



CURRICULUM VITAE
JEFFREY A. RUMBAUGH, M.D., Ph.D.
January 21, 2009

WORK

600 N. Wolfe Street, Pathology 509
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CURRENT APPOINTMENTS

2004-present *Assistant Professor*, Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, Maryland.
Director, Inpatient Neuroimmunology and Neuro-Infectious Diseases Consult Service, Johns Hopkins Hospital, Baltimore, Maryland.

EDUCATIONAL BACKGROUND

Johns Hopkins Hospital	Chief Resident in Neurology	2004
Johns Hopkins Hospital	Neurology Residency	2003
Johns Hopkins Bayview Medical Center	Medicine Internship	2001
University of Rochester	M.D.	2000
University of Rochester	Ph.D. (Biochemistry)	1998
University of Rochester	M.S. (Biochemistry)	1996
Haverford College	B.S. with Honors in Chemistry, <i>magna cum laude</i>	1993

ACADEMIC HONORS

Scientific Program Highlights Plenary Session recognition at AAN annual meeting, 2005, 2006, 2008
Who's Who in America Selection, 2006-2008
American Society for Clinical Investigation junior investigator Travel Award, 2006
S. Weir Mitchell Award from the American Academy of Neurology for basic neuroscience research, 2005
American Neurological Association's Travel Fellow for top science abstract from junior investigator, 2004
American Academy of Neurology's Travel Award for potential to be a future leader of Neurology, 2004
Society for Neuroimmune Pharmacology's award for best post-doctoral poster presentation, 2004
Society for Neuroimmune Pharmacology's Travel Award for work in HIV related neurotoxicity, 2004
American Neurological Association's Travel Award for outstanding potential in Academic Neurology, 2002
Dean's Award to fourth year medical student for excellent academic and research accomplishment, 2000
E. H. Hooker Fellowship for outstanding work in biological chemistry, 1997
Louis and Molly Wolk Fellowship for outstanding MD-PhD student, 1996
Genetics Training Fellowship from NIH for work in DNA replication and genetics, 1996

Elmer Stotz Fellowship for outstanding potential in biochemical research, 1995
Medical Scientist Training Program at University of Rochester, 1993
American Chemical Society's undergraduate award for analytical chemistry, 1993
Phi Beta Kappa, Junior Year, Haverford College, 1992
Nominated twice by Haverford for Barry Goldwater Scholarship, 1991 and 1992

RESEARCH EXPERIENCE

Neuroinfectious disease research focusing on the neurotoxicity of HIV proteins—Avindra Nath, Professor, and Katherine Conant, Assistant Professor, Dept. of Neurology, Johns Hopkins University, current

Biochemical mechanisms of DNA replication and repair, and of HIV replication, using mammalian enzymes—Robert A. Bambara, Professor, Dept. of Biochemistry, University of Rochester, 1995-1999

Formation of aldol adduct equivalents from betaketosulfoxides—Frances Blase, Assistant Professor, Dept. of Chemistry, Haverford, 1992-1993

Photodynamic therapy of ovarian cancer—Tayyaba Hasan, Associate Professor, Dept. of Biochemistry, and Barbara Goff, Asst. Professor, Dept. of Gynecology, Massachusetts General Hospital, Summers 1991-1992

EXTRACURRICULAR ACTIVITIES

Admissions Volunteer—interview Neurology residency applicants, 2004-present
Grand Rounds Resident—responsible for scheduling/organizing visits of out-of-town speakers, 2003-2004
Neuroscience Journal Club, 2001-2004
Residency Planning Committee, 2000-2001
Humanism in Medicine Committee, 2000
Students of Rochester Outreach—taught AIDS awareness in high schools, 1993-2000
Admissions Volunteer—led tours, hosted and interviewed medical school candidates, 1993-2000
Student Interest Group in Neurology, 1998-1999
Graduate Education in the Biomedical Sciences, Organizational Committee, 1997-1998
Tutor—Neurology, Biochemistry, Anatomy, Physiology, and Histology, 1994-1997
Teaching Assistant—Medical Biochemistry, 1996

