

**DATE PREPARED:** 10/1/08

**Name:** Edward Robert Smith

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Children's Hospital  
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**Place of Birth:** Newton, MA, USA

**Education:**

1992	B.A.	Dartmouth College
1996	M.D.	Columbia University
2005	Program in Clinical Effectiveness	Harvard School of Public Health

**Postdoctoral Training:**

1996-1997	Intern in General Surgery	Massachusetts General Hospital
1997-2003	Resident in Neurosurgery	Massachusetts General Hospital
1999-2001	Postdoctoral Research Fellow, Chiocca Laboratory	Massachusetts General Hospital
2003-2004	Fellow in Pediatric Neurosurgery	Children's Hospital, Boston
2004-2005	Clinical Research Fellow, Moses Laboratory	Children's Hospital, Boston

**Licensure and Certification:**

1999-	Registered Physician by the Commonwealth of Massachusetts Board of Registration in Medicine #161140
2007-	Board Certified in Neurosurgery (American Board of Neurological Surgery) #27058
2008-	Board Certified in Pediatric Neurosurgery (American Board of Pediatric Neurological Surgery)

**Academic Appointments:**

1996-2004	Clinical Fellow in Surgery	Harvard Medical School
2004-2006	Instructor in Surgery	Harvard Medical School
2006-	Assistant Professor in Surgery	Harvard Medical School

**Hospital or Affiliated Institution Appointments:**

1996-2004	Clinical Fellow in Surgery	Massachusetts General Hospital
2002-2003	Assistant in Neurosurgery	Massachusetts General Hospital
2003-2004	Shillito Staff Associate	Children's Hospital, Boston
2003-	Assistant in Neurosurgery	Brigham and Women's Hospital
2004-	Assistant in Neurosurgery	Children's Hospital, Boston
2005-	Consulting Staff-Surgical Services	Dana Farber Cancer Institute

**Other Professional Positions and Major Visiting Appointments:**

N/A

### **Hospital and Health Care Organization Clinical and Service Responsibilities:**

2004 – CHAMPS project – Children’s Hospital Applications Maximizing Patient Safety  
2005 - MRI Research Committee - Children's Hospital Boston  
2005 – JCAHO safety goal – Time out/universal protocol – Physician liaison for implementation and compliance  
2005- Vascular Anomalies Center (Neurosurgery)  
2005- Advanced Fetal Care Center (Neurosurgery)  
2005- Brain Tumor Program (Neurosurgery)  
2006- Brain Injury Program  
2006- Comprehensive Myelodysplasia Clinic  
2007- Perioperative clinical practice committee  
2007- Center for Head, Neck and Skull Base  
2007- Neurosurgical Stroke Program  
2008- Steering Committee - Phenotyping and Banking Core of Neurological Disorders

### **Administrative Responsibilities:**

2006 – Neurosurgery liaison to combined Neurology-Neurosurgery Departmental Conference  
2007 - Neurosurgery liaison to combined Endocrinology-Neurosurgery Conference  
2008- Co-Director, Center for Head, Neck and Skull Base, Children’s Hospital Boston  
2008- Co-Director, Neurosurgical Stroke Program

### **Major Committee Assignments:**

2007-2009 Liaison to the Pediatric Section Executive Committee of the AANS/CNS  
2007- Neurosurgery Research and Education Foundation (NREF) Executive Committee Liaison

### **Professional Societies:**

#### Congress of Neurological Surgeons

2005- Neurosurgical Research Committee, Congress of Neurological Surgeons  
2005- Education Committee, Congress of Neurological Surgeons  
2008- Fellowships Committee, Congress of Neurological Surgeons

#### American Association of Neurological Surgeons

2005-2009 Young Neurosurgeons Committee – American Association of Neurological Surgeons  
2008-2009 Secretary, Young Neurosurgeons Committee  
2009-2010 Vice-President (elect), Young Neurosurgeons Committee  
2010-2011 President (elect), Young Neurosurgeons Committee  
2005- Neurosurgery Research and Education Foundation (NREF) Silent Auction Committee – Young Neurosurgeons Committee  
2007- Education Coordinator Young Neurosurgeons Committee (Scientific Planning Committee, NREF, MOC, EPM)

#### International Society of Pediatric Neurosurgery

#### New England Neurosurgical Society

#### American College of Surgeons

#### American Heart Association / American Stroke Association

#### American Association for Cancer Research

#### American Medical Association

#### American Association of Pediatrics

Speciality Fellow of the American Association of Pediatrics

#### Massachusetts Medical Society

#### Alpha Omega Alpha

#### Sigma Xi Scientific Society

**Community Service Related to Professional Work:**

2008 National Youth Leadership Forum on Medicine (July 1, 2008, Boston, MA)

**Editorial Boards:**

2004- Ad hoc reviewer for *Stroke*  
2005- Ad hoc reviewer for *Brain*  
2005- Ad hoc reviewer for *Neurosurgery*  
2006-2008 Reviewer for *Practical Reviews in Neurosurgery*  
2006- Ad hoc reviewer for *Surgical Neurology*  
2006- Ad hoc reviewer for *Pediatrics*  
2006- Ad hoc reviewer for *Journal of the Neurological Science*  
2008- Ad hoc reviewer for *World Journal of Pediatrics*  
2008- Ad hoc reviewer for *Pediatric Neurosurgery*  
2008- Ad hoc reviewer for *Journal of Cerebral Blood Flow & Metabolism*  
2008- Ad hoc reviewer for *BMC Neurology*

**Awards and Honors:**

1991-1992 Presidential Scholar Research Grant  
Dartmouth College

1992 Graduated *cum laude* from Dartmouth College, *Sigma Xi* scientific honor society

1992-1993 Honors Research Program in Physiology  
College of Physicians & Surgeons, Columbia University

1996 *Alpha Omega Alpha* (AOA) medical honor society, College of Physicians & Surgeons,  
Columbia University

2000 American College of Surgeons - Massachusetts Chapter Annual Meeting Best  
Resident Presentation Award  
(*Individual award for best resident presentation at state meeting*)

American Association of Neurological Surgeons/Congress of Neurological  
Surgeons Tumor Meeting Best Resident Paper Award  
(*Individual award for best resident paper on tumor research at national joint meeting*)

New England Neurosurgical Society Best Resident Presentation Award  
(*Individual award for best resident presentation at regional meeting – NewEngland/Montreal*)

2002 Congress of Neurological Surgeons Synthes Basic Science Award  
(*Individual award for best basic science research related to neurosurgical critical care at national  
meeting*)

American Association of Neurological Surgeons/Congress of Neurological  
Surgeons Mayfield Basic Science Award  
(*Individual award for best basic science research related to spinal cord at national joint meeting*)

