

## Curriculum Vitae

### *Urvashi M. Upadhyay, MD, FAANS*

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#### **Academic Training:**

|      |      |   |  |
|------|------|---|--|
| 2002 | B.S. | Brain and Cognitive Sciences,<br>Systems Neuroscience | Massachusetts Institute of Technology, Phi<br>Beta Kappa |
| 2006 | M.D. | Medicine  | Johns Hopkins University School of<br>Medicine           |

#### **Additional Training:**

|           |          |                         |   |
|-----------|----------|-------------------------|---|
| 6/06-7/07 | Intern   | General Surgery         | Harvard University/Brigham and Women's Hospital                                 |
| 7/07-6/13 | Resident | Neurosurgery            | Harvard University/Brigham and Women's Hospital<br>& Children's Hospital Boston |
| 7/13-6/14 | Fellow   | Skull Base Neurosurgery | Brigham and Women's Hospital  |

#### **Academic Appointments:**

4/19-Present: Director of Skull Base Surgery, Assistant Professor of Neurosurgery, BU School of Medicine, Boston, MA.

2/20-Present: Visiting Scientist, Graybiel Lab, McGovern Institute, Massachusetts Institute of Technology, Cambridge, MA

7/14-3/19: Co-Director of Skull Base Surgery, Assistant Professor of Neurosurgery, University of Massachusetts Medical School, Worcester, MA

7/09-7/11: Visiting Scientist, Langer Lab, Cima Lab, Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, Cambridge, MA

#### **Hospital Appointments or Other Employment:**

|                |   |
|----------------|---|
| 7/2014-3/2019  | Attending Neurosurgeon, University of Massachusetts Medical Center, Worcester, MA |
| 4/2019-Present | Attending Neurosurgeon, Boston Medical Center, Boston, MA                         |

#### **Honors:**

|      |  |  |
|------|--|--|
| 1999 | National Society of Collegiate Scholars (NSCS)                     | Massachusetts Institute of Technology Chapter, National Society of Collegiate Scholars |
| 2001 | Award for Excellent Academic Record                                | Massachusetts Institute of Technology, Course 9  |
| 2002 | Association of MIT Alumnae Semifinal Award for Academic Excellence | Massachusetts Institute of Technology  |
| 2002 | Award for Outstanding Scholarship                                  | Massachusetts Institute of Technology, Course 9  |
| 2002 | Phi Beta Kappa   | Massachusetts Institute of Technology Chapter  |
| 2003 | Dean's Award for Research and Exploration                          | Johns Hopkins University School of Medicine  |
| 2004 | Dean's Award for Research and Exploration                          | Johns Hopkins University School of Medicine  |
| 2009 | Von Meyer Award  | Children's Hospital Boston/Harvard University  |
| 2010 | Von Meyer Award  | Children's Hospital Boston/Harvard University  |

**Licenses and Certification:**

2016 Board Certified, American Board of Neurologic Surgeons  
2013-Present Massachusetts Medical License (License No. 246684)

**Departmental and University Committees:**

|           |  |  |
|-----------|--|--|
| 2009      | Radiosurgery Attending Neurosurgeon Search Committee                     | Brigham and Women's Hospital, Department of Neurosurgery, Harvard University |
| 2009      | Skull Base Attending Surgeon Search Committee                            | Brigham and Women's Hospital, Department of Neurosurgery, Harvard University |
| 2010      | Functional and Movement Disorder Attending Neurosurgeon Search Committee | Brigham and Women's Hospital, Department of Neurosurgery, Harvard University |
| 2010-2011 | Neuroscience Institute Education Committee, Resident Representative      | Brigham and Women's Hospital,, Harvard University                            |

|              |  |   |
|--------------|--|---|
| 2014-2019    | Critical Care Operations Committee                     | University of Massachusetts Medical Center                                      |
| 2016-2019    | Faculty Advisor, AMWA student group                    | University of Massachusetts Medical School                                      |
| 2016-2019    | Chair, Women's Faculty Committee                       | University of Massachusetts Medical School                                      |
| 2016-2019    | Neurosurgery Rotation Director, Surgery Residency      | University of Massachusetts Medical School                                      |
| 2016-2019    | Medical Student Neurosurgery Clerkship Director        | University of Massachusetts Medical School                                      |
| 2019-Present | BUSM Faculty Affairs Committee                         | Boston University School of Medicine  |
| 2019-Present | BUSM Admissions Committee                              | Boston University School of Medicine  |
| 2019-Present | Site Director, Neurosurgery Residency Training Program | Boston Medical Center/Beth Israel Deaconess Hospital Combined Residency Program |

