

CURRICULUM VITAE

Charles H. Vite, DVM, PhD, Diplomate ACVIM (Neurology)

Professor of Neurology (with tenure)

Department of Clinical Sciences and Advanced Medicine

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EDUCATION:

1982 - 1986	BS	Cornell University
1986 - 1990	DVM	Purdue University
1999 - 2003	PhD	University of Pennsylvania

POSTDOCTORAL TRAINING:

1990 - 1992	Staff Veterinarian, Veterinary Emergency Service, Inc., Fresno, CA
1992 - 1994	Resident, Veterinary Neurology, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania
Dec. 1994	Introductory Magnetic Resonance Visiting Fellowship (1 week), School of Medicine, University of Pennsylvania, Philadelphia, PA
Nov. 1996	Neuro Magnetic Resonance Visiting Fellowship (1 week), School of Medicine, University of Pennsylvania, Philadelphia, PA
1994 - 1997	Lecturer in Veterinary Neurology, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA
1997 - 1998	Post-Doctoral Fellow, Department of Pathobiology, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA
1998 - 2001	Research Associate, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA
2001 - 2003	Senior Research Investigator, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA

FACULTY APPOINTMENTS:

2004 - 2012	Assistant Professor (Tenure Track), Section of Neurology, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA
2012 - 2018	Associate Professor (with tenure), Section of Neurology and Neurosurgery, Department of Clinical Sciences and Advanced Medicine, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA
2018 - present	Professor (with tenure), Section of Neurology and Neurosurgery, Department of Clinical Sciences and Advanced Medicine, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA

DEPARTMENTAL AND ADMINISTRATIVE APPOINTMENTS:

2004 - 2007 Section Chief, Neurology
2012 - 2015 Section Chief, Neurology and Neurosurgery
2017 – 2022 Director, Division of Inherited Metabolic Diseases

NATIONAL SERVICE:

2014 – present Director, National Referral Center for Animal Models of Human Genetic Disease

RESEARCH AND CLINICAL INTERESTS:

The focus of my lab is to improve the characterization and treatment of neurodegenerative diseases by studying naturally occurring large animal models of human diseases. My lab develops and evaluates experimental therapies including gene therapy, cell-based therapy, and pharmacotherapy in canine and feline models, and develops and validates ante mortem biochemical and magnetic resonance markers of disease severity and progression.

I manage the National Referral Center for Animal Models of Human Genetic Disease (RCAM; NIH OD P40-10939, PI: Vite). The mission of the RCAM is to discover, understand, develop treatments for, and disseminate to the biomedical community large animal models with naturally occurring hereditary disorders that are orthologous to those found in human patients. My emphasis is to build bridges between biomedical sciences, government, pharmaceutical industries, and the FDA in order to bring new therapies to patients.

SPECIALTY CERTIFICATION:

Diplomate American College of Veterinary Internal Medicine (ACVIM), Neurology

LICENSURE: Pennsylvania

AWARDS, HONORS AND MEMBERSHIP IN HONORARY SOCIETIES:

1986 - present Phi Kappa Phi Honor Society
2001 - present Phi Zeta Society
2005 Veterinary Medical Student Organization Teaching Award (Class of 2006)
2009 Veterinary Medical Student Organization Teaching Award (Class of 2010)
2014 Zoetis Award for Veterinary Research Excellence
2016 Guardian Angel Award, Dana's Angels Research Trust
2016 RARE Champion of Hope, Collaborations in Science and Technology, Global Genes
2020 Philadelphia College of Physicians

PROFESSIONAL AND SCIENTIFIC SOCIETIES:

1992 - 2014 Veterinary Emergency and Critical Care Society
1998 - 2010 American Society of Human Genetics
1990 - present American Veterinary Medical Association
1993 - present European Society of Veterinary Neurology
1997 - present American College of Veterinary Internal Medicine
2003 - present American Society of Gene and Cell Therapy
2009 - present Intellectual and Developmental Disabilities Research Center, Children's Hospital of Philadelphia (CHOP)
2012 - present Institute for Translational Medicine and Therapeutics, University of PA
2013 - present Center for Orphan Disease Research and Therapy, University of PA

NATIONAL COMMITTEES AND ACTIVITIES:

2000 - 2003 ACVIM Neurology Examination Committee (member)
2001 - 2002 ACVIM Neurology Examination Committee (Chair)

- 2001 European Society of Veterinary Neurology Symposium, Scientific Program, Philadelphia, PA (co-organizer)
- 2003 - 2006 ACVIM Neurology Credentials Committee (member)
- 2004 - 2005 ACVIM Neurology Credentials Committee (Chair)
- 2004 - 2005 ACVIM Neurology Neurosurgery Task Force (member)
- 2005 American Kennel Club (AKC) Canine Health Foundation (grant review)
- 2005 - 2013 ACVIM Neurology Residency Advisor
- 2012 - 2014 ACVIM/European College of Veterinary Neurology liaison committee (Chair)
- 2013 - 2014 ACVIM Neurology President-elect
- 2014 - 2017 ACVIM Neurology President
- 2015 - 2017 Vtesse, PreClinical Scientific Advisory Board (member)
- 2016 - 2017 National Niemann Pick Disease Foundation Scientific Advisory Board (member)
- 2017 - 2018 Sucampo, PreClinical Scientific Advisory Board (member)
- 2019 - 2020 Mallinckrodt Pharmaceutical, Preclinical Advisory Board (member)
- 2002 - 2021 National Mucopolysaccharidosis Society Scientific Advisory Board (member)
- 2002 - present International Society for Mannosidosis and Related Diseases Scientific Advisory Board (member)
- 2005 - present ACVIM Forum (abstract reviewer)
- 2011 - present ACVIM Neurology Exam Rating Committee (member)
- 2014 – present Support for Accelerated Research for Niemann Pick type C (scientist member)
- 2014 – present Comparative Medicine Resource Director (National Referral Center Animal Models of Human Genetic Disease). NIH Office of Research Infrastructure Programs
- 2018- present NIH study sections
- 2020 - present Sigilon, Scientific Advisory Board (member)
- 2020 –2021 Clinical and Translational Science Award One Health Alliance (COHA) – Advocacy Committee (member)
- 2021 FDA’s Cellular, Tissue and Gene Therapies Advisory Committee (Special Government Employee)
- 2021 – present The Seeing Eye Canine Committee (Chair)
- 2021 – present The Seeing Eye Genetics Advisory Panel (Chair)
- 2021 – present The Seeing Eye (Board of Trustees)
- 2022 Mandos Health (consultant)

