Research & Training

Cerebrovascular Research Laboratory

The laboratory employs experimental models to study the pathophysiology of cerebral ischemia/reperfusion injury, with a focus on clinical translation. This NIH-funded effort has recently identified a specific component of the complement cascade that mediates post-ischemic cerebral injury, and current studies seek to delineate the mechanisms of this injury, and to develop specific techniques of targeting complement and translating these findings to human neuroprotective trials.

Related projects focus on long-term functional outcome and post-ischemic cellular recovery. An active collaboration with Dr. Carol Troy (Pathology) seeks to understand novel mechanisms of caspase-mediated post-ischemic neuronal cell death/survival. In addition, recent laboratory studies are underway to study the role of the complement cascade, programmed cell death, and neurogenesis in spontaneous intracerebral hemorrhage, as well.

Clinical research efforts include those directed at understanding the pathological changes in large and small cerebral vessels following subarachnoid hemorrhage and trauma, in relation to arteriovenous malformations and other pathological vascular conditions. In collaboration with Dr. Eric Heyer (Anesthesiology), the lab has also shown that possession of the ε4 allele of the Apoε gene is a risk factor for neurocognitive decline following carotid endarterectomy. Researchers in the laboratory also play a pivotal role in the international effort to identify genes responsible for the formation of cerebral aneurysms. Finally, in collaboration with Dr. Stephan Mayer (Neurology), the laboratory has continued to examine the pathophysiology of delayed injury following aneurysmal subarachnoid hemorrhage.

Clinical Trials

At any one time, the NYNI is conducting a multitude of NIH- and foundation-funded research trials in all aspects of cerebrovascular disease. A partial list include the following: 1) Familial Intracranial Aneursysm Trial [genetic epidemiology; NIH]; 2) COSS [therapeutic bypass; NIH]; 3) MISTIE-ICES [therapeutic minimally invasive clot removal; NIH]; 4) ARUUBA [therapeutic AVM treatment; NIH]; 5) SAMPRIS [therapeutic intracranial stenting; NIH]; 6) CREST [therapeutic endarterectomy; NIH]; 7) Neurocognition following carotid revascularization [epidemiology and shunting; NIH]; 8) Duradapt [novel surgical adjunct; NGO]; 9) Non-invasive ICP [novel critical care adjunct; NGO]

Training

Residency

Neurosurgery – Program Director, Dr. Jeff Bruce, 212-305-7346
Neurology - Program Director, Dr. Blair Ford, 212-305-0549
NeuroRadiology – Program Director, Dr. Robert DeLaPaz, 212-305-9820

Fellowships

Endovascular Surgical Neuroradiology – Program Directors, Dr. Sean Lavine, 212-305-0135 and Dr. Phil Meyers, 212-305-6384
Stroke - Program Director, Dr. Randolf Marshall, 212-305-8389
Neuro Critical Care – Program Director, Dr. Neeraj Badjatia, 212-305-3251

Contact Information

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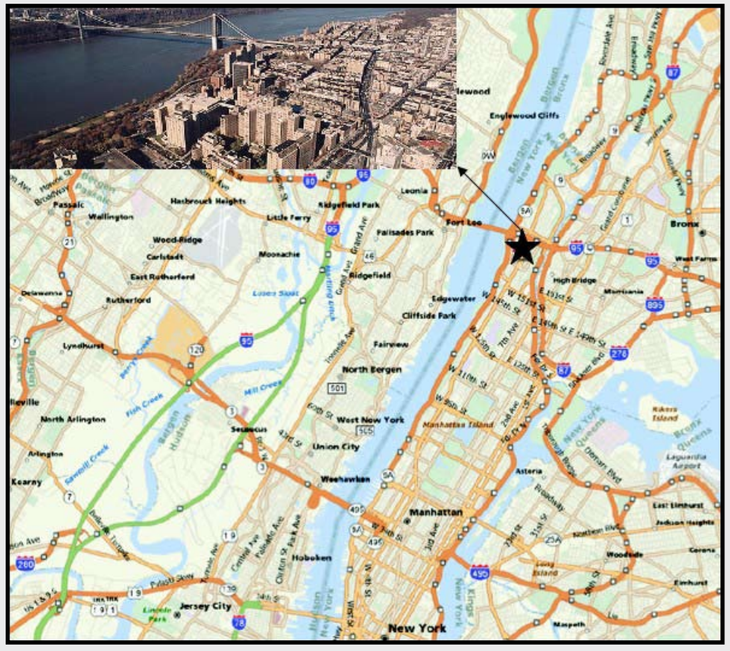


COLUMBIA UNIVERSITY
MEDICAL CENTER

The Cerebrovascular Center
at the
Department of
NEUROLOGICAL SURGERY

Discover. Educate. Care. Lead.

