

CURRICULUM VITAE

Joseph P. Steiner

March 2011

DEMOGRAPHIC INFORMATION

Current Appointment: Associate Professor, Department of Neurology, Johns Hopkins University.

Personal Data:

Business address:

Department of Neurology
Meyer 6-181C
600 N. Wolfe street
Baltimore, MD 21287

Tele: 410-502-3290

Fax: 410-502-8075

E-mail: jsteine3@jhmi.edu

Date and place of birth: September 15, 1961; Allentown, PA.

EDUCATION AND TRAINING

Sept 1979 -- June 1983 BS Biochemistry, Lehigh University, Bethlehem, PA.

June 1983 -- Sept 1984 MS Chemistry, Lehigh University, Bethlehem, PA.

Sept 1984 -- May 1989 PhD BCMC program, The Johns Hopkins University School of Medicine, Baltimore, MD.

FELLOWSHIPS

May 1989 -- Sept 1990 Postdoctoral Fellow, Department of Biochemistry, Duke University Medical Center, Durham, NC (Laboratory of Dr. G. Vann Bennett)

Sept 1990 -- October 1994 Postdoctoral Fellow, Department of Neuroscience, the Johns Hopkins University School of Medicine, Baltimore, MD 21287 (Laboratory of Solomon H. Snyder)

EMPLOYMENT

1994-1996 Scientist/Biology Group Leader, Guilford Pharmaceuticals, Inc., Baltimore, MD
1996-2000 Senior Scientist/Biology Group Leader, Guilford Pharmaceuticals, Inc., Baltimore, MD
2000-2001 Principal Scientist/Biology Group Leader, Guilford Pharmaceuticals, Inc., Baltimore, MD
2001-2002 Principal Scientist/Project Team Leader, Guilford Pharmaceuticals Inc., Baltimore, MD
2002-2005 Principal Research Scientist II/ Project Team Leader, Guilford Pharmaceuticals, Inc., Baltimore, MD

FACULTY POSITIONS

July 2009—Present: Associate Professor, Department of Neurology Director, Division of Neuroimmunology, Johns Hopkins University, Baltimore, Maryland.

July 2005 – July 2009: Assistant Professor, Department of Neurology Director, Division of Neuroimmunology, Johns Hopkins University, Baltimore, Maryland.

October 1994 – July 2005: Visiting Scientist, Department of Neuroscience, The Johns Hopkins University School of Medicine, Baltimore, MD.

RESEARCH ACTIVITIES

PUBLICATIONS IN PEER REVIEWED JOURNALS

1. **Steiner, J.P.**, Ling, E., Bennett, V. Nearest neighbor analysis for brain synapsin I. Evidence from in vitro reassociation assays for association with membrane protein(s) and the Mr = 68,000 neurofilament subunit. *J. Biol. Chem.*, 262: 905-914, 1987.
2. **Steiner, J.P.**, Gardner, K., Baines, A. and Bennett, V. Synapsin I. A regulated synaptic vesicle organizing protein. *Brain Res. Bull.*, 18: 777- 785, 1987.
3. Bennett, V.,* Gardner, K. and **Steiner, J.P.** Brain adducin: A protein kinase C substrate that may mediate site-directed assembly at the spectrin-actin junction. *J. Biol. Chem.*, 263: 5860-5869, 1988.
4. **Steiner, J.P.** and Bennett, V. Ankyrin-independent membrane protein binding sites for brain and erythrocyte spectrin. *J. Biol. Chem.*, 263: 14417-14425, 1988.
5. Supattapone, S., Danoff, S.K., Theibert, A., Joseph, S.K., **Steiner, J. P.** and Snyder, S.H. Cyclic AMP dependent phosphorylation of a brain inositol trisphosphate receptor decreases its release of calcium. *Proc. Natl. Acad. Sci. USA*, 85: 8747-8750, 1988.
6. **Steiner, J.P.**, Walke, H. T., Jr. and Bennett, V. Calcium/Calmodulin inhibits direct binding of spectrin to synaptosomal membranes. *J. Biol. Chem.*, 264: 2783-2791, 1989.
7. Khan, AA., **Steiner, J.P.** and Snyder, S.H. Plasma membrane inositol-1,4,5-trisphosphate receptor of lymphocytes: Selective enrichment in sialic acid and unique binding specificity. *Proc. Natl. Acad. Sci. USA*, 89: 2849-2853, 1992.
8. Khan, AA., **Steiner, J.P.**, Klein, M.G., Schneider, M.F., and Snyder, S.H. IP3 receptor: localization to plasma membrane of T cells and cocapping with the T cell receptor. *Science*, 257: 815-818, 1992.
9. **Steiner, J.P.**, Dawson, T.M., Fotuhi, M., Glatt, C.E., Snowman, A.M., Cohen, N. and Snyder, S.H. High brain densities of the immunophilin FKBP colocalized with calcineurin. *Nature*, 358: 584-587, 1992.
10. Dawson, T.M., **Steiner, J.P.**, Dawson, V.L., Dinerman, J.L., Uhl, G.R. and Snyder, S.H. The immunosuppressant, FK506, enhances phosphorylation of nitric oxide synthase and protects against glutamate neurotoxicity. *Proc. Natl. Acad. Sci. USA*, 90: 9808-9812, 1993.

