



Our past is distinguished, our present unmatched...our future boundless

by **Robert M. Friedlander, MD**
Chairman, Department of Neurological Surgery

It is a great privilege and honor to be the new chairman of this preeminent University of Pittsburgh Department of Neurological Surgery...a department with a great history and tradition.

It is my goal to elevate this department from its already prominent position to be the leader in both delivery and development of care. In achieving these goals, we are fortunate to work with a group of immensely talented and dedicated colleagues in an extraordinary medical center. Our mission will be to deliver the best possible care, to train the next generation of neurosurgical leaders, and to advance our field through innovative and high impact research.

We must always remember the fundamental reason as to why we work in a leading academic hospital. Not only is the patient at the top of our priority list, but we must also

make a commitment to advance and improve the manner in which their care is delivered. Ingenuity, persistence, and innovation are traits that are woven into the fabric of this Department. These same qualities and the ability to leverage the strengths of the University of Pittsburgh's biomedical community uniquely position us to change and improve the way we diagnose and treat neurologic diseases. We are fortunate to be part of an exceedingly supportive medical center where innovative ideas can be turned into transformative therapies. The human capital is extraordinary and the opportunities endless.

Our goal is to provide to each patient the very best that modern medicine has to offer. Patients with complex disorders are seen and evaluated by our multidisciplinary subspecialists, and their cases discussed in one of our many multidisciplinary conferences. One of our strengths is the broad spectrum of available technical approaches for the treatment of both common as well as unusual and

complex disease entities. With an unparalleled technical spectrum of abilities, we shall tailor treatment to individual patient needs, always seeking to do our utmost.

Master clinicians equipped with the latest technical facilities and surrounded by a group of talented and most caring health care providers are the keys to quality health care. For example, intracranial aneurysms are evaluated by microvascular as well as endovascular neurosurgeons in multidisciplinary conferences providing the patient both with option and the combined expertise of different therapeutic approaches. Brain and spinal cord tumors are evaluated and treated using a broad variety of techniques including endoscopically-approached, microsurgery as well as radiosurgery. Complex spinal disorders are treated by highly experienced neurosurgeons providing a broad spectrum of minimally invasive techniques and modern instrumentation. This kind of work is possible because we have close collaborative efforts with many leading subspecialists from a myriad of different departments.

Advances in therapies will only come by the work of gifted basic and clinician scientists. Our department is fortunate to house a significant number of talented individuals who continuously move our fields forward. Being a clinical department, our overriding goals are to develop novel approaches for the treatment of a broad spectrum of devastating diseases. Given the limited regenerative abilities of the brain and spinal cord following injury, our goal is to develop therapies that both reduce the impact of initial damaging events, as well as to enhance endogenous abilities for neurologic recovery. Through our collaborative work we will develop novel drugs to stop neurologic decline and enhance neurorecovery.

I know that given the combination of our clinical and investigative talents, we are positioned to improve and develop treatments for patients and play a transformative role in the development of new therapies for neurologic diseases. Our past is distinguished, our present is unmatched, and the promise of our future boundless. •



University of Pittsburgh/Joshua Francos

New Department of Neurological Surgery Chairman, Robert M. Friedlander, MD

Chairman

Robert M. Friedlander, MD

Professors

C. Edward Dixon, PhD
(Vice Chairman, Research)
Michael B. Horowitz, MD
Larry W. Jenkins, PhD
Douglas S. Kondziolka, MD, MSc
(Vice Chairman, Education)
L. Dade Lunsford, MD
John J. Moossy, MD
Ian F. Pollack, MD
(Vice Chairman, Academic Affairs)
Mingui Sun, PhD

Associate Professors

Jeffrey Balzer, PhD
Peter C. Gerszten, MD, MPH
Ajay Niranjani, MD
Hideho Okada, MD, PhD

Assistant Professors

David J. Bissonette, PA-C, MBA
(Executive Director)
Donald J. Crammond, PhD
Johnathan Engh, MD
Anthony Fabio, PhD
Juan C. Fernandez-Miranda, MD
Paul A. Gardner, MD
Paola Grandi, PhD
Miguel Habeych, MD, PhD
Brian Jankowitz, MD
Adam S. Kanter, MD
Arlan H. Mintz, MD, MSc
David O. Okonkwo, MD, PhD
Richard M. Spiro, MD
Mandeep Tamber, MD
Elizabeth C. Tyler-Kabara, MD, PhD

Clinical Professors

Adnan A. Abla, MD
Matt El-Kadi, MD, PhD
(Vice Chair, Passavant Neurosurgery)
Joseph C. Maroon, MD
Daniel A. Wecht, MD, MSc

Clinical Associate Professors

John R. Baker, MD, PhD
Michael J. Rutigliano, MD, MBA

Clinical Assistant Professors

Pedro J. Aguilar, MD
Eric M. Altschuler, MD
J. William Bookwalter, MD
Daniel M. Bursick, MD
David J. Engle, MD
Stephanie Greene, MD
David L. Kaufmann, MD
Parthasarathy D. Thirumala, MD
Matthew M. Wetzel, MD