2003 American Association of Neurological Surgeons/Congress of Neurological  
Surgeons Pediatric Section Meeting Poster Award  
(*Individual award for best poster presentation at national joint meeting*)

- |      |  |
|------|--|
| 2005 | Harvard Medical School nominee for Damon Runyon Lilly Clinical Investigator Award  |
| 2006 | American Association of Neurological Surgeons/Congress of Neurological Surgeons Pediatric Neurological Surgery Annual Meeting Electronic Poster Presentation Award<br>( <i>Recognition of best submissions for highlighted presentation as electronic poster</i> ) |
| 2007 | Best Doctors in America<br>( <i>National peer-reviewed selection of physicians</i> )   |

## **Part II: Research, Teaching and Clinical Contributions**

### **A. Narrative report of Research, Teaching and Clinical Contributions**

Dr. Edward Smith is interested in the treatment of neurosurgical disease, with a clinical focus on the pediatric population, including brain tumors, neurovascular disorders, and neuro-endoscopy, incorporating conventional, minimally invasive and translational treatment modalities. His research is primarily centered on obtaining an increased understanding of the molecular mechanisms of tumorigenesis and angiogenesis in the central nervous system. This work has predominantly focused on a group of angiogenic molecules classified as matrix metalloproteinases (MMPs). This research is focused on understanding basic mechanisms of disease and utilizing this information to facilitate translational research. In particular, Dr. Smith is interested in the development of tests to better screen for the presence, recurrence and progression of brain tumors and cerebrovascular disease. Formal teaching responsibilities include instruction of the medical students and residents on the neurosurgical service, lecturing for medical school neuroanatomy courses and presenting research at regional and national meetings.

### **B. Funding information**

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|-----------|--|
| 1991-1992 | Presidential Scholar Research Grant, Dartmouth College<br>“Synaptic Regeneration and Calcium Ionophores”<br>PI – Edward Smith, MD<br>Mentor - Samuel J. Velez, PhD, Dartmouth College<br>Mentor - E. Sander Connolly, MD, Columbia University College of Physicians and Surgeons |
| 1994      | Columbia-Presbyterian Cancer Center Research Grant<br>“ <i>bcl-2</i> and Apoptosis in Prostate Cancer”<br>PI – Edward Smith, MD<br>Mentor - Ralph Buttyan, PhD, Columbia University College of Physicians and Surgeons   |
| 1996      | National Institutes of Health Student Research Grant<br>“Advanced Glycation Endproducts in Neurovascular Disease”<br>PI – Edward Smith, MD   |
| 1999-2001 | American Brain Tumor Association Post-Doctoral Fellowship Award<br>"Characterizing the Interaction Between Oncolytic Viruses and Tumors"<br>PI – Edward Smith, MD<br>Mentor - E. Antonio Chiocca, MD, PhD, Massachusetts General Hospital  |
| 2004-2005 | Hagerty Research Fellow Grant<br>“Role of Matrix Metalloproteinases in Brain Tumors”<br>PI – Edward Smith, MD<br>Mentor - Marsha Moses, PhD, Children’s Hospital Boston  |
| 2005-2007 | Lucas Warner AVM Research Fund<br>PI - Edward Smith, MD and Marsha Moses, PhD, Children’s Hospital Boston  |

- 2005-2009 National Institutes of Health Pediatric Loan Repayment Program Award  
PI - Edward Smith, MD, Children's Hospital Boston
- 2005-2007 National Institutes of Health K12 Neuro-oncology Training Grant #1K12CA90354-01  
Recipient – Edward Smith, MD  
Mentor - Marsha Moses, PhD, Children's Hospital Boston
- 2006-2008 Maria Pearl Miller Cerebrovascular Disease Research Fund  
PI – Edward Smith, MD, Children's Hospital, Boston
- 2006-2008 Tara Bean Brain Tumor Research Fund  
Co-PI – Edward Smith, MD, Children's Hospital, Boston
- 2007-2008 Christopher K. Fellows Family Fund for Research in Pediatric Neurosurgery  
Co-PI – Edward Smith, MD, Children's Hospital, Boston
- 2007-2008 Emma Marrone Brain Tumor Research Fund  
PI – Edward Smith, MD, Children's Hospital Boston

### C. Report of Current Research Activities

Dr. Smith is currently engaged in basic science research on primary brain tumors and cerebrovascular disease. His research is primarily centered on obtaining an increased understanding of the molecular mechanisms of tumorigenesis and angiogenesis in the central nervous system. This work has included the use of basic science and translational studies investigating adult and pediatric brain tumors, moyamoya disease and cerebral vascular malformations. This research has implicated the class of extracellular matrix proteins called matrix metalloproteinases (MMPs) in the advent and progression of several disease states of the central nervous system, including brain tumors, moyamoya and vascular malformations. His research has been supported by funding from several sources, including the NIH, and is carried out in collaboration with a number of investigators in associated fields.

#### Active research protocols

BWH Protocol # 2004-P-001926 An exploratory study of matrix metalloproteinase levels in the blood and urine of patients with brain tumors with comparisons to age-matched controls  
PI - Smith ER

CH Protocol # S04-12-138 Use of matrix metalloproteinases as non-invasive biomarkers of central nervous system disease  
PI - Smith ER

CH Protocol # S05-10-076 Matrix metalloproteinases in neurosurgical disease  
PI – Smith ER

CH Protocol # 07-08-0328 Genome Wide Linkage Study of Moyamoya Syndrome  
Co-investigator – Smith ER

CH Protocol # M05-10-249 The Long Term Outcome Of Children With Moyamoya Syndrome Treated By Pial Synangiosis  
Co-investigator – Smith ER

CH Protocol # M08-04-0199 Clinical and Intra-Operative Correlates to Transcranial Doppler (TCD) Changes in Pediatric Moyamoya Surgery  
PI – Smith ER

CH Protocol # A06-11-097 Monitoring And Modulation Of Angiogenesis In Neurosurgical Disease  
PI – Smith ER

### Completed research protocols

BWH Protocol # 2004-P-001991/3 Markers for vascular malformations and disease in the central nervous system  
PI - Smith ER

CH Protocol # S05-11-158 Characterization of regional cerebral blood flow in patients with moyamoya disease undergoing pial synangiosis  
Co-investigator – Smith ER

### **D. Report of Teaching**

Dr. Smith is engaged in local teaching at Tufts and Harvard medical schools, having taught neuroanatomy in 2000, 2001, 2003-2006. He held weekly resident teaching rounds at Massachusetts General Hospital and has been an invited speaker at grand rounds at several institutions. He is also involved in teaching lectures for the critical care team, the nursing staff and the first responder teams at Children's Hospital and gives teaching rounds for the neurosurgical department at Children's Hospital/Brigham and Women's Hospital. Dr. Smith is involved in a career panel at Harvard Medical School, talking to medical students about career decisions in medicine (most recently on March 16, 2006). He has been recognized for his teaching efforts by student citations, written evaluations and continued invitations to give lectures and teach courses.

### Medical school courses / teaching responsibilities

2000	Harvard Medical School Neuroanatomy	2 <sup>nd</sup> year course for 3 months (~10 students in lab, ~60 in class) Lab teaching assistant (2hr sessions 3x/week) and lecturer (2 lectures of 1 hr each)
2001	Harvard Medical School Neuroanatomy	2 <sup>nd</sup> year course for 3 months (~10 students in lab, ~60 in class) Lab teaching assistant (2hr sessions 3x/week) and lecturer (2 lectures of 1 hr each)
2003	North Service teaching rounds / Chief resident teaching rounds, 6 months (~20 residents and students)	Conducted didactic teaching rounds 1hr/week
2004-present	Tufts Medical School Neuroanatomy	2 <sup>nd</sup> year course for 2 months (~10 students in session) Small groups teaching session (weekly 2hr session)
2007-present	Harvard Medical School/Brigham & Women's Hospital Resident Skull Base Dissection Lab (~10 students)	Small groups teaching session weekly (total of 2 sessions/year, each ~3 hours)

### Mentoring / trainees

2005	Harvard Medical School career panel (advisor/panelist), March 8, 2005
2006	Harvard Medical School career panel (advisor/panelist), March 16, 2006
2006-present	Medical student mentor (2hr session 2x/week for one month, in addition to clinical teaching on service)
2008	Harvard Medical School Student Summer Fellowship - Mentor Pasteur Fellowship; awarded to Matthew Naunheim "Transcranial Doppler in Moyamoya Syndrome"

### Invited teaching presentations

- 2000 Smith ER, Carter BS, Ogilvy CS CT-Angiography, Sylvian Hematoma Removal and Hemicraniectomy can Facilitate Management of Patients Presenting in Poor Grade after MCA Aneurysm Rupture. Presented at Neurosurgery Grand Rounds, Massachusetts General Hospital, Boston, MA, September 14, 2000.
- Smith ER, Carter BS, Ogilvy CS The Evolving Role of Craniectomy in Trauma and Subarachnoid Hemorrhage. Presented at Neurosurgery Grand Rounds, Massachusetts General Hospital, Boston, MA March 9, 2000.
- 2002 Smith ER, Chiocca EA Clinical Case Presentation, Grand Rounds, Massachusetts General Hospital, Boston, MA, July 25, 2002.
- Smith ER, Pfannl, RM, Barker FG Report of the West Neurosurgical Service, Grand Rounds, Massachusetts General Hospital, Boston, MA, May 30, 2002.
- 2003 Smith ER, Chen C Decompressive Craniectomy, Grand Rounds, Invited Speaker, Department of Neurosurgery, Brigham and Women's Hospital, Harvard University, Boston, MA, December 23, 2003
- 2004 Smith ER Evaluation and Treatment of the Child with Closed Myelomenigocele, Teaching Rounds, Children's Hospital, Boston, MA, September 1, 2004
- Smith ER Interesting Cases from the Pediatric Neurosurgery Service, Surgical Grand Rounds, Children's Hospital, Boston, MA, June 23, 2004
- Smith ER Hydrocephalus, Neuroradiology Grand Rounds, Children's Hospital, Boston, MA, June 18, 2004
- Korf B, Stemmer-Rachamimov A, Henson J, Smith ER, MacCollin M (2004) Genetic heterogeneity of NF1, Neurology Grand Rounds, New England Journal of Medicine Clinicopathologic Conference, Massachusetts General Hospital, Boston, MA, April 8, 2004
- Smith ER Pediatric Brain Tumors, Nursing Education Day, Children's Hospital, Boston, MA, March 3, 2004
- Smith ER Pediatric Arteriovenous Malformations, Intensive Care Unit and Transport Team Meeting, Children's Hospital, Boston, MA, January 20, 2004
- 2005 Smith ER Matrix Metalloproteinases in Neurosurgical Disease, Partners Department of Neurology Research Rounds, Harvard University, Boston, MA, November 2, 2005
- Smith ER Pediatric Hydrocephalus, Department of Neurosurgery, Brigham and Women's Hospital, Harvard University, Boston, MA, August 24, 2005
- Smith ER Matrix Metalloproteinases in Cerebrovascular Disease, Department of Neurosurgery, Brigham and Women's Hospital, Harvard University, Boston, MA, March 23, 2005
- Smith ER Pediatric spinal epidural abscess – a neurosurgical perspective (guest speaker with Ahmed A), Department of Medicine Teaching Grand Rounds, Children's Hospital Boston, MA, March 11, 2005
- Smith ER Raised Intracranial Pressure: A Neurosurgical Perspective on Monitoring and Operative Therapies, Combined Anesthesia - Surgery Grand Rounds Children's Hospital, Boston, MA, March 2, 2005
- 2006 Smith ER Biomarkers for Brain Tumors, Partners Department of Neurology Research Rounds, Harvard University, Boston, MA, May 31, 2006

Smith ER Neurosurgical Management of Split Cord Malformations, Department of Neurosurgery, Brigham and Women's Hospital, Harvard University, Boston, MA, January 18, 2006

2007 Smith ER Moyamoya Disease, Department of Neurosurgery, Brigham and Women's Hospital, Harvard University, Boston, MA, March 22, 2007

Smith ER, Chiari Malformations, Combined Anesthesia and Surgery Grand Rounds, Children's Hospital Boston, Boston, MA, April 4, 2007

2008 Smith ER, Hydrocephalus, Department of Neurosurgery, Brigham and Women's Hospital, Harvard University, Boston, MA, July 17, 2008

#### Continuing Medical Education Courses

2005 Smith ER Pediatric Intensive Care: Increased Intracranial Pressure and Hydrocephalus, Nursing Education Day, Children's Hospital, Boston, MA, November 15, 2005

Smith ER Lumps and bumps of the scalp and spine, Pediatric Health Care Summit, Beverly Hospital, Beverly, MA, April 13, 2005

Smith ER The Significance of Headache in the Pediatric Patient: When to Evaluate or Refer, Surgical Frontiers Conference, Burlington, MA, March 2, 2005

2006 Smith ER Head Injuries: Office Evaluation and Significance of Post Concussive Symptoms. Frontiers in Pediatric Surgery Conference, Waltham, MA, March 15, 2006

2007 Smith ER, Chiari Malformations – Refer or Defer? Frontiers in Pediatric Surgery Conference, Waltham, MA, March 7, 2007