## Teaching Experience and Responsibilities:

### *Classroom Instruction*

|      |   |  |
|------|---|--|
| 2009 | Neuroanatomy: Practical laboratory<br>Instructor, biweekly sessions | Harvard Medical School   |
| 2013 | Boston Skull Base Dissection and<br>Endoscopy Course                | Depuy Instruments<br>Harvard Medical School  |
| 2017 | Boston Skull Base Dissection and<br>Endoscopy Course                | Depuy Instruments<br>Harvard Medical School  |
| 2017 | Neurosurgery 101, Medical Student<br>Lecture Series                 | University of Massachusetts Medical School<br>University of Massachusetts Medical School |
| 2018 | Neurosurgery 101, Medical Student<br>Lecture Series                 |  |

### *Clinical Instruction*

|              |  |   |
|--------------|--|---|
| 2015-present | Flexible Clinical Experiences (FCE) Mentor         | University of Massachusetts Medical School              |
| 2016-present | Neurosurgery Medical Student Clerkship<br>Director | University of Massachusetts Medical<br>School           |
| 2019-present | Neurosurgery Residency Site Director               | BMC/Beth Israel Deaconess Combined<br>Residency Program |

## Major Mentoring Activities:

|           |   |
|-----------|---|
| 2009-2011 | Qunya Ong, PhD Candidate/HST Graduate Student<br>Supervised development of an independent research project. Helped in identification of objectives and milestones of the project and assisted in obtaining grant funding for the project from the Deshpande Foundation for 2010-2011 and 2011-2012. |
| 2009-2011 | Yoda Patta, SciD/MIT Langer and Cima Laboratories<br>Supervised her research project and thesis project. She successfully defended her thesis in 2011 at MIT. Publication resulted Nature Biomaterials.   |

- 2009-2010 Alex W. Scott, MSc/MIT Cima Laboratory  
Supervised his research project and thesis project. He successfully obtained his masters degree in 2010 at MIT. Publication resulted from project in Biomaterials and PNAS.
- 2014-2015 Kyle Wu, MD Candidate University of Massachusetts Medical School. Since 2015, Kyle has been a Neurosurgery Resident , Brigham & Women’s Hospital, Boston, MA.
- 2015-present Peter Cruz-Gordillo, MD PhD Candidate, University of Massachusetts Medical School. Supervised Clinical QI project and am currently serving as his thesis advisor. He plans to defend in the Fall of 2020.
- 2015-present Michaela Cyr, MD Candidate Class of 2019, University of Massachusetts Medical School, mentored regarding application for neurosurgery residency
- 2016-present Daniel Munger, MD Candidate 2018, University of Massachusetts Medical School. Since 2018 Daniel has been a Neurosurgery Resident at OHSU, Oregon. Mentored in his application to residency and in QI project
- 2016-2020 Britney Atwater, MD Class of 2020, University of Massachusetts Medical School. I served Mentor for Capstone Program examining outcomes in anterior skull base surgery- resulted in oral presentation at Congress of Neurosurgery Meeting and in a manuscript currently accepted, under revision. Britney successfully matched in Urological Surgery in 2020.
- 2016-2020 Pawan Matthew, Class of 2020, University of Massachusetts Medical School. I have served as Mentor for a Quality Improvement Project on DVT prophylaxis and advises on his neurosurgery residency application. Pawan successfully matched in Neurosurgery in 2020.

**Major Administrative Responsibilities:**

- 2014-2019 Co-Director Skull Base Surgery, University of Massachusetts Medical Center, Worcester, MA  
2019-present Director Skull Base Surgery, Boston Medical Center, Boston, MA

**Other Professional Activities:**

**Professional Societies:**

- 2007-2016 Member, American Association of Neurological Surgeons (AANS)  
2009-Present Member, Congress of Neurological Surgeons  
2014-Present Member, North American Skull Base Society, Research Committee Member as of 2020  
2016-Present Fellow, American Association of Neurologic Surgeons  
2016-Present Member, New England Neurosurgical Society, Committee Member

**Editorial Boards:**

- 2009-2012 Reviewer, World Neurosurgery  
2013-2014 Reviewer, Journal of Critical Care  
2017-2018 Guest Editor, Journal of Cancer Metastasis and Treatment

## Grant & Other Support:

### Private/Foundation:

- 2003 American Brain Tumor Association Young Investigator Grant.  
Title: *In vivo* mechanistic and efficacy studies of nimesulide(cox-2 inhibitor) and dexamethasone in combination with BCNU *versus* experimental gliomas  
Role: Principle Investigator
- 2004 Johns Hopkins University School of Medicine Research Grant.  
Title: Efficacy studies of dexamethasone in combination with BCNU vs glioma  
Role: Principle Investigator
- 2010-2013 Brain Science Foundation Research Grant, Title: *In Vivo* Efficacy of intracranial MEMS-driven drug delivery in the treatment of brain tumors. Role: Principle Investigator

### Invited Lectures:

### Regional/Local:

- 12/09 Local Delivery of Intracranial Chemotherapy in the treatment of High Grade Glioma  
Department of Neuro-oncology, Massachusetts General Hospital, Boston, MA
- 4/2009 Developing and Applying a Miniature Microchip Device  
Koch Institute for Integrative Cancer Research, MIT, Cambridge, MA
- 6/2009 In vivo efficacy of local delivery of temozolomide in the treatment of malignant glioma  
Koch Institute for Integrative Cancer Research, MIT, Cambridge, MA
- 5/2010 In Vivo Sensors for Early Cancer Detection  
MIT Enterprise Forum, MIT, Cambridge, MA
- 10/2010 Circumventing the Blood-Brain-Barrier: Devices for Intracranial Drug Delivery  
Johnson and Johnson Scientific Advisory Board, Cambridge, MA
- 11/2011 In Vivo efficacy of microcapsule drug delivery in intracranial tumors/Oral presentation  
Koch Institute for Integrative Cancer Research, MIT, Cambridge, MA
- 6/15 Engineering Solutions to Neurosurgical Dilemmas, Neuro-regenerates Club,  
University of Massachusetts Medical School, Worcester, MA
- 4/19 Department of Neurosurgery Grand Rounds, Tufts New England Medical Center,  
Boston, MA

### National:

- 10/09 Delivery of Healthcare in a Tertiary Care Center. Meningioma Awareness Day, Brain Science Foundation, Boston, MA
- 6/13 Challenges to Resident Education: Residency Program Coordinators Meeting, SNS Annual Meeting, Boston, MA
- 12/13 Local Delivery of Chemotherapy for treatment of High Grade Gliomas, Louisiana State University Department of Neurosurgery Grand Rounds, Shreveport, LA.
- 6/18 Clival Chordoma, Neurosurgical Society of America, Jackson Hole, Wyoming
- 2/19 Department of Neurosurgery Grand Rounds, Johns Hopkins University School of Medicine, Baltimore, MD
- 4/20 Revival in Microsurgery, Invited Faculty, Talk: Microneurosurgery: Back to the Future. Harvard Medical School/Brigham and Women's Department of Neurosurgery, Boston, MA