EDITORIAL POSITIONS:

- 2007 - 2020 Editorial review board (member), Journal of the American Animal Hospital Association
- 2012 - 2018 Editorial review board (member), BMC Veterinary Research
- 2004 - present Editor, *Braund’s Clinical Neurology in Small Animals - Localization, Diagnosis and Treatment*. International Veterinary Information Service, Ithaca, NY
- 2021 – present Editor, *Animals*, Special Issue: Neurodegenerative Diseases in Animals—Mechanisms, Onset and Therapeutic Options

AD HOC/INVITED REVIEWS:

- Clinician’s Brief
- Journal of the American Animal Hospital Association
- Journal of Clinical Investigation
- Journal of Heredity
- Journal of Lipid Research
- Journal of Neuropathology and Experimental Neurology
- Journal of Neuroscience
- Journal of Neuroscience Research
- Journal of Veterinary Emergency and Critical Care

Journal of Veterinary Internal Medicine
Molecular Genetics and Metabolism
Molecular Therapy
Neuropathology and Applied Neurobiology
Pediatric Endocrinology Reviews
PLoS One
PLoS Genetics
Proceedings National Academy of Sciences
Today's Veterinary Practice
Veterinary Radiology and Ultrasound
National Academies report, "Laboratory Dogs in Biomedical Research: Evaluating the Necessity, Care, and Use at the U.S. Department of Veterans Affairs"

CLINICAL SERVICE AT PENN VET:

Title of service	Years	Number of months on clinics per year	Number of weeks per month on clinics	Number of days on clinics per week	Hours per week of direct student teaching contact while on clinics
Neurology service	1992 - 1997	11	4	5	30
Neurology service	1998 - 2012	2	4	5	40
MRI interpretation with rounds (1 hr/day)	2004 - 2012	11	4	5	5
MRI interpretation without rounds (1 hr/day)	2012 - present	11	4	5	0

PUBLICATIONS:

Peer-Reviewed Research Papers (*senior or corresponding author):

1. **Vite CH**, Gfeller RW. Suspected albuterol intoxication in a dog. *J Vet Emer Crit Care* 4: 7-12, 1994.
2. Brehm DM, **Vite CH**, Steinberg HS, Haviland J, Van Winkle T. A retrospective evaluation of 51 cases of peripheral nerve sheath tumors in the dog. *J Am Anim Hosp Assoc* 31: 349-359, 1995.
3. **Vite CH***, Dayrell-Hart B, Lexa F, Kerlin R, Van Winkle T, Steinberg S. Neurologic examination and MR imaging of a Kerry Blue Terrier with cerebellar cortical and extrapyramidal nuclear abiotrophy. *Prog Vet Neurol* 7: 12-15, 1996.
4. **Vite CH***, Insko EK, Schotland HM, Panckeri K, Hendricks JC. Quantification of cerebral ventricular volume in English bulldogs. *Vet Radiol Ultrasound* 38: 437-443, 1997.
5. **Vite CH***, Cozzi F, Rich M, Klide AK, Volk SW, Lombardo R. Myotonia in a miniature schnauzer: Case report suggesting abnormal chloride conductance across the muscle membrane. *J Vet Intern Med* 12: 394-397, 1998.
6. Cozzi F, **Vite CH***, Wenger DA, Victoria T, Haskins ME. MRI and electrophysiological abnormalities in a case of canine globoid cell leucodystrophy. *J Sm Anim Prac* 39: 401-405, 1998.
7. Tiches D, **Vite CH**, Dayrell Hart B, Steinberg SA, Gross S, Lexa F. A case of canine central nervous system cryptococcosis: Management with fluconazole. *J Am Anim Hosp Assoc* 34: 145-151, 1998.
8. King LG, **Vite CH**: Acute fulminating myasthenia gravis in five dogs. *J Am Vet Med Assoc* 212: 830-4, 1998.
9. Wenger DA, Victoria T, Rafi MA, Luzi P, Vanier MT, **Vite C**, Patterson DF, Haskins MH. Globoid cell leukodystrophy in Cairn and West Highland White Terriers. *J Heredity* 90: 138-142, 1999.
10. **Vite CH**, Melniczek J, Patterson D, Giger U. Congenital myotonic myopathy in the miniature schnauzer: An autosomal recessive trait. *J Heredity* 90: 578-580, 1999.
11. Rhodes TH, **Vite CH**, Giger U, Patterson DF, Fahlke C, George AL. A missense mutation in canine CIC-1 causes recessive myotonia congenita in the dog. *FEBS Lett* 456: 54-58, 1999.