Smith ER, Moyamoya Syndrome, Neuroscience Education Day, Children's Hospital Boston, Boston, MA, November 26, 2007

Smith ER, Chiari Malformation, Neuroscience Education Day, Children's Hospital Boston, Boston, MA, November 26, 2007

2008 Smith ER, Lumps and Bumps of the Scalp and Spine, Frontiers in Pediatric Surgery Conference, Waltham, MA, March 5, 2008

Smith ER, Moyamoya Syndrome, Neuroscience Education Day, Children's Hospital Boston, Boston, MA, November 10, 2008

Smith ER, Chiari Malformation, Neuroscience Education Day, Children's Hospital Boston, Boston, MA, November 10, 2008

#### Regional / National Invited Presentations

2002 Smith ER, Chiocca EA Increased Frequency of Cells Expressing a Neuronal Phenotype in the Injured Spinal Cord after Intravascular Transplantation with Bone Marrow Cells. Grand Rounds, Invited Speaker, Department of Neurosurgery, University of Rochester, Rochester, NY, June 11, 2002.

Smith ER, Barker FG Esthesioneuroblastoma. Clinical Neurosurgery Presentation, Invited Speaker, Department of Neurosurgery, University of Rochester, Rochester, NY, June 11, 2002.

- 2004 Smith ER Matrix Metalloproteinases in Neurosurgical Disease, First Annual Symposium in Cellular, Molecular and Clinical Research in Surgery, Children’s Hospital, Boston, MA, November 30, 2004
- Smith ER Pediatric Brain Tumors, Grand Rounds, Invited Speaker, Department of Neurosurgery, Brown University, Rhode Island Hospital, Providence, RI, January 12, 2004
- 2005 Smith ER Pediatric Head Trauma, (Plenary Session), Pediatric –Neonatal Critical Care Transport Conference, Seaport World Trade Center, Boston, MA, October 14, 2005
- 2007 Smith ER, Headaches in Children: When to Worry, St. Joseph’s Hospital, Nashua, NH, October 23, 2007
- Smith ER, Loeffler, Misra M, Pomerantz S, Stemmer-Rachamimov A, Post MD, A 17-year-old boy with a pituitary tumor and skull abnormalities. Clinicopathological Conference – Case Records of the Massachusetts General Hospital (Primary discussant), Massachusetts General Hospital, Boston, MA, November 15, 2007
- 2008 Smith ER, Sickle Cell Disease and Moyamoya, Grand Rounds, Invited Speaker, Department of Pediatrics, Boston Medical Center, Boston, MA, April 4, 2008
- Smith ER, The Chiari Malformation: What Does It Mean? (Selected Subject), Invited Expert, American Association of Pediatrics (AAP) Annual Meeting, Boston, MA, October 14, 2008
- 2009 Smith ER, Non-Invasive Biomarkers for Pediatric Brain Tumors, Philadelphia, PA, January 22, 2009

Invited Panelist / Moderator

- 2005 Smith ER Moderator - Pediatric Scientific Session, Wednesday, October 12, 2005, Annual Congress of Neurological Surgeons National Meeting, Boston, MA
- 2006 PERCS Contini Event: Decision making and communication workshop for critically ill children. Boston, MA, April 11, 2006 (Faculty)
- Smith ER Moderator - Pediatric Scientific Session – Neurosurgical Forum, Monday, October 19, 2006, Annual Congress of Neurological Surgeons National Meeting, Chicago, IL
- Smith ER Moderator – Open Papers Session – Friday, December 1, 2006, Annual AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Denver CO
- 2007 PERCS Contini Event: Decision making and communication workshop for critically ill children. Boston, MA, May 1, 2007 (Faculty)
- 2008 National Youth Leadership Forum on Medicine, Wellesley, MA, July 17, 2008
- 2009 Smith ER, Moderator – Management of Vein of Galen and Other Neonatal/Early Infancy Arteriovenous Shunts – XIV World Congress of Neurological Surgery of the World Federation of Neurosurgical Societies, September 4, 2009, Boston, MA

**E. Report of Clinical Activities**

Dr. Smith has a clinical practice involved in the treatment of pediatric neurosurgical disease, with a focus on cerebrovascular and neuro-oncologic disorders. His patient load is predominantly seen at Children’s Hospital, with a weekly clinic and scheduled operative cases. Annually, Dr. Smith sees approximately 500-750 patients as outpatients and performs 150-200 cases. Patients are also seen at the Peabody Children's Hospital Satellite Clinic. Dr. Smith has been recognized for his

clinical work with a series of awards both regionally and nationally (see “Awards and Honors”) and has also had patients highlighted on regional and national media, including Good Morning America (January 26, 2003) and The Learning Channel (Untold Stories of the ER, May 30, 2005).

### Part III. Bibliography

#### Original Articles

1. Gupta A, Smith ER, Velez SJ, Synaptic repression at the crayfish neuromuscular junction II. Evidence for calcium involvement. *Journal of Neurobiology*, 1993, 24(8): 999-1007.
2. Wade-Martins R, Smith ER, Tyminski E, Chiocca EA, Saeki Y, An infectious transfer and expression system for genomic DNA loci in human and mouse cells. *Nature Biotechnology*, 2001 Nov;19(11): 1067-70.
3. Dreibelbis JE, Brown RH Jr, Pastuszak KA, Smith ER, Kaplan PL, Cudkowicz ME, Disease course unaltered by a single intracisternal injection of BMP-7 in ALS mice. *Muscle & Nerve* 2002 Jan;25(1):122-3.
4. Smith ER, Ott M, Wain J, Louis DN, Chiocca EA, Massive Growth of a Meningioma into the Brachial Plexus and Thoracic Cavity after Intraspinal and Supraclavicular Resection: A Case Report and Review of the Literature. *Journal of Neurosurgery* 2002 Jan;96(1 Suppl):107-11.
5. Smith ER, Carter BS, Ogilvy CS, Proposed Use of Prophylactic Decompressive Craniectomy in Poor Grade Aneurysmal Subarachnoid Hemorrhage Patients Presenting with Associated Large Sylvian Hematomas *Neurosurgery*, 2002 Jul 51(1):117-124.
6. Smith ER, Chapman PH, Ogilvy CS, Far posterior subtemporal approach to the dorsolateral brainstem and tentorial ring: Technique and clinical experience *Neurosurgery*, 2003 Feb 52(2): 364-8.
7. Smith ER, Butler WE, Barker FG, In-Hospital Mortality After Ventriculoperitoneal Shunt Procedures in the United States 1998-2000: Relation to Hospital and Surgeon Volume of Care *Journal of Neurosurgery, Pediatrics*, 2004, Feb 100(2): 90-7.
8. Smith ER, Butler WE, Barker FG, Craniotomy for Resection of Pediatric Brain Tumors in the United States 1988-2000: the Effect of Provider Caseload and Progressive Centralization and Specialization of Care *Neurosurgery*, 2004 Mar 54(3): 553-63.
9. Smith ER, Scott RM, Surgical Management of Moyamoya Syndrome, *Skull Base Surgery*. 2005 Feb;15(1):15-26.
10. Ahn E, Smith ER Acute clival and spinal subdural hematoma with spontaneous resolution: Clinical and radiographic correlation in support of a proposed pathophysiologic mechanism *Journal of Neurosurgery, Pediatrics*, 2005, Aug;103(2):175-9.
11. Jea A, Smith ER, Robertson R, Scott RM Moyamoya syndrome associated with Down syndrome - Outcome following surgical revascularization *Pediatrics*, 2005 Nov;116(5):e694-701.
12. Kim AH, Maher CO, Smith ER Lumbar intramedullary spinal schistosomiasis presenting as progressive paraparesis: A case report and literature review. *Neurosurgery* 2006, May;58(5):E996; discussion E996.
13. Tailor J, Dunn I, Smith ER, Conservative treatment of spontaneous spinal epidural hematoma associated with oral anti-coagulant therapy in a child. *Childs Nervous System* 2006 Sep 15