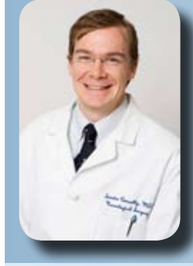
The Department of Neurological Surgery at Columbia University Medical Center and New York-Presbyterian Hospital, is where exceptional patient care, innovative research and leading technology converge in a challenging academic environment to create a world-class center for neurological diseases. Our Cerebrovascular Neurosurgery Center provides comprehensive treatment for blood vessel disorders of the brain and spine. Recent scientific studies demonstrate that experienced neurosurgeons and interventional neuroradiologists at neuroscience centers of excellence achieve the best possible patient outcomes.

www.columbianeurosurgery.org

The Cerebrovascular Team

Robert A. Solomon, M.D., F.A.C.S.
Byron Stookey Professor of Neurosurgery
Chairman and Director of Service
(212) 305-4118
ras5@columbia.edu

Dr. Solomon has specialized in the surgical treatment of cerebrovascular diseases since 1986, and has amassed extensive experience in this area. His special interests are in the identification and definitive treatment of cerebral aneurysms and cerebral arteriovenous malformations before rupture and before the onset of devastating neurological problems. Dr. Solomon has developed an outstanding team of physicians to handle even the most complex problems with minimal invasion and the highest degree of safety. His team includes neuroradiologists and neurosurgeons who are the regional experts in non-surgical endovascular treatment of cerebrovascular diseases.



E. Sander Connolly Jr., M.D.
Associate Professor of Neurological Surgery
Director, Cerebrovascular Research Laboratory
Surgical Director, Neuro-Intensive Care Unit
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esc5@columbia.edu

Dr. Connolly serves as the Surgical Director of the Neuro-Intensive Care Unit, caring for patients suffering from the acute effects of both hemorrhagic as well as ischemic stroke. Working as part of an extremely experienced and world-renowned team of critical care and stroke neurologists, as well as interventional radiologists, endovascular neurosurgeons, neuroanesthesiologists, and specialized nurse practitioners, he provides highly personalized, state of the art care for patients with brain aneurysms, arteriovenous malformations, spontaneous hemorrhages, as well as for those patients with carotid stenosis, moyamoya disease, and cerebral ischemia due to atherosclerosis and other vasculopathies.

Sean D. Lavine, M.D.
Assistant Professor of Neurological Surgery and Radiology
Clinical Co-Director, Neuroendovascular Services
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sl2081@columbia.edu

Dr. Lavine dedicates his practice exclusively to diseases associated with the cerebrovascular system and to those diseases treated with Endovascular Neurosurgical and Interventional Neuroradiological Procedures. He was among the first surgeons in the country to complete training in these procedures after completing neurosurgical training. He serves as a Clinical Co-Director of Neuroendovascular Services at the Columbia University Medical Center, New York Presbyterian Hospital. Together with Drs. Robert Solomon, E. Sander Connolly, & Philip Meyers, Dr. Lavine & the Department offer comprehensive care of cerebrovascular and related diseases.

Philip M. Meyers, M.D.
Associate Professor of Radiology and Neurological Surgery
Clinical Co-Director, Neuroendovascular Services
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Dr. Meyers is an Associate Professor of Radiology and Neurological Surgery at Columbia University and Co-Director of Neuroendovascular Services at New York Presbyterian Hospitals. Dr. Meyers treats vascular disorders of the brain and spinal cord using minimally-invasive, image-guided techniques. Using state-of-the-art technology and working with a multi-disciplinary team, many vascular diseases of the head and neck, brain, and spine can be effectively treated without conventional surgery. Areas of academic interest and research include cerebral aneurysms and arteriovenous malformations, cerebrovascular blood flow regulation, intracranial and extracranial revascularization therapy.

Our Specialties

Brain Aneurysm

The Brain Aneurysm Center at Columbia offers state of the art treatment of ruptured and unruptured aneurysms. Based on the published literature and government databases, the center's results have been shown repeatedly to be the best in NY State and amongst the best in the world. In the case of an unruptured aneurysm, patients are first evaluated to see whether any surgical therapy at all is needed. If not, carefully designed long-term radiological follow-up studies are performed and patients are periodically reassessed. When treatment is warranted, patients are evaluated for both aneurysm clipping and aneurysm coiling. In some cases flow diversion techniques are considered, some of these involving extra-cranial to intra-cranial cerebral bypass, and others involving endovascular vessel sacrifice or stenting. Treatments are chosen only after weighing patient specific factors, patient preferences as well as all treatment options including those that might be investigational or involve a combination of microsurgical and endovascular techniques. Treatments are then performed in collaboration with a world-class team of neuro-anesthesiologists, led by Dr. Eric Heyer. Post-operative recovery is generally quite speedy and is managed by the treating member of the team along with an extremely experienced team of neurologists and cerebrovascular nurse specialists.

In those instances where the aneurysm has already bled, patients also benefit from our world-renowned team of neurological intensive care physicians, led by Drs. Stephan Mayer, Niraj Batjadia, Kiwon Lee and Jan Claasen. This team is largely responsible for development neurological critical care as a specialty, and has not only been the source of many of the field's major discoveries but has also trained numerous ICU directors throughout North America.
Phone: 212-305-5543

Brain AVM

The Brain AVM Center at Columbia offers state of the art treatment of ruptured and unruptured AVMs. The center has not only reported some of the lowest complication rates and highest cure rates in the literature, but has also led the international community in developing better tools to decide who should be treated and how the available treatments should be performed. Those treatments, which include microsurgery, Gamma knife radiosurgery, and endovascular embolization are currently employed to treat not only cerebral cortical AVMs, but dural AVMs, combined dural and cortical AVMs as well as spinal AVMs. In addition, the center has been on the forefront of managing and treating patients with cerebral cavernous malformations often in collaboration with our world-class Epilepsy group.
Phone: 212-305-5543

Acute Stroke Program

The Acute Stroke Program at Columbia is a collaborative program that leverages world-class stroke neurology, neuroradiology, emergency medicine and neurosurgery. It has been recognized as a center of excellence by the NIH, with both SPOTRIAS and NETT designation. I.V. rt—PA door to needle times are amongst the lowest in the country, and I.A. treatment protocols offer both local patients and those transferred from other institutions access to state of the art pharmacologic as well as mechanical revascularization. Sophisticated neuroimaging, as enabled by 3T MRI imaging in the neuro-ICU, has expanded the window for many patients and the center has been a leader in the multi-modality monitoring of these patients and defining those populations most benefited by surgical decompression.
Phone: 212-305-5543

Cerebral Bypass Surgery

The Cerebral Bypass Surgery Center at Columbia has provided support to the Brain Aneurysm Center for the rare aneurysm patient who requires microsurgical flow diversion but has focused most of its efforts on helping those patients with transient ischemic attacks or strokes resulting from atherosclerotic occlusion of either their intracranial or extracranial arteries. Currently in addressing that mission it is actively involved in managing those patients with symptomatic carotid occlusion that are eligible for surgery as part of the NIH-funded carotid occlusion surgery study (COSS). The center has also been able to help those with intracranial athero-occlusive disease that is not amenable to intracranial stenting as a participating center in the SAMPRIS trial. The center actively collaborates with the **Columbia Adult Moyamoya Surgery Center**. This center is actively involved in not only providing both direct and indirect bypasses for patients with moyamoya disease but is involved in both the medical management as well as the neuropsychological and neuro-radiological follow-up of these patients.
Phone: 212-305-5543

Cartoid Surgery Center

The Carotid Surgery Center at the New York Neurological Institute is a collaborative program involving the departments of Neurosurgery, Neurology, Radiology and Anesthesia. The center provides three important services. First, unbiased assessment aimed at determining whether medical management is optimal and whether procedural intervention is necessary. If procedural intervention is necessary, the center's mission is to provide referral to highly experienced surgeons and radiologists performing state of the art procedures to determine whether endarterectomy or angioplasty and stenting should be performed. Finally, the center then supports those performing the procedure with world-renowned neuroanesthesia, as well as highly innovative perioperative and postoperative care. Long-term follow-up can be received locally or at the Institute depending on the patient's desire.
Phone: 212-305-5543

Center Philosophy & History

Building on the pioneering work of Columbia neurosurgical giants such as Larry Pool (aneurysms; 1940s-70s), James Correll (carotid disease, EC-IC bypass; 1950s-80s) and Bennett Stein (AVMs, 1960-90s), and luminary Columbia neuroradiologists Juan Taveres (cerebral angiography; 1952-1964) and Sadek Hilal (endovascular therapy; 1975-1985), our team's goal is to provide each patient with the highest quality care by offering state of the art treatments, performed by a completely integrated group of highly experienced and skilled sub-specialists. Treatment decisions are made after careful consideration of all the options by the entire team including non-operative conservative management.

The College of Physicians and Surgeons, Columbia University was organized in 1807 and is the descendent of Kings College, which was the first institution in the North American Colonies to confer the degree of doctor of medicine in 1770. The Neurological Institute of New York was founded in 1909 and is the oldest institute dedicated exclusively to the care of patients with neurological disease in North America. The department of neurosurgery has been led over the years by Charles Elsberg (1909-1937), Byron Stookey (1937-1947), Ted Scarf (1947-1949), J. Lawerence Pool (1949-1972), Lester Mount (1972-1973), Ed Schlesinger (1973-1980), Bennett Stein (1980-1996), Don Quest (1996-1997) and Robert Solomon (1997-present) and now boasts a faculty of 21 neurosurgeons covering all the major subspecialty areas: 1) vascular/endovascular, 2) oncology, 3) spinal/peripheral nerve disorders, 4) epilepsy/functional, 5) pain, 6) pediatrics. Over 4000 cases are performed annually.