12. Brady CA, **Vite CH**, Drobatz KJ. Severe neurologic sequelae in a dog after treatment of hypoadrenal crisis. *J Am Vet Med Assoc.* 215: 222-225, 1999.
13. Gracis M, Keith D, **Vite CH***. Dental and craniofacial findings in eight miniature schnauzer dogs affected by myotonia congenita: Preliminary results. *J Vet Dent* 17: 119-127, 2000.
14. McGowan JC, Haskins ME, Wenger DA, **Vite CH***. Investigating demyelination in the brain in a canine model of globoid cell leukodystrophy (Krabbe Disease) using magnetization transfer contrast. *J Comp Assist Tomog* 24: 316-321, 2000.
15. Glass EN, Kapatkin A, **Vite C**, Steinberg SA. A modified bilateral transfrontal sinus approach to the canine frontal lobe and olfactory bulb: Surgical technique and five cases. *J Am Anim Hosp Assoc* 36: 43-50, 2000.
16. **Vite CH**, McGowan JC. Magnetization transfer imaging of the canine brain. *Vet Radiol Ultrasound* 42: 5-8, 2001.
17. Springer SL, **Vite CH**, Polesky A, Kesari S, Fraser NW, Wolfe JH. Infection and establishment of latency in the dog brain after direct inoculation of a non-pathogenic strain of herpes simplex virus-1. *J Neuro Virol* 7: 149-154, 2001.
18. **Vite CH**, McGowan JC, Braund KG, Drobatz KJ, Glickson JD, Wolfe JH, Haskins ME. Histopathology, electrodiagnostic testing, and magnetic resonance imaging show significant peripheral and central nervous system myelin abnormalities in the cat model of alpha-mannosidosis. *J Neuropath Exp Neurol* 60: 817-28, 2001.
19. Bush WW, Barr CS, Darrin EW, Shofer FS, **Vite CH**, Steinberg SA. Results of cerebrospinal fluid analysis, neurologic examination findings, and age at the onset of seizures as predictors for results of magnetic resonance imaging of the brain in dogs examined because of seizures: 115 cases (1992-2000). *J Am Vet Med Assoc* 220: 781-784, 2002.
20. Mayhew PD, Kapatkin A, Wortman J, **Vite CH**. Association of lumbosacral compression on magnetic resonance imaging and clinical signs in dogs with degenerative lumbosacral stenosis. *J Am Anim Hosp Assoc* 38: 555-562, 2002.
21. Bhalerao DP, Rajpurohit Y, **Vite CH**, Giger U. Detection of a genetic mutation for myotonia congenita among Miniature Schnauzers and identification of a common carrier. *Am J Vet Res* 63: 1443-1447, 2002.
22. Bush WW, Throop JL, McManus PM, Kapatkin AS, **Vite CH**, van Winkle T. Intravascular lymphoma involving the central and peripheral nervous system of a dog. *J Amer Anim Hosp Assoc* 39: 90-96, 2003.
23. Passini MA, Watson DJ, **Vite CH**, Landsburg DJ, Feigenbaum AL, Wolfe JH. Intraventricular injection of AAV1 in the neonatal brain results in complementary patterns of transduction to AAV2 and complete long-term correction of storage lesions in β -glucuronidase deficient mice. *J Virology* 77:7034-40, 2003. PMC156185
24. **Vite CH**, Passini MA, Haskins ME, Wolfe JH. Adeno-associated virus vector-mediated transduction in the cat brain. *Gene Therapy* 10: 1874-1881, 2003.
25. Troxel MT, **Vite CH***, Van Winkle TJ, Newton AL, Tiches D-M, Dayrell-Hart BL, Kapatkin AS, Shofer FS, Steinberg SA. Feline intracranial neoplasia: retrospective review of 160 cases (1985-2001). *J Vet Intern Med* 17: 107-116, 2003.
26. Troxel MT, **Vite CH***, Massicotte C, McLearn RC, Van Winkle TJ, Glass EN, Tiches D, Dayrell-Hart B. Magnetic resonance imaging features of feline intracranial neoplasia: Retrospective analysis of 46 cats. *J Vet Intern Med* 18: 176-189, 2004.
27. Marioni K, **Vite CH**, Newton AL, Van Winkle TJ. Prevalence of diseases of the spinal cord of cats. *J Vet Intern Med* 18: 851-8, 2004.
28. **Vite CH**, McGowan JC, Niogi S, Passini MA, Drobatz KJ, Haskins ME, Wolfe JH. Effective gene therapy for an inherited diffuse CNS disease in a large animal model. *Ann Neurol* 57: 355 – 364, 2005.
29. Mikszewski JS, **Vite CH***. Central nervous system dysfunction associated with Rocky Mountain spotted fever infection in five dogs. *J Am Anim Hosp Assoc* 41: 259-266, 2005.