11. Hirsch, D.B., **Steiner, J.P.**, Dawson, T.M., Mammen, A., Hayek, E. and Snyder, S.H. Neurotransmitter release regulated by nitric oxide in PC12 cells and brain synaptosomes. *Current Biology*, 3: 749-754, 1993.
12. Dawson, T.M., **Steiner, J.P.**, Lyons, W.E., Fotuhi, M., Blue, M. and Snyder, S.H. The immunophilin FKBP and cyclophilin are discretely localized in the brain: Relationship to calcineurin. *Neurosci.*, 62(2): 569-80, 1994.
13. Dinerman JL, **Steiner JP**, Dawson TM, Dawson V, Snyder SH. Cyclic nucleotide dependent phosphorylation of neuronal nitric oxide synthase inhibits catalytic activity. *Neuropharmacology*, 33(11): 1245-51, 1994.
14. Lyons WE, George EB, Dawson TM, **Steiner JP**, Snyder SH. Immunosuppressant FK506 promotes neurite outgrowth in cultures of PC12 cells and sensory ganglia. *Proc Natl Acad Sci U S A*, 91(8): 3191-5, 1994.
15. Dawson, T.M., Hung, K., Dawson, V.L., **Steiner, J.P.** and Snyder, S.H. Neuroprotective effects of gangliosides may involve inhibition of nitric oxide synthase. *Annals Neurol.*, 37: 115-8, 1995.
16. Lyons WE, **Steiner JP**, Snyder SH, Dawson TM. Neuronal regeneration enhances the expression of the immunophilin FKBP-12. *J Neurosci*, 15(4): 2985-94, 1995.
17. Cameron AM, **Steiner JP**, Sabatini DM, Kaplin AI, Walensky LD, Snyder SH. Immunophilin FK506 binding protein associated with inositol 1,4,5-trisphosphate receptor modulates calcium flux. *Proc Natl Acad Sci U S A*, 92(5): 1784-8, 1995.
18. Sharp AH, Loev SJ, Schilling G, Li SH, Li XJ, Bao J, Wagster MV, Kotzuk JA, **Steiner JP**, Lo A, Dawson, TM and Ross, CA. Widespread expression of Huntington's disease gene (IT15) protein product. *Neuron*, 14(5): 1065-74, 1995.
19. Cameron AM, **Steiner JP**, Roskams AJ, Ali SM, Ronnett GV, Snyder SH. Calcineurin associated with the inositol 1,4,5-trisphosphate receptor-FKBP12 complex modulates Ca²⁺ flux. *Cell*, 83(3): 463-72, 1995.
20. **Steiner JP**, Dawson TM, Fotuhi M, Snyder SH. Immunophilin regulation of neurotransmitter release. *Molec Medicine*, 2(3): 325-33, 1996.
21. **Steiner JP**,* Hamilton GS, Ross DT, Valentine HL, Guo H, Connolly MA, Liang S, Ramsey C, Li JH, Huang W, Howorth P, Soni R, Fuller M, Sauer H, Nowotnik AC and Suzdak PD. Neurotrophic immunophilin ligands stimulate structural and functional recovery in neurodegenerative animal models. *Proc Natl Acad Sci U S A*, 94(5):2019-24, 1997. #Selected for news release
22. **Steiner JP**,* Connolly MA, Valentine HL, Hamilton GS, Dawson TM, Hester L, Snyder SH. Neurotrophic actions of nonimmunosuppressive analogues of immunosuppressive drugs FK506, rapamycin and cyclosporin A. *Nature Med*, 3(4): 421-8, 1997.
23. Walensky LD, Dawson TM, **Steiner JP**, Sabatini DM, Suarez JD, Klinefelter GR, Snyder SH. The 12 kD FK 506 binding protein FKBP12 is released in the male reproductive tract and stimulates sperm motility. *Molec Medicine*, 4(8):502-14, 1998.

