

## Curriculum Vita

**Mark K. Borsody, M.D., Ph.D.**

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### Current Positions

2008 – present

Director, Medical Sciences  
Astellas Pharma US, Deerfield, Illinois

- functional experience
  - global development planning
  - regulatory agency submissions and interactions
  - study design and development for clinical trials
  - intellectual property creation
  - development of academic alliances and external partnership
  - identification of key opinion leaders
- therapeutic areas of drug development expertise
  - Alzheimer's Disease: symptomatic and disease-modifying therapies
  - cognitive impairment in schizophrenia
  - multiple sclerosis
  - migraine

2006 – 2008

Associate Director, Clinical Research - Neurosciences  
AstraZeneca Pharmaceuticals, Wilmington, Delaware

- functional experience
  - study physician, and study design and development for clinical trials
  - regulatory agency submissions and interactions
  - business plan development
  - in-licensing / due diligence evaluations
  - intellectual property creation and patent writing
  - academic alliance development
  - recruitment and evaluation of investigator-sponsored studies
  - evaluation and management of contract research organizations
  - marketing program development, including a Gold MarCom Creative Award-winning stroke education program

- therapeutic areas of drug development expertise
  - stroke and neuroprotection: NXY-059
  - pain and analgesia: muscarinic, vanilloid, cannabinoid, glutamatergic compounds; biologic agents
  - cognitive impairment in schizophrenia: nicotinic compounds
  - multiple sclerosis: myeloperoxidase inhibitors
  - bipolar disorder, substance abuse: quetiapine

### Volunteer Positions

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|----------------|--|
| 2008 – present | Clinical Assistant Professor, The Rosalind Franklin University / Chicago Medical College   |
| 2007 – 2008    | Neurologist, The Claymont Free Clinic, Wilmington, Delaware <ul style="list-style-type: none"> <li>- responsible for diagnosis and treatment of general neurology patients</li> </ul>  |
| 2005 – present | Director, Northern Neurosciences, Inc. <ul style="list-style-type: none"> <li>- responsible for initial business organization and application for not-for-profit status</li> <li>- involved in development, management, and fund-raising for research projects (listed on <a href="http://www.northern-neurosciences.com">www.northern-neurosciences.com</a>)</li> <li>- responsible for accounting and budgeting</li> </ul> |

### Previous Positions

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|-------------|--|
| 2005 – 2006 | Founder and Owner, The Northern Stroke Alliance, PLC <ul style="list-style-type: none"> <li>- responsible for development of a telemedicine network providing consultation by stroke neurologists to rural and small urban community hospitals throughout Michigan</li> <li>- responsible for sales and marketing, customer support, and contract development and negotiation</li> <li>- responsible for interaction with federal and state governments, stroke healthcare organizations, insurance providers, and business groups</li> <li>- developed working partnership between two major Michigan hospital systems to provide staffing and delivery of service</li> </ul> |
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## Education

- 2004 - 2005      Vascular Neurology Fellow  
Department of Neurology, Wayne State University / Detroit Medical Center, Detroit, Michigan
- expertise in acute stroke management and neurocritical care
  - technical proficiency with transcranial Doppler ultrasonography and carotid ultrasonography
- 2001 - 2004      Resident  
Department of Neurology, Northwestern Memorial Hospital, Chicago, Illinois
- 2000 - 2001      Transitional Medicine Intern  
Department of Medicine, Weiss Memorial Hospital, Chicago, Illinois
- 1995 - 1999      Medical Student  
The Ohio State University, Columbus, Ohio
- coursework completed after 3.5 years of enrollment (winter, 1999)
  - Doctorate of Medicine received spring, 2000
- 1991 - 1995      Graduate Student  
Division of Neuroscience, Emory University, Atlanta, Georgia
- coursework completed after 4 years of enrollment (spring, 1995)
  - Doctorate of Philosophy received spring, 1996
- 1988 - 1991      Undergraduate Student  
Program in Molecular Genetics, The Ohio State University, Columbus, Ohio
- coursework completed after 2.5 years of enrollment (winter, 1990)
  - Bachelors of Science received spring, 1991