30. Troxel MT, Drobatz KJ, **Vite CH***. Signs of neurologic dysfunction in dogs with central versus peripheral vestibular disease. *J Am Vet Med Assoc* 227: 570-574, 2005.
31. Wang B, O'Malley TM, Xu L, **Vite C**, Wang P, O'Donnell PA, Ellinwood NM, Haskins ME, Ponder KP. Expression in blood cells may contribute to biochemical and pathological improvements after neonatal intravenous gene therapy for mucopolysaccharidosis VII in dogs. *Mol Genet Metab* 87:8-21, 2006.
32. Fletcher DJ, Snyder JM, Messinger JS, Chiu AG, **Vite CH***. Ventricular pneumocephalus and septic meningoencephalitis secondary to dorsal rhinotomy and nasal polypectomy in a dog. *J Am Vet Med Assoc* 229: 240-245, 2006.
33. Ellinwood NM, Colle M-A, Weil MA, Casal ML, **Vite CH**, Weimelt S, Hasson CW, O'Malley TM, He X, Prociuk U, Verot L, Melniczek JR, Lannon A, Aguirre GD, Know VW, Evans SM, Vanier M-T, Schuchman EH, Walkley SU, Haskins ME. Bone marrow transplantation for feline mucopolysaccharidosis I. *Molec Genet Metab* 91:239-50, 2007. PMC 2736908
34. Traas A, Wang P, Ma X, Tittiger M, Schaller L, O'Donnell P, Sleeper MM, **Vite C**, Herati R, Aguirre GD, Haskins M, Ponder KP. Correction of clinical manifestations of canine mucopolysaccharidosis I with neonatal retroviral vector gene therapy. *Mol Ther* 15:1423-31, 2007.
35. Marioni-Henry K, van Winkle TJ, Smith SH, **Vite, CH***. Tumors affecting the spinal cord of cats: 85 cases (1980-2005). *J Am Vet Med Assoc* 232: 237-243, 2008.
36. **Vite CH***, Magnitsky S, Aleman D, O'Donnell P, Cullen K, Ding W, Pickup S, Wolfe JH, Poptani H. Apparent diffusion coefficient reveals gray and white matter disease and T2 mapping detects white matter disease in the brain in feline alpha-mannosidosis. *Am J Neuroradiol* 29: 308-313, 2008.
37. Morgan MJ, **Vite CH**, Radhakrishnan A, Hess RS. Clinical peripheral neuropathy associated with diabetes mellitus in four dogs. *Can J Vet Med* 49: 583-586, 2008. PMC 2387263
38. Troxel MT, **Vite CH***. CT-guided stereotactic brain biopsy using the Kopf stereotactic system. *Vet Radiol Ultrasound* 49: 438-443, 2008.
39. **Vite CH***, Ding W, Bryan C, O'Donnell P, Cullen K, Aleman D, Haskins ME, Van Winkle T. Clinical, electrophysiological, and serum biochemical measures of progressive neurological and hepatic dysfunction in feline Niemann-Pick type C disease. *Ped Res* 64:544-549, 2008. PMC 3251164
40. Abkowitz JL, Sabo KM, **Vite CH**, Shields LE, Haskins ME. In utero transplantation of monocytic cells in cats with alpha-mannosidosis. *Transplantation* 88:323-329, 2009. PMC 2742773
41. Journey C, Haddad J, Crawford N, Miller AD, van Winkle JT, **Vite CH**, Sponenberg P, Inzana KD, Cook CR, Britt L, O'Brien DP. Polymicrogyria in standard poodles. *J Vet Intern Med* 23:871-4, 2009.
42. Ward SA, O'Donnell PA, Fernandez S, **Vite CH***. 2-hydroxypropylbetacyclodextrin raises hearing threshold in normal cats and cats with Niemann-Pick type C. *Ped Res* 68:52-56, 2010. PMC 2913583
43. Cervera V, Mai W, **Vite CH**, Sanchez M, Johnson V, Dayrell-Hart B, Seiler GS. Comparative magnetic resonance imaging findings between gliomas and presumed infarct in dogs. *Vet Radiol Ultrasound* 52: 33-40, 2010.
44. Dickson PI, Hanson S, McEntee MF, **Vite CH**, Vogler CA, Mlikotic A, Chen AH, Ponder KP, Haskins ME, Tippin BL, Le SQ, Passage MB, Guerra C, Dierenfeld A, Jens J, Snella E, Kan S, Ellinwood NM. Early versus late treatment of spinal cord compression with long-term intrathecal enzyme replacement therapy in canine mucopolysaccharidosis type I. *Mol Genet Metab* 101: 115-122, 2010. PMC2950221
45. Dierenfeld AD, McEntee MF, Vogler C, **Vite CH**, Passage M, Le S, Shah S, Jens JK, Snella EM, Kline KL, Parkes JD, Ware WA, Moran LE, Fales-Williams JA, Wengert JA, Whitley RD, Betts DM, Boal AM, Riedesel EA, Gross W, Ellinwood NN, Dickson PI. Replacing the enzyme alpha-L-iduronidase at birth ameliorates symptoms in the brain and periphery of dogs with mucopolysaccharidosis type I. *Sci Transl Med* 1;2:60ra89, 2010. PMC 3075726
46. Porter FD, Scherrer DE, Lanier MH, Langmade SJ, Molugu V, Gale SE, Olzeski D, Sidhu R, Dietzen DJ, Fu R, Wassif CA, Yanjanin NM, Marso SP, House J, **Vite C**, Schaffer JE, Ory DS. Cholesterol oxidation products are sensitive and specific blood-based biomarkers for Niemann-Pick C1 disease.