24. Munis, J.R. **Steiner, J.P.**, Ruat, M. and Snyder, S.H. Diamine oxidase induces neurite outgrowth in chick dorsal root ganglia by a nonenzymatic mechanism. *J. Neurochem.*, 70: 1323-6, 1998.
25. Eberling JL, Bankiewicz KS, Pivrotto P, Bringas J, Chen K, Nowotnik DP, **Steiner JP**, Budinger TF, Jagust WJ. Dopamine transporter loss and clinical changes in MPTP-lesioned primates. *Brain Res.*, 832(1-2): 184-7, 1999.
26. Sauer H, Francis JM, Jiang H, Hamilton GS, **Steiner JP**. Systemic treatment with GPI 1046 improves spatial memory and reverses cholinergic neuron atrophy in the medial septal nucleus of aged mice. *Brain Res.*, 842(1): 109-18, 1999.
27. Ross DT, Guo H, Howorth P, Chen Y, Hamilton GS, **Steiner JP**. The small molecule FKBP ligand GPI 1046 induces partial striatal re-innervation after intranigral 6-hydroxydopamine lesion in rats. *Neurosci Lett.*, 297(2): 113-6, 2001.
28. Emborg ME, Shin P, Roitberg B, Sramek JG, Chu Y, Stebbins GT, Hamilton JS, Suzdak PD, **Steiner JP**, Kordower JH. Systemic administration of the immunophilin ligand GPI 1046 in MPTP-treated monkeys. *Exp Neurol.*, 168(1): 171-82, 2001.
29. Zhang, C., **Steiner, J. P.**, Hamilton, G. S., Hicks, T. P., and Poulter, M.O. Regeneration of dopaminergic function in 6-hydroxydopamine-lesioned rats by neuroimmunophilin ligand treatment. *J. Neurosci.*, 21: RC156 1-6, 2001.
30. Wei, L., Wu, Y.-Q., Wilkinson, D.E., Chen, Y., Soni, R., Scott, C., Ross, D.T., Guo, H., Howorth, P., Valentine, H.L., Liang, S., Spicer, D., Fuller, M., **Steiner, J.P.**, Hamilton, G.S. Solid-phase synthesis of FKBP12 inhibitors: N-sulfonyl and N-carbamoylpropyl and piperidyl amides. *Bioorg. Med. Chem. Lett.*, 12: 1429-33, 2002.
31. Choi, C.; Li, J.-H.; Vaal, M.; Thomas, C.; Limburg, D.C.; Wu, Y.-Q.; Chen, Y.; Soni, R.; Scott, C.; Ross, D.T.; Guo, H.; Howorth, P.; Valentine, H.L.; Liang, S.; Spicer, D.; Fuller, M.; **Steiner, J.P.**; Hamilton, G.S. Use of parallel synthesis combinatorial libraries for rapid identification of potent FKBP12 inhibitors. *Bioorg. Med. Chem. Lett.*, 12: 1421-28, 2002.
32. Hamilton, G.S., Wu, Y.-Q., Limburg, D.C., Wilkinson, D.E., Vaal, M.J., Li, J.-H., Thomas, C., Huang, W., Sauer, H., Ross, D.T., Soni, R., Chen, Y., Guo, H., Howorth, P., Valentine, H.L., Liang, S., Spicer, D., Fuller, M., **Steiner, J.P.** Synthesis of N-glyoxyl and piperidyl amides and thioesters and evaluation of their in vitro and in vivo nerve regenerative effects. *J. Med. Chem.*, 45: 3549-57, 2002.
33. Wu, Y.-Q., Wilkinson, D.E., Limburg, D.C., Li, J.-H., Sauer, H., Ross, D.T., ; Liang, S., Spicer, D., Valentine, H.L., Fuller, M., Guo, H., Howorth, P., Soni, R., Chen, Y., **Steiner, J.P.**, Hamilton, G.S. Synthesis of ketone analogues of propyl and piperidyl ester FKBP12 ligands. *J. Med. Chem.*, 45: 3558-68, 2002.
34. Khan, Z., Ferrari, G., Kasper, M., Tonge, D. A., **Steiner, J. P.**, Hamilton, G. S., Gordon-Weeks, P. R. The Non-Immunosuppressive Immunophilin Ligand GPI-1046 Potently Stimulates Regenerating Axon Growth from Adult Mouse Dorsal Root Ganglia Cultured in Matrigel. *Neuroscience*, 114: 601-09, 2002.

35. Sezen, S., Blackshaw, S., **Steiner, J.P.** and Burnett, A.L. FK506 binding protein 12 is expressed in rat penile innervation and upregulated after cavernous nerve injury. *Int. J. Impot. Res.*, 14: 506-512, 2002.
36. Eberling JL, Pivrotto P, Bringas J, **Steiner JP**, Kordower JH, Chu Y, Emborg ME, Bankiewicz KS. The immunophilin ligand GPI-1046 does not have neuroregenerative effects in MPTP-treated monkeys. *Exp Neurol.*, 178(2): 236-42, 2002.
37. Wu YQ,* Limburg DC, Wilkinson DE, Jackson P, **Steiner JP**, Hamilton GS, Belyakov SA. Neuroprotective effects of inhibitors of dipeptidyl peptidase-IV in vitro and in vivo. *Adv Exp Med Biol.*, 524, 351-5, 2003.
38. Limburg DC, Thomas BE 4th, Li JH, Fuller M, Spicer D, Chen Y, Guo H, **Steiner JP**, Hamilton GS, Wu YQ. Synthesis and evaluation of chiral bicyclic proline FKBP12 ligands. *Bioorg Med Chem Lett.*, 13(21): 3867-70, 2003.
39. Wilkinson DE, Thomas BE 4th, Limburg DC, Holmes A, Sauer H, Ross DT, Soni R, Chen Y, Guo H, Howorth P, Valentine H, Spicer D, Fuller M, **Steiner JP**, Hamilton GS, Wu YQ. Synthesis, molecular modeling and biological evaluation of aza-proline and aza-pipecolic derivatives as FKBP12 ligands and their in vivo neuroprotective effects. *Bioorg Med Chem.*, 11(22): 4815-25, 2003.
40. Wei L, **Steiner JP**, Hamilton GS, Wu YQ. Synthesis and neurotrophic activity of nonimmunosuppressant cyclosporin A derivatives. *Bioorg Med Chem Lett.*, 14(17): 4549-51, 2004.
41. Ganel, R, Ho T, Maragakis NJ, Jackson M, **Steiner JP** and Rothstein JD. (2006) Selective up-regulation of the glial Na⁺-dependent glutamate transporter GLT1 by a neuroimmunophilin ligand results in neuroprotection. *Neurobiol Dis.*, 21(3): 556-67, 2006. Epub 2005 Nov 7.
42. Wang T, Allie R, Conant K, Haughey N, Turchan-Chelowo J, Hahn K, Rosen A, **Steiner J**, Keswani S, Jones M, Calabresi PA, Nath A Granzyme B mediates neurotoxicity through a G-protein-coupled receptor. *FASEB J.* 20(8):1209-11, 2006. Epub 2006 Apr 24.
43. Theodore S, Cass WA, Nath A, **Steiner J**, Young K, Maragos WF. Inhibition of tumor necrosis factor-alpha signaling prevents human immunodeficiency virus-1 protein Tat and methamphetamine interaction. *Neurobiol Dis.*, 23(3):663-8, 2006. Epub 2006 Jul 7.
44. Caporello E, Nath A, Slevin J, Galey D, Hamilton G, Williams L, **Steiner JP**, Haughey NJ. The immunophilin ligand GPI1046 protects neurons from the lethal effects of the HIV-1 proteins gp120 and Tat by modulating endoplasmic reticulum calcium load. *J Neurochem.*, 98(1):146-55, 2006.
45. Valentine, H.L., Chen, Y., Guo, H., McCormick, J., Wu, Y., Sezen, S., Hoke, A., Burnett, A.L., **Steiner, J.P.***. Neuroimmunophilin Ligands Protect Cavernous Nerves after Crush Injury in the Rat: New Experimental Paradigms. *Eur. Urology*, 51(6):1724-31, 2007 [Epub 2006 Nov 16].