PROFESSIONAL MEMBERSHIPS

International Society for Neurovirology, 2007-present
American Academy of Neurology, 2001-present
Rochester Academy of Medicine, 1998-2000
American Psychiatric Association, 1993-2000
American Association for the Advancement of Science, 1991-1993

PERSONAL

Son, Jonah, born 06/06/08.
Advanced Cardiac Life Saving, 1999-2004; Basic Life Saving, 1998-2000; EMT-D, 1994-1997
Running Enthusiast—have now completed 22 marathons and am currently training for twenty-third

PUBLICATIONS

Jeffrey A. Rumbaugh, Joseph Steiner, Ned Sacktor, and Avindra Nath. “*Developing Neuroprotective Strategies for Treatment of HIV-Associated Neurocognitive Dysfunction.*” Future Neurol. (2008), in press.

Kevin Tan, Subhash Patel, Nishiena Gandhi, Felicia Chow, **Jeffrey Rumbaugh**, and Avindra Nath. “*Burden of Neuroinfectious Diseases on the Neurology Service in a Tertiary Care Center.*” Neurology (2008), **71**, 1160-6.

Avindra Nath, Nicoline Schiess, Arun Venkatesan, **Jeffrey Rumbaugh**, Ned Sacktor, and Justin McArthur. “*Evolution of HIV Dementia with HIV Infection.*” Int. Rev. Psychiatry (2008), **20**, 25-31.

Diego Cadavid, Paul Auwaerter, John Aucott, and **Jeffrey Rumbaugh**. “*Treatment for the Neurological Complications of Lyme Disease (Protocol).*” Cochrane Database Syst. Rev. (2008), **1**, CD006978.

Jeffrey A. Rumbaugh, Guanhan Li, Jeffrey Rothstein, and Avindra Nath. “*Ceftriaxone protects against the neurotoxicity of human immunodeficiency virus proteins.*” J. Neurovirol. (2007), **13**, 168-72.

J. Rumbaugh, J. Turchan-Cholewo, D. Galey, C. St. Hillaire, C. Anderson, K. Conant, and A. Nath. “*Interaction of HIV Tat and Matrix Metalloproteinase in HIV Neuropathogenesis: A New Host Defense Mechanism.*” FASEB J. (2006), **20**, 1736-8.

Tongguang Wang, **Jeffrey A. Rumbaugh**, and Avindra Nath. “*Viruses and the Brain: From Inflammation to Dementia.*” Clin. Sci. (Lond.) (2006), **110**, 393-407.

Jeffrey A. Rumbaugh and Avindra Nath. “*Developments in HIV Neuropathogenesis.*” Curr. Pharm. Des. (2006), **12**, 1023-1044.

Arun Venkatesan, Cassie Spalding, Andrea Speedie, Gita Sinha, and **Jeffrey A. Rumbaugh**. “*Pseudomonas aeruginosa infective endocarditis presenting as bacterial meningitis.*” J. Infect. (2005), **51**, e199-202.

N. S. Hussain, **J. Rumbaugh**, D. Kerr, A. Nath, and A. E. Hillis. “*Effects of Prednisone and Plasma Exchange on Cognitive Impairment in Hashimoto Encephalopathy.*” Neurology (2005), **64**, 165-166.

Jeffrey A. Rumbaugh, Jeffrey R. LaDuca, Yuan Shan, and Catherine A. Miller. “*Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL): The Dermatologic Diagnosis of a Neurologic Disease.*” J. Am. Acad. Dermatol. (2000), **43**, 1128-1130.

Jeffrey A. Rumbaugh, Leigh A. Henriksen, Michael S. DeMott, and Robert A. Bambara. “*Cleavage of Substrates with Mismatched Nucleotides by Flap Endonuclease (FEN1): Implications for Mammalian Okazaki Fragment Processing.*” J. Biol. Chem. (1999), **274**, 14602-14608.

Jeffrey A. Rumbaugh, Gloria M. Fuentes, and Robert A. Bambara. “*Processing of an HIV Replication Intermediate by the Human DNA Replication Enzyme, FEN1.*” J. Biol. Chem. (1998), **273**, 28740-28745.

Jeffrey A. Rumbaugh, Richard S. Murante, Shuying Shi, and Robert A. Bambara. “*Creation and Removal of Embedded Ribonucleotides in Chromosomal DNA during Mammalian Okazaki Fragment Processing.*” J. Biol. Chem. (1997), **272**, 22591-22599.