14. Smith ER, Butler WE, Barker FG, Is there a "July effect" in pediatric neurosurgery at teaching hospitals? *Journal of Neurosurgery*, 2006 Sep; 105 (3 Suppl): 169-176.
15. Codd PJ, Riesenburger RI, Klimo P, Slotkin JR, Smith ER, Vertebra Plana due to an Aneurysmal Bone Cyst of the Lumbar Spine: Case report and review of the literature. *Journal of Neurosurgery* 2006 Dec;105(6):490-5.
16. Dunn ID, Woodworth G, Siddiqui A, Smith ER, Vates GE, Day AL, Goumnerova LC Traumatic pericallosal artery aneurysm: a rare complication of transcallosal surgery, *Journal of Neurosurgery, Pediatrics* 2007 Feb;106(2):153-7.
17. Klimo P, Khalil A, Slotkin JR, Smith ER, Scott RM, Goumnerova LC, Wound Complications Associated with the Use of Bovine Serum Albumin-Glutaraldehyde Surgical Adhesive (BioGlue®) in Pediatric Patients, *Neurosurgery* 2007 Apr; 60 (4 suppl 2): 305-9.
18. Smith ER, Manfredi M, Scott RM, Black PM, Moses MA, Case of a recurrent craniopharyngioma used to illustrate the potential utility of urinary matrix metalloproteinases as non-invasive biomarkers, *Neurosurgery* 2007 Jun; 60 (6) E1148-9; discussion E1149.
19. Dunn IF, Agarwalla PK, Papanastassiou AM, Butler WE, Smith ER, Multiple pilocytic astrocytomas of the cerebellum in a 17-year-old patient with Neurofibromatosis Type I *Child's Nervous System*, 2007 Oct; 23(10): 1191-1194.
20. Nahed BV, Darbar A, Doiron R, Ahn E, Robson C, Smith ER, Acute Hydrocephalus Secondary to Obstruction of Foramen of Monro and Cerebral Aqueduct by a Choroid Plexus Cyst of the Lateral Ventricle. *J Neurosurg*. 2007 Sep;107(3 Suppl):236-9.
21. Saad A, Poussaint TY, Smith ER, Folkerth RD, Ligon K, Meningioangiomas associated with meningioma: case report with surgical cytology, (*In press, Acta Cytologica*)
22. Smith ER, Zurakowski D, Saad A, Scott RM, Moses MA, Urinary Biomarkers Predict Brain Tumor Presence and Response to Therapy. *Clin Cancer Res*. 2008 Apr 15;14(8):2378-86
23. Smith ER, Scott RM, Progression of Disease in Unilateral Moyamoya Syndrome *Neurosurg Focus*. 2008;24(2):E17.
24. Jha RM, Klimo PK, Smith ER, Foramen magnum stenosis from overgrowth of the opisthion in a child with achondroplasia, *J Neurosurg Pediatrics*. 2008 Aug;2(2):136-8.
25. Agarwalla PK, Dunn IF, Turner CD, Ligon KL, Schneider KA, Papanastassiou AM, Smith ER, A Novel TP53 Germline Mutation in a Family with a History of Multiple Malignancies: Case report and Review of the Literature, (*In press, Pediatric Neurosurgery*)
26. Smith ER, Loeffler, Misra M, Pomerantz S, Stemmer-Rachamimov A, Post MD, A 17-year-old boy with a pituitary tumor and skull abnormalities. (*In press, New England Journal of Medicine*)
27. Smith ER, Scott RM, Medical Progress: Moyamoya, (*In press, New England Journal of Medicine*)
28. Qaiser R, Scott RM, Smith ER, Identification of an Association Between Robinow Syndrome and Moyamoya", (*In press, Pediatric Neurosurgery*)
29. Nahed BV, Ferreira M, Naunheim MR, Kahle KT, Proctor MR, Smith ER, "Intracranial Vasospasm with Subsequent Stroke after Traumatic Subarachnoid Hemorrhage in a 22 month-old child", (*In press, Journal of Neurosurgery Pediatrics*)

## Professional Guidelines

1. Roach ES, (Chair), Golomb M, Adams R, Biller, Daniels JS, deVeber G, Ferriero D, Ichord R, Jones B, Kirkham F, Scott RM, Smith ER, Guidelines for the Management of Cerebrovascular Disorders in Infants and Children: A Statement for Healthcare Professionals From a Special Writing Group of the Stroke Council, American Heart Association. *Stroke*. 2008 Jul 17.

## Clinical Communications

1. Korf BR, Henson JW, Stemmert-Rachamirnov A, Case 13-2005: A 48-year-old man with weakness of the limbs and multiple tumors of spinal nerves *New England Journal of Medicine*, 2005, Apr. 28; 352 (17): 1800-8.

## Edited Books and Journals

1. Smith ER, Scott RM, Moyamoya Disease, *Neurosurgical Focus*, April 2009
2. Klimo P, Maher C, Smith ER, Pediatric Vascular Neurosurgery, *Neurosurgery Clinics of North America*, January 2010.

## Book Chapters and Review Articles

1. Smith ER, Chiocca EA, Oncolytic viruses as novel anticancer agents: turning one scourge against another. *Expert Opinion on Investigational Drugs* 2000 9(2): p. 311-327.
2. Smith ER, Amin-Hanjani S, Diagnosis and management of elevated intracranial pressure *UpToDate*, Rose, BD (Ed), *UpToDate*, Wellesley, MA, In press (on-line).
3. Smith ER, Butler WE, Ogilvy CS, Surgical approaches to vascular anomalies of the child's brain, *Current Opinion in Neurology*, 2002, Apr. 15(2): 165-171.
4. Smith ER, Madsen JR, Cerebral Pathophysiology and Critical Care Neurology: Basic Hemodynamic Principles, Cerebral Perfusion and Intracranial Pressure *Seminars in Pediatric Neurology*, Bodensteiner JB (Ed.) Elsevier Press, New York, 2004, Jun. 11(2): 89-104.
5. Smith ER, Madsen JR, Neurosurgical Aspects of Critical Care Neurology, *Seminars in Pediatric Neurology*, Bodensteiner JB (Ed.) Elsevier Press, New York, 2004, Jun. 11(2): 169-78.
6. Smith ER, Scott RM, Moyamoya Syndrome *Argentine Journal of Neurosurgery*, Schijman E (Ed.), 2005 Mar. 19(1); p. 31-40.
7. Smith ER, Ebb DH, Tarbell NJ, Barker FG, Pilocytic Astrocytoma, *Textbook of Neuro-Oncology*. Berger MS, Prados MD, eds. Philadelphia: Elsevier Saunders, 2005;149-155.
8. Chen C, Smith ER, Ogilvy CS, Carter BS, Decompressive Craniectomy *Operative Neurosurgical Techniques: Indications, Methods and Results*, Schmidek HM and Sweet WH (Eds.) Elsevier Press, New York, 2006; 70-80.
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10. Smith ER, Ischemic Stroke in the Pediatric Population, *Principles and Practice of Pediatric Neurosurgery*, Second Edition; Albright LA (Ed.) Thieme Medical Publishers, New York, 2007; 1004-1014.

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12. Maher CO, Smith ER, Proctor MR, Scott RM, Vascular Malformations of the Spinal Cord, *Surgery of the Pediatric Spine*, Kim, Betz, Hunh, Newton (Ed.), Thieme Medical Publishers, In press.
13. Agarwalla PK, Dunn IF, Scott RM, Smith ER, Tethered Cord Syndrome, *Neurosurgery Clinics of North America* Klimo P (Ed.), Elsevier Press, New York, 2007, July; 18(3):531-47.
14. Smith ER, Scott RM, Pediatric Arteriovenous Malformations, *Textbook of Paediatric Neurosurgery* (<http://surgicalneurology.pbwiki.com>), Narenthiran G (Ed.) 2007
15. Smith ER, Scott RM, Pediatric Moyamoya, *Textbook of Paediatric Neurosurgery* (<http://surgicalneurology.pbwiki.com>), Narenthiran G (Ed.) 2007
16. Grondin R, Smith ER, Scott RM, Moyamoya Disease: EDAS/EMS, *Controversies in Pediatric Neurosurgery*, Jallo, Kothbauer, Padilla (Ed.), Thieme Medical Publishers, In press.
17. Smith ER, Scott RM, Cerebrovascular Disorders in Children, American Association of Pediatrics, Pediatric Neurosciences for Primary Care, Piatt, Legido (ed.) American Academy of Pediatrics, In press.
18. Smith ER, Scott RM, Cerebrovascular Disease, *Pediatric Neurosurgery On Call*, Ritter (ed.), Congress of Neurologic Surgeons, In press.

#### **Abstracts and Presentations**

(abstracts prior to 2003 omitted)

1. Smith ER, Butler WE, Barker FG, Mortality After Ventriculoperitoneal Shunt Procedures: Relation to Hospital and Surgeon Volume. Presented at the American Association of Neurological Surgeons Annual Meeting in the Plenary Session, San Diego, CA, April 2003.
2. Smith ER, Chiocca, EA, Oncolytic Viral Selectivity for Tumor Versus Normal Brain in Human Tissue Using an Ex Vivo Assay. Presented at the Congress of Neurological Surgeons Annual Meeting, Denver, CO, October 2003.
3. Smith ER, Butler WE, Barker FG, Mortality Rates for Pediatric Brain Tumor Craniotomy in the United States, 1988-2000: The Influence of Hospital and Surgeon Volume and Trends over Time. Presented at the Congress of Neurological Surgeons Annual Meeting, Denver, CO, October 2003.
4. Smith ER, Butler WE, Barker FG, Resection of pediatric brain tumors in the United States, 1988-2000: Progressive Centralization and Specialization of Care. Presented at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Salt Lake City, UT, December 2003.
5. Smith ER, Butler WE, Multiple Cerebellar Pilocytic Astrocytomas in Neurofibromatosis Type I. Presented (poster and electronic poster) at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Salt Lake City, UT, December 2003.
6. Smith ER, Butler WE, Barker FG, Pediatric subspecialization within American neurosurgery, 1988-2001: a population-based study. Presented at the American Association of Neurological Surgeons Annual Meeting, Orlando, FL, May 2004.

7. Smith ER, Butler WE, Barker FG, Craniotomy for resection of pediatric brain tumors in the United States 1988-2000: Provider volume–outcome relationships and effects of progressive centralization and specialization of care. Presented at the 11<sup>th</sup> International Symposium on Pediatric Neuro-Oncology, Boston, MA, June 2004.
8. Siddiqui AH, Dunn IF, Woodworth G, Smith ER, Vates GE, Day AL, Goumnerova LC, Traumatic Pericallosal Aneurysm - A rare complication of transcallosal surgery. Presented at the New England Neurosurgical Society , Springfield, MA June 4, 2004.
9. Siddiqui AH, Smith ER, Goumnerova LC, Spontaneous clinical and radiographic resolution of a ventriculoperitoneal shunt malfunction. Presented at the New England Neurosurgical Society , Springfield, MA June 4, 2004.
10. Smith ER, Scott RM, Moyamoya Syndrome and Alagille Syndrome: Possible Association and Implications for Screening Recommendations in the Pediatric Population. Presented at the Congress of Neurological Surgeons Annual Meeting, San Francisco, CA, October 2004.
11. Smith ER, Scott RM, Familial Incidence of Moyamoya Syndrome in the Pediatric Population. Presented at the Congress of Neurological Surgeons Annual Meeting, San Francisco, CA, October 2004.
12. Raju M, Ferreira M, Maher C, Smith ER, Significant Neurologic Injury to the Spinal Cord and Brain from a Hyperflexion Lap Belt Injury. Presented at the New England Neurosurgical Society, Woodstock, VT, February 24, 2005.
13. Raju M, Ahn E, Smith ER, Acute Clival and Spinal Subdural Hematoma with Spontaneous Resolution. Presented at the New England Neurosurgical Society, Woodstock, VT, February 24, 2005.
14. Smith ER, Butler WE, Barker FG, Is there a "July effect" in pediatric neurosurgery at teaching hospitals? Presented at the American Association of Neurological Surgeons Annual Meeting, New Orleans, LA, April 2005.
15. Smith ER, Scott RM, Treatment of Moyamoya Disease in the Adult Population with Indirect Cerebral Revascularization Utilizing Pial Synangiosis. (poster) Presented at the American Association of Neurological Surgeons Annual Meeting, New Orleans, LA, April 2005.
16. Narayan M, Maher C, Smith ER, Chiari I Malformation Associated with Lateral Gaze Palsies, Facial Pain and Syringobulbia Treated by Suboccipital Decompression (poster) Presented at the American Association of Neurological Surgeons Annual Meeting, New Orleans, LA, April 2005.
17. Kim A, Maher C, Smith ER, Lumbar Intramedullary Spinal Schistosomiasis (poster) Presented at the American Association of Neurological Surgeons Annual Meeting, New Orleans, LA, April 2005.
18. Smith ER, Scott RM, Moyamoya Associated With Down Syndrome: Outcome following Surgical Revascularization. Presented at the 33<sup>rd</sup> Annual Meeting of the International Society of Pediatric Neurosurgery, Vancouver, B.C., Canada, September 2005.
19. Smith ER, Scott RM, Moyamoya syndrome: clinicopathologic correlation. (poster) Presented at the 33<sup>rd</sup> Annual Meeting of the International Society of Pediatric Neurosurgery, Vancouver, B.C., Canada, September 2005.
20. Smith ER, Scott RM, Moyamoya Associated With Down Syndrome: Outcome following Surgical Revascularization . Presented at the Congress of Neurological Surgeons Annual Meeting, Boston, MA, October 2005.

21. Smith ER, Soriano S, Scott RM, Moses MA, Correlation between disease status and matrix metalloproteinase levels in moyamoya syndrome. (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Boston, MA, October 2005.
22. Smith ER, Manfredi M, Black P, Moses MA, Incidental finding of elevated urinary matrix metalloproteinases as an independent predictor of recurrent brain tumor (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Boston, MA, October 2005.
23. Ahn E, Smith ER, Acute clival and spinal subdural hematoma with spontaneous resolution: Clinical and radiographic correlation in support of a proposed pathophysiologic mechanism (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Boston, MA, October 2005.
24. Soni D, Ogilvy CS, Scott RM, Smith ER, Novel Technique for Intraoperative Localization of Deep Lesions: An Adjunct to Frameless Stereotaxy. (poster) Presented at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Orlando, FL, November 2005.
25. Codd PJ, Riesenburger RI, Slotkin JR, Smith ER, Management of an aneurysmal bone cyst of the spine in a pediatric patient. Presented at the New England Neurosurgical Society, Southbridge, MA, January 20, 2006.
26. Smith ER, Scott RM, Moses MA, Urinary biomarkers for neurosurgical disease. Presented at the American Society for Pediatric Neurosurgeons, Grand Exuma, Bahamas, February 3, 2006.
27. Smith ER, Moses MA, Urinary matrix metalloproteinases as non-invasive biomarkers to predict disease status in pediatric and adult brain cancer patients. (poster) Presented at the American Association for Cancer Research, Washington, DC, April 4, 2006.
28. Smith ER, McClain C, Scott RM, Moyamoya associated with sickle-cell disease – outcome following surgical revascularization, Presented at the New England Neurosurgical Society, Dedham, MA, June 9, 2006.
29. Manfredi M, Smith ER, From the bench to the bedside and back – Urinary biomarkers for brain tumors, Presented at the Vascular Biology Program Annual Retreat, Academy of Arts and Sciences, Cambridge, MA, July 11, 2006.
30. Ferreira M, Smith ER, Infantile Scalp Hemangiomas in Association with Occult Intracranial Lesions Producing Sinus Thrombosis and Hydrocephalus, (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Chicago IL, October 7-12, 2006
31. Taylor J, Dunn I, Smith ER, Conservative treatment of spontaneous spinal epidural hematoma associated with oral anti-coagulant therapy in a child: A case report, (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Chicago IL, October 7-12, 2006
32. Codd PJ, Riesenburger RI, Slotkin JR, Klimo P, Smith ER, A Pediatric Case of Vertebra Plana due to an Aneurysmal Bone Cyst of the Lumbar Spine - Role of Embolization and Current Management Strategies, (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Chicago IL, October 7-12, 2006
33. Smith ER, Moses MA, Urinary Matrix Metalloproteinases as Non-Invasive Biomarkers to Predict Disease Status in Pediatric and Adult Brain Cancer Patients, (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Chicago IL, October 7-12, 2006
34. Jha RM, Klimo P, Smith ER, Symptomatic Foramen Magnum Stenosis Due to Overgrowth of the Opisthion in a Child with Achondroplasia, (poster) Presented at the Congress of Neurological Surgeons Annual Meeting, Chicago IL, October 7-12, 2006

35. Yen KL, Piva S, McClain CD, Smith ER, Riviello JJ, Robertson RL, Soriano SG, Scott RM, McManus ML, Regional Cerebral Blood flow Monitoring by Thermal Diffusion Probe in Children with Moyamoya Syndrome Undergoing Pial Synangiosis, (poster) Presented at the Society of Neurosurgical Anesthesia and Critical Care, Chicago, IL, October 13, 2006.
36. Yen KL, Piva S, McClain CD, Smith ER, Riviello JJ, Robertson RL, Soriano SG, Scott RM, McManus ML, Noninvasive Cerebral Oxygenation Monitoring by Near-Infrared Spectroscopy in Children with Moyamoya Syndrome Undergoing Pial Synangiosis, (poster) Presented at the Society of Neurosurgical Anesthesia and Critical Care, Chicago, IL, October 13, 2006.
37. Yen KL, Piva S, McClain CD, Smith ER, Riviello JJ, Robertson RL, Soriano SG, Scott RM, McManus ML, Real-time Detection of Regional Cerebral Ischemia in a Patient with Moyamoya Syndrome Undergoing Pial Synangiosis. Presented at the Neurocritical Care Society Meeting, Baltimore MD, November 2-5, 2006.
38. Ahn ES, Chapman AE, Smith ER, Scott RM, Chorea in association with moyamoya syndrome: Results of surgical revascularization and a proposed clinicopathological correlation. Presented at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Denver CO, November 28-December 1, 2006.
39. Ferreira M, Ahn ES, Proctor MR, Smith ER, Report of Intracranial Vasospasm with Subsequent Stroke After Subarachnoid Hemorrhage in 22 Month Old Child (Electronic Poster Award) Presented at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Denver CO, November 28-December 1, 2006.
40. Klimo P, Khalil A, Slotkin JR, Smith ER, Scott RM, Goumnerova LC, Wound Complications Associated with the Use of Bovine Serum Albumin-Glutaraldehyde Surgical Adhesive (BioGlue®) Presented at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Denver CO, November 28-December 1, 2006.
41. Smith ER, Ahn EA, McClain C, Scott RM, Moyamoya Associated With Sickle Cell Disease: Outcome Following Surgical Revascularization, Presented at the AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Denver CO, November 28-December 1, 2006.
42. Goumnerova LC, McClain CD, Proctor MR, Smith ER, Soriano SG, Scott RM, Rockoff MA, Use of Intraoperative MRI Limits Routine Postoperative MRIs in Pediatric Neurosurgical Patients, Presented at the annual meeting of the American Society for Pediatric Neurosurgeons in Lanai, HI, February 1, 2007.
43. Smith ER, McClain C, Scott RM, Moyamoya Associated With Sickle Cell Disease: Outcome Following Surgical Revascularization, Presented at the annual meeting of the American Society for Pediatric Neurosurgeons in Lanai, HI, February 1, 2007.
44. McClain CD, Proctor MR, Smith ER, Soriano SG, Goumnerova LC, Rockoff MA, Use of Intraoperative MRI Limits Routine Postoperative MRIs in Pediatric Neurosurgical Patients, Presented at the Society for Pediatric Anesthesia Winter Meeting, Phoenix, AZ, March 8-11, 2007.
45. Darbar A, Khalil A, Smith ER, Double Split Cord Malformation: A Novel Type of Congenital Split Cord, (poster) Presented at the American Association of Neurological Surgeons Annual Meeting, Washington, DC, April 14-19, 2007.
46. Naheed B, Darbar A, Ahn E, Smith ER, Acute Hydrocephalus Secondary to Obstruction of Foramen of Monro and Cerebral Aqueduct by a Choroid Plexus Cyst of the Lateral Ventricle, (poster) Presented at the American Association of Neurological Surgeons Annual Meeting, Washington, DC, April 14-19, 2007.
47. Agarwalla PK, Dunn IF, Turner C, Goumnerova LC, Smith ER, A Novel TP53 Germline Mutation in an Infant with Choroid Plexus Carcinoma (poster) Presented at the American Association of Neurological Surgeons Annual Meeting, Washington, DC, April 14-19, 2007.

48. Smith ER, Scott RM, Progression of Disease in Unilateral Moyamoya Syndrome, Presented at the American Association of Neurological Surgeons Annual Meeting, Washington, DC, April 16, 2007.
49. Shim JW, Madsen JR, Smith ER, Connors S, Folkman J, CSF VEGF-A and Vascular Dynamics in Hydrocephalus, Presented at the Society for Neuroscience, San Diego, CA, November 3-7, 2007.
50. Shim JW, Madsen JR, Smith ER, Connors S, Folkman J, Elevated Cerebrospinal Vascular Endothelial Growth Factor In Hydrocephalus: Therapeutic Implications? AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Miami, FL, November 27, 2007.
51. Grondin R, Smith ER, Scott RM, Pial Synangiosis for Moyamoya Disease with Hemorrhagic Presentation in Children: Long-Term Follow-Up, New England Neurosurgical Society, Newport RI, September 28, 2007.
52. Smith ER, Zurakowski D, Saad A, Scott RM, Moses MA, Urinary Biomarkers Predict Brain Tumor Presence and Response to Therapy, New England Neurosurgical Society, Newport RI, September 28, 2007.
53. Grondin R, Scott RM, Smith ER, Treatment of Moyamoya Disease in the Adult Population with Indirect Cerebral Revascularization Utilizing Pial Synangiosis, American Heart Association International Stroke Conference, New Orleans, LA, February 21, 2008.
54. Grondin R, Smith ER, Scott RM, Pial Synangiosis for Moyamoya Disease with Hemorrhagic Presentation in Children: Long-term Follow-up, (poster) American Heart Association International Stroke Conference, New Orleans, LA, February 20-22, 2008.
55. Grondin R, Scott RM, Smith ER, Progression of disease in unilateral moyamoya syndrome, (poster) American Heart Association International Stroke Conference, New Orleans, LA, February 20-22, 2008.
56. Smith ER, Zurakowski D, Saad A, Scott RM, Moses MA, Urinary Biomarkers Predict Brain Tumor Presence and Response to Therapy, Presented at the American Association of Neurological Surgeons Annual Meeting, Chicago, IL, April 28, 2008.
57. Grondin R, Smith ER, Scott RM, Pial Synangiosis for Moyamoya Disease with Hemorrhagic Presentation in Children: Long-term Follow-up, (poster), Presented at the American Association of Neurological Surgeons Annual Meeting, Chicago, IL, April 29-May 1, 2008.
58. Smith ER, Zurakowski D, Saad A, Scott RM, Moses MA, Urinary Biomarkers Predict Brain Tumor Presence and Response to Therapy, (poster) Presented at the American Association for Cancer Research, San Diego, CA, April 13, 2008.
59. Smith ER, Scott RM, Treatment of Moyamoya Disease in the Adult Population with Indirect Cerebral Revascularization Utilizing Pial Synangiosis, Presented at the New England Neurosurgical Society Annual Meeting, Chatham, MA, June 20, 2008.
60. Viswanathan V, Smith ER, Kozakewich H, Orbach DB. Infantile hemangiomas with CNS manifestation: Prevalence, imaging characteristics, and clinical significance. American Society of Neuroradiology; New Orleans, Louisiana, June 5, 2008
61. Viswanathan V, Smith ER, Kozakewich H, Orbach DB. Infantile hemangiomas with intracranial or intraspinal extension: Clinical, histopathologic, and radiologic correlation. International Society for the Study of Vascular Anomalies, Boston, Massachusetts, June 24, 2008
62. Smith ER, Zurakowski D, Scott RM, Moses MA, Urinary Biomarkers Predict Presence of Moyamoya Disease, AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Spokane, WA, December 5, 2008

63. Magge S, Orbach D, Soriano S, Smith ER, Combined Preoperative Embolization And Perioperative Administration Of Tranexamic Acid To Decrease Blood Loss During Resection Of A Choroid Plexus Papilloma, (poster) AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Spokane, WA, December 5, 2008
64. Naunheim M, Smith ER, Surgical Treatment Of Moyamoya With Pial Synangiosis Provides Independence From Exchange Transfusions In Sickle Cell Disease, AANS/CNS Section on Pediatric Neurological Surgery Annual Meeting, Spokane, WA, December 5, 2008