## Bibliography:

### Original, Peer Reviewed Articles:

1. Canales JJ, Capper-Loup C, Hu D, Choe ES, **Upadhyay U**, Graybiel AM. Shifts in striatal responsivity evoked by chronic stimulation of dopamine and glutamate systems. *Brain*. 2002 Oct;125(Pt 10):2353-63. PMID: 12244091
2. Salin-Pascual RJ, **Upadhyay U**, Shiromani PJ. Effects of hypocaloric diet on sleep in young and old rats. *Neurobiol Aging*. 2002 Sep-Oct;23(5):771-6. PMID: 12392780
3. Lesniak MS, **Upadhyay U**, Goodwin CR, Tyler B, Brem H. Local delivery of doxorubicin for the treatment of malignant brain tumors in rats. *Anticancer Res*. 2005 Nov-Dec;25(6B):3825-31 PMID: 16312042
4. Huang J, **Upadhyay U**, Tamargo R. Inflammation in Stroke and Focal Cerebral Ischemia. *Surg Neurol*. 2006 Sep;66(3):232-45 PMID: 16935624
5. **Upadhyay UM**, Golby AJ. Role of pre- and intraoperative imaging and neuronavigation in neurosurgery. *Expert Rev Med Devices*. 2008 Jan;5(1):65-73 PMID: 18095898
6. Elman NM, **Upadhyay UM**. Medical Applications of Implantable Drug Delivery Microdevices Based on MEMS. *Current Pharmaceutical Biotechnology*, 2010, 11(4): 398-403. PMID: 20201795
7. Scott AE, Tyler B, **Upadhyay U**, Patta Y, Brem H, Cima MJ, Langer R. Intracranial Microcapsule Drug Delivery for the Treatment of an Experimental Glioma Model. *Biomaterials* 32 (2011) 2532-2539. PMID: 21220172
8. Rosen Y, **Upadhyay U**, Elman NM. From Pharmacogenomics to Therapy: Targeted NanoDelivery of RNAi. *Nature Pharmacogenomics*. 2011 PMID: 22658087
9. **Upadhyay UM**, Gormley W. Management of Hyponatremia in Neurosurgical Patients. *Journal of Critical Care*. Feb 2011: 139-144 PMID: 21345881
10. Rosen, Y. **Upadhyay, U**. Elman, N. Pharmacogenomics-Based RNA Interference Nanodelivery: Focus on Solid Malignant Tumors. *Expert Opin Drug Deliv*. 2012 Jul;9(7):755-66. PMID:22658087
11. **Upadhyay U**, Tyler B, Patta Y, Wicks R, Spencer K, Masi B, Hwang LS, VanShaik G, Langer R, Brem H, Cima MJ. *Intracranial Microcapsule Chemotherapy Delivery in a Brain Tumor Metastasis Model*. *Proc Natl Acad Sci USA*, PNAS 2014 Nov 11; 111(45): 16071-6. PMID: 25349381
12. Wang W, Wang JY, Caplan JM, Braileanu M, Shang H, **Upadhyay U**, Zenonos GA, Rigamonti D, Colby GP, Coon AL, Tamargo RJ, Huang J. Predictors of functional outcome following treatment of posterior fossa arteriovenous malformations. *J Clin Neurosci*. 2015 Feb;22(2):357-62 PMID: 25439748

13. Varlotto J, Flickinger J, Pavelic MT, Specht CS, Sheehan JM, Timek DT, Glantz MJ, Sogge S, Dimaio C, Moser R, Yunus S, Fitzgerald TJ, **Upadhyay U**, Rava P, Tangel M<sup>1</sup>, Yao A, Kanekar S Distinguishing grade I meningioma from higher grade meningiomas without biopsy. *Oncotarget*. 2015 Nov 10;6(35):38421-8 PMID: 26472106
14. Varlotto J, DiMaio C, Grassberger C, Tangel M, Mackley H, Pavelic M, Specht C, Sogge S, Nguyen D, Glantz M, Saw C, **Upadhyay U**, Moser R, Yunus S, Rava P, Fitzgerald T, Glanzman J, Sheehan J. *Neurooncol Prac* 2016 Sep; 3(3):173-187. PMID 31386091
15. **Upadhyay U**, Almefty R, Al-mefty OA. Letter to the Editor: Save the nerve: A note on "Retrosigmoid removal of small acoustic neuroma: curative tumor removal with preservation of funcion." *J Neurosurg*. March 2017 PMID: 26162045
16. Lu J, Bi WL, **Upadhyay U**, Dunn IF. Skull Base Cavernous Hemangiomas. *World Neurosurgery*, accepted 2020. No PMID yet.
17. Atwater B, **Upadhyay U**. Readmission Rates in Anterior Cranial Fossa Surgery: Experience from a Single Institution, *Neurosurgery* [accepted with revision May 2020].
18. Christenson E, Figy S, Upadhyay, U, Tracy, J. Syndrome of the trephined: a rare challenge in head and neck reconstruction. *Otolaryngology* [under revision May 2020]

### **Case Reports, Reviews, Chapters, and Editorials:**

#### **Proceedings of Meetings and Invited Papers:**

1. **Urvashi Upadhyay**, Eric Amundson MD, Henry Brem, MD. 2004. *In vivo* mechanistic and efficacy studies of nimesulide(cox-2 inhibitor) and dexamethasone in combination with BCNU *versus* experimental gliomas. In Final Abstracts Guide, American Association of Neurologic Surgeons National Meeting, Orlando FL
2. **Urvashi Upadhyay**, Sarah Posner, Betty Tyler, Henry Brem MD. 2004. In Vitro and In Vivo Mechanistic and Efficacy Studies of BCNU Combination Therapy. In Final Abstracts Guide, American Association of Neurologic Surgeons National Meeting, Orlando FL
3. **Urvashi Upadhyay**, Eric Amundson MD, Adam Fisch, Henry Brem, MD. 2004. Efficacy studies of dexamethasone in combination with BCNU *versus* experimental gliomas. In Final Abstracts Guide, American Association of Neurologic Surgeons National Meeting, Orlando FL
4. Jian Zhang, **Urvashi Upadhyay**, Weiyun Sun, Aalap Shah, AqueelPabaney, Judy Huang. 2005 Cortical Matrix Metalloproteinase-9 Expression is Increased with Endogenous Estrogen in Experimental Stroke (abstract). Presented at the Congress of Neurologic Surgeons annual meeting, Boston, MA.
5. **Upadhyay, U**. Friedlander, RF. June 2008: New England Neurosurgical Society Annual Meeting. Streptococcus Constellatus Cerebral Abscess in a patient with congenital VSD.
6. **Urvashi M. Upadhyay MD**, Alex W. Scott, Yoda Patta, Byron Masi, Betty Tyler, Michael J. Cima PhD, Henry Brem MD, Robert Langer PhD. In Vivo Efficacy and Molecular Analysis of Microcapsule-Driven Delivery of Temozolomide to Experimental High Grade Glioma: preliminary results. Presented at CNS Annual Meeting, October 2010.
7. Popp AJ, Ln N, **Upadhyay U**. "The Management of Extracranial Cerebrovascular Disease: The Past, Present, and Future" Annual Stroke and Cerebrovascular Intervention, St. Louis University, St. Louis, MO, June 2010.
8. Alex W. Scott, **Urvashi M. Upadhyay MD**, Yoda Patta, Byron Masi, Betty Tyler, Michael J. Cima PhD, Henry Brem MD, Robert Langer PhD. Development of a Microcapsule Temozolomide Delivery Device for Intracranial Treatment of Glioblastoma Multiforme: In Vitro Device Performance. Presented at CNS Annual Meeting, October 2010.



9. **Upadhyay, U.** In vivo Efficacy of Microcapsule Drug Delivery in Intracranial Tumors for Koch FOCUS meeting, Koch Institute of Integrative Cancer Research, MIT, February 2011
10. **Upadhyay UM,** Patta Y, Tyler B, Spencer K, Wicks RT, Van Schaik G, Brem H, Cima M, Langer R, Spatial Distribution of Drug Exposure and Cleaved Caspase-3 Expression in an Experimental Model of Brain Metastases following Microcapsule-Driven Intracranial Doxorubicin Delivery. CNS Annual Meeting, Washington DC, 2011
11. Betty Tyler, Yoda Patta, Rachel Grossman, **Urvashi Upadhyay,** Javad Azadi, Robert Wicks, Michael Cima, Henry Brem. Efficacy of Locally Implanted Temozolomide Microcapsules in an Intracranial Metastatic Breast Cancer Model. Presented at AANS Annual Meeting, Dever, CO, April 2011.
12. Robert Wicks, Yoda Patta, Betty Tyler, **Urvashi Upadhyay,** Kristin Martin, Michael Cima, and Henry Brem. Efficacy of Microcapsule Delivery of Temozolomide compared to Systemic Temozolomide Therapy in Intracranial Metastatic Breast Carcinoma. Submitted for CNS Annual Meeting 2011
13. Betty Tyler, Rachel Grossman, Yoda Patta, **Urvashi Upadhyay,** Lauren Huey, Javad Azadi, Michael Cima, Henry Brem. Systemically Delivered Doxil Increases Survival in Both an Intracranial Gliosarcoma Model and an Intracranial Metastatic Breast Cancer Model in Rodents. Presented at AANS Annual Meeting, Dever, CO, April 2011.
14. Robert T. Wicks, Irma Zhang, **Urvashi Upadhyay,** Yoda Patta, Alp Yurter, Henry Brem, and Betty Tyler. "Combination Therapy of Doxil with Temozolomide, Radiation Therapy, and BCNU in an Experimental Glioma Model." American Association of Neurological Surgeons (AANS) 80th Annual Meeting; Miami, Florida. April 14-18, 2012.
15. **Upadhyay, U.**...Langer, R. Intracranial Microcapsule Chemotherapy Delivery in a Brain Tumor Metastasis Model. New England Neurosurgical Society, June 2012.
16. **Urvashi Upadhyay (presentor),** Daryoush Tavanaiepour, Mohammed Abolfotoh, Ossama Almefty. Rethinking Falcine Meningioma: one surgeon's experience. North American Skull Base Society Annual Scientific Meeting, San Diego, February 2014
17. **Urvashi Upadhyay,** Kathleen Mazor The Role of Health Literacy in Neurosurgical Patient Unexpected Readmission Rates. CNS Annual Meeting, October 2017
18. **Urvashi Upadhyay,** Alec Vaezi, Jeremiah Tracy, Sathish Dundamadappa, Thomas Smith. Distinguishing Small Lesions of the Clivus. CNS Annual Meeting, October 2017
19. **Urvashi Upadhyay,** Alec Vaezi, Jeremiah Tracy, Sathish Dundamadappa, Thomas Smith. Management of Small Clival Lesions. NSA Annual Meeting, June 2018.
20. Atwater B, **Upadhyay U.** Comparing Outcomes, Cost and Length of Stay in Open vs Endoscopic Skull Base Approaches. AANS Annual Meeting, April 2019

#### **Textbook Chapters:**

1. **Upadhyay, U.** Golby AG. Malignant Cerebral Glioma: treatment strategies and considerations. Clinical Neurosurgery (Editor: Peter Black), 2007
2. **Upadhyay, U.** Biomaterials Related to the Nervous System: A Neurosurgeon's Perspective. Biomaterials Science: An Integrated Clinical and Engineering Approach. CRC Press, 2010.
3. **Upadhyay U,** Popp AJ. Commentary: The Randomized Clinical Trial. Controversies in Neurosurgery II. Al Mefty, 2012

#### **Case Reports:**

1. **Upadhyay, U.** Friedlander, RF. June 2008: New England Neurosurgical Society Annual Meeting. *Streptococcus Constellatus Cerebral Abscess in a patient with congenital VSD.*
2. **Upadhyay, U,** Boskowitz A, Bi WL, Ramkisson S, Reardon D, Almefty O. Sellar spindle cell sarcoma of unknown origin: case report, surgical strategy, and review of the literature. New England Neurosurgical Society, June 2013
3. Bi L, **Upadhyay U,** Dunn I. Cavernous hemangioma as a rare internal auditory canal mass. New England Neurosurgical Society, June 2013