- Sci Transl Med. 2:56ra81, 2010. PMC 3170139
47. Magnitsky S, **Vite CH**, Delikatny, EJ, Pickup S, Wehrli S, Wolfe JH, Poptani H. Magnetic resonance spectroscopy of the cerebellar vermis and occipital cortex distinguishes individual cats affected with alpha-mannosidosis from normal cats. *NMR in Biomedicine* 23:74-9, 2010. PMC 3045771
 48. Lewis MJ, Williams DC, **Vite CH***. Maturation of the electroencephalogram in young cats. *Am J Vet Res* 72: 391-397, 2011. PMC 3663299
 49. **Vite CH***, Cross J. Correlating MRI findings with neuropathology and clinical signs in dogs and cats. *Vet Radiol Ultrasound* 52: S23-S31, 2011. PMC 3093660
 50. **Vite CH***, Wang P, Patel RT, Walton RM, Walkley SU, Sellers RS, Ellinwood NM, Cheng A, White JT, O'Neill CA, Haskins ME. Biodistribution and pharmacodynamics of recombinant human alpha-L-iduronidase (rhIDU) in mucopolysaccharidosis type I-affected cats following multiple intrathecal administrations. *Mol Genet Metab* 103:268-74, 2011. PMC 3130519
 51. Anwer C, Schwartz T, Volk SW, **Vite CH***. Bone-conduction brain-stem auditory evoked response testing in a dog with bilateral external ear canal aplasia. *J Am Anim Hosp Assoc* 47, 370-374, 2011.
 52. Davis KA, Sturges BK, **Vite CH**, Ruedebusch V, Worrell G, Gardner AB, Leyde K, Sheffield D, Litt B. A novel implanted device to wirelessly record and analyze continuous intracranial canine EEG. *Epilepsy Res* 96: 116-122, 2011. PMC 3175300
 53. Malik SZ, Lewis M, Isaacs A, Haskins M, Van Winkle T, **Vite CH**, Watson DJ. Identification of the rostral migratory stream in the canine and feline brain. *PLoS One*. 7:e36016, 2012. PMC 3350506
 54. Brinkmalm G, Portelius E, Ohrfelt A, Persson R, Gustavsson M, Mattson N, **Vite CH**, Gobom J, Mansson JE, Nilsson J, Halim A, Larson G, Ruetschi U, Zetterberg H, Blennow K, Westman-Brinkmalm A. An online nanoLC-ESI-FTICR-MS method for comprehensive characterization of endogenous fragments from amyloid β and amyloid precursor protein in human and cat cerebrospinal fluid. *J Mass Spectrometry* 47:591-603, 2012.
 55. Mattson N, Olsson M, Gustavsson MK, Kosicek M, Malnar M, Månsson JE, Blomqvist M, Gobom J, Andreasson U, Brinkmalm G, **Vite C**, Hecimovic S, Hastings C, Blennow K, Zetterberg H, Portelius E Amyloid- β metabolism in Niemann-Pick C disease models and patients. *Metab Brain Dis* 27:573-85, 2012.
 56. Stein VM, Crooks A, Ding W, Prociuk M, O'Donnell P, Bryan C, Sikora T, Dingemans J, Vanier MT, Walkley SU, **Vite CH***. Miglustat improves Purkinje cell survival and alters microglial phenotype in feline Niemann-Pick Disease Type C. *J Neuropath Exp Neurol* 71:434-48, 2012. PMC 3352323
 57. Datta R, Lee J, Duda J, Avants BB, **Vite CH**, Tseng B, Gee JC, Aguirre GD, Aguirre GK. A digital atlas of the dog brain. *PLoS One* 7(12):e52140, 2012. PMC 3527386
 58. Bagel JH, Sikora TU, Prociuk M, Pesayco JP, Mizisin AP, Shelton GD, **Vite CH***. Electrodiagnostic testing and histopathological changes confirm peripheral nervous system myelin abnormalities in the feline model of Niemann-Pick disease type C. *J Neuropath Exp Neurol* 72:256-62, 2013. PMC 3640270
 59. **Vite CH***, Nestrasil I, Mlikotic A, Jens JK, Snella E, Gross W, Shapiro EG, Kovac V, Provenzale J, Chen S, Le SQ, Kan S-h, Banakar S, Wang RY, Haskins ME, Ellinwood NM, Dickson PI. Features of brain MRI in dogs with treated and untreated mucopolysaccharidosis type I. *Comp Med* 63: 163-73, 2013. PMC 3625057
 60. Song RB, **Vite CH***, Bradley C, Cross JR. Retrospective postmortem evaluation of 435 cases of canine intracranial neoplasia: Relationship of neoplasm to breed, age, and body weight (1986-2010). *J Vet Intern Med* 27: 1143-52, 2013.
 61. Roszell BR, Tao J-Q, Yu KJ, Gao L, Huang S, Ning Y, Feinstein SF, **Vite CH**, Bates SR. Pulmonary abnormalities in animal models due to Niemann-Pick Type C1 (NPC1) or C2 (NCP2) disease. *PLoS One* 8:e67084, 2013. PMC 3770093
 62. Coles LD, Patterson EE, Sheffield WD, Mavoori J, Higgins J, Michael B, Leyde K, Cloyd JC, Litt B, **Vite C**, Worrell GA. Feasibility study of a caregiver seizure alert system in canine epilepsy. *Epil Res* 106: 456-460, 2013. PMC 3903427
 63. Fan M, Sidhu R, Fujiwara H, Tortelli B, Zhang J, Davidson C, Walkley SU, Bagel JH, **Vite C**, Yanjanin

- NM, Porter FD, Schaffer JE, Ory DS. Identification of Niemann-Pick C1 disease biomarkers through sphingolipid profiling. *J Lipid Res.* 54:2800-14, 2013. PMC 3770093
64. Swain GP, Prociuk M, Bagel JH, O'Donnell P, Berger K, Drobatz K, Gurda BL, Haskins ME, Sands MS, **Vite CH***. Adeno-associated virus serotypes 9 and rh10 mediate strong neuronal transduction of the dog brain. *Gene Therapy* 21: 28-36, 2014. PMC 3881028
65. Cubizolle A, Serratrice N, Skander N, Colle M-A, Ibanes S, Gennetier A, Bayo-Puxan N, Mazouni K, Mennechet F, Kalatzis V, Joussemet B, Cherel Y, Lajat Y, **Vite C**, Bernex F, Haskins M, Kremer E. Corrective GUSB transfer to the canine mucopolysaccharidosis VII brain. *Molec Therapy* 22: 762-73, 2014. PMC3983960
66. Howbert JJ, Patterson EE, Stead SM, Brinkmann B, Vasoli V, Crepeau D, **Vite CH**, Sturges B, Ruedebusch V, Mavoori J, Leyde K, Sheffield WD, Litt B, Worrell GA. Forecasting seizures in dogs with naturally occurring epilepsy. *PLoS One* 9:e81920, 2014. PMC 3885383
67. Yoon SY, Gay-Antaki C, Ponde D, Poptani H, **Vite CH**, Wolfe JH. Quantitative, non-invasive, in vivo longitudinal monitoring of gene expression in the brain by co-AAV transduction with a PET reporter gene. *Mol Ther Methods Clin Dev* 1: 14016, 2014. PMC4362377
68. Tortelli B, Fujiwara H, Bagel JH, Zhang J, Sidhu R, Jiang X, Yanjanin NM, Shankar RK, Carillo-Carasco N, Heiss J, Ottinger E, Porter FD, Schaffer JE, **Vite CH**, Ory DS. Cholesterol homeostatic responses provide biomarkers for monitoring treatment for the neurodegenerative disease Niemann-Pick C1 (NPC1). *Hum Mol Genet* 23: 6022–6033, 2014. PMC4204776
69. Fletcher JL, Kondagari GS, **Vite CH**, Williamson P, Taylor RM. Oligodendrocyte loss during the disease course in a canine model of the lysosomal storage disease fucosidosis. *J Neuropathol Exp Neurol* 73:536-47, 2014. PMC4117195
70. Hinderer C, Bell P, **Vite CH**, Louboutin J-P, Grant R, Bote E, Yu H, Pukenas B, Hurst R, Wilson JM. Widespread and safe gene transfer in the central nervous system of cynomolgus macaques following delivery of AAV9 into the cisterna magna. *Mol Ther Methods Clin Dev.* 1: 14051, 2014. PMC4448732
71. **Vite CH***, Bagel JH, Swain GP, Prociuk M, Sikora TU, Stein VM, O'Donnell P, Ruane T, Ward S, Crooks A, Li S, Mauldin E, Stellar S, De Meulder M, Kao ML, Ory DS, Davidson C, Vanier MT, Walkley SU. Intracisternal cyclodextrin prevents cerebellar dysfunction and Purkinje cell death in feline Niemann-Pick type C1 disease. *Sci Transl Med* 7(276):276ra26. doi: 10.1126/scitranslmed.3010101, 2015. PMC4415615
72. Provenzale JM, Nestrasil I, Chen S, Kan SH, Le SQ, Jens JK, Snella EM, Vondrak KN, Yee JK, **Vite CH**, Elashoff D, Duan L, Wang RY, Ellinwood NM, Guzman MA, Shapiro EG, Dickson PI. Diffusion tensor imaging and myelin composition analysis reveal abnormal myelination in corpus callosum of canine mucopolysaccharidosis I. *Exp Neurol.* 26;273:1-10, 2015. PMC4644459
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 11. Rusbridge C, **Vite CH** Steinberg SA , Tiches D Britton J. Cervical dystonia secondary to infarction of the extrapyramidal or thalamic nuclei. 15th Annual Symposium European Society Veterinary Neurology, Philadelphia, PA 2003
 12. **Vite CH**, McGowan JC, Niogi S, Wenger D, Haskins ME. Magnetization transfer imaging of the brain in a canine model of globoid cell leukodystrophy (Krabbe disease). 15th Annual Symposium European Society Veterinary Neurology, Philadelphia, PA 2003.
 13. **Vite CH**, Passini M, Polesky A, O'Donnell P, Zweigel J, Salvetti A, Moullier P, Haskins M, Wolfe J. AAV vector-mediated transduction in the cat brain. 15th Annual Symposium European Society Veterinary Neurology, Philadelphia, PA 2003.
 14. **Vite CH**, McGowan JC, Niogi S, Passini MA, Drobatz KJ, Haskins ME, Wolfe JH. Effective gene therapy for an inherited diffuse CNS disease in a feline animal model. 2nd International Conference Advances in Canine and Feline Genomics. Utrecht, Netherlands. October 14-16, 2004.
 15. **Vite CH**, Magnitsky S, Haskins ME, O'Donnell P, Aleman D, Pickup S, Wolfe JH Poptani H. T2 and diffusion MRI aids in the diagnosis of alpha-mannosidosis in a feline model. International Society of Magnetic Resonance in Medicine, Miami Beach, Florida 2005.
 16. Magnitsky S, **Vite CH**, Pickup S, Aleman D, Wolfe JH, Poptani H. In vivo brain NMR spectroscopy of alpha-mannosidosis in a feline model. International Society of Magnetic Resonance in Medicine, Seattle, Washington 2006.
 17. **Vite CH**, Walkley SU, Mellon SH, Aleman D, Cullen K, O'Donnell P, Magnitsky S. Markers for disease progression of feline Niemann-Pick type C. NIH/NINDS Workshop: Glycosphingolipids in Health and Disease. Alexandria, VA, 2006
 18. Lewis M, Ding W, Williams C, **Vite C**. Characterization of cerebrocortical dysfunction in feline Niemann-Pick type C (NP-C) Disease. Veterinarians in Biomedical Research: Building National Capacity. Merck-Merial-NIH National Veterinary Scholars Symposium. Washington DC, August 2007.
 19. Malik S, Ding W, **Vite CH**, Watson DJ. BRDU labeling pattern of the rostral migratory stream in normal canine and feline brains. Society for Neuroscience Annual Meeting, Washington, DC, 2008.
 20. Walkley SU, Davidson CD, Vanier MT, **Vite CH**. Pharmacological approaches to the treatment of lysosomal storage disease. Shire Pharmaceutical Mtg, Berlin, Germany, 2011.
 21. Patterson E, Coles L, Cloyd J, Podell M, **Vite C**, Bush W, Rendahl A, Leppik I. The canine translational platform” Proof of concept study of fosphenytoin for status epilepticus in canine clinical patients. American Epilepsy Society, Washington D.C., December 2013.
 22. Davis KA, Wulsin D, Wu C, **Vite C**, Leyde K, Worrell G, Litt B. Transient disruption of the epileptic network with intracranial electrodes. American Epilepsy Society, Washington D.C., December 2013.
 23. **Vite CH**. Cyclodextrin effects on LC3 accumulation in the brain of NPC1 cats. Ara Parseghian Medical Research Foundation, Tucson, AZ, 2016.
 24. Porter FD, Farhat NY, Ottinger EA, McKew JC, Weissfeld L, Machielse B, Berry-Kravis EM, **Vite CH**, Walkley SU, Ory DS, TRND team. Phase 1/2a trial of intrathecal VTS-270 for the treatment of Niemann-Pick Disease, type C1. Ara Parseghian Medical Research Foundation, Tucson, AZ, 2017.
 25. Bradbury AL, **Vite CH**. A natural history study and AAV-mediated gene therapy approach for feline mucopolysaccharidosis II. International Society of Mannosidosis and Related Disorders. 2017
 26. Bradbury AL, **Vite CH**. A natural history study and AAV-mediated gene therapy approach for feline mucopolysaccharidosis II. Mucopolysaccharidosis Society. 2017
 27. Porter FD, Farhat NY, Ottinger EA, McKew JC, Weissfeld L, Machielse B, Berry-Kravis EM, **Vite CH**,

- Walkley SU, Ory DS and the TRND team: Phase 1/2a trial of intrathecal 2-hydroxypropyl- β -cyclodextrin (VTS-270) for the treatment of Niemann-Pick Disease, type C1. ESHG 2017
28. Gurda BL, Swain G, Bagel J, Gray SJ, Prociuk M, O'Donnell P, **Vite CH**. AAV gene therapy studies in the feline model of Niemann-Pick type C disease. ACVIM Forum, National Harbor, Maryland, 2017.
29. Gurda BL, Liu A, Brisson B, Margolies C, Casal M, Lengner C, **Vite CH**. Generating novel large animal models of nervous system disease for therapeutic study using CRISPR/Cas9 system. ACVIM Forum, National Harbor, Maryland, 2017.
30. Dreese K, Swain G, **Vite CH**. AAV-mediated gene therapy to treat the central nervous system in feline NPC1 disease. Student Research Day, School of Veterinary Medicine, University of PA, Philadelphia, 2019.
31. Johe K, Boulis N, Wetzel J, Buchman T, Vite C, Quach D. A one-time treatment to continuously and permanently deliver lysosomal enzymes to the CNS. ASGCT, Washington D.C, May 2022.

GRANTS:

Current Research Support

Name of Grant	Funding Agency	Period of Grant	Type of Grant	Role on Grant and Percent Effort	Annual Direct Cost	Annual Indirect Cost	Comment
Referral Center for Animal Models of Human Genetic Disease P40-OD010939-35 581384	NIH	2019 - 2023	PP (P40)	PI, 15%	422,174	229,244	61% IC rate
Referral Center for Animal Models of Human Genetic Disease 2-P40-OD-010939-34A1 576282	NIH (Program Income Fund)	2019-2023	PP (PIF)	PI, 0%	250,000	Variable IC rate	
AAV-mediated gene therapy for CNS disease correction in feline NPC1 disease R01-NS-115869-01 581295	NIH	2020-2025	R01	PI, 15%	409,111	157,146	62% IC rate
Preclinical evaluation of a therapeutic CD22 antibody in feline Niemann-Pick Type C1 disease	APMRF	2022-2023	PG	PI, 5%	90,909	9,091	10% IC rate, No salary support
Safety and efficacy of tissue from long-term AAV-treated dogs with globoid cell leukodystrophy	Neurogene	2022-2023	FFS	PI, 10.4%	122,283	80,095	
Translation of Efavirenz from preclinical models to Niemann-Pick, type C1 Patients	NIH	2021-2023	Bench to Bedside	Extramural PI, 3%	131,357	104,384	Intramural PI, Porter
Translational studies on cerebrospinal fluid (CSF)-directed gene therapy for global neurometabolic brain disease. R01-NS110349-01A1 576958	NIH	2019-2023	R01	Co-invest, 4.2%	528,654		PI, Wolfe
Gene therapy for mannosidosis 583695	NIH	2021-2023	R01	Co-invest, 5%			PI, Wolfe
Vectored contraception in the female dog by Mullerian inhibiting substance	Michelson Foundation	2021-2023	SRA	Site-PI, 7.7%	355,415	28,432	PI, Pepin

Support of the NPC1 cat colony for future preclinical trials 582048	APMRF	2020-2023	PG	PI, (4%)	56,343	5,634	10% IC rate, No salary support
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Pending Research Support

Name of Grant	Funding Agency	Period of Grant	Type of Grant	Role in Grant	Annual Direct Cost	Annual Indirect Cost
Combination gene therapy for treatment of canine mucopolysaccharidosis type I GRANT13273825	NIH	2022-2027	R01	Co-invest, 5%	1,329,185	830,741 PI, Wang
Determine efficacy of Kisbee discs in Feline NPC model	Kisbee Therapeutics	2023-2024	FFS	PI, 10%	401,815	156,708
Investigating a novel gene therapy for neurodegenerative disease in large animals	TAPITMAT	2023-2024	Intramural	Co-PI, 5%	75,000	0
Targeting the endogenous stem cells to boost skeletal muscle regeneration in DMD	DoD	2023-2028	DoD	Co-invest, 10%	Pending	Pending

Past Research Support

Name of Grant	Funding Agency	Period of Grant	Type of Grant	Role in Grant and Percent Effort	Annual Direct Cost	Annual Indirect Cost
A Pilot Feasibility Study of Subchronic Immunosuppression and Multi-track Intracerebral Xeno-Transplantation of Human Neural Stem Cells Overexpressing Recombinant Human SGSH Enzyme in Normal Healthy Dogs and Wildtype and MPS3a-/- Huntaway Dogs	ReMotor	2021-2023	FFS	PI, 10%	186,087	9,304
Intracisternal administration of novel AAV-fNPC1 to restore expression and treat cerebellar ataxia in feline NPC1	StrideBio	2021-2023	SRA	PI, 10%	298,018	193,711
AAV-mediated intrathecal therapy of feline NPC1 disease 566996	Galyatech	2015-2021	PG	PI, (5%)	62,436	\$12,487
A pharmacodynamic study of human iduronidase (hIDUA) delivered via Afibromer coated cell factories to the spinal fluid of MPSI dogs	Sigilon	2019-2021	IG, SRA	PI, (5%)	26,222	16,519
Combination therapy, biomarkers, and imaging in canine Krabbe disease R01-NS096087-05 569365	NIH	2016 - 2021	R01	PI, 16.7%	257,445	135,432

Improving extracerebellar NPC1 disease using intravenous HPBCD 577556	APMRF	2019-2021	PG	PI, (10%)	68,182	\$6,818
Evaluating a combination of 2-hydroxypropyl-beta-cyclodextrin and delta tocopherol at two doses in cats with Niemann-Pick disease type C1	NIH	2021-2023	FFS	Co-invest, 8%	58,731	36,413
Evaluating a small molecular synthetic agent in cats with Niemann-Pick disease type C1	NIH	2021-2023	FFS	Co-invest, 5%	31,513	19,538
Combination therapy for feline NPC disease 560727	DART/ SOAR	2012-2021	PG	PI, (10%)	91,695	8,336
Gene transfer and NMR studies in alpha-mannosidosis. 575246	NIH	2015-2020	R01	Co-invest, (4%)	47,678	28,607
Frontiers in Leukodystrophy Initiative (FrontLINE) 576007	CHOP	2018-2020		Co-invest, 5% (PI, Vanderver)	\$94,658	\$18,931
Treatment of Krabbe disease using intravenous AAV gene therapy 568049	Univ Pitts	2015-2020	Flow Down	PI, 3%	117,522	\$5,876
Choroid plexus-directed gene therapy for alpha-mannosidosis 576958	NIH	2015 – 2020	R01	Co-invest, 4.2%	47,678	28,607
Intrathecal recombinant GALC administration to treat canine Krabbe disease 567190	BioMarin Pharma	2015 - 2022	IG	PI, 5%	495,747	307,363
Biomarker development in canine MPSIIIA-ICV 576124	BioMarin Pharma	2019-2022	IG	PI, 2.5%	111,506	70,249
Biomarker MPSIIIA-Breeder production 573317	BioMarin Pharma	2017-2019	IG	PI, 0%	243,867	153,636
CRISPR Cas9 creation of feline model of NPC disease 572206	Leidos	2017-2018	IG	PI, 15%	561,973	245,290
Development of cyclodextrin in preclinical trials for eventual use in clinical trials 567493	APMRF	2015 - 2017	PG	PI, 0%	90,910	9,090
Gene Therapy for Mucopolysaccharidosis 563334	NIH	2016-2017	R01	Co-invest, 10% (PI, Wolfe)	402,645	134,416
Lentiviral-mediated hematopoietic stem cell gene therapy for canine globoid cell leukodystrophy 567730	NIH	2015 – 2018	F32	Mentor, 5% (PI, Bradbury)	154,200	7,725
Combination therapy for feline NPC disease 560727	Support of Accelerated Research (SOAR)	2016 - 2017	PG	PI, 0%	62,814	6,281

Development program for the treatment of Krabbe disease using intravenous AAV gene therapy 568049	Children's Hospital of Pittsburgh	2016-2017	PG	Site PI, 3% (PI, Escolar)	123,398	5,876
Natural history study and biomarker development in the large animal model of mucopolipidosis II 015802/4113	Univ PA, Center for Orphan Disease Research	2016- 2017	PG	PI, 0%	45,901	4,591
Cell-based therapy for seizures by transplantation of human stem cