IV Epilepsy Center
- The Joint Commission — Certified Primary Stroke Center (the highest available designation)
- Brain Attack Coalition — Comprehensive Stroke Center
- American Heart Association: Annual Performance Achievement Award for Stroke
- Thomson 100 Top Hospitals (formerly Solucient): University Hospitals Case Medical Center — the only major teaching hospital in Ohio to be recognized
- Received Beacon Award for care of medical intensive care patients
- Leapfrog Top 50 Hospitals
- Magnet Status for Nursing
- One of Ohio's first physician-led Brain Attack programs — now one of the largest in the nation and available 24 / 7 for emergency transfers
- Stereotactic Radiosurgery suite — first in Ohio to offer both Gamma Knife and CyberKnife® technology to treat patients

## Novel Research

In addition to providing state-of-the-art care for patients with neurologic disease, the UH Neurological Institute educates medical students, neurology residents and fellows in neurology subspecialties. There are more than 96 research protocols under way in basic and clinical neurosciences with research funding of over \$18.7 million directed at understanding diseases of the nervous system and developing new treatments based on that knowledge. This includes research for technological options in diseases such as Tourette syndrome and depression, and in procedures such as minimally invasive spine surgery and the convection-enhanced delivery of chemotherapeutic agents. Our partner institution, Case Western Reserve University School of Medicine, continues to have one of the top NIH-funded neuroscience departments in the country.

## Physician Advice Line

The UH Neurological Institute offers a Physician Advice Line — a free advice help line that provides decision-making assistance to physicians seeking clinical expertise. We provide advice on neurological problems from simple to complex, and information on the latest diagnostics and treatments. Simply call **216-844-1001** to consult by phone with one of University Hospitals Case Medical Center's neurological or neurosurgical experts.

## Streamlined Referrals

The UH Neurological Institute's coordinated scheduling system makes it more convenient for referring doctors and patients to schedule appointments with multiple specialists in a timely manner. **We offer a second opinion with a center specialist within 48 hours and specific staff referrals within one week.** The UH Neurological Institute strives to maintain active partnerships with referring physicians during all stages of patient care. The model for interaction with physicians who refer to the UH Neurological Institute emphasizes communication and mutual respect. We ensure continuity of care from referring physician to specialist, we provide prompt communication after each patient visit and carefully coordinated perioperative management.

## ➔ Brain Tumor and Neuro-Oncology Center

Hallmarks of the UH Neurological Institute's Brain Tumor and Neuro-Oncology Center include experience, expertise, technical abilities and the resources of recognized authorities in the field. The Brain Tumor and Neuro-Oncology Center seamlessly collaborates with University Hospitals world-renowned main campus facilities, Ireland Cancer Center and Rainbow Babies & Children's Hospital, one of the top five children's hospitals in the nation.

### INTERDISCIPLINARY CARE TEAM

The Brain Tumor and Neuro-Oncology Center staff takes a very aggressive, proactive approach to caring for patients. An expert panel of neurologists, neurosurgeons, medical oncologists, radiation oncologists, radiologists and brain tumor neuropathologists reviews each case and then collaborates to recommend a treatment plan. Daily interactions of this multi-disciplinary team, combined with the most current treatment protocols, facilitate rapid response to individual therapeutic needs and allow appropriate modifications to be made without delay. This approach to managing cases has more than doubled survival rates and has improved quality of life for thousands of people with brain tumors.

DAILY INTERACTIONS AMONG MULTI-DISCIPLINARY TEAM MEMBERS,  
COMBINED WITH THE MOST CURRENT TREATMENT PROTOCOLS,  
FACILITATE RAPID RESPONSE TO INDIVIDUAL THERAPEUTIC NEEDS  
AND MODIFICATIONS AS NECESSARY.



### CONDITIONS WE TREAT

The Brain Tumor and Neuro-Oncology Center sees adult and pediatric patients with both benign and malignant tumors including:

- Gliomas
- Glioblastoma
- Astrocytomas
- Ependymomas
- Oligodendrogliomas
- Mixed gliomas
- Brain stem gliomas
- Meningiomas
- Optic nerve gliomas
- Acoustic neuromas
- Certain skull-based tumors
- Medulloblastomas



**CLINICAL PROGRAMS**

- **Benign Brain Tumor:** Incorporates minimally invasive and image-guided approaches for the treatment of benign brain tumors and makes use of endoscopic and radiosurgical techniques.
- **Malignant Brain Tumor:** Actively pursues innovative therapies for the treatment of malignant brain tumors and has markedly expanded its clinical trial offerings. Patients have the opportunity to participate in trials investigating brain tumor etiology and outcome as well as therapeutic trials utilizing novel imaging and surgical techniques, intra-operative MRI, innovative tumor vaccines, cellular therapy, immunotoxins, novel methods of drug delivery and advanced chemotherapy.
- **Metastatic Brain Tumor:** Uses advanced and radiosurgical techniques, radiation and advanced imaging to manage patients with metastatic disease of the brain. Minimally invasive, image-guided surgical techniques and stereotactic radiosurgery optimize outcomes and minimize risks.
- **Skull Base Surgery:** Comprised of a multidisciplinary team of neurosurgeons, head and neck surgeons and otologists to treat skull base disorders using minimally invasive, image-guided and radiosurgical techniques. New approaches are devised and perfected in the skull base laboratory.
- **Stereotactic Radiosurgery:** A multidisciplinary team of neurosurgeons and radiation oncologists use Gamma Knife to successfully treat benign and malignant lesions of the brain, arteriovenous malformations (AVMs), facial pain disorders and other diseases.

**SURGICAL SERVICES INCLUDE:**

- Gamma Knife and CyberKnife® radiosurgery for brain and spine tumors
- Minimally invasive surgical techniques
- Image-guided surgical navigation
- Intra-operative magnetic resonance imaging operating room
- Intra-operative brain mapping of functionally critical brain involving motor, language, sensory, visual and cranial nerves
- Endoscopic neurosurgical techniques

**NOVEL RESEARCH**

We have opened several trials for benign and malignant primary brain tumors including biorepository, epidemiological and outcome studies done in cooperation with the Case Comprehensive Cancer Center and the Case Western Reserve University Department of Epidemiology and Biostatistics.

Research within the Brain Tumor and Neuro-Oncology Center involves scientists, neuroscientists, pathologists and biomedical engineers who share a strong bench-to-bedside mission. Some of the many areas currently under study are:

- Gamma Knife surgery protocols
- Chemotherapy protocols
- Image-guidance protocols
- Artificial intelligence software programming for robots
- Photodynamic therapy to both diagnose and treat tumors
- Immunotherapy with convection enhanced delivery of small molecules

THE GAMMA KNIFE, WHICH FOCUSES 201 BEAMS OF GAMMA RADIATION DIRECTLY UPON A SMALL, TARGETED AREA, SPARES HEALTHY SURROUNDING BRAIN TISSUE AND IS THE MOST ACCURATE FORM OF STEREOTACTIC RADIOSURGERY FOR BRAIN.



## Epilepsy Center

The Epilepsy Center specializes in state-of-the-art evaluation and treatment of epilepsy in adults and children. Highly trained epileptologists use an interdisciplinary team approach to provide comprehensive evaluations and a wide range of therapeutic options. We take into consideration each patient's unique situation to customize a treatment plan that will render optimal results.

The National Association of Epilepsy Centers has given University Hospitals Epilepsy Center a level IV designation — the highest available. This designation makes us the next stop for patients for whom previous treatments failed. We re-evaluate such patients and offer them access to clinical drug trials, novel medications and advanced surgical therapies. Innovative methods combined with an individualized approach can lead to marked improvements in a patient's quality of life — from a significant reduction in the number and frequency to a complete elimination of seizures.

### EPILEPSY CENTER PROGRAMS AND SPECIALTIES

- Adult epilepsy
- Developmentally delayed epilepsy
- Geriatric epilepsy
- Intractable epilepsy
- Neurodiagnostics
- Neurosurgery for epilepsy
- New onset epilepsy
- Pediatric epilepsy
- Women's epilepsy



### ADVANCED DIAGNOSTIC AND MONITORING MODALITIES

#### Electroneurodiagnostics (END) Lab

Our END Lab provides comprehensive testing of the electrical activity of the brain and nervous systems. The lab is equipped with electroencephalogram (EEG), video EEG, evoked potentials and intra-operative monitoring. We also offer technology used for instances of brain or spinal cord tumor, trauma, aneurysm, vascular malformations or blockage, congenital abnormalities, spinal cord malformations, epilepsy surgery and movement disorders. Our full list of advanced brain monitoring and neuroimaging capabilities includes:

- Continuous EEG-video monitoring
- Evoked potentials
- Functional MRI
- Intracarotid amobarbital testing
- Ictal SPECT scans
- Intra-operative monitoring
- Mapping of seizure onset zones with scalp EEG and/or implantation of subdural grids, subdural strips or depth electrodes
- MEG imaging
- Pediatric Sedation Unit
- PET scans
- Routine EEG
- Specialized MRI epilepsy-specific imaging protocols using a 4 Tesla MRI

#### Magnetoencephalography (MEG) Program

A new Magnetoencephalography (MEG) Laboratory located on University Hospitals Case Medical Center main campus is scheduled for development in 2009. MEG measures small electrical currents arising inside the neurons of the brain. These currents produce small magnetic fields. MEG generates a remarkably accurate representation (the most accurate to date) of the magnetic fields produced by the neurons. By providing a more precise localization prior to epilepsy surgery, MEG has the potential to significantly enhance surgical outcomes.

## SURGICAL THERAPY

Our vastly experienced epileptologists prescribe medication most likely to reduce seizures with minimal side effects. Seizures that do not respond to pharmaceutical management may be reduced or eliminated through epilepsy surgery. Advances in presurgical diagnostic techniques, including brain-mapping, now offer surgical therapeutic options to a significantly larger percentage of epileptic patients with medically intractable seizures.

The Center's care team accurately classifies, quantifies and localizes seizure-producing areas of the patient's brain using the most advanced diagnostic methods, including:

- Specialized MRI epilepsy-specific imaging protocols using 4 Tesla MRI, which can detect formerly hidden lesions.
- Stereo-Electroencephalography (sEEG), a new invasive presurgical evaluation technique, that offers unprecedented diagnostic precision for localization of epileptic foci.
- Precise, non-invasive localization of epileptic foci by source-imaging the electric or magnetic signal directly on the patient's MRI.
- Mapping of seizure onset zones and adjacent eloquent cortex with scalp EEG and implantation of subdural grids, subdural strips or depth electrodes.

### We offer the following surgical treatment procedures:

- Temporal lobe resections
- Extratemporal lobe resections
- Lesionectomies
- Corpus callosum sections
- Selective amygdalo-hippocampectomies
- Multiple subpial transections
- Multiple hippocampal transections
- Hemispherectomies
- Vagal nerve stimulations

## EPILEPSY MONITORING UNITS (EMU)

The Epilepsy Center expanded its epilepsy monitoring facilities from 5 to 11 beds with separate units for both adult and pediatric patients. The EMU comprises a team of highly trained epileptologists who provide round-the-clock care using the most advanced monitoring equipment to determine individualized treatment plans for every patient.

## LEADING-EDGE RESEARCH

Our physician-scientists regularly conduct clinical trials to test the efficacy of new medications and therapies for both pediatric and adult epilepsy. The findings from our extensive research are applied to patients' clinical care and expedite access to the latest, most advanced treatment alternatives.

## CHILD-FRIENDLY SERVICES

As epilepsy is increasingly diagnosed in children, nationally and internationally known UH Rainbow Babies & Children's Hospital aims to set the standard for quality, child-friendly care. A dedicated pediatric epilepsy team cares for children undergoing surgery for seizures as an integral part of University Hospitals Epilepsy Center. Each child undergoes an individualized, pre-surgical evaluation with the latest advances in clinical management and technology. Our comprehensive, family-centered approach is designed to obtain better seizure control, improve the child's quality of life and optimize the child's future.

ADVANCES IN PRESURGICAL DIAGNOSTIC TECHNIQUES,  
INCLUDING BRAIN-MAPPING, NOW OFFER SURGICAL THERAPEUTIC  
OPTIONS TO A SIGNIFICANTLY LARGER PERCENTAGE OF EPILEPTIC  
PATIENTS WITH MEDICALLY INTRACTABLE SEIZURES.

## ➔ General Neurology Center

UH Neurological Institute's General Neurology Center is typically the starting point for new patients with undiagnosed neurological disorders and those seeking second opinions. Depending on the diagnosis, patients may be referred to one of the specialty centers within the Neurological Institute, or receive treatment through General Neurology. The physicians who lead the Center have over 60 years of combined experience in diagnosing and treating a full range of neurological disorders, and work closely with Neurological Institute specialists including:

- Neurosurgery
- Neuropsychiatry
- Neuropathology
- Endocrinology
- Neuro-oncology
- Neuro-psychology
- Ophthalmology
- Neurotology
- Related medical and surgical specialties



### PROGRAMS

General Neurology Center programs are led by nationally recognized clinicians with expert knowledge and experience in state-of-the-art diagnostic techniques and treatment methods.

Programs include:

- **Comprehensive Diagnosis and Evaluation:** Provide diagnosis and second opinions for patients with complex or difficult to diagnose neurological disorders.
- **Headache Management:** Diagnose and treat migraine, cluster, sinus and tension headaches.
- **Neuro-ophthalmology:** Patients experiencing visual disturbances from optic nerve diseases, central nervous system disorders, ocular motility dysfunction and pupillary abnormalities benefit from a unique, close collaboration between clinicians and world-renowned investigators in the field of eye movements.
- **Multiple Sclerosis:** Experienced experts provide early diagnosis; treatment with the latest disease-modifying drugs can positively alter the course of multiple sclerosis.
- **Neuro-psychology:** Highly trained neuropsychologists consult on a broad range of neurological and psychiatric conditions in which neurological dysfunction is known or suspected in adults.
- **Pain Management:** Expert management of neuropathic pain syndromes such as monoradiculopathies, trigeminal neuralgia, postherpetic neuralgia, phantom limb pain, complex regional pain syndromes and the various peripheral neuropathies.

PROGRAMS AT THE GENERAL NEUROLOGY CENTER ARE  
LED BY NATIONALLY RECOGNIZED CLINICIANS WITH EXPERT  
KNOWLEDGE AND EXPERIENCE IN STATE-OF-THE-ART DIAGNOSTIC  
TECHNIQUES AND TREATMENT METHODS.



## Memory and Cognition Center

UH Neurological Institute's Memory and Cognition Center has a 20-year track record of providing exemplary care for those affected with memory and cognitive disorders. The Center's internationally recognized experts devote themselves to caring not only for patients but their families too, through what may be a difficult and prolonged disease process. We offer an interdisciplinary and longitudinal approach that helps maintain physical, emotional and cognitive fitness, as well as a measure of stability and reassurance for patients with the following conditions:

- Alzheimer's disease
- Vascular dementia
- Frontotemporal dementia
- Dementia with Lewy bodies
- Mild cognitive impairment
- Parkinson's disease dementia
- Normal Pressure Hydrocephalus
- Other dementias
- Huntington's disease
- Autism (adults)
- Adult Attention Deficit-Hyperactivity Disorder
- Trisomy 21 (Down's syndrome)

### COLLABORATIVE AND INTERDISCIPLINARY APPROACH

The Memory and Cognition Center has established an interdisciplinary care model that is being adopted by neurological institutes nationwide. Our staff works alongside the Neurology Department at Case Western Reserve University School of Medicine, and has access to the latest NIH-funded research, plus that of the pharmaceutical industry and top physicians around the world. Specialists evaluate patients and design a treatment plan to improve cognitive functions and overall quality of life. Patients and their families benefit from staff expertise and resources in the following areas:

- Neurology
- Radiology
- Geriatrics
- Pharmacy
- Social work
- Neuro-psychology
- Pathology
- Geropsychiatry
- Nursing
- Speech pathology

### PROGRAMS WITHIN THE MEMORY AND COGNITION CENTER

Our Center serves patients and their families all over the country. We coordinate with primary care physicians and go beyond treating biological issues by offering specialty services such as:

- **Alzheimer's Disease and Memory Disorders Program:** Evaluates and treats individuals with Alzheimer's disease and related dementia syndromes. Services include traditional medical treatments and state-of-the-art clinical research programs.
- **Memory Health Program:** Targets individuals with concerns about maintaining brain health. The program offers a variety of services related to maintaining cognitive wellness in the context of aging.

### PIONEERING INNOVATION

Over the last two decades, our physicians have emerged as leaders in Alzheimer's disease evaluation, genetic studies, care-giving assessment and quality of life. They have authored textbooks and articles in prestigious, peer-reviewed journals and book chapters. Team members who are passionately committed to improving the lives of those affected, continue to strive towards medical breakthroughs. Current research projects include:

- Research drug studies in Alzheimer's disease, Frontotemporal dementia, Trisomy 21 and aging
- Assessment of caregiving methods
- Depression in caregivers of Alzheimer's disease patients
- Genetics of Alzheimer's disease
- Alzheimer's disease Neuroimaging Initiative
- Brain donation program for diagnosis and research in dementia
- Translational research in Alzheimer's disease

## Minimally Invasive Neurosurgery Center

UH Neurological Institute's Minimally Invasive Neurosurgery Center specializes in innovative treatments for brain and spinal cord tumors and related problems in both adults and children. Our neurosurgery team pioneered minimally invasive technology and applications. Our advanced training and continued research programs are helping to develop the leading neurosurgeons of the future.

Minimally invasive approaches and robotic technology enable surgeons to treat a wide range of brain and spinal cord conditions without having to cut through skull, face or back to reach the target. These methods spare sensitive tissue, minimize the risk of disabilities or disfigurement and significantly decrease recovery periods. Our multi-disciplinary team of neurosurgeons, otolaryngologists, ophthalmologists, radiologists and plastic surgeons collaborate to provide the best possible treatment plan according to the needs of each individual patient. *U.S. News & World Report* bestowed the Neurological Surgery Department at UH Rainbow Babies & Children's Hospital with the highest possible rating for successful removal of cancerous brain tumors.

MINIMALLY INVASIVE NEUROSURGERY MAKES SURGERY  
FAR SAFER AND LESS TRAUMATIC THROUGH THE USE OF  
MINIATURE COMPUTERS AND IMAGE GUIDANCE ENDOSCOPES

Our multi-disciplinary team of neurosurgeons, otolaryngologists, ophthalmologists, radiologists and plastic surgeons collaborate to provide the best possible treatment plan according to the needs of each individual patient.

### MINIMALLY INVASIVE NEUROSURGERY SERVICES

**Neuroendovascular surgery** (also called interventional neuroradiology) is a subspecialty within the fields of radiology and neurosurgery that manages and treats complex neurologic lesions using minimally invasive techniques. Interventionists treat lesions from within rather than from outside, by delicately threading small catheters through veins and arteries. This less-invasive approach often translates into shorter recovery times and more effective results. Treatments include:

- Endovascular aneurysm repair
- Angioplasty / pharmacological vasodilatation for subarachnoid hemorrhage vasospasm
- Mechanical / pharmacological revascularization for acute stroke
- Angioplasty / stenting for intracranial and extracranial atherosclerotic disease
- Endovascular repair of post traumatic and neoplastic-related vascular injuries
- Embolization of vascular malformations of the brain, head and neck, spine
- Embolization of brain neoplasms, head and neck neoplasms and spine neoplasms

**Radiosurgery** (also known as stereotactic radiotherapy) allows non-invasive treatment of benign and malignant conditions by directing beams of ionizing radiation. Using a precise dosage of radiation, radiotherapy can be used to treat intracranial and extracranial tumors and lesions that would otherwise be inaccessible with open surgery. The two primary types of radiosurgery are Gamma Knife and CyberKnife.



GAMMA KNIFE



CYBERKNIFE

- **Gamma Knife:** Gamma Knife radiosurgery uses 201 narrow beams of cobalt gamma radiation, all precisely focused on a single tumor or blood vessel abnormality. The tissue being treated receives the highest dose of radiation, while surrounding healthy tissue is spared. The Gamma Knife procedure is generally performed on an outpatient basis with local anesthesia.
- **CyberKnife:** The CyberKnife® System is the only radiosurgery system that delivers high-dose, non-isocentric beams to the tumor from virtually unlimited positions, enabling physicians to aggressively treat tumors with sub-millimeter accuracy while minimizing damage to surrounding healthy tissue. This painless, non-invasive technology gives patients new hope for treatment of tumors and lesions that were previously diagnosed as untreatable or inoperable.

**Minimally invasive spine treatments** enable our spinal neurosurgeons to diagnose and treat all spinal disorders, including cervical spinal stenosis, lateral femoral cutaneous nerve syndrome, scoliosis, spinal cord injury and tethered cord syndrome. Minimally invasive / image guided robotics spine surgical technologies include:

- Posterior (keyhole) cervical foraminotomy
- Posterior (keyhole) cervical microdiscectomy
- Thoracoscopic discectomy with or without fusion
- Removal of synovial cyst
- TLIF (transforaminal lumbar interbody fusion)
- Posterior spinal instrumentation (pedicle screws and rods)
- Percutaneous lumbar facet screws
- XLIF (extreme lateral interbody fusion)
- AxialLIF (presacral transsacral L5-S1 interbody fusion)
- X-stop implantation (the so-called “titanium bullet”)
- Removal of certain spinal or paraspinal tumors

**Neuroendoscopic surgery** has revolutionized the treatment of brain tumors and other brain and spinal disorders. Instead of removing sensitive tissues to reach a target, neuroendoscopic surgeons can now access and treat most areas of the brain and spine by navigating with endoscopes and miniature instruments through the nasal passages or tiny incisions. Neuroendoscopic surgery minimizes scars and disfigurement, side effects, complications, and recovery times. Procedures include:

- Endoscopic treatment of hydrocephalus
- Endoscopic treatment of brain tumors and cysts
- Endoscopic pituitary tumor surgery
- Endoscopic craniosynostosis surgery
- Endoscopic spinal surgery

### **LEADING THE WAY IN MINIMALLY INVASIVE NEUROSURGICAL ADVANCES**

Our physician-researchers have been at the forefront of developing new, minimally invasive therapies and technologies to treat brain and spinal cord tumors. Center benchmarks:

- Minimally invasive neurosurgery fellowship, including on-site laboratory training in a state-of-the-art simulation laboratory.
- Teaching location for the AANS minimally invasive neurosurgery course.
- Virtual Reality Surgical Simulator: the “flight simulator for the brain,” the only such technology in the region.
- First in the region to implement MR / OR: Intra-operative Magnetic Resonance Imaging (MRI) which enables surgeons to determine the extent of a tumor while the patient is undergoing surgery and ensure its accurate removal.
- International leadership role in minimally invasive (endoscopic) neurosurgery.
- One-of-a-kind minimally invasive neurosurgery lab, which focuses on developing new instruments and operative approaches, as well as teaching new surgical techniques housed at Rainbow Babies & Children’s Hospital.



## Movement Disorders Center

UH Neurological Institute's Movement Disorders Center comprises an interdisciplinary team of specialists who employ the full range of diagnostic techniques and therapies to treat:

- Parkinson's disease
- Related parkinsonism (such as progressive supranuclear palsy, multiple system atrophy)
- Essential tremor
- Huntington's disease
- Tourette syndrome (TS)
- Dystonia (generalized or focal, including torticollis, blepharospasm, writer's cramp, oromandibular dystonia, spasmodic dysphonia and more)
- Hemifacial spasm
- All other disorders that cause involuntary movements

### PROGRAMS WITHIN THE MOVEMENT DISORDERS CENTER

We offer an unparalleled range of diagnostic and therapeutic capabilities including:

- **Comprehensive Medical Management:** Cares for the full range of movement disorders including Parkinson's disease, essential tremor and dystonia.
- **Botulinum Toxin Therapy:** Used to treat movement disorders, spasticity, drooling, migraine and other indications.
- **Deep Brain Stimulation (DBS) Program:** Manages tremors, movement and walking problems via surgical implantation of electrodes in the brain and pulse generators in the upper chest just beneath the collarbones.
- **Functional and Restorative Neurosurgery:** State-of-the-art deep brain stimulation (DBS) surgery, as well as comprehensive pre-operative and post-operative care for patients undergoing DBS. Careful, fine-tuned programming of DBS stimulators, balanced with medication management, is provided on an ongoing basis.

ONE OF ONLY 25 CENTERS NATIONWIDE DOING SURGICAL THERAPY FOR DYSTONIA. WE USE DBS TO TREAT PATIENTS WITH DYSTONIA, PARKINSON'S DISEASE AND ESSENTIAL TREMOR. DBS HAS BEEN DEMONSTRATED TO RELIEVE TREMORS AND OTHER MOTOR DYSFUNCTIONS SUCH AS RIGIDITY, BRADYKINESIA, DYSKINESIA, AND GAIT AND BALANCE PROBLEMS.

### INNOVATION

Research interest in the treatment of neurological movement disorders has reached an unprecedented level. Vast, intensive behind-the-scenes activity is leading to increased breakthroughs and giving patients more hope than ever before. The Movement Disorders Center is at the forefront of this pioneering research. Some of our recent advances in neurological movement therapies are:

- First in North America to perform DBS of the thalamus to treat symptoms of Tourette syndrome successfully.
- The first group to complete a prospective randomized double blinded trial of thalamic DBS for Tourette syndrome in a pilot clinical trial of five patients. A larger trial of DBS for TS currently underway here, has broad implications for patient care.
- Greatest experience in the state with botulinum toxin injections, and uses the procedure for the broadest range of neurological indications.

**UNIVERSITY HOSPITALS NEUROLOGICAL INSTITUTE IS THE FIRST IN NORTH AMERICA TO PERFORM DEEP BRAIN STIMULATION (DBS) OF THE THALAMUS TO TREAT SYMPTOMS OF TOURETTE SYNDROME (TS) SUCCESSFULLY.**



## Neurocritical Care Center

UH Neurological Institute's world-renowned Neurocritical Care Center provides continuous state-of-the-art monitoring and treatment for all critically ill patients with neurological or neurosurgical disease.

University Hospitals introduced the world to neurological intensive care medicine nearly three decades ago. Since then, the Center has earned international respect for training physicians worldwide. We literally "wrote the book" on neurocritical care (our textbook, *Critical Care Neurology and Neurosurgery*, is the standard textbook of the field). UH is one of only a handful of institutions in the United States that offers a fellowship in Neurocritical Care to doctors in training. And our annual international CME conference is the benchmark meeting for the field. Patients benefit by receiving care from a hospital staff that receives continuous training in the latest, most effective techniques and technology.

### A DEDICATED NEURO-INTENSIVE CARE TEAM

The Reinberger Neuroscience Intensive Care Unit (NSU) is staffed 24/7 by a dedicated team of neuro-intensive care specialists as well as specially trained critical care nurses, pharmacists, respiratory therapists, physical therapists, nutritionists, case managers, social workers, and bioethicists. Our team is skilled in managing the full range of neurology and neurosurgery patients. We offer highly sophisticated treatment options for patients who are critically ill, need postoperative care, or require intensive neurological monitoring.

Studies show that involvement of a dedicated neurological intensive care team correlates with significantly reduced length-of-stay and controlled cost and most importantly with reduced in-hospital mortality and better patient outcomes.

### CRITICAL, ROUND-THE-CLOCK MONITORING

The NSU team observes patients' minute-to-minute progress with the most advanced monitoring equipment in the world, including:

- Intracranial pressure monitoring
- Brain tissue oxygenation monitoring
- Cerebral blood flow monitoring
- Transcranial Doppler (TCD) ultrasonography
- Continuous video EEG monitoring

- CT angiography and CT perfusion studies
- MRI perfusion — diffusion imaging
- Positron Emission Tomography (PET)

### STATE-OF-THE-ART TREATMENTS

Our team employs the latest interventions to save brain function including:

- Cerebral angiography and intervention (angioplasty, stenting)
- Endovascular coiling
- Intravenous and intra-arterial thrombolysis
- Induced hypertension (Hypertensive hypervolemic hemodilution)
- Induced hypothermia
- Burst suppression
- Plasmapheresis
- Ventricular drainage

### LEADING-EDGE RESEARCH INVESTIGATION

**Clinical Research:** Investigating the possible detrimental effects of blood transfusion on critically ill patients with neurological disease and evaluating better ways of treating patients with respiratory failure

**Basic Science Research:** Evaluating the effects of induced hypothermia combined with induced hypertension in patients with cardiac arrest

**Case Critical Care Bioinformatics Project:** (A collaboration study between UHCMC and Case Western Reserve University) We believe that the future of intensive care monitoring lies in:

- Integration and time-synchronization of multiple channels of physiological data continuously and simultaneously
- Processing of this data in real-time, using new tools such as multivariate analysis and nonlinear time series analysis
- Presenting the processed information visually in a user-friendly and customizable way

Our participation in trials gives patients the opportunity to receive new therapeutic treatments that may not be available elsewhere.

### CONSULTATIONS AVAILABLE

Physicians caring for patients in intensive care units are welcome to consult with the Center's neurointensivists. Please call **216-844-1001**.



## Neuromuscular Center

The UH Neurological Institute's Neuromuscular Center has established itself as one of America's foremost institutions for the treatment of complex neuromuscular disorders. Our physicians are renowned experts who have authored textbooks and lecture frequently at national conferences. We also have a very active fellowship training program. Our large neuromuscular facility offers leading-edge diagnostic services including autonomic testing and an Electromyography (EMG) Lab.

Conditions we treat include:

- Myasthenia gravis
- Peripheral neuropathy
- Amyotrophic lateral sclerosis (ALS)
- Polymyositis/Dermatomyositis
- Muscular dystrophies
- Guillain-Barre syndrome
- Chronic inflammatory demyelinating polyneuropathy
- Entrapment neuropathies
- Orthostatic hypotension
- Syncope
- Cervical and lumbar radiculopathy

### LEADING-EDGE DIAGNOSTICS AND TREATMENTS

- **Amyotrophic Lateral Sclerosis (ALS) Program:** This nationally renowned program takes an interdisciplinary approach by bringing together specialists from the Neuromuscular Center, pulmonary medicine, speech pathology and nutrition. Diaphragmatic stimulation and pacing is an integral part of managing respiratory failure in ALS patients. University Hospitals Case Medical Center (UHCMC) pioneered the implantable breathing device in spinal cord patients and used it to successfully treat the late actor Christopher Reeve in March 2003.

The UHCMC team began using the device in March 2005 in ALS patients and recently completed a successful pilot trial. In an expanded FDA-approved study, 17 ALS patients have received the device to-date, in addition to some 33 others. This device helps patients breathe and speak more normally, and it helps stave off respiratory complications during the progression of ALS.

- **Autonomic Disorders Interdisciplinary Program:** Autonomic disorders are a complex group of disorders affecting a large proportion of our population with symptoms often considered mysterious. Several interdisciplinary clinics offer diagnosis and treatment of these disorders, including:
  - Pediatric Autonomic Disorders*, for children with dizziness, fainting, vomiting or unexplained stomach pain
  - Dizzy/Falls* for adults with unexplained falls, dizziness or loss of consciousness
  - Complex regional pain syndrome* for persons of all ages with severe unexplained limb pain
  - Pelvic pain* for persons who have unexplained or unmanaged pain in the pelvic region, including the diagnosis of interstitial cystitis.
  - Sweat* for people of all ages who sweat excessively or have other sweat or flushing related issues.
- **Autonomic Laboratory:** As one of only 12 such labs in the country our Autonomic Laboratory is equipped to test all aspects of autonomic function including cardiac, vasomotor and sudomotor (sweat) functions; and to diagnose chronic regional pain syndrome, peripheral neuropathies, Postural Orthostatic Tachycardia Syndrome (POTS) and syncope of unknown etiology. It provides full support in the assessment of patients seen in the interdisciplinary program clinics.
- **Electromyography (EMG) Lab:** Our EMG Lab provides high-quality, state-of-the-art electrodiagnostic testing of neuromuscular disorders. The EMG test includes nerve conduction studies performed by the EMG technologists and the muscle needle examination performed by the EMG physician. Last year, new computerized Medtronic EMG machines were installed at all six EMG Lab locations. The machines enable lab personnel to perform detailed electrodiagnostic testing on every patient with instant report generation.
- **Myasthenia Gravis Program:** Established in 1990, the Center's Myasthenia Gravis Program is the only such program in Ohio. Patients are often treated with immunosuppressive drugs as well as plasma exchange and intravenous immunoglobulin.
- **Muscular Disease Program:** Established in 1954, this United-Way sponsored program brings a multidisciplinary approach to the diagnosis and management of patients with inherited neuromuscular disorders, including muscular dystrophies and inherited peripheral neuropathies, as well as acquired disorders such as postpolio-myelitis syndrome and inclusion body myositis.

## RESEARCH

Neuromuscular Center physicians and scientists are involved in some of today's most important research in neuromuscular diseases including:

- **Thymectomy in the Treatment of Myasthenia Gravis:** The center is one of only a few nationwide participating in an NIH-funded trial testing the efficacy of thymectomy in the treatment of myasthenia gravis.
- **Diaphragmatic Pacing for ALS:** We recently completed and presented a pilot study which examines the use of diaphragmatic pacing in patients with ALS and respiratory failure. Data from this pilot study revealed the average pre-implant rate of decline was calculated at -2.8 percent per month, and for patients with at least nine months post implant follow-up the rate improved to -1.0 percent per month. A pivotal study, headed by our center with seven other U.S. centers, started in fall 2007, and will include a total of 100 ALS patients.
- **Adult Tay-Sachs Disease:** We recently completed a study on the use of a novel drug in the treatment of late-onset Tay-Sachs (LOTS) disease. OGT918 is sold as Zavesca in Europe and Israel, where it has been approved to treat Gaucher disease.
- **Epidemiology of Diabetes Intervention and Complication (EDIC):** The primary aim of EDIC is to examine the long-term effects of conventional vs. intensive diabetes treatment received during the DCCT on the subsequent development and progression of peripheral neuropathic complications. This involves neurological and well-planned electrodiagnostic studies on the influence of genetic factors and others such as HbA1c, blood pressure, lipid levels, and treatment modalities on the development and progression of these complications.

**OUR AUTONOMIC LABORATORY IS ONE OF ONLY A FEW LABS IN THE COUNTRY  
EQUIPPED TO TEST ALL ASPECTS OF AUTONOMIC FUNCTION  
INCLUDING CARDIAC, VASOMOTOR AND SUDOMOTOR (SWEAT) FUNCTIONS.**

## CLOSE TO HOME

Perhaps the most significant benefit to patients is that they have access to expert consultation and advanced diagnostics close to home in our community facilities. In addition to the main UHCMC campus, our renowned specialists see patients at UH Chagrin Highlands Health Center, University Suburban Health Center, UH Westlake Health Center, UH Bedford Medical Center and UH Richmond Medical Center.

THE NEUROMUSCULAR CENTER IS ONE OF ONLY  
A FEW NATIONWIDE PARTICIPATING IN AN NIH-FUNDED TRIAL  
TESTING THE EFFICACY OF THYMECTOMY IN THE TREATMENT  
OF MYASTHENIA GRAVIS.





## Neuropsychiatry Center

The majority of neurological conditions have co-occurring psychiatric syndromes ranging from adjustment disorders, to depression or anxiety related to a primary medical illness, to an underlying mood or anxiety disorder that was previously unrecognized or untreated. Management of psychiatric comorbidity has been shown to decrease morbidity and mortality, and increase functioning in medically ill patients.

UHCMC's Neuropsychiatry physicians treat co-occurring disorders in both adult and pediatric patients. Examples include:

- **Multiple Sclerosis:** Commonly associated with mood disorders such as depression or bipolar mania.
- **Parkinson's Disease:** Often accompanied by depression or secondary psychosis.
- **Stroke/Cerebrovascular Accident:** May present with symptoms of depression, dementia or psychosis.
- **Epilepsy:** Commonly associated with conversion disorders, psychosis.
- **Traumatic Brain Injury:** Often associated with behavioral disturbances, psychosis or personality changes.
- **Brain Tumor:** May be complicated by depression, delirium psychosis.

### NOVEL MEDICATIONS AND NEURO-STIMULATION

The Neuropsychiatry Center is nationally renowned for pioneering advanced protocols for treatment refractory disorders, or disorders that are resistant to traditional therapy. Patients in our Bipolar Disorder Program benefit through access to novel antipsychotic medications, antidepressants and various mood stabilizers that might not be generally available. Treatment refractory disorders may also be helped by the most advanced neuro-stimulation techniques including:

- **Electroconvulsive Therapy (ECT):** Performed in a recently renovated, state-of-the-art suite.
- **Vagus Nerve Stimulation (VNS):** Used to treat refractory depression by stimulating the Vagus Nerve.
- **Repetitive transcranial magnetic stimulation (rTMS):** A brand new, non-invasive treatment for major depression in which a pulsed magnetic field stimulates neurons in the brain.

### AMBULATORY AND OUTPATIENT ADDICTION RECOVERY SERVICES

The Neuropsychiatry Center has launched a novel approach to addiction recovery with the recent opening of our Ambulatory and Outpatient Addiction Recovery Services Program on the main UHCMC campus.

Sometimes, patients undergoing severe withdrawal from alcohol or other drugs require hospitalization. The majority, however, can be treated on an intensive outpatient basis. Patients may come into the hospital during the day for three to five days a week and return home in the evening.

Ambulatory and Outpatient Addiction Recovery Services interfaces with community-based programs such as "The 12-Step Program." We have also developed our own unique 12-Step Program for patients suffering from both a mental illness and an addiction problem. Patients have access to the newest, proven medications without having to remain in a hospital setting.

### INVESTIGATIONAL THERAPIES

Patients may benefit from the newest and / or investigational treatments by participating in clinical trials. For example, the Center is involved in a national registry for patients with treatment-refractory depression.

Additionally, patients may access pharmacologic treatments currently under investigation through research protocols of UHCMCs National Institutes of Mental Health "Bipolar Disorder Across the Lifespan" Center, the first funded Bipolar Center of Excellence in the U.S.

**REFERRALS ARE BY PHYSICIAN ONLY AND MAY BE MADE BY CALLING 216-844-2400.**

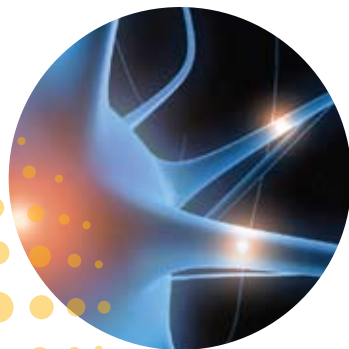
## Neuroscience Nursing Practice Center

The UH Neurological Institute's Neuroscience Nursing Practice Center is dedicated to the development and implementation of best practices in neuroscience nursing. Our mission is to improve patients' long-term outcomes by providing care according to the most advanced protocols based on the latest research findings; offering highly personalized care; and maximizing efficiencies during every stage of treatment. These strategies are implemented throughout the continuum of patient care from first diagnosis, through treatment, to follow-up visits in any location in which the patient is seen. Our program is based on three core principals:

- Evidence-based nursing practice
- Patient-centered care
- Relationship-based nursing

### **EVIDENCE-BASED NURSING PRACTICE**

The explosion of research in the neurosciences field has given nurses a significant opportunity to bring new information into their practice. The Neuroscience Nursing Center aims to bridge the gap between nursing research and clinical practice by creating mechanisms to facilitate the translation of information from evidence-based research to practice. In this way, we ensure critical, succinct, reasonable evaluation and application of research findings as they relate to point-of-care delivery. Evidence-based nursing practice ensures delivery of the highest quality and most scientific nursing services to improve overall outcomes.



### **PATIENT-CENTERED CARE**

Patient-centered care takes into consideration patients' individual circumstances including lifestyle, family situations, cultural traditions, religious beliefs and other factors during care planning and implementation. It puts responsibility for important aspects of self-care and monitoring in patients' hands, along with the tools and support they need to carry out that responsibility. In this way, patient-centered care can reduce unneeded and unwanted services, and also improve outcomes.

The Neuroscience Nursing Center upholds a strong culture of patient-centered care which extends across every discipline including rehabilitation, pharmacy, social work, nutrition, and medical services. Through training and communication, we ensure that transitions between providers, departments, and health care settings are respectful, coordinated, and efficient.

### **RELATIONSHIP BASED NURSING**

The Neuroscience Nursing Center maintains a standard of excellence by relying on the principles of relationship-based nursing. Collaborative relationships which are developed in a caring, competent, healing environment result in greater efficiencies and improved outcomes for patients. These principles also help to instill in nursing professionals a high level of competence, professionalism and personal empowerment that continue to enhance the nursing practice within our healthcare setting.

THE NEUROSCIENCE NURSING CENTER UPHOLDS A STRONG  
CULTURE OF PATIENT-CENTERED CARE WHICH EXTENDS ACROSS  
EVERY DISCIPLINE INCLUDING REHABILITATION, PHARMACY,  
SOCIAL WORK, NUTRITION, AND MEDICAL SERVICES.



## Rainbow Neurological Center

The Pediatric Neurology Division at UH Rainbow Babies & Children's Hospital (RB&C) is one of the most active service, training and research programs in the upper Midwest of the United States. We evaluate over 15,000 outpatients, and 2,000 inpatients every year using state-of-the-art procedures in diagnosis and care for children with neurological problems, including:

- Seizures
- Headaches
- Developmental delay
- Movement disorders
- Learning and behavioral problems
- Autistic spectrum disorders
- Genetic neurological disorders

### COLLABORATION AND INNOVATION

The Rainbow Neurological Center team includes pediatric neurologists, neurosurgeons, intensivists, advanced practice nurses, psychologists, social workers, Child Life specialists and occupational, speech and physical therapists. These specialists collaborate to develop a treatment plan according to each child's specific needs.

Pediatric Neurology faculty are certified by the American Boards of Neurology and Pediatrics. Each physician brings expertise in specific areas of epilepsy, metabolic-genetic disease, sleep medicine, headaches, neuro-oncology, behavioral and cognitive neurology (including ADHD, Tourette syndrome and autism), and the care of multiply-handicapped children including those with cerebral palsy.

Our surgical specialists are pioneers in minimally invasive neurosurgery, which means minimal trauma, shorter hospitalizations and safer procedures. RB&C operates a special, minimally invasive lab where we train other surgeons and physicians. We are at the forefront of ongoing research and innovations, making pediatric neurosurgery less traumatic and more effective.

### PROGRAMS AND CENTERS

- **The Autism Center:** This Clinical Center of Excellence brings together a team of professionals from RB&C and affiliated institutions that are knowledgeable about the diagnosis of autistic disorders and their impact on development, education and the family.
- **Brain Tumor Program:** This Program provides top-notch care, the most promising new treatments, nationally known researchers and educators and a dedicated, compassionate team of experts devoted to improving the lives of infants, children and teenagers with cancer.
- **Cerebral Palsy Program:** Considered the rehabilitation wing of the Neurocritical Care Center, this program comprises a multidisciplinary team of specialists in pediatric neurology, orthopedics, neuroradiology and physical and occupational therapy, all dedicated to offering the highest level treatments and therapies available.
- **Pediatric Epilepsy Center:** This comprehensive, Level IV Epilepsy Center offers the most advanced approaches to diagnosing, managing and treating epilepsy. Family-centered services, experienced staff and advanced technologies all contribute to our pioneering care of children with seizure disorders.

- **Pediatric Neurology:** With eight Pediatric Neurology faculty, two advanced practice nurses and two RNs to provide both outpatient and inpatient consultations for children and their families, The Division of Pediatric Neurology at RB&C is one of the most active services with one of the best training and research programs in the upper Midwest of the United States.
- **Pediatric Neuro-Psychology:** Part of Rainbow Behavioral Pediatrics, this Center assesses children with learning and school-related problems resulting from ADHD, autism, head injury, seizure disorders, developmental disabilities, neurological conditions, genetic disorders, cochlear implants, cancer or other chronic physical conditions.
- **Pediatric Neurosurgery:** Delivering the most compassionate and advanced family-centered care for infants and children with surgical disorders of the nervous system, our nationally known and respected neurosurgical experts routinely address a wide variety of the life-threatening concerns that may result from disorders of the nervous system, brain and spinal cord.
- **Neurocritical Care Center:** Our internationally renowned Neonatal Intensive Care Unit (NICU) and Pediatric Intensive Care Unit (PICU) provide the highest level of critical care while covering a wide range of problems including fetal consultations as well as referrals for seizures, stroke, infection and trauma.
- **Pediatric Neurological and Neurosurgical Nursing:** Comprised of advanced practice nurses, clinical and advanced clinical nurses, this group of specially trained experts helps institute and provide leadership and vision to promote the ongoing evolution of individualized family-centered care in both the inpatient and outpatient settings.

## NOVEL RESEARCH

The Rainbow Neurological Center leads in the field of research related to fetal and neonatal neurology, neuro-intensive care and pediatric epilepsy. Center physicians and scientists are involved in multiple NIH-funded research projects including:

- Designing new technologies for bedside continuous brain monitoring in the intensive care setting for the diagnosis and assessment of children at high risk for neurological sequelae after brain disorders.
- Drug and surgical outcomes research for pediatric epilepsy.
- Developmental care in the neonatal nursery and the impact of specific nursing care practices on the development of the brain. These studies culminate in evaluation for developmental neural plasticity concentrating primarily on high-risk preterm populations.



## Spinal Neurosurgery Center

UH Neurological Institute's Spinal Neurosurgery Center offers the newest, most sophisticated surgical techniques alongside proven conventional methods to treat the full range of spinal disorders including:

- Arthritis
- Degenerative disorders / aging of the spine
- Fractures
- Herniated discs
- Infections of the spine
- Injury, trauma to back, neck, spine or spinal cord
- Malignant and benign spinal tumors
- Paralysis and chronic spinal pain
- Spinal cord compression
- Spinal deformities (scoliosis, kyphosis)
- Spinal stenosis

### PROGRAMS WITHIN THE SPINAL NEUROSURGERY CENTER

The Spinal Neurosurgery Center fosters an extremely close working collaboration with pain medicine interventionalists, orthopaedic surgeons and physical therapists to develop treatment plans according to each patient's individual needs. Programs within the center include:

- CyberKnife Radiosurgery Program
- Endoscopic and Minimally Invasive Spinal Neurosurgery Program
- Functional and Restorative Spinal Neurosurgery
- Spine Neurosurgery

**FACULTY EXPERTISE COMBINED WITH RECENT ADVANCES IN MOLECULAR BIOTECHNOLOGY FOR SPINAL SURGERY YIELD LESS DISCOMFORT, SHORTER RECOVERY TIMES AND IMPROVED OUTCOMES FOR PATIENTS.**

### COMPREHENSIVE SURGICAL OPTIONS

Spinal Center neurosurgeons specialize in both conventional and minimally invasive spine surgery. Faculty expertise combined with recent advances in molecular biotechnology for spinal surgery yield less discomfort, shorter recovery times and improved outcomes for patients. Surgical treatments offered:

- Laparoscopic fusions
- Microvascular surgery
- Spinal implants
- Microsurgery
- Microsurgery of the spinal cord
- Minimally invasive procedures
- Numerous fusion techniques
- CyberKnife for spinal tumors

Some of the conditions that can now be treated with minimally invasive techniques on an outpatient basis are:

- Degenerative disc disease
- Spinal column tumors
- Fractures
- Spinal stenosis
- Infection
- Herniated discs

### CYBERKNIFE®

**University Hospitals is the first hospital in Ohio to offer CyberKnife treatment for patients.** CyberKnife delivers frameless stereotactic radiosurgery treatment to tumors and lesions previously considered inaccessible with surgery or radiation. CyberKnife technology uses an image-guided system with pinpoint accuracy and a multi-jointed robotic arm to deliver radiation from more than 1,200 angles with sub-millimeter accuracy. Focused beams of radiation converge on the tumor while exposure to surrounding healthy tissue is minimized. This painless, non-invasive technology gives patients new hope for treatment of tumors and lesions of the neck and spine previously diagnosed as untreatable or inoperable.

**CYBERKNIFE GIVES PATIENTS NEW HOPE FOR TREATMENT OF TUMORS AND LESIONS OF THE NECK AND SPINE PREVIOUSLY DIAGNOSED AS UNTREATABLE OR INOPERABLE.**

## Translational Neurosciences Center

Findings in conventional research institutions often take years to be translated to the care of patients. University Hospitals Translational Neurosciences Center expedites this process by serving as a comprehensive link between Neurological Institute clinical investigators and basic scientists. We are focused on developing new approaches to treating major neurological disorders, and transferring them from bench-to-bedside in record time.

The Translational research team is led by world-renowned scientists and works with every center within the UH Neurological Institute. The team is affiliated with the Case Western Reserve University School of Medicine Translational Neurosciences Center — over 60 scientific researchers whose purpose is to develop scientific interactions that promote understanding of the pathology of neurological disease and to develop novel therapeutic strategies for the treatment of those diseases. Our advanced research efforts in almost every kind of neurological disease or disorder, enhance our ability to tailor very specific treatment plans to each patient.

THE BASIC NEUROSCIENCE COMMUNITY AT CASE WESTERN  
RESERVE UNIVERSITY SCHOOL OF MEDICINE IS CURRENTLY RANKED  
IN THE TOP 15% FOR NIH FUNDING NATIONWIDE.



**OUR RESEARCH EFFORTS COORDINATE WITH OR ARE PARALLEL TO MANY NIH STUDIES. WE WELCOME INQUIRIES FROM POTENTIAL COLLABORATORS.**

### UNCOVERING NEUROLOGICAL SECRETS

Center investigators use genetic, cellular and molecular analyses to investigate the ways in which the nervous system processes information and which dysfunctions lead to the many kinds of neurological diseases and conditions, including:

- Stroke
- Brain tumors
- Cerebral palsy
- Multiple sclerosis
- Spinal cord injury
- Alzheimer's disease

### INNOVATIVE INVESTIGATION

The Translational Neurosciences Center is funded by a variety of extramural sources including the NIH and other healthcare agencies, as well as grants and contracts from corporate and philanthropic organizations. Research is currently being conducted in the following areas:

- In models of stroke, researchers have identified new molecules in the brain that have a neuroprotective function. These, or related molecules, may prove useful in future stroke treatment.
- Researchers have discovered that drugs used for other treatments stop the growth of some brain tumor cells. These drugs are now being tested in neurological clinical trials.
- Investigators in the Center are developing new insights into how to maintain viable neurons after ischemic insults. Several new targets have been identified and will be developed to determine whether they are drug-treatable.
- A novel project defining the responses of the embryonic and newborn brain to inflammation, prematurity and ischemia is identifying new strategies for treating babies with these problems.
- Stem cell therapies for multiple sclerosis and stroke are in development.

## Stroke and Cerebrovascular Center

UH Neurological Institute's Stroke and Cerebrovascular Center is the **most experienced Stroke Center in Northeast Ohio**. It comprises a world-class, multidisciplinary team including five board certified vascular neurologists; three neurointensivists; four interventional neuroradiologists; two cerebrovascular neurosurgeons. This team provides comprehensive diagnosis and treatment for patients with vascular disorders of the brain and spinal cord including:

- Emergent evaluation of transient ischemic attacks and stroke
- Aneurysms
- Arteriovenous malformations (AVMs), dural and cavernous malformations
- Intracranial stenosis
- Carotid artery atherosclerotic stenosis or occlusion
- Stroke due to cardiac disease, including patent foramen ovale (PFO)
- Lacunar or small vessel disease
- Carotid or vertebral artery dissection
- Cerebral vasculitis
- Other unusual causes — mitochondrial disorders, CADASIL, migraine



### HIGHLIGHTS OF CLINICAL CARE

The Joint Commission has designated the Stroke and Cerebrovascular Center as a certified, Primary Stroke Center — the highest available designation. The program also meets Brain Attack Coalition criteria for a comprehensive stroke center, as it fulfills the following criteria:

- 24 / 7 emergency admissions and transfers, call **216-844-1111**
- Management of complex diseases in patients who are considered high-risk due to age, co-morbid conditions or inability to tolerate anesthesia.
- A Neuroscience Intensive Care Unit staffed by neurointensivists and specialty-trained nurses providing round-the-clock care for critically ill patients.
- Dedicated Stroke Inpatient Service, staffed by neurologists who are specialty-boarded in Vascular Neurology.
- Renowned neurosurgeons experienced in complex procedures such as aneurysm repair, vascular reformations and diseased-artery bypasses; performed in very few facilities.
- Experienced team of neuro-interventionalists offering minimally invasive endovascular ablation of aneurysms and AVMs, angioplasty and stenting of extracranial and intracranial stenoses, and emergency treatment of acute stroke or vasospasm.
- Treatment of complex vascular malformations deemed “inoperable” with “knifeless” procedures such as Gamma Knife and CyberKnife stereotactic radiosurgery: non-invasive, virtually pain-free approaches requiring minimal recovery time.
- Extensive array of diagnostic modalities including MR diffusion / perfusion, MRA, MRV, CTA, CT perfusion, SPECT, PET, carotid duplex and Transcranial Doppler.
- Rehabilitation specialists who employ state-of-the-art techniques to speed recovery after stroke.
- Dedicated stroke clinic for ongoing therapy and management of co-morbid conditions.

### CLINICAL TRIALS AND TRANSLATIONAL RESEARCH



University Hospitals Neurological Institute has joined the American Stroke Association as the local Power Cleveland Partner in the Power to End Stroke initiative. This national campaign is designed to increase stroke awareness and educate the community on their risk factors.

Clinical research trials offer patients access to therapies that are not otherwise available or reimbursed by their insurance:

- **Carotid Occlusion Surgery Study (COSS, NIH):** A multicenter, randomized clinical trial to determine whether surgical bypass of the superficial temporal artery to the middle cerebral artery (STA-MCA) in addition to best medical therapy can reduce the risk of stroke in patients with an occluded carotid artery.
- **Interventional Management of Stroke-III (IMSIII, NIH):** A multicenter, randomized clinical trial in patients with acute ischemic stroke of < 3 hours comparing a combined intravenous (IV) and intra-arterial (IA) treatment approach to restoring blood flow to the brain to the current standard FDA-approved approach of giving IV tPA (alteplase, Activase®) alone.
- **Secondary Prevention of Small Subcortical Strokes (SPS3, NIH):** A multinational, multicenter, randomized clinical trial focusing on the prevention of stroke and memory decline in patients who have experienced a lacunar stroke due to small vessel disease. Treatments include antiplatelet therapies, aspirin and clopidogrel, as well as antihypertensive therapies. Patients are followed to determine the best level of blood pressure control after a stroke.
- **Insulin Resistance Intervention after Stroke (IRIS, NIH):** A multicenter, randomized clinical trial to determine the effectiveness of pioglitazone, compared with placebo, for prevention of recurrent stroke and heart attack among non-diabetic men and women with a recent ischemic stroke or transient ischemic attack (TIA) and insulin resistance.
- **A Randomized Evaluation of Recurrent Stroke Comparing PFO closure to Established Current Standard of Care Treatment (RESPECT, AGA Medical):** A multicenter, randomized clinical trial to evaluate safety and efficacy of the AMPLATZER® PFO Occluder to the medical standard of care in patients with a stroke attributed to a PFO (patent foramen ovale).

- **Stenting and Aggressive Medical Management for Preventing Recurrent Stroke in Intracranial Stenosis (SAMMPRIS, NIH):** A multicenter, randomized clinical trial in patients with symptomatic intracranial stenosis to determine whether intracranial angioplasty plus stenting with intensive medical therapy is superior to intensive medical therapy alone.
- **Thrombin Receptor Antagonist in Secondary Prevention of Atherothrombotic Ischemic Events (TRA 2P-TIMI 50, Schering-Plough):** A multinational, randomized, double-blind, placebo-controlled study of a novel antiplatelet agent added to standard medical care in approximately 19,500 patients with prior stroke, MI or peripheral arterial disease.

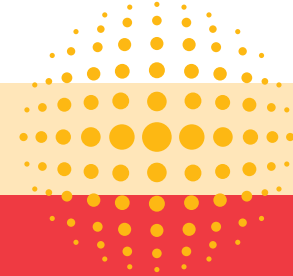
#### CASE WESTERN RESERVE SCHOOL OF MEDICINE COLLABORATION

The Stroke and Cerebrovascular Center's connection with the Case Western Reserve School of Medicine enables basic science research to be translated to findings that will improve future patient care. Recent major activity includes:

**Joseph LaManna PhD, Director of the BrainLab**, has been involved in cerebral blood flow and metabolism research for over 30 years. Dr. LaManna is investigating energy demand, energy metabolism, and blood flow in the brain, as well as the roles of mechanisms associated with tissue response to pathological insults such as stroke (cerebral edema), hypoxia and seizures.

**Sophia Sundararajan MD, PhD**, is leading an NIH-funded, K08-award investigating the role of PPAR agonists to limit inflammation and damage caused by a stroke.

**Janis J. Daly PhD, MS, Director, Cognitive and Motor Learning Research Program**, has developed and is testing intervention protocols for voluntary gait and upper limb functional recovery. Her funded research includes the study of a number of innovative cognitive and motor learning methods including engaging the brain's own signal to retrain itself to control arm movement, the use of robotics and the use of functional electrical stimulation to restore voluntary walking and arm activity.



## University Hospitals Neurological Institute

University Hospitals Neurological Institute is Northeast Ohio's first designated institute for the comprehensive care of patients with diseases affecting the nervous system. It has fourteen Centers of Expertise that bring together some of the country's foremost experts in neurology, neurosurgery, neuropsychiatry, neuroradiology, neuro-oncology, neuro-ophthalmology, neurotology, neuropathology, neuro-psychology and related specialties. Under the direction of Warren Selman, MD, chairman of the Department of Neurological Surgery, and co-director Anthony Furlan, MD, chairman of the Department of Neurology, the Neurological Institute at University Hospitals offers the latest in innovative technology for the diagnosis and treatment of all neurological conditions and diseases.

## Make an Appointment or Speak to a Specialist

To learn more about UH Neurological Institute or to refer a patient, please call **216-844-2724** or log on to [www.UHhospitals.org/neuro](http://www.UHhospitals.org/neuro).

For urgent advice or consultation, please call our experts at **216-844-1001**.