## Research Experience, Graduate and Postdoctoral

- 1999 - 2000      Postdoctoral Research, in the laboratory of Drs. Loch Macdonald and Bryce Weir  
Department of Neurosurgery, The University of Chicago, Chicago, Illinois
- Topic: effects of serine proteases and cytokines on smooth muscle function
- Techniques Used: large-animal angiography, ex vivo cerebral artery flowimetry and biophysical assessment, myocyte patch clamping, enzyme kinetic analysis

- 1995 - 1996 Postdoctoral Research, in the laboratory of Dr. Laurel A. Fisher  
Department of Physiology, The Ohio State University, Columbus, Ohio  
Topic: control of cardiovascular function in unanesthetized animals by stress neurohormones and cytokines  
Techniques Used: small animal cardiovascular monitoring
- 1991 - 1995 Thesis Research, in the laboratory of Dr. Jay M. Weiss  
Emory University, Atlanta, Georgia  
Topic: effects of stress neurohormones, cytokines, and microbial immune system stimulants on locus coeruleus neuronal activity  
Techniques Used: small animal surgery and anesthesia, single neuron electrophysiology, small animal electroencephalography

#### Research Experience, Serving as the Principal Investigator

“The Relation of Haptoglobin Types to the Development of Cerebral Artery Vasospasm After Subarachnoid Hemorrhage.” A multicenter study involving the Detroit Medical Center, University of Rome, Northwestern University, and the Technion Institute of Israel. The goal of this study was to determine the relationship between haptoglobin isoforms and the likelihood of developing vasospasm after aneurismal subarachnoid hemorrhage. Funding: The American Heart Association Greater Midwestern Postdoctoral Research Grant and The Northwestern Memorial Foundation Women’s Board FY2005 Award.

“The Relation of Brain Ouabain to the Development of Pseudotumor Cerebri.” A multicenter study involving the Detroit Medical Center, Northwestern University, and the University of Ottawa. The goal of this study was to determine if low levels of the endogenously-produced steroid ouabain in the cerebrospinal fluid are related to the development of pseudotumor cerebri.

“Infarction Involving the Insula and Risk of Mortality After Stroke.” A multicenter study involving six hospitals in Michigan and Michigan Acute Stroke Care Overview and Treatment Surveillance System (MASCOTS) of the Paul Coverdell National Acute Stroke Registry. The goal of this study was to determine if infarctions involving insular cortex increase the 1-year mortality rate in stroke patients.

#### Grant Funding, Individual Investigator Awards

- 2005 - 2007 American Heart Association Greater Midwest Postdoctoral Fellow
- 2005 - 2007 Northwestern Memorial Foundation Women’s Board FY2005 Award
- 2003 The Northwestern University Research Grants Committee Award

## Honors

2004	Teacher of the Year Award, Northwestern Memorial Hospital
2002	Goldberg Family Trust Award, Northwestern Memorial Hospital
1995, 1996	Samuel J. Roessler Memorial Scholarship, the Ohio State University
1991 - 1995	Woodruff Fellowship, Emory University
1988 - 1989	Scarlet and Gray Scholarship, the Ohio State University
1988 - 1991	Ohio State University Honors Program

## Medical Licensure

2009 – present	State of Illinois permanent physician license, ID #036.122548
2007 - present	State of Delaware permanent physician license, ID # C1-0008489
2004 - present	State of Michigan permanent physician license, ID # 4301083710

## Board Examinations

- American Board of Psychiatry and Neurology, certificate number 53344
- written section passed, 2004
  - oral section passed, 2005

## Publications: Books

M.K. Borsody. “Comprehensive Neurology Board Review” Thieme Medical Publishing, New York, 2006.

Publications: Manuscripts and Book Chapters

Anawis M.A. and **M.K. Borsody**. 2004. "Chronic Headache Disorders" in *The 5-Minute Neurology Consult*. J. Lynn, A. Rae-Grant, and H. Newton (Eds.) Lippincott, Williams, and Wilkins.

**Borsody M.K.**, A. Burke, W. Coplin, R. Miller-Lotan, and A. Levy. 2006. "Haptoglobin and the Development of Cerebral Artery Vasospasm After Subarachnoid Hemorrhage" *Neurology* 66, 634-40.

**Borsody M.K.** and S. Chaturvedi. 2005. "Asymptomatic Carotid Artery Stenting" in *Carotid Artery Stenosis: Current and Emerging Treatments*. S. Chaturvedi and P. Rothwell (Eds.) Marcel Dekker Publishers.

Bhangoo S., R. Chua, C. Hammond, Z. Kimmel, I. Semenov, A. Videnovic, J. Kessler, and **M. Borsody**. 2005. "Focal Neurological Injury From West Nile Virus Infection May Not Be Associated with Patient Age and Premorbid Health" *Journal of the Neurological Sciences* 234, 93-8.

**Borsody M.K.** and M.L. Coco. 2001. "A Hypothesis Accounting for the Inconsistent Results of Corticosteroid Therapy in Closed Head Trauma" *Medical Hypotheses* 56, 65-72.

**Borsody M.K.**, G.A. DeGiovanni, L.S. Marton, R.L. Macdonald, and B.H. Weir. 2000. "Thrombin Reduces Cerebral Artery Contractions Caused by Cerebrospinal Fluid from Subarachnoid Hemorrhage Patients" *Stroke* 31, 2149-2156.

**Borsody M.**, J.W. Gargano, M. Reeves, and B. Jacobs. "Infarction Involving the Insula and Risk of Mortality after Stroke." *Cerebrovascular Diseases* 27: 564-71.

**Borsody M.K.** and R.L. Macdonald. 1999. "Current Treatment of Cerebral Vasospasm Caused by Subarachnoid Hemorrhage" *Advances in Clinical Neurosciences* 9, 205-222.

**Borsody M.**, I. Semenov, K. Carroll, A. Kessler, J. Dubow, A. Barion, C. Hammond, G. Van Stavern, R. White, J. Raizer, and F. Leenen. 2006. "The Relation of Brain Ouabain-Like Compounds to Idiopathic Intracranial Hypertension" *Headache* 46, 1255-1260.

**Borsody M.K.** and J.M. Weiss. 1996. "Influence of Corticotropin-Releasing Hormone on Electrophysiological Activity of Locus Coeruleus Neurons" *Brain Research* 724, 149-168.

**Borsody M.K.** and J.M. Weiss. 2002. "Peripheral Endotoxin Causes Long-Lasting Changes in Locus Coeruleus Activity Via IL-1 in Brain" *Acta Neuropsychiatrica* 14, 303-321.

**Borsody M.K.** and J.M. Weiss. 2002. "Alteration of Locus Coeruleus Neuronal Activity by Interleukin-1 and the Involvement of Endogenous Corticotropin-Releasing Hormone" *Neuroimmunomodulation* 10, 101-121.

**Borsody M.K.** and J.M. Weiss. 2004. "The Effects of Endogenous Interleukin-1 Bioactivity on Locus Coeruleus Neurons in Response to Bacterial and Viral Substances" *Brain Research* 1007, 38-56.

**Borsody M.K.** and J.M. Weiss. 2005. "The Subdiaphragmatic Vagus Nerves Mediate Activation of Locus Coeruleus Neurons by Peripherally-Administered Microbial Substances" *Neuroscience* 131, 235-45.

**Borsody M.K.** and C.Y. Yamada. 2005. "Limitations of Longitudinal Studies of Quality in Randomized Controlled Trials" *Medical Research Methodology* 5, 1-29.

Komoro T., **M.K. Borsody**, R.L. Macdonald, and B.H. Weir. 2001. "The Vasorelaxation of Cerebral Arteries by Carbon Monoxide" *Experimental Biology and Medicine* 226, 860-5.

Macdonald R.L., B.K. Weir, L.S. Marton, Z.D. Zhang, M. Sajdak, L.M. Johns, A. Kowalczyk, **M. Borsody**. 2001. "Role of Adenosine 5'-Triphosphate in Vasospasm after Subarachnoid Hemorrhage: Human Investigations" *Neurosurgery* 48, 854-62.

Tselis A., S. Chaturvedi, **M. Borsody**, R. Vaidya. 2007. "Management of Isolated Demyelinating Episodes by North American Neurologists" *Canadian Journal of Neurological Sciences* 34: 375-6.

#### Publications: Abstracts

Allers K.A., **M.K. Borsody**, and R.W. Bonsall. 1993. "TW-RIA: An Ultrasensitive Micro-Radioimmunoassay" *Society for Neuroscience Abstracts* 17, 856.

**Borsody M.K.** and L.A. Fisher. 1996. "Central Nervous System Actions of Urocortin and Corticotropin-Releasing Factor on Cardiovascular Function in Conscious Rats" *Society for Neuroscience Abstracts* 20, 855.

**Borsody M.K.**, G.A. DeGiovanni, L.S. Marton, R.L. Macdonald, and B.H. Weir. 2000. "Thrombin Reduces Cerebral Artery Contractions Caused by Cerebrospinal Fluid from Subarachnoid Hemorrhage Patients" *Wangensteen Forum* 51, 26.

**Borsody M.K.** and J.M. Weiss. 1995. "Influence of Corticotropin-Releasing Hormone on Electrophysiological Activity of Locus Coeruleus Neurons" *American College of Neuropsychopharmacology Abstracts* 34, 189.

**Borsody M.K.** and J.M. Weiss. 1994. “Locus Coeruleus Neurons Respond Differently to Interleukin-1 $\beta$  and Corticotropin-Releasing Hormone” *Society for Neuroscience Abstracts* 18, 212.

**Borsody M.K.** and J.M. Weiss. 2000. “The Role of the Subdiaphragmatic Vagus Nerve in the Activation of the Locus Coeruleus by Peripheral Immune System Stimulants” *The Chicago Society for Neuroscience*.

**Borsody M.K.** and J.M. Weiss. 2003. “Interleukin-1 Affects the Activity of Locus Coeruleus Neurons in Health and Sickness” *Cytokines and Beyond, GTCBIO meeting, San Diego*.

Weiss J.M. and **M.K. Borsody**. 1995. “Effects of Interleukin-1 and Endotoxin on Neural Activity: Electrophysiological Studies of the Locus Coeruleus” *American College of Neuropsychopharmacology Abstracts* 34, 64.

Yamada C.Y. and **M.K. Borsody**. 2002. “Factors Associated With Quality in Randomized Controlled Trials Examining Brain Injury” *54<sup>th</sup> American Neurological Association Meeting*.

#### Invited Presentations and Seminars

2006 “Haptoglobin and Cerebral Artery Vasospasm”  
University of Rome – La Sapienza

2006 “Telemedicine for Stroke”  
Mecosta County Medical Center, Big Rapids, Michigan  
Michigan Hospital Association Stroke Conference, Lansing, Michigan  
The Detroit Medical Center

2005 “The Use of the MRI in Stroke Diagnosis”  
University of South Florida, Tampa.  
Baystate Hospital, Springfield, Massachusetts.  
University of Colorado, Denver.  
SUNY – Stony Brook, New York.  
The Detroit Medical Center

2003, 2004 “Towards Understanding the Neurological Mechanisms of Being Sick”  
The University of Vermont, Burlington.  
Northwestern Memorial Hospital, Chicago

2003 “Effects of Interleukin-1 and Immune System Stimulants on the Activity of Locus Coeruleus Neurons”  
Institute of the National Academy of Sciences, Budapest, Hungary

- 2000      “Thrombin Reduces Cerebral Artery Contractions Caused by Cerebrospinal Fluid  
From Subarachnoid Hemorrhage Patients”  
            American College of Surgery Annual Meeting, Chicago, Illinois
- 1999      “Novel Neurosteroids: Brain Ouabain”  
            The University of Chicago
- 1998      “Cytokines as Neuromodulatory Substances”  
            The Johns Hopkins University
- 1995      “Effects of Interleukin-1 and Endotoxin on Neural Activity of the Locus  
Coeruleus”  
            American College of Neuropsychopharmacology Meeting, San Juan