Richard S. Murante, **Jeffrey A. Rumbaugh**, Carole J. Barnes, J. Russell Norton, and Robert A. Bambara. “*Calf RTH-1 Nuclease Can Remove the Initiator RNAs of Okazaki Fragments by Endonuclease Activity.*” J. Biol. Chem. (1996), **271**, 25888-25897.

Lin Huang*, **Jeffrey A. Rumbaugh***, Richard S. Murante, Richard J. R. Lin, Lynn Rust, and Robert A. Bambara. “*Role of Calf RTH-1 Nuclease in Removal of 5' Ribonucleotides during Okazaki Fragment Processing.*” Biochemistry (1996), **35**, 9266-9277. (*LH and **JAR** contributed equally to this work.)

B. A. Goff, U. Hermanto, **J. Rumbaugh**, J. Blake, M. Bamberg, and T. Hasan. “*Photoimmunotherapy and Biodistribution with an OC125-Chlorin Immunoconjugate in an In Vivo Murine Ovarian Cancer Model.*” Br. J. Cancer (1994), **70**, 474-480.

ONLINE PUBLICATIONS

Jeffrey A. Rumbaugh. “*Neurological Complications of the Hepatitis Viruses.*” In: Johnson, Richard T., editor. MedLink Neurology. San Diego: MedLink Corporation. June 2008. Available at www.medlink.com.

Jeffrey A. Rumbaugh. “*Pneumococcal meningitis.*” In: Johnson, Richard T., editor. MedLink Neurology. San Diego: MedLink Corporation. February 2008. Available at www.medlink.com.

Jeffrey A. Rumbaugh. “*Haemophilus influenzae meningitis.*” In: Johnson, Richard T., editor. MedLink Neurology. San Diego: MedLink Corporation. July 2007. Available at www.medlink.com.

Jeffrey A. Rumbaugh. “*Rocky Mountain Spotted Fever.*” In: Johnson, Richard T., editor. MedLink Neurology. San Diego: MedLink Corporation. March 2007. Available at www.medlink.com.

Jeffrey A. Rumbaugh. “*Neurological Manifestations of Staphylococcal Infections.*” In: Johnson, Richard T., editor. MedLink Neurology. San Diego: MedLink Corporation. February 2007. Available at www.medlink.com.

RECENT PRESENTATIONS AT INTERNATIONAL MEETINGS (** = platform)

J. A. Rumbaugh, M. Bachani, W. Li, T. R. Butler, K. J. Smith, M. Bianchet, M. A. Prendergast, and A. Nath. “*A Tat-Immune Complex Binds the NMDA Receptor, Preventing Receptor Activation and Excitotoxicity.*” American Academy of Neurology Annual Meeting, Seattle, Washington, 2009 (submitted).

J. Rumbaugh, M. Bachani, T. Butler, K. Smith, M. Prendergast, and A. Nath. “*HIV Tat Immune Complexes Attenuate Neurotoxicity via NMDA Receptors.*” American Neurological Association Annual Meeting, Salt Lake City, Utah, 2008.

****J. Rumbaugh**, M. Bachani, G. Li, W. Li, and A. Nath. “*Matrix Metalloproteinase Protects against HIV-1 Tat-Induced Neurotoxicity by Decreasing Nitrosative and Oxidative Stress and by Inhibiting HIV Replication.*” American Academy of Neurology Annual Meeting, Chicago, Illinois, 2008.

Kevin Tan, Subhash Patel, Nishiena Gandhi, **Jeffrey Rumbaugh**, and Avindra Nath. “*The Burden of Neuroinfectious Diseases in a Tertiary Care Hospital.*” American Academy of Neurology Annual Meeting, Chicago, Illinois, 2008.

J. Rumbaugh, M. Bachani, W. Li, G. Li, D. Galey, T. Malpica, and A. Nath. “*Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection.*” International Society for Neurovirology Annual Meeting, San Diego, California, 2007.

J. Rumbaugh, M. Bachani, G. Li, W. Li, and A. Nath. “*Matrix Metalloproteinase Protects against HIV-1 Tat-Induced Neurotoxicity by Decreasing Nitrosative and Oxidative Stress and by Inhibiting HIV Replication.*” American Neurological Association Annual Meeting, Washington, DC, 2007.

M. Bachani, A. Nath, and **J. Rumbaugh**. “*Detection of Tat and Anti-Tat Antibodies in Cerebrospinal Fluid of Patients with HIV Infection: Correlation with HIV Dementia, Viral Load, and CD4 Lymphocyte Count.*” American Neurological Association Annual Meeting, Washington, DC, 2007.

****J. Rumbaugh**, M. Bachani, T. Malpica-Llanos, T. Wang, I. Tikhonov, D. Pauza, and A. Nath. “*HIV Tat Immune Complexes Attenuate Neurotoxicity via NMDA Receptors.*” American Academy of Neurology Annual Meeting, Boston, Massachusetts, 2007.

J. Rumbaugh, M. Bachani, T. Malpica, and A. Nath. “*Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection.*” Society for Neuroimmune Pharmacology Annual Meeting, Salt Lake City, Utah, 2007.

J. Rumbaugh, M. Bachani, I. Tikhonov, D. Pauza, and A. Nath. “*A Monoclonal Antibody against HIV Tat Attenuates Neurotoxicity via Glutamate Receptors.*” Institute of Human Virology Annual International Meeting on HIV/AIDS, Baltimore, Maryland, 2006.

J. Rumbaugh, M. Bachani, J. Turchan-Cholewo, D. Galey, K. Conant, and A. Nath. “*Interaction of HIV Tat and Matrix Metalloproteinase in HIV Neuropathogenesis: A New Host Defense Mechanism.*” American Neurological Association Annual Meeting, Chicago, Illinois, 2006.

J. Rumbaugh, M. Bachani, I. Tikhonov, D. Pauza, and A. Nath. “*A Monoclonal Antibody against HIV Tat Attenuates Neurotoxicity via Glutamate Receptors.*” International Society for Neurovirology Annual Meeting, Philadelphia, Pennsylvania, 2006.

J. Rumbaugh, J. Turchan-Cholewo, D. Galey, K. Conant, and A. Nath. “*Interaction of HIV Tat and Matrix Metalloproteinase in HIV Neuropathogenesis: A New Host Defense Mechanism.*” American Society for Clinical Investigation/American Academy of Physicians Annual Meeting, Chicago, Illinois, 2006.

J. Rumbaugh, J. Rothstein, and A. Nath. “*Ceftriaxone Protects against the Neurotoxicity of Human Immunodeficiency Virus (HIV) Proteins.*” American Academy of Neurology Annual Meeting, San Diego, California, 2006.

J. Rumbaugh, T. Wang, J. Steiner, J. Rothstein, and A. Nath. “*Ceftriaxone Protects against the Neurotoxicity of Human Immunodeficiency Virus (HIV) Proteins.*” Society for Neuroscience Annual Meeting, Washington, DC, 2005.

J. Rumbaugh, I. Tikhonov, D. Pauza, and A. Nath. “*A Monoclonal Antibody against HIV Tat Attenuates Neurotoxicity via Glutamate Receptors.*” American Neurological Association Annual Meeting, San Diego, California, 2005.

****J. Rumbaugh**, J. Turchan-Cholewo, D. Galey, R. Slevin, K. Conant, and A. Nath. “*Interaction of HIV Tat and Matrix Metalloproteinase in HIV Neuropathogenesis: A New Host Defense Mechanism.*” American Academy of Neurology Annual Meeting, Miami, Florida, 2005.

J. Rumbaugh, J. Turchan-Cholewo, D. Galey, R. Slevin, K. Conant, and A. Nath. “*Interaction of HIV Tat and Matrix Metalloproteinase in HIV Neuropathogenesis: A New Host Defense Mechanism.*” American Neurological Association Annual Meeting, Toronto, Ontario, Canada, 2004.

****J. Rumbaugh**, J. Turchan-Cholewo, K. Conant, C. St. Hillaire, R. Slevin, D. Galey, S. Frederick, C. Anderson, and A. Nath. “*The Role of Matrix Metalloproteinases in Modulation of Neuro-inflammatory and Neuro-Infectious Diseases: A Study in HIV Associated Dementia.*” International Symposium on Rare Neuro-Immunological Diseases, Baltimore, Maryland, 2004.

J. Rumbaugh, J. Turchan-Cholewo, K. Conant, C. St. Hillaire, C. Anderson, R. Slevin, and A. Nath. “*Interaction of HIV Tat and Matrix Metalloproteinase in HIV Neuropathogenesis: A New Host Defense Mechanism.*” Society for Neuroimmune Pharmacology Annual Meeting, Santa Fe, New Mexico, 2004.

Jeffrey A. Rumbaugh, Richard S. Murante, Leigh A. Henricksen, Michael S. DeMott, Carole J. Barnes, and Robert A. Bambara. “*Creation and Removal of Embedded Ribonucleotides in Chromosomal DNA during Mammalian Okazaki Fragment Processing.*” Eukaryotic DNA Replication Meeting, Cold Spring Harbor, New York, 1997.

Robert A. Bambara, Richard S. Murante, **Jeffrey Rumbaugh**, Leigh Ann Hendrickson, and Chockalingam Palaniappan. “*Junction Ribonuclease Activity of Mammalian RNase HI.*” Ribonuclease H Meeting, Ocean City, Maryland, 1996.

Richard S. Murante, Carole J. Barnes, **Jeffrey A. Rumbaugh**, Lin Huang, John Turchi, Lynn Rust, and **Robert A. Bambara**. “*Reconstituting Mammalian Okazaki Fragment Processing.*” DNA Replication and Repair Meeting, Taos, New Mexico, 1996.

INVITED BOOK CHAPTERS

Jeffrey A. Rumbaugh and Avindra Nath. “*Approach to the Patient with a CSF Pleocytosis.*” In: Irani, David N., editor. Cerebrospinal Fluid in Clinical Practice. Burlington, MA: Elsevier Inc. (2008).

Jeffrey A. Rumbaugh and Avindra Nath. “*Substance Use Disorders and Neuro-AIDS in the HAART Era.*” In: Goodkin, Karl, editor. The Spectrum of Neuro-AIDS Disorders: Pathophysiology, Diagnosis, and Treatment. ASM Press (2008).

Jeffrey A. Rumbaugh. “*Therapies for the Neurological Complications of HIV Infection.*” In: Johnston, Michael, editor. Principles of Drug Therapy in Neurology. New York, NY: Oxford University Press (2008).

Jeffrey A. Rumbaugh and Justin C. McArthur. “*HIV-Associated Neurocognitive Disorders.*” In: Geldmacher, David, editor. Other Dementias. Delray Beach, FL: Carma Publishing LLC (2007).

Jeffrey A. Rumbaugh. “*Neurological Infections.*” In: Rafii, Michael and Cochrane, Thomas, editors. First Aid for the Neurology Boards. New York, NY: McGraw-Hill (2007), in press.

Jeffrey A. Rumbaugh. “*Tingling and Numbness.*” In: Levy, Michael, editor. Guidebook for Medical Students on the Neurology and Psychiatry Wards. Lippincott (2007), in press.

Jeffrey A. Rumbaugh and Avindra Nath. “*Neuronal Cell Death and Inflammation.*” In: Haddad, John J, Binder MD, Hirokawa N, Windhorst U, and Hirsch MC, editors. Encyclopedic Reference of Neuroscience. Neuroimmunology. Heidelberg, Germany: Springer-Verlag (2006), in press.

CURRENT EXTRAMURAL RESEARCH SPONSORSHIP

Principal Investigator: **Jeffrey A. Rumbaugh**

Mentors: Avindra Nath, Katherine Conant

Grant Number: 1 K08 MH072389-01

Title: Interaction of HIV Tat and MMP in HIV Neuropathogenesis

Sponsor: National Institute of Mental Health

Dates: July 2004 to June 2009

Effort: 90%

Amount: \$50,000/year for direct research support

Description: The aim of this project is to explore the molecular mechanisms and interactions of human and viral factors as they relate to development of neurodegeneration in patients with HIV dementia. In the initial phase of the project, we will utilize a human neuronal cell culture system to investigate the modulation of neuronal toxicity by the interaction of human MMPs with the HIV protein, Tat. We will then use a transgenic murine model system to further explore these interactions *in vivo*. Finally, we will utilize the framework provided by Tat-MMP interactions to identify neuroprotective agents which may be clinically useful for the treatment of HIV dementia. This basic research will not only advance clinical medicine through its therapeutic implications for many of the neurological complications of HIV disease but may have implications for understanding the pathophysiology of other viral encephalitides and other dementias as well.

Principal Investigator: Ned Sacktor

Co-Investigators: **Jeffrey A. Rumbaugh**, Elly Katabira, Noeline Nakasujja

Title: HIV Dementia and Sensory Neuropathy in Uganda

Sponsor: National Institutes of Health, R21

Dates: April 2008 to March 2010

Effort: 5%

Amount: \$100,000/year for direct research support

Description: We propose the first large scale prospective study of HIV-D and HIV-SN in Uganda. The project will assemble a cohort of HIV+ individuals in Uganda: 1) to determine the prevalence of and risk factors associated with HIV-D and HIV-SN among untreated HIV+ individuals with moderate to advanced immunosuppression, 2) to determine whether untreated HIV+ individuals decline from baseline in neuropsychological test performance and peripheral nerve function, and 3) to obtain preliminary data to determine whether HIV subtypes differ with respect to the risk of HIV-D and HIV-SN and progression of HIV-associated cognitive impairment and peripheral nerve function. This proposal will provide the data necessary to characterize the natural history of HIV-D and HIV-SN, which could be used for future R01 applications, and could impact the clinical practice parameters for the initiation of HAART in countries within the Sub-Saharan Africa such as Uganda. Our proposal will provide important preliminary data to examine whether HIV subtypes may differ with respect to their ability to cause HIV-associated CNS and PNS dysfunction. The proposal will also provide training for the HIV clinician-scientists in Kampala, Uganda in the research and management of HIV-associated neurological disease.

PENDING GRANT APPLICATIONS

Principal Investigator: **Jeffrey A. Rumbaugh**

Title: Protective Host Responses in the Neuropathogenesis of HIV Infection

Sponsor: National Institutes of Health, K02

Dates: July 2009 to June 2010

Effort: 85%

Amount: \$175,000/year for direct research support

Description: The goal of this proposal is to characterize the action of two recently recognized host defense mechanisms in preventing HIV associated neurotoxicity. One of these mechanisms involves the interaction of human MMPs with viral proteins, such as HIV-1 Tat and gp120, to modulate neurotoxicity. The second protective mechanism involves the ability of the host antibody response to neutralize neurotoxic functions of viral proteins mediated through glutamate receptors. In the initial phase of the project, we will utilize a human neuronal cell culture system to identify specific processes of interaction between MMPs and Tat. We will then investigate the interaction between the MMP-based and antibody-based defense mechanisms. Finally, we will use human spinal fluid to further explore these interactions *ex vivo*. The proposed research is significant because it will provide us with information about the nervous system's repertoire of response to viral infection, and about the role of MMP and antibody responses in central nervous system inflammatory conditions. Such an understanding will impact clinical practice and public health by leading to new therapeutic targets for HIV-associated dementia and, perhaps, peripheral neuropathy.

Principal Investigator: Ned Sacktor

Co-Investigators: **Jeffrey A. Rumbaugh**, Justin McArthur, Elly Katabira, Noeline Nakasujja

Title: Neuropathogenesis of HIV Dementia and Neuropathy in Uganda

Sponsor: National Institutes of Health, R01

Dates: April 2008 to March 2013

Effort: 20%

Amount: \$250,000/year for direct research support

Description: We propose the first large longitudinal study of the pathogenesis of HIV-D and HIV-SN in Uganda. The project will assemble a cohort of 125 HIV+ individuals with moderate-advanced immunosuppression in Uganda: 1) to determine the prevalence and risk factors (including HIV subtype) for HIV-D and HIV-SN, 2) to determine whether untreated HIV+ individuals decline from baseline in neuropsychological test performance over a three year period, and 3) to determine whether HIV-SN is associated with decreased epidermal nerve fiber density (ENFD) and whether this is affected by initiation of D-drug HAART therapy. It will be one of the first studies to assess the impact of viral clade in well-characterized individuals with HIV-D and HIV-SN. The three year duration will permit an evaluation of the progression of HIV-associated CNS and PNS disease. It will also be the first application of the skin biopsy technique to assess PNS disease by ENFD in Africa. Our preliminary results suggest that HIV-D and HIV-SN are common neurological complications of HIV infection in Uganda, and this proposal will identify clinical and pathogenetic factors which could lead to an earlier diagnosis of each condition and improved treatment.

PREVIOUS EXTRAMURAL RESEARCH SPONSORSHIP

Principal Investigator: **Jeffrey A. Rumbaugh**

Title: Characterization of Novel Protective Mechanisms by Host Response to HIV Neuropathogenesis

Sponsor: Center for AIDS Research

Dates: July 2007 to June 2008

Amount: \$40,000/year for direct research support

Description: The aim of this project is to characterize the action of two recently recognized host defense mechanisms in preventing HIV associated neurotoxicity. We have previously identified neuroprotective interactions between human MMPs and HIV Tat protein. The first goal of this project is to study the specificity of this interaction, particularly by exploring possible mechanisms of interaction between MMPs and HIV gp120. The second protective process involves the ability of the host antibody response to neutralize neurotoxic functions of viral proteins mediated through glutamate receptors. We will use neurotoxicity assays and immunoprecipitation experiments to study the interactions of these proteins. We will also study the effects such interactions may have on downstream signaling cascades usually triggered by NMDA receptors. The research will provide us with information about the nervous system's repertoire of response to viral infection, and about the role of MMP and antibody responses in central nervous system inflammatory conditions.

Principal Investigator: **Jeffrey A. Rumbaugh**

Title: Plasmacytoid Dendritic Cells and the Innate Immune Inflammatory Response in the Neurodegeneration of Multiple Sclerosis

Sponsor: The Montel Williams MS Foundation

Dates: July 2007 to June 2008

Amount: \$20,000/year for direct research support

Description: The aim of this project is to study the role of plasmacytoid dendritic cells in the neurodegenerative phase of multiple sclerosis. The mechanisms of damage during this phase of disease are not well understood, and the medications used to treat patients with relapsing remitting MS do not work in patients with progressive MS. We hypothesize that neuronal damage is mediated by the innate inflammatory response and PDCs play a critical, but unexplored, role. Using both in vitro and animal model systems, we will study the interaction of PDCs with other innate immune mediators which have been most strongly implicated as potential contributors to MS related neurodegeneration. This work will provide information essential for development of new therapies that might prevent irreversible disability associated with MS.

Grant Number: N01-AI-30025

Title: West Nile Virus Treatment Study and Natural History Study

Study Type: Phase II, Double Blind, Placebo-Controlled Trial

Performed by: Collaborative Antiviral Study Group

Role: Sub-Investigator

Dates: July 2004 to June 2007

Sponsor: National Institute of Allergy and Infectious Disease

Description: The aim of the natural history study is to identify and describe the mortality and morbidity, specifically neurological and functional outcomes, of patients infected with West Nile Virus. We will also characterize the clinical course and diverse manifestations of West Nile Virus infection, assess kinetics of specific anti-West Nile antibodies following infection, and correlate them with outcomes. The aim of the treatment portion of the grant is to assess and characterize the safety and tolerability of Omr-IgG-amTM in a population of hospitalized patients with confirmed or suspected West Nile Virus disease. We will assess pharmacokinetics of specific anti-West Nile antibodies following intravenous administration of Omr-IgG-amTM, and estimate efficacy of Omr-IgG-amTM in reducing morbidity and mortality, for patients with known or suspected West Nile Virus infection who receive West Nile Virus specific IV-Omr-IgG-amTM versus similar patients who receive either placebo or non-specific, pooled intravenous immunoglobulin (IVIg).

Title: Clinical and Laboratory Characterization of Adult Lyme Disease in Maryland

Study Type: Observational and Laboratory Evaluation

Performed by: Johns Hopkins Lyme Disease Study Group

Role: Co-Investigator

Dates: May 2005 to April 2007

Sponsor: Gene Logic, Inc.

Description: We will evaluate the effectiveness of various diagnostic laboratory tests for patients with systemic and/or CNS Lyme disease, with the aim of developing techniques with significantly improved sensitivity and specificity compared to currently available tests. We will evaluate serum and CNS of patients with Lyme disease for host susceptibility markers indicating a predisposition to developing CNS Lyme complications and/or post-Lyme disease syndrome.

TEACHING RESPONSIBILITIES

2000-present	Supervised over 200 undergraduate, medical students, medicine, psychiatry, neurology, and neurosurgery residents at Johns Hopkins University School of Medicine. Give didactic lectures.
2001-present	Instructor for Neurology section of Clinical Skills course for second year medical students
2004-present	Instructor of Neurology Clinical Practicum for undergraduate students
2006-present	Instructor in Introduction to Clinical Medicine for first year medical students
2008-present	Preceptor for Neurology Resident's Continuity Clinic

JOURNAL ACTIVITIES

Ad-Hoc Reviewer

The American Journal of the Medical Sciences, 2008
Clinical and Vaccine Immunology, 2007-2008
Canadian Journal of Neurological Sciences, 2004-2008
AIDS Research and Therapy, 2007
Proceedings of the National Academy of Sciences U.S.A, 2007
Antimicrobial Agents and Chemotherapy, 2007
Journal of Neurovirology, 2007
Journal of Clinical Microbiology, 2006-2007
The AIDS Reader, 2004-2007
Journal of Virology, 2006
Journal of Leukocyte Biology, 2006
Journal of Neurochemistry, 2006
AIDS, 2005
Annals of Neurology, 2004

CERTIFICATIONS AND LICENSES

American Board of Psychiatry and Neurology Certification, #53213, 2005
Maryland State Medical License, #D61460, 2004

CLINICAL SERVICE RESPONSIBILITIES

Care for outpatients with a wide range of general neurological conditions, including seizures, headaches, movement disorders, dementias, and peripheral neuropathies, but with a focus on neuro-infectious and neuro-immunological conditions. Acute management of inpatients with all forms of neurological disease on a neurological inpatient service, a general neurology consult service, and a neuro-immunology/neuro-infectious disease consult service. Attending responsibilities with direct patient care account for a time commitment of 10% effort.

CLINICAL RESEARCH

Grant Number: N01-AI-30025

Title: Long Term Therapy of Herpes Simplex Encephalitis: An Evaluation of Valacyclovir

Study Type: Phase III, Double Blind, Placebo-Controlled Trial

Performed by: Collaborative Antiviral Study Group

Role: Sub-Investigator

Dates: July 2004 to June 2010

Sponsor: National Institute of Allergy and Infectious Disease

Description: The purpose of this study is to test the effect of long-term oral anti-viral therapy (valacyclovir) following the standard intravenous acyclovir therapy on the clinical outcome of patients with herpes simplex encephalitis. A separate substudy will correlate cognitive function with HSV viral load and longitudinal analyses of MRI volumetric measurements, viral load and cognitive test scores as a function of treatment (placebo vs. valacyclovir) and other covariates. Neurological outcome will be assessed for 5 years.

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

Neuroimmunology/Neuro-Infectious Diseases Fellowship Certification Committee, Member, 2007-present.

Working to obtain recognition of this subspecialty from the United Council for Neurologic Subspecialties.

INVITED TALKS/PANELS

Johns Hopkins University, Clinical Neuroscience Seminar, "HIV Tat Immune Complexes Attenuate Neurotoxicity via NMDA Receptors", Baltimore, MD, 2008

Emory University, Grand Rounds, "Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection", Atlanta, GA, 2008.

University of Rochester, Special Seminar, "Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection", Rochester, NY, 2007.

University of North Carolina Medical Center, Grand Rounds, "Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection", Chapel Hill, NC, 2007.

Johns Hopkins University, Clinical Neuroscience Seminar, "Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection", Baltimore, MD, 2007

University of Colorado Health Sciences Center, Grand Rounds, "Novel Host Defense Mechanisms in the Neuropathogenesis of HIV Infection", Denver, CO, 2007.

Invited "Expert Neurologist", A Day for Men with Multiple Sclerosis, National Multiple Sclerosis Society, Washington, DC, 2007.