46. **Steiner, J.P.**, Galey, D., Haughey, N., Asch, D., Nath, A.* Neuroprotective and Antiretroviral Effects of the Immunophilin ligand GPI 1046. *J NeuroImmune Pharmacol.*, 2(1): 49-57, 2007
47. Li, W., Haung, Y., Reid, R., **Steiner, J.**, Malpic-Llanos, T., Darden, T., Shankar, S., Mahadevan, A., Satishchandra, P., and Nath, A.* NMDA receptor activation by HIV-Tat protein is clade-dependent. *J. Neurosci.* 28(47):12190-8, 2008 (Accepted Sept 22, 2008).
48. **Steiner JP***, Payne KB, Main CD, D'Alfonso S, Jacobsen KX, Hicks TP, Staines WA, Poulter MO. GPI-1046 increases presenilin-1 expression and restores NMDA channel activity. *Can J Neurol Sci.* 37(4): 457-67, 2010.
49. Myoung-Hwa Lee, Tongguang Wang, Mi-Hyeon Jang, **Joseph Steiner**, Norman Haughey, Guo-li Ming, Hongjun Song, Avindra Nath, and Arun Venkatesan. "Rescue of Adult Hippocampal Neurogenesis in a Mouse Model of HIV Neurologic Disease", *Neurobiol Disease* 41(3):678-87, 2011.
50. **Joseph P. Steiner***, Myoung-Hwa Lee, Muznabanu Bachani, Brett Wolfson-Stofko, John Pontolillo, Tongguang Wang, Norman Haughey, Justin C. McArthur and Avindra Nath. Neuroprotective SSRI treatment for HIV-Associated Neurocognitive Disorders: New paradigms. In preparation.
51. **Joseph P. Steiner***, Tanya Malpica-Llanos, Muznabanu Bachani, Myoung-Hwa Lee, Brett Wolfson-Stofko, Wenxue Li, Tongguang Wang, Norman Haughey, Justin C. McArthur and Avindra Nath. Treatment of HIV mediated neurodegeneration with antifungal agents: Axodendritic Neuroprotection Protection in vitro and in vivo. In preparation.
52. **Joseph P. Steiner***, Muznabanu Bachani, Myoung-Hwa Lee, Anita Bhamidipati, Mark Vaal, Brett Wolfson-Stofko, Wenxue Li, Norman Haughey, Justin C. McArthur and Avindra Nath. Novel limonoid natural products as neuroprotective therapy for HAND. In preparation.

INVITED ARTICLES, EDITORIALS, CHAPTERS AND LETTERS (# denotes peer reviewed)

1. Bennett, V.*, Davis, J., Gardner, K. and **Steiner, J.P.** . Spectrin-based membrane skeleton: extensions of the current paradigm. In *Cell Physiology of Blood*, (Eds., J. Parker and R. Gunn) Rockefeller University Press, pp. 102-109, 1988.
2. Bennett, V.,* **Steiner, J.** and Davis, J. Diversity in protein associations of the spectrin-based membrane skeleton of nonerythroid cells. *Protoplasma* 145, 89-94, 1988.
3. Snyder, S.H.,* Supattapone, S., Worley, P. Baraban, J., **Steiner, J.P.** and Bennett, V. Multiple second messengers: The Earl Usdin Memorial Lecture. In *Progressive*

- Catecholamine Research, Part A: Basic Aspects and Peripheral Mechanisms*. Alan R. Liss, Inc. NY, 1-6, 1988.
4. Bennett, V ., * **Steiner, J .P.**, Davis, J ., Kaiser, H. and Kordeli, E. Strategies in regulation of protein associations of the spectrin-based membrane skeleton. In *Springer Series in Biophysics: Structure, Interactions and Assembly of Cytoskeletal and Extracellular Proteins*, Springer- Verlag, Inc. Berlin, Vol. 3, pp. 319-327, 1989.
 5. **Steiner, J .P.** and Bennett, V. Reversible association of spectrin with brain membrane proteins and implications of a dynamic spectrin-based membrane skeleton. In *UCLA Symposia on Molecular and Cellular Biology: Cellular and Molecular Biology of Normal and Abnormal Erythroid Membranes*, (Eds. C. Cohen and J. Palek) New Series, vol. 118. Alan R. Liss, Inc. NY, 1-26, 1990.
 6. Zhang J, **Steiner JP**. Nitric oxide synthase, immunophilins and poly(ADP-ribose) synthetase: novel targets for the development of neuroprotective drugs. *Neurol Res.*, Aug;17(4):285-8, 1995.
 7. Hamilton, G. S., **Steiner, J. P.**, Neuroimmunophilin ligands. *Curr. Pharm. Design*, 3: 405-428, 1997.
 8. Snyder SH,* Sabatini DM, Lai MM, **Steiner JP**, Hamilton GS, Suzdak PD. Neural actions of immunophilin ligands. *Trends Pharmacol Sci.*, 19(1):21-6, 1998.
 9. Hamilton GS, **Steiner JP**. Immunophilins: beyond immunosuppression. *J Med Chem.*, 41(26): 5119-43, 1998.
 10. **Steiner, J.P.***; Valentine, H.; Morrow, T.; Hamilton, G.S. Neuroimmunophilin ligands stimulate recovery of injured sciatic nerves. In: *Immunosuppressants and Neurological Disorders*, Humana Press, chapter 4, 2002.
 11. **Steiner, J.P.***; Ross, D.T.; Sauer, H.; Morrow, T.; Hamilton, G.S. Effects of neuroimmunophilin ligands on Parkinson's Disease and Cognition. In: *Immunosuppressants and Neurological Disorders*, Humana Press, Chapter 17, 2002.
 12. Poulter M.O.,* Payne K.B. and **Steiner J.P.** Neuroimmunophilins: a novel drug therapy for the reversal of neurodegenerative disease? *Neuroscience.*, 128(1):1-6, 2004.
 13. **Steiner JP**, Haughey N, Li W, Venkatesan A, Anderson C, Reid R, Malpica T, Pocernich C, Butterfield DA, Nath A.* Oxidative stress and therapeutic approaches in HIV dementia. *Antioxid Redox Signal.*, 8(11-12): 2089-100, 2006.
 14. Rumbaugh, J.A., **Steiner, J.P.**, Sacktor, N and Nath, A.* Developing neuroprotective strategies for treatment of HIV-associated neurocognitive dysfunction. *Future HIV Ther.* 2 (3), 2008.

15. Haughey, N.J.*, **Steiner, J.P.***, Nath, A., McArthur, J.C., Sacktor, N, Pardo, C. and Veera Venkata Ratnam Bandaru. Converging roles for sphingolipids and cell stress in the progression of neuroAIDS. *Frontiers in Bioscience* May 1, 5120-30, 2008.
16. Li, W., Li, G., **Steiner, J.** and Nath, A.* Role of Tat protein in HIV Neuropathogenesis. *Neurotox. Res.* 16, 205-220, 2009.
17. Reingold, S.C.* , **Steiner, J.P.**, Polman, C.H., Cohen, J.A., Freedman, M.S., Kappos, L., Thompson, A.J. and Wolinsky, J.S. The Challenge of Follow-on Biologics for Treatment of Multiple Sclerosis. *Neurology* 73, 552-559, 2009.
18. Justin McArthur, **Joseph P. Steiner**, Ned Sacktor and Avindra Nath. "HIV-associated neurocognitive disorders: 'mind the gap'". *Annals Neurology*, 67(6):699-714, 2010.

INVENTIONS, PATENTS, COPYRIGHTS:

Granted US Patents:

Steiner and Hamilton US patent 5,614,547
 Steiner, Hamilton, Snyder and Dawson US patent 5,696,135
 Steiner and Hamilton US patent 5,795,908
 Steiner, Hamilton, Snyder and Dawson US patent 5,798,355
 Steiner and Hamilton US patent 5,801,197
 Steiner, Hamilton, Snyder and Dawson US patent 5,843,960
 Steiner, Burak and Hamilton US patent 5,846,979
 Steiner, Hamilton, Snyder and Dawson US patent 5,846,981
 Steiner and Hamilton US patent 5,859,031
 Lyons, George, Dawson, Steiner and Snyder US Patent 5,898,029
 Steiner and Hamilton US Patent 5,945,441
 Steiner and Hamilton US Patent 5,968,957
 Steiner and Hamilton US patent 6,004,993
 Steiner, Hamilton, Snyder and Dawson US patent 6,022,878
 Steiner, Burak and Hamilton US patent 6,054,452
 Lyons, George, Dawson, Steiner and Snyder US Patent 6,080,753
 Steiner and Hamilton US patent 6,140,357
 Steiner and Hamilton US patent 6,172,087
 Steiner and Hamilton US patent 6,177,455
 Steiner and Hamilton US patent 6,187,784
 Steiner and Hamilton US patent 6,187,806
 Steiner and Hamilton US patent 6,191,125
 Steiner and Hamilton US patent 6,194,440
 Steiner, Ross, Hamilton and Sauer US Patent 6,218,423
 Steiner and Hamilton US patent 6,239,164
 Steiner, Hamilton and Li US patent 6,242,468
 Steiner and Hamilton US patent 6,245,783
 Steiner, Burak and Hamilton US patent 6,251,892
 Steiner and Hamilton US patent 6,271,244
 Steiner and Hamilton US patent 6,274,602

Steiner and Hamilton US patent 6,274,617
 Steiner and Hamilton US patent 6,291,510

Ross, Sauer, Hamilton and Steiner US Patent 6,333,340
 Ross, Sauer, Hamilton and Steiner US Patent 6,335,348
 Ross, Sauer, Hamilton and Steiner US Patent 6,337,340
 Ross, Sauer, Hamilton and Steiner US Patent 6,339,101
 Dawson, Steiner, Dawson, Uhl and Snyder US Patent 6,362,160
 Ross, Sauer, Hamilton and Steiner US Patent 6,376,517
 Ross, Sauer, Hamilton and Steiner US Patent 6,384,056
 Ross, Sauer, Hamilton and Steiner US Patent 6,395,758
 Ross, Sauer, Hamilton and Steiner US Patent 6,399,648
 Steiner and Hamilton US Patent 6,429,215
 Steiner, Hamilton and Snyder US Patent 6,444,643
 Hamilton, Steiner and Burak US Patent 6,486,151
 Steiner, Snyder, Hamilton and Dawson US Patent 6,500,843
 Steiner and Hamilton US Patent 6,500,959
 Ross, Sauer, Hamilton and Steiner US Patent 6,506,788
 Steiner and Hamilton US Patent 6,509,477
 Steiner and Hamilton US Patent 6,593,362
 Wu, Belyakov, Hamilton, Limburg, Steiner, Vaal, Wei and Wilkinson US Patent 6,656,971
 Hamilton, Steiner, Vaal, Choi and Wei US Patent 6,677,376

31 US patent applications pending.

Provisional US Patent, Use of Limonoids as Neuroprotective Agents, JHU Ref #5038 Priority Date: Aug. 11, 2006 Steiner, Nath, Haughey, inventors
 Conversion of U.S. Provisional Application No. 60/xxx,yyy and 3171701-1 PCT filing
 "Compositions and Methods for Neuroprotection" filed August 11, 2007

Provisional US Patent, Role of Antifungal Agents as Neuroprotective Agents, JHU Ref#10028 Priority date April 5, 2007. Steiner, Nath, Haughey, inventors
 Conversion of U.S. Provisional Application No. 60/922,043, and 35271-702-601 PCT filing
 "Antifungal Agents as Neuroprotectants", filed April 7, 2008.

ROI April 17, 2008 Development of novel agents that promote axonal regeneration. Paul Worley, Guo-li Ming, Joe Steiner, inventors.

EXTRAMURAL SPONSORSHIP
CURRENT RESEARCH FUNDING (Direct costs only)

| | | |
|--------------------|-------------------|-----|
| R01NS039253 (Nath) | 07/01/99-05/31/10 | 15% |
| NIH/NINDS | \$231,250 | |

Role of HIV Tat Protein in Pathogenesis of HIV Dementia

Propose to determine HIV clade specific differences in Tat effects on brain cells.

| | | |
|------------------------------|-----------------------|-----|
| P30MH075673 (McArthur) | 04/01/06-03/31/11 | |
| NIH/NIMH | \$938,993 | |
| (Steiner-Center Co-Director) | Administrative Core | 10% |
| | Clinical outcome Core | 35% |

NIMH JHU Center for Novel Therapeutics for HIV-associated Cognitive Disorders
Efforts on this Center Grant will be focused on developing novel therapeutics for treatment of patients with HIV Dementia.

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|--------------------|-------------------|----|
| R01NS056884 (Nath) | 09/30/06-08/31/11 | 5% |
| NIH/NINDS | \$218,750 | |

Neuropathogenesis of Immune Reconstitution Syndrome with HIV Infection

Propose to determine HIV proteins can activate T cells to cause release of GB. Determine the mechanism of GB mediated neurotoxicity. Determine the mechanism of neuroprotection with Kv1.3 blockers.

| | | |
|---------------------------|---------------------|----|
| R01 AG023471-02 (Haughey) | 06/01/03 – 06/01/08 | 5% |
| NIA | \$125,000 | |

HIV Associated CNS Dysfunction with Aging

Test the hypothesis that HIV-1 infection compounds age-related increases in ceramide and cholesterol resulting in lipid imbalance and neuronal cell death. We propose to determine the mechanisms by which age, ceramides, cholesterol, gp120 and Tat interact and contribute to neuronal dysfunction and death in HAD. In vivo, we will test the protective effects of cholesterol reduction, inhibition of ceramide synthesis and reduction of oxidative stress in models of HIV protein-induced neuronal toxicity.

| | | |
|---|-------------------|-----|
| Proposal # 08041714 (Steiner) | 12/01/07-11/30/12 | 10% |
| Sponsored Research Agreement with Nerveda | \$437,473 | |

Development of Novel Neuroprotective Drugs for MS

To characterize the neuroprotective efficacy of 2 classes of novel neuroprotectants both in vitro and in vivo assays of neurodegeneration and multiple sclerosis.

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|--|---------------------|-----|
| R01DA024593 (Nath and Steiner, Co-PIs) | 03/01/08 - 02/28/13 | 15% |
| NIDA | \$250,000 | |

SSRI-neuroprotection for HIV/drug abuse

To investigate the neuroprotective effects of selective serotonin reuptake inhibitors (SSRI) in preventing the neurotoxic effects of HIV-1, Tat or gp120. We propose to investigate the effects of SSRIs on neuronal populations, neuroglial cells and adult neuroprogenitor cells under the influence of HIV and drugs of abuse, cocaine and heroine.

PENDING

| | | |
|--|-------------------|-----|
| Fast Forward MS grant proposal (Steiner) | 06/01/10-12/31/11 | 20% |
| Fast Forward Inc/NMSS | \$237,371 | |

Evaluation of Neuroprotective Limonoid Compounds in MS Animal Models: Neuroprotective Proof of Concept and Neuroprotective/Neuroregenerative Mechanism of Action

The aims of this study are to characterize the neuroprotective effects of limonin and new limonoid derivatives in EAE animal models of multiple sclerosis. We also proposed to investigate the neuroprotective mechanism of action of these compounds.

Grant approved for funding Feb 2010—JHU negotiating sponsored research agreement with Fast Forward

R01 NS072008-01 (Steiner) 06/01/10-05/31/15 20%
NINDS \$250,000

Neuroprotective Antifungal Treatment for HIV-mediated Neurodegeneration

The aims of this study are to characterize the neuroprotective efficacy of fluconazole and other azole antifungal compounds in vitro and in vivo and to determine their neuroprotective mechanism of action.

R41 MH090942-01A1 (Steiner) 07/01/10-06/30/12 15%
NIMH \$250,000

Neuroprotective and Antiviral Effects of BMD-101 and BMD-104 in HIV Infection

The aims of this study are to characterize the neuroprotective efficacy of huperzine compounds in vitro and in vivo and to determine their mechanism of action. We propose to administer these agents with drug-like properties and brain penetration to vulnerable neuronal populations in the CNS.-- Awaiting Council approval.

EDUCATIONAL ACTIVITIES

TEACHING

Lecture in “Translational Research in Neuro-AIDS and Mental Health”

Nov. 20, 2007 Drug Development for HIV dementia

Nov. 25, 2008 Therapeutics Development for HAND

Nov. 24, 2009 New Therapeutics Development for HIV-associated Neurocognitive Disorders

Established New Course:

NeuroTherapeutics Jan. 7, 2009 Joseph P. Steiner, Course Director

Lecture Neurotherapeutic Drug Development for HIV neurodegeneration

Feb. 26, 2009

Lecture in “Diseases of the Brain Course” Dr. C. Ross, Course Director

April 15, 2010 Neurotherapeutics

Seminars/ Grand rounds

2006-Present Neuroimmunology seminar series (organizer; held biweekly)

2006-present Neuro-AIDS seminar series (organizer; held weekly)

MENTORING

Undergraduate Students

1. Adit Tal Jan 2006-May 2008 Johns Hopkins University graduated.

- | | | |
|----------------------|-------------------|-------------------------------------|
| 2. Justin Jacob | Aug 2008-Dec 2009 | Johns Hopkins University graduated. |
| 3. Anita Bhamidipati | Aug 2007-May 2010 | Johns Hopkins University. |
| 4. John Pontolillo | May 2008-May 2010 | Johns Hopkins University. |
| 5. Darshan Shastri | Feb 2008-Present | Johns Hopkins University. |
| 6. Akriti Gupta | Feb 2008-Present | Johns Hopkins University. |
| 7. Romina Ortiz | Sept 2009-Present | Johns Hopkins University. |
| 8. Sara Stockman | Sept 2009-Present | UMBC |

Graduate Students

None to date

Technicians

1. Daniella Asch 2006-2007
2. Tanya Malpica-Llanos 2007-2009
3. Brett Wolfson-Stofko 2008-2009
4. Muznabanu Bachani 2009-Present
5. Joem Serrano 2009-Present

Research Associates

1. Mark J. Vaal Sept. 2008-present

EDITORIAL BOARDS

2001- present Associate Editor, Central Nervous System Agents in Medicinal Chemistry (formerly Current Medicinal Chemistry, Central Nervous System Agents)

AD HOC REVIEWER

Journal of Neuroscience
 The Proceedings of the National Academy of Sciences USA
 Journal of Biological Chemistry
 Journal of Pharmacology and Experimental Therapeutics
 Experimental Neurology
 Neuroscience
 Brain Research
 European Journal of Neuroscience

ORGANIZATIONAL ACTIVITIES

MEMBERSHIP IN PROFESSIONAL SOCIETIES

1990-present: Society for Neuroscience
 2006-present: International Society for NeuroVirology
 2007-present: Society for Neuroimmune Pharmacology

GRANT REVIEW COMMITTEES

2006-2007 NIAID Special Emphasis Panel ZAI-TP-A-J2 for Novel HIV Therapies.

RECOGNITION

ACADEMIC AWARDS AND DISTINCTIONS

1983 Merck Index Award

INVITED PRESENTATIONS

January 14, 1997 Department of Neurology The Johns Hopkins University School of Medicine, Baltimore, MD entitled: Neurotrophic Immunophilin ligands stimulate structural and functional recovery in neurodegenerative animal models.

March 23, 1997 The 12th International symposium on Parkinson's Disease in London, UK entitled: Orally active immunophilin ligands stimulate structural and functional recovery in animal models of Parkinson's Disease.

July 9-13, 1997 The 8th International symposium on Stroke, Neurotrauma and other neurological diseases in New Orleans, LA entitled: The orally active immunophilin ligand GPI 1046 promotes structural and functional recovery in animal models of Parkinson's Disease.

July 28-29, 1997 The 2nd International Neurodegeneration in Alzheimer's Disease, Parkinson's Disease and Acute Stroke in Princeton, NJ entitled: Neurotrophic Immunophilin ligands as a novel therapeutic agent for PD.

September 19, 1997 Mechanisms of motor neuron disease (3rd annual workshop) in Philadelphia, PA

September 22-23, 1997 IBC Conference on Neurodegenerative disease in Philadelphia, PA entitled: Orally active neuroimmunophilin ligands stimulate structural and functional recovery in neurodegenerative animal models.

September 28, 1997 The Parkinson's Study Group 11th annual symposium on etiology, pathogenesis and treatment of Parkinson's Disease entitled: The orally active neuroimmunophilin ligand GPI 1046 promotes structural and functional recovery in animal models of Parkinson's Disease.

October 24-25, 1997 National Parkinson's Disease Foundation 5th international symposium of Parkinson's Disease Research in New Orleans, LA.

January 18-21, 1998 Molecular, Cellular and Clinical aspects of Neurodegenerative Diseases in Verbier, Switzerland entitled: Neuroimmunophilin ligands and Parkinson's Disease.

February 27-28, 1998 The Parkinson's Study Group Annual Meeting in Sante Fe, NM entitled: GPI 1046 as a potential therapy for PD.

October 31-November 4, 1998 11th European College of Neuropsychopharmacology Congress in Paris, France entitled: Neuroimmunophilin ligands and neurodegenerative disorders.

April 7, 1999 Research Seminar in the Department of Pharmacology and Experimental Therapeutics at the Johns Hopkins University School of Medicine in Baltimore, MD entitled: Neuroimmunophilin ligands and neuronal regeneration.

July 9-11, 1999 Immunophilins in the Brain symposium in Schlangenbad, Germany entitled: Neuroimmunophilin ligands as treatment for Parkinson's Disease.

July 26-27, 1999 The 3rd International Neurodegeneration in Alzheimer's Disease, Parkinson's Disease and Acute Stroke in Princeton, NJ entitled: Orally active neuroimmunophilin ligands and neurodegenerative disorders. (Meeting Co-Chairman)

September 11-13, 1999 International Symposium on Dementia from Molecular Biology to Therapeutics in Kobe, Japan entitled: Neuroimmunophilin ligands: Potential therapies for Neurodegenerative disorders as treatment for Parkinson's Disease.

February 24-29, 2000 Keystone Symposium on Molecular and Cellular Biology (Theme C6) Immunophilins: Cellular Functions and Immunosuppressive Drug Targets in Keystone, CO entitled: Neuronal Regeneration and Neuroimmunophilin Ligands.

March 20-23, 2000 Neuronal Plasticity: The Key to Stroke Recovery meeting in Kananaskis, Alberta, Canada entitled: Neuroimmunophilin ligands and neuroprotective therapies.

November 10, 2001 2nd Symposium on Immunophilins in the brain: Bridging the gap between basic research and clinical application in San Diego, CA entitled: Regenerative Effects of Neuroimmunophilin Ligands.

June 24-25, 2002 The 5th International Neurodegeneration in Alzheimer's Disease, Parkinson's Disease and Acute Stroke in Princeton, NJ entitled: Neuroimmunophilin Ligands as treatment for Parkinson's Disease. (Meeting Co-Chairman)

October 15-16, 2002 Anti-Aging Drug Discovery and Development summit: The molecular basis of aging and commercial prospects for therapeutics in aging intervention in San Francisco, CA entitled: Neuroimmunophilin ligands protect against post-prostatectomy induced erectile dysfunction.

September 26, 2005 Department of Pharmacology and Experimental Therapeutics, Johns Hopkins University "Neuroprotective Effects of Neuroimmunophilin ligands"

December 10, 2006 USA Caribbean Conference: HIV and Drugs of Abuse at University of Puerto Rico. "Therapeutics Development for HIV-Dementia"
UPR

October 31, 2007 8th International Society for Neurovirology meeting, San Diego, CA
"Paroxetine Treatment for HIV-Mediated Neurodegeneration"

February 4, 2008 JHU Clinical Neurosciences Lecture Therapeutics Development for HIV-mediated Neurodegeneration

April 29, 2009 61st Annual Meeting of the American Academy of Neurology
“Epicatechin protects Neurons against Mitochondrial Toxins” by S. Nath, T. Malpica-Llanos and Joseph P. Steiner

May 29, 2009 International Society for Neurovirology
“New Therapeutics Development for HAND” by J.P. Steiner, T. Malpica-Llanos, B. Wolfson-Stofko, M. Lee, M. Bachani, N.J. Haughey, J.C. McArthur

October 12, 2009 134th Annual Meeting of American Neurological Association
“Characterization of Neuroprotective Agents for HAND” by J.P. Steiner, B. Wolfson-Stofko, V. Toodle, T. Malpica-Llanos, M. Lee, M. Bachani, N.J. Haughey, J.C. McArthur

October 19, 2009 Society for Neuroscience Meeting
Limonoids as neuroprotective therapeutics for HIV associated neurocognitive disorders
Myounghwa Lee, Tanya Malpica-Llanos, Brett Wolfson-Stofko, Muzna Bachani, Norman J. Haughey, Justin C. McArthur, Avindra Nath and Joseph P. Steiner

January 4, 2010 Clinical Neuroscience
“New Therapeutics Development for HIV-associated Neurocognitive Disorders” Joseph P. Steiner

Visiting Professorships

June 11, 2004 The Gill Heart Institute, University of Kentucky “Protective Strategies targeting Immunophilin Proteins”