Research Assistant Professors

Yue-Fang Chang, PhD
Wendy Fellows-Mayle, PhD
Mitsugu Fujita, PhD
Esther Jane, PhD
Wenyan Jia, PhD
Hideyuki Kano, MD, PhD
Daniel Premkumar, PhD
Hong Qu Yan, MD, PhD

Clinical Instructors

Jeff Bost, PA-C
Sandi Lam, MD

Chief Residents

Hilal Kanaan, MD
Dean B. Kostov, MD
Richard Singleton, MD, PhD

Congratulations graduating 2010 neurosurgery residents



The Department of Neurological Surgery would like to congratulate its graduating residents Brian Jankowitz, MD, Ricky Madhok, MD, and Devin Amin, MD, PhD (pictured here 3rd, 4th and 6th from left in front row, respectively, with new department chairman Robert M. Friedlander, MD, and residency training program director L. Dade Lunsford, MD, and other residents at June graduation dinner.) For more info, see our 'News and Notes' section.

Some Key Department Phone Numbers

Brain Function & Behavior	(412) 647-7744	Movement Disorders	(412) 647-7744
Brain Trauma Research Ctr	(412) 647-0956	Neurotrauma	(412) 647-1025
Brain Tumor	(412) 647-6778	Pediatric Neurosurgery	(412) 692-5090
Carotid Disease.....	(412) 647-6778	Referrals (General).....	(412) 647-3685
Cerebrovascular	(412) 647-6778	Residency Program	(412) 647-6777
Clinical Neurophysiology.....	(412) 647-3450	Speakers Bureau.....	(412) 647-3685
CyberKnife	(412) 647-1700	Spine	(412) 802-8199
Donations.....	(412) 647-7781	Synergy.....	(412) 647-9786
Endonasal Surgery	(412) 647-6778	UPMC News Bureau	(412) 647-3555
Endovascular	(412) 647-7768	UPMC Presbyterian.....	(800) 533-8762
Gamma Knife	(412) 647-7744	Website.....	(412) 647-7931

for *MORE* information

on the **University of Pittsburgh Department of Neurological Surgery**,
visit our **website** at

UPMC www.neurosurgery.pitt.edu

UNIVERSITY of PITTSBURGH
neurosurgerynews

Editor: Douglas Kondziolka, MD • **Production Editor:** Paul Stanick

Newsletter .pdf archive is available on our website at www.neurosurgery.pitt.edu/news/neuronews
General Phone & Referrals: (412) 647-3685 • **Department e-mail:** neuroinfo@upmc.edu

All *University of Pittsburgh Neurosurgery News* content is copyrighted and is meant solely for the educational purpose of the reader. Please consult your physician before taking any medical actions, or contact the University of Pittsburgh Department of Neurological Surgery at (412) 647-3685.

How important are age and disease duration for planning deep brain stimulation surgery in Parkinson's Disease patients?

by Brodie Parent, BA; Sarah Berman, MD, PhD; Valerie Suski, DO; Donald Crammond, PhD; Douglas Kondziolka, MD

Deep brain stimulation (DBS) of the subthalamic nucleus has well-established efficacy in treating the symptoms of Parkinson's Disease (PD). In a recent randomized controlled trial, DBS was shown to be approximately 40% superior to best medical therapy at improving motor function and quality of life at six months in PD patients. Given that PD is progressive in nature, and given that DBS has substantial sustained benefits, recent discussion has focused on expanding the population of patients referred for DBS surgery. However, little is known about the optimal age and disease duration for DBS intervention. Moreover, the available studies have assessed outcomes in terms of overall motor function and quality of life, but few have targeted specific motor outcomes for comparison across subgroups. In this study, we assess variation in rigidity and dyskinesia between post-operative subgroups undergoing optimal DBS therapy.

At the University of Pittsburgh Medical Center, patients with PD undergoing DBS surgery may voluntarily opt into a registry which records their demographic information, disease status, intra-operative events, and post-operative follow-up. Inclusion criteria for both the surgery and the registry are defined by a diagnosis of idiopathic PD, age greater than 30 years, duration of disease greater than two years, disease severity quantified as Hoehn and Yahr stage 2 or greater, and preserved levodopa responsiveness. Pre-operatively, a movement disorder neurologist assessed each patient's motor function, both 'on' and 'off' prescribed anti-parkinsonian medications. Intra-operatively, the location of the subthalamic nucleus was confirmed via characteristic neuronal activity patterns on microelectrode recordings. All surgeries were performed by the same neurosurgeon and neurophysiologist. Postoperatively, patients were programmed three to four weeks later and received continuous stimulation. At each follow-up visit, university movement disorder neurologists assessed motor function and patient-reported complications. We divided patients into groups according to age > or < 70 and disease duration > or < 10 years.



Clinical neurophysiologist Donald Crammond, PhD, evaluates and tests patient's motor and sensory levels during deep brain stimulation procedure.

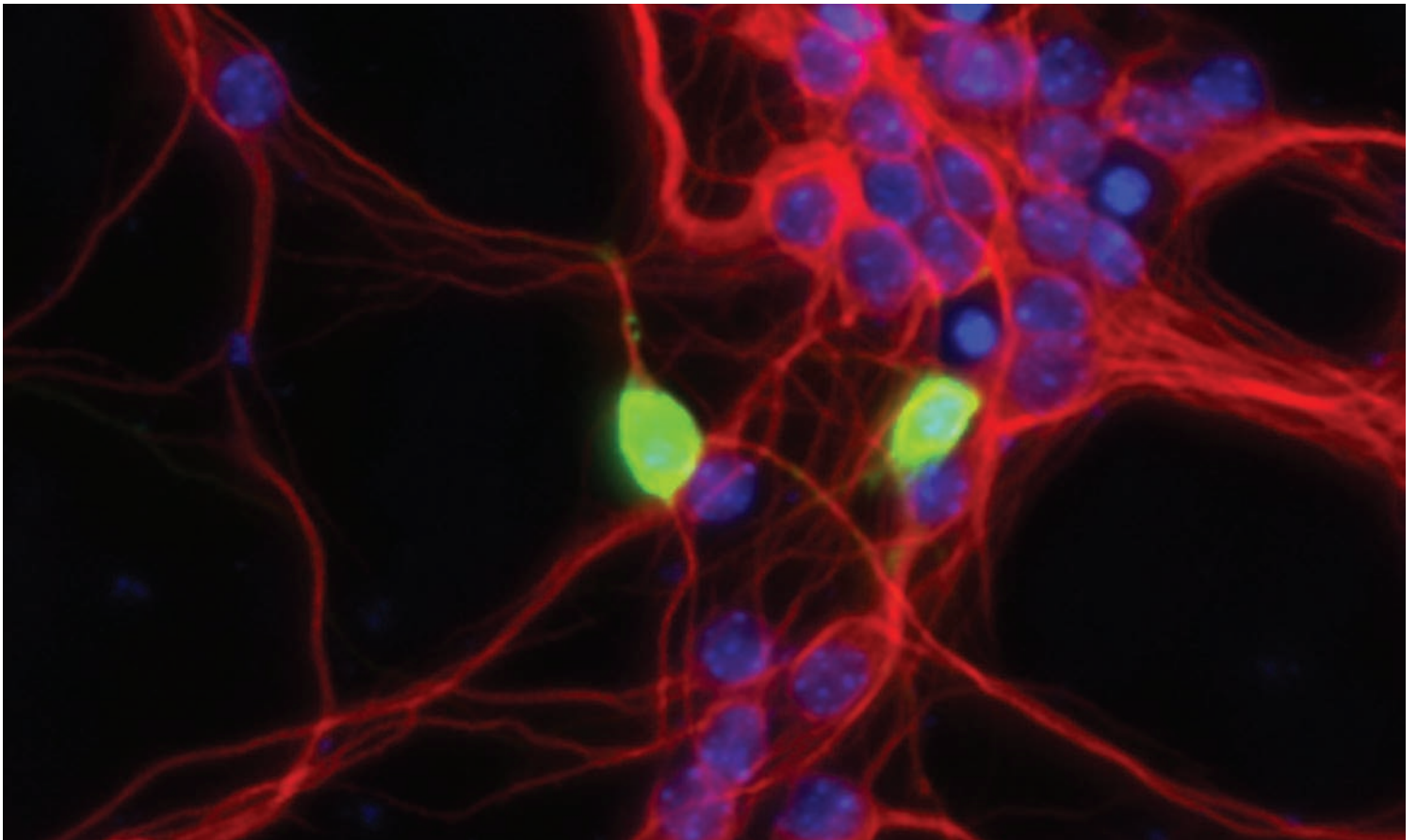
UPDRS mean dyskinesia score for patients with >10 years disease was 3.5 ± 0.63 versus 2.2 ± 1.68 in patients with ≤ 10 years disease ($p=0.02$). Of note, the mean age in patients with disease duration >10 years and ≤ 10 years was 64.3 years and 60.7 years ($p=0.3$), respectively. At three months, both mean rigidity and mean dyskinesia scores dropped significantly from preoperative scores, by 55% and 78% respectively ($p<0.001$). Moreover, this significant reduction was maintained at 1 year, with overall 43% reduction in rigidity and 72% reduction in dyskinesia.

Rigidity mean scores initially significantly decreased in both disease duration subgroups. However, at one year, only patients with ≤ 10 years disease showed sustained significant improvement, with a 45% reduction in rigidity ($p=0.027$). Those with >10 years disease initially showed a significant decrease in rigidity at three months, and the mean rigidity score at one year remained 31% below the preoperative mean. Rigidity mean scores were significantly decreased by 58% at one-year follow-up in patients <70 years old ($p=0.004$). However, in patients ≥ 70 years old, rigidity failed to significantly change at any time-point after surgery ($p=0.863$ at one year). Dyskinesia

mean scores showed significant sustained reductions at one-year across all subgroups. At one year, patients with >10 years disease had 70% improvement ($p=0.011$) and patients with ≤ 10 years had 64% improvement ($p=0.005$). At one-year, patients ≥ 70 years old had 90% improvement ($p=0.016$) and patients <70 had 53% improvement ($p=0.003$).

A comparison of the change in mean scores was also performed across subgroups at both three-months and one-year. Improvement in rigidity was significantly greater in patients <70 years old when compared to patients ≥ 70 years old at three months and one-year ($p=0.019$ and $p=0.043$, respectively). Improvement in rigidity was not significantly different between disease duration subgroups. Improvement in dyskinesia was significantly greater in patients ≥ 70 years old when compared to patients <70 years old at one-year ($p=0.011$). Improvement in dyskinesia appears to be significantly greater in patients with >10 years disease when compared to patients with ≤ 10 years disease at three-months ($p=0.038$), but this difference was not sustained at one-year.

(continued on back page)



Finding therapies for untreatable diseases

by Robert M. Friedlander, MD

Neuronal cell death is a shared feature of a broad spectrum of neurologic diseases. Although the cause of cell death may be different in different diseases, the manner in which neurons die is remarkably similar. If we could understand the specific pathways activated during the neuronal death process, we could develop targeted therapeutics to try to block this process. This is the strategy that our laboratory has pursued over the past fifteen years. Our main guiding approach has been to enhance our understanding of mechanisms modulating neuronal cell death. By understanding both the triggers of cell death and the pathways that modulate the death process we would be able to develop rational targeted therapy for these devastating and often untreatable diseases. We use cellular and animal models for both acute (i.e. stroke, aneurismal subarachnoid hemorrhage, spinal cord injury, brain trauma) and chronic (i.e. Huntington's disease, ALS/Lou Gehrig's disease).

Huntington's Disease

Huntington's disease is a hereditary neurologic disease which begins in midlife (typically during the third to fifth decade) characterized by uncontrolled repetitive movements (chorea), psychiatric distress, and dementia. Moreover, the syndrome progresses inexorably towards death after ten to twenty five years. At present, there is no drug therapy that reverses or even slows the insidious course of HD. The cruel symptoms of HD, its resistance to experimental therapies, and a frequency of 1 in 10,000 (the highest among hereditary diseases in the American population) make research towards a cure a priority in the medical discipline.

Developing medication for HD has long frustrated academic physicians. Nevertheless, scientists studying the syndrome have a great advantage over those investigating other neurologic disease: the cause of HD is known to be a mutation in a gene encoding the huntingtin protein.

The protein produced from this gene is large (350 kDa) by the standards of most biological molecules. However, the harmful mutation always occurs at the very front of the amino-acid chain. All molecules of "huntingtin" protein begin with a stretch of tandem glutamines. In healthy individuals this amino acid is typically repeated about 20, though it can recur as many as 35 times. Person producing huntingtin with a longer stretch of glutamines—and there can be 100 or more in severely impacted patients—develop disease symptoms. The more repeated glutamines in the protein, the earlier is disease onset and the more severe the symptoms. As many carriers of the mutated gene have children before symptoms become noticeable, the disease can be perpetuated through successive generations.

Knowing the gene that causes HD is only a start to understanding the disease mechanism. The mutated protein starts a series of molecular changes that culminate in the nerve cell's death. Moreover, it is not just any nerve cells that die; middle spiny neurons in a brain region called the striatum are particularly vulnerable. Our lab investigates the later part of the cell death pathway, i.e., the events that directly lead to cell death. A pattern observed throughout evolution—from worms to humans—is outlined in *figure 1* on next page:

(continued on next page)

(continued from previous page)

Our lab uses a three-tiered strategy to develop drugs which inhibit cell death. The first step is to test a battery of chemicals for their ability to block cytochrome c release from purified mitochondria. (These organelles are familiar for their role in generating the cell's energy.) Twenty one among 1040 compounds were selected for their activity in this cell-free system. These candidate drugs were administered to cells carrying a copy of the mutated human gene for HD.

The most powerful drugs at blocking cell death in this *in vitro* disease model were given to R6/2 mice. These animals are a useful model for HD because they carry a piece of the mutated human gene for HD. R6/2 mice progressively lose motor control in a syndrome reminiscent of the human disease. We have already identified several compounds which delay the disease progression in this disease-model: the antibiotic minocycline, the hormone melatonin, and the anti-glaucoma drug methazolamide. Minocycline is now under clinical investigation.

Ischemic Stroke

Ischemic stroke is the third commonest cause of death in the developed nations and the leading cause of disability. My lab investigates strategies aimed at diminishing damage from ischemic stroke. As with the experimental therapy proposed for HD, we are trying to identify a drug that blocks the cell death pathway in affected neurons. To understand these ideas one must know about the physiology of ischemic stroke.

In the core region of the infarct, a severe lack of oxygen causes nerve cells to suffer metabolic collapse and necrotic death. By contrast, neurons in the ischemic penumbra are stressed by low oxygen tension. Consequently, they undergo apoptotic death after activation of an endogenous cell death pathway. We are attempting to block the molecular events that constitute this lethal process.

We hypothesized that many molecular changes that underlie chronic neurologic degeneration also mediate acute brain injury. Fol-

lowing this line of reasoning, my laboratory investigated the twenty one drugs selected by their effects on purified mitochondria. Of course, the cellular model and *in vivo* models for ischemia differed from those for Huntington's disease. The former system consisted of primary cerebrocortical neurons (PCNs), i.e., nerve cells isolated from the brain of embryonic mice. These cells were stressed by transferring to a medium devoid of glucose and incubating them for three hours in an anoxic chamber. Control cells were kept in glucose-containing medium at atmospheric oxygen tension. Subsequently, the extent of cell death was measured in test and control culture dishes. Our lab is using this system to determine the effects of the same drugs as discussed for HD. We found that supplementing the culture medium with methazolamide, melatonin, and minocycline decreases the extent of cell death from oxygen/glucose-deprivation (OGD).

The next step is to determine whether these drugs decrease ischemic damage *in vivo*. The animal model for ischemic stroke is middle cerebral artery occlusion (MCAO) in mice. The animals are sacrificed after 24 hours of MCAO, and their brains are removed and prepared for analysis. Sections of brain are stained so as to reveal the area of tissue death. By measuring successive brain slices, the area of the infarct is reconstructed. In a striking endorsement of our experimental strategy, both melatonin and methazolamide decreased the volume of ischemic infarct. Moreover, compared to untreated animals, mice given these drugs better retained normal behaviors despite 24 hours of MCAO.

We have made significant progress over the last decade, both in understanding how cells die, and how to interfere with this process. Given the lack of effective endogenous regeneration of the brain and spinal cord, ameliorating or halting the cell death process is of critical importance in order to be able to make a difference for our patients. These approaches are both useful for a broad spectrum of neurologic diseases as well as for making surgical procedures with risks of ischemic injury safer. •

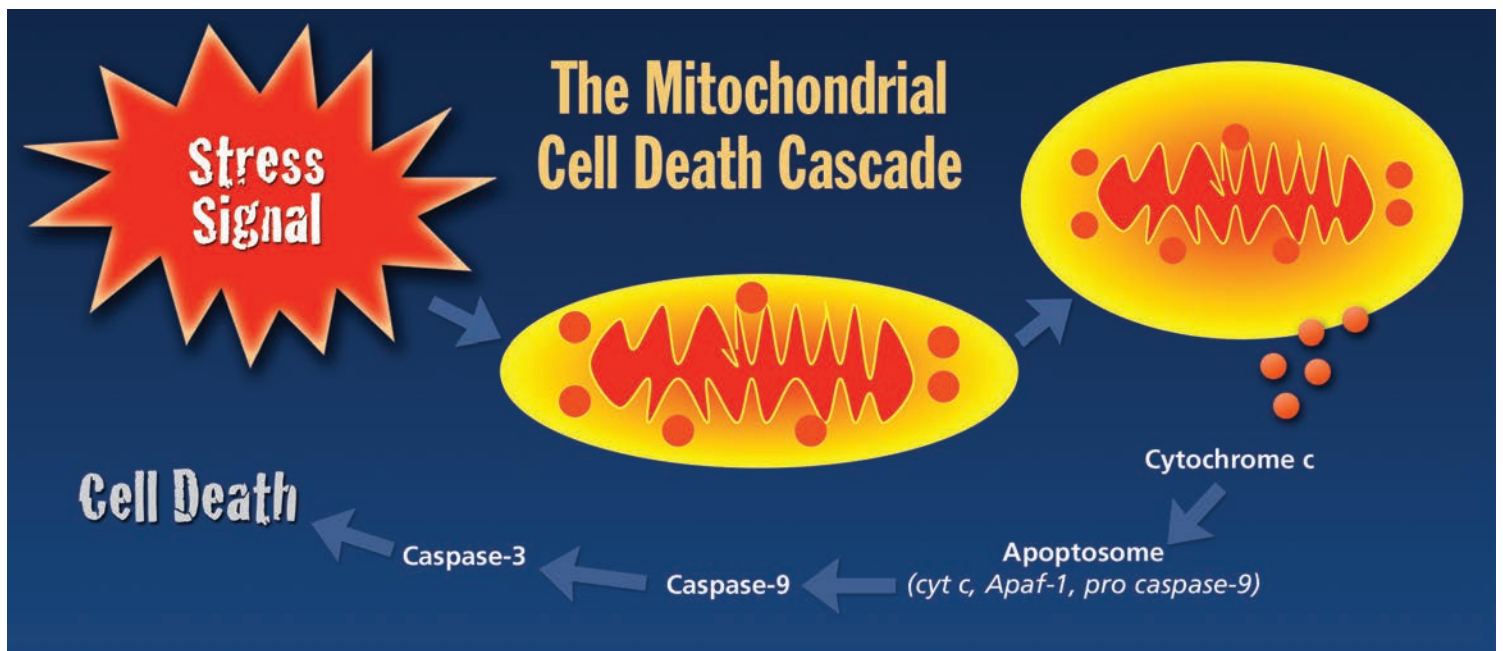


Figure 1: Following exposure to a stressful environment (i.e. stroke, trauma, Huntington's disease), neurons can trigger an endogenous suicide program mediated by proteins called caspases. Following caspase activation, the cell goes through a process called program cell death, also known as apoptosis.

Torticollis: An ancient problem, a modern solution

by Douglas Kondziolka, MD

Twisting and torsion of the neck muscles (torticollis) can be a painful, functionally disabling, and socially incapacitating problem. For centuries, torticollis has been addressed with neck braces, muscular injections of botulinum toxin (botox), the cutting of muscles thought to be responsible for pulling the neck, decompression of blood vessels that might compress the accessory nerve, section of the intraspinal motor nerves, and surgeries targeted to the brain itself. Although now correctly classified as cervical dystonia, torticollis is part of a frustrating group of neuromuscular syndromes that often can be difficult to diagnose and often more challenging to manage.

Dystonia is a term coined by Oppenheim in 1911 to describe a disorder causing variable muscle tone and recurrent spasms. It is often unrecognized by primary-care physicians, unless severe, and results in involuntary concomitant contractions of agonist and antagonist muscles with overflow of unwanted contractions to adjacent muscles. This frequently leads to twisting and repetitive movements with abnormal postures, and it can affect an isolated part of the body or be more generalized. The average age of onset is 17 years with bimodal incidence peaks at 9 and 40 years of age. The symptoms can be worsened with movement.

The spectrum of symptoms can include torticollis, cervical muscle strain, dry eyes (related to blepharospasm), writer's cramp or more generalized symptoms affecting the limbs and/or torso. Even a diagnosis of cerebral palsy may inadvertently be given to somebody with a genetically-based dystonia. Many dystonias are unaccompanied by other neurological problems except tremor and myoclonus. The most common type is cervical dystonia, usually with onset between the ages of 30 and 50. It is estimated that there may be 100,000 such patients in the United States. When the onset of dystonia is in childhood or young adulthood, it often begins at a focal site and later becomes generalized. After age 25, it is usually not progressive. There are many genetic forms of dystonia with a locus on the "DYT" gene. There can be dominant, recessive or X-linked inheritance patterns.

Medical therapy for torticollis has included baclofen, anticholinergic medicines, dopaminergic agents, benzodiazepines, or local injections of Botox, perhaps now the most frequent form of treatment. In the last decade, deep brain stimulation (DBS) of the globus pallidus has become the treatment of choice for severe cervical dystonia. Now approved by the United States Food and Drug Administration under a human device exemption (that requires IRB approval for both adults and children), we have been offering children and adults this surgery for years. The initial observation that pallidal surgery could help dystonia was made in patients with Parkinson's disease who had dystonia and who sustained benefit after a radiofrequency pallidotomy. Although the mechanism of DBS is unknown, it is believed to be inhibitory to the globus pallidus and thus impact outflow to the thalamus and cortex. It may work through modulation of network firing patterns rather than just pure pallidal inhibition, since the effects build over time and are not immediate such as when deep brain stimulation is used to stop tremor.

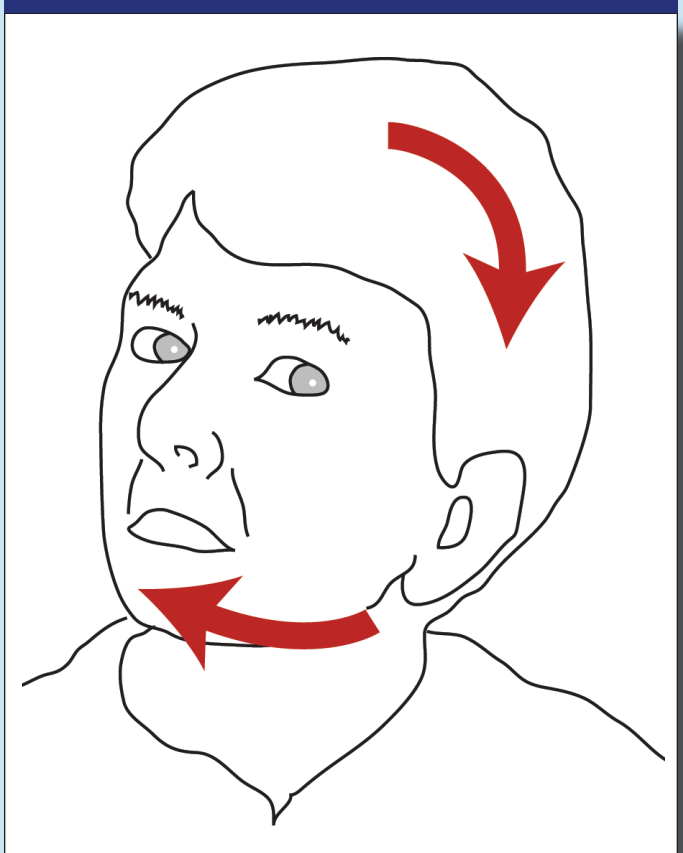
Our experience at the University of Pittsburgh includes both adults and children with focal and generalized dystonia. In follow-ups extending past five years, almost all patients have had moderate to significant improvement including those with complex presentations such as Meige's syndrome that include cervical dystonia, oral dysphonia,

and blepharospasm. Other patients who previously had numerous hospitalizations with generalized dystonia, even to the point of "status dystonicus" are now walking without return to severe dystonic disability. Studies from other centers including a prospective randomized sham-controlled trial have shown that pallidal deep brain stimulation improves quality of life in both segmental and generalized dystonia.

At times, stimulation parameters are much higher than specifically seen in Parkinson's disease. These can require more frequent battery changes. To this end, a new rechargeable pulse generator has been available for the last four months, and four patients with dystonia have had rechargeable systems placed. To date, these have been well tolerated. Typically, patients choose to recharge themselves nightly for a few minutes or every week or two with a longer session. This is done wirelessly with a rechargeable device placed over the pulse generator.

Dystonia remains a complex neurological problem due to its myriad forms and degrees of disability. The globus pallidus and its outflow appears to be a unique physiological site for neuromodulation. "Rewiring" of the neural control of agonist and antagonist muscles appears to be a better solution than the older operations where muscles were simply incised. As our understanding of neural circuitry improves, we continue to expect the development of new therapies for other movement and behavioral disorders. •

Torticollis



Cervical dystonia affects the muscles of the neck and shoulder leading to persistent torsion and discomfort.

Department Honors Graduating Residents

A special black-tie graduation reception and dinner was held June 12 at the Fox Chapel Golf Club honoring chief residents **Devin Amin, MD, PhD**, **Brian Jankowitz, MD**, and **Ricky Madhok, MD**, on their successful completion of the University of Pittsburgh's seven-year neurological surgery residency program. The event was attended by well over 100 faculty members, colleagues, family and friends.

Dr. Amin is headed for Southern Illinois University in Springfield IL, while Dr. Madhok is headed for the Harvey Cushing Neuroscience Institute at the North Shore University Hospital in Manhasset, NY. Dr. Jankowitz is remaining with the University of Pittsburgh to practice endovascular neurosurgery with Michael Horowitz, MD.

During the evening's festivities, the department's annual teaching awards were announced. Dr. Madhok was selected as best resident teacher by the staff and **Peter Gerszten, MD**, and **L. Dade Lunsford, MD**, shared the best faculty teacher award as selected by the residents.

Lunsford, Maroon, Pollack Cited Among Best

L. Dade Lunsford, MD, **Joseph C. Maroon, MD**, and **Ian Pollack, MD**, were name among this area's top doctors in their field in a national survey published locally in the May issue of *Pittsburgh Magazine*.

The annual survey was conducted by Castle Connolly, Ltd., a health care research and information company founded in 1991 by a former medical-college board chairman and president to help guide consumers to America's top doctors and top hospitals

According to the magazine's website, "Castle Connolly's physician-led team of researchers follows a rigorous screening process to select top doctors on the national and regional levels. Using mail and telephone surveys and electronic ballots, the team asks physicians and the medical leadership of leading hospitals to identify highly skilled, exceptional doctors. Careful screening of doctors' educational and professional experience is essential before final selection is made among those physicians most highly regarded by their peers.

It's the ninth straight year for Dr. Lunsford's inclusion on the list.

UPMC Stroke Program Receives Achievement Award

In May of 2010, the **UPMC Mercy Stroke Program** was presented with the Gold Plus Performance Award by the American Heart Association and American Stroke Association. The award recognizes an 85% or higher adherence score for consecutive 12-month intervals in seven achievement areas, and a 75% or higher compliance score in additional patient care and outcome areas.

John Baker, MD, is director of the program, and **Kathleen Seiler, RN, BSN**, is the program's coordinator.

In April, the Joint Commission on Accreditation of Health-care Organizations (JCAHO) certified UPMC Mercy as a Primary Stroke Center.

In the News

- **Eric Altschuler, MD**, was quoted in a May 5 ESPN *E:60* feature story dealing with concussions in football.

- **Elizabeth Tyler-Kabara, MD, PhD**, was featured on the May 4 WQED-TV (Pittsburgh) edition of *OnQ* magazine. Dr. Tyler-Kabara discussed how brain mapping can pinpoint microscopic areas of the brain causing epileptic seizures in children.

- **Douglas Kondziolka, MD**, was quoted in a April 19 *Wired* magazine article, 'Military's Extreme Medicine Wing,' that took a look at the University of Pittsburgh's involvement in Armed Forces Institute of Regenerative Medicine (AFIRM) project designed to fund leading-edge research into the science of rebuilding human muscle, tissue and minds.

- **Matthew Tormenti, MD**, was interviewed on a June 1 *Journal of Neurosurgery* podcast discussing a hybrid dynamic stabilization and fusion system utilized in lumbar spine procedures.

Prominent Appearances

- **Dr. Gerszten** gave the keynote lecture at the 15th International Meeting of the Leksell Gamma Knife Society in Athens, Greece on May 17.

Congratulations

- **Dr Altschuler** was selected president-elect of the Pennsylvania Neurosurgical Society. His two-year terms begins in July.

- According to recent statistics released from the CyberKnife Society at their February 2010 annual meeting, the University of Pittsburgh was listed as the number one CyberKnife center in the U.S.—and second in the world—for intracranial treatments.

- **Dr. Lunsford** received the 2010 Pioneer in Radiosurgery Award at the 15th International Meeting of the Leksell Gamma Knife Society in Athens, Greece. The award is given every two years to someone who has made a significant contribution to the field of radiosurgery.

- **Brad Stephens** received the Department of Neurological Surgery's Theodore Kurze award, given to a senior University of Pittsburgh medical student exemplifying excellence in clinical neuroscience. Stephens will train in neurosurgery at Washington University Barnes Hospital starting this July. The award carries a cash honorarium.

Special Note

- **Kristen E. Jones** was a guest bartender/organizer of the charity event "Rock the Streets" in Shadyside. The event benefits Community Human Services, a local Pittsburgh charity providing food, clothing, shelter, and educational opportunities for local low-income individuals. The event raised over \$100,000 for the charity.

Welcome

- **Christopher Deibert, MD**, **Zachary Tempel, MD**, and **Nathan Zwagerman, MD**, PGY-1 residents. Dr. Diebert is a native of Pottsville, PA, and a graduate of the University of Pittsburgh School of Medicine. Dr. Tempel is from Indianapolis, IN, and attended the Indiana University School of Medicine. Dr. Zwagerman hails from Zeeland, MI, and graduated from the Wayne State University School of Medicine.

- **Bonnie McKibben**, administrative support for Drs. Gerszten, Adam Kanter, Brian Jankowitz Paul Gardner and Juan Fernandez-Miranda; **Gisele Dudek**, administrative secretary for Robert M. Friedlander, MD; **Mary Elizabeth Cable (Liz)**; medical records clerk. •



Department of Neurological Surgery
 University of Pittsburgh Medical Center
 UPMC Presbyterian/Suite B-400
 200 Lothrop Street
 Pittsburgh, PA 15213
 (412) 647-3685
 neuroinfo@upmc.edu

www.neurosurgery.pitt.edu



Patient Referrals
 (412) 647-3685



www.NewWindEnergy.com

UPMC

Recognized as an honor roll member of *U.S. News & World Report's* 'America's Best Hospitals' 2009-10

SUMMER 2010 • VOLUME 11, NUMBER 3

A look at age, disease considerations in DBS surgery for Parkinson's Disease

(continued from page 3)

Overall, our results show that there is a sustained significant reduction in rigidity and dyskinesia one year after DBS surgery. This confirms multiple prior studies which indicate that DBS is a proven effective therapy for managing symptoms of PD and improving quality of life. Selection criteria for DBS patients which favor optimal motor outcome have been established in prior studies. Ideal patients should have a diagnosis of idiopathic PD with disabling symptoms despite optimal medical therapy, or should have intolerable side effects to medication. Patients should have moderate to severe motor symptoms with a clearly preserved response to levodopa. DBS is most often indicated for severe motor fluctuations and dyskinesia but may also be used for refractory tremor. Contraindications to surgery include poor cognition, dementia, or significant psychiatric illness. Chronologic age beyond 70 years and disease duration

less than five years have been cited as relative contraindications to surgery, but these last criteria are based on limited data.

The data from our study demonstrate that younger patients have significantly improved rigidity (50-60%) at one year after surgery, while older patients show no significant change in rigidity from their preoperative baseline. The apparent loss of efficacy with chronologic age may be mechanistically similar to the known decreased efficacy of levodopa with increased age and disease duration. The results of our analysis may therefore suggest that patients ≥ 70 are not optimal candidates for DBS if rigidity is the main indication for surgery. Results for dyskinesia show different trends. Dyskinesia markedly improves in both age subgroups, but improves more dramatically in older patients (90% versus 53% improvement). The results of this analysis may indicate that patients ≥ 70 should undergo DBS surgery if dyskinesia is a main indication for surgery.

In summary, the data from this study indicate that rigidity tends to improve more dramatically in younger patients with shorter disease duration, while rigidity tends to be merely stabilized by surgery in older patients with longer disease duration. Moreover, this study indicates that dyskinesia seems to markedly improve in older patients after surgery, with more modest reductions in dyskinesia for younger patients. Dyskinesia response does not appear to be affected by disease duration.

Therefore, performing surgery on patients at a younger age with short disease duration may more effectively delay functional impairment. Early intervention may slow the disease before patients have developed a markedly diminished quality of life and before they have become medically refractory. Nevertheless, if older patients with longer disease duration are primarily affected by dyskinesia from chronic levodopa use, DBS surgery can also offer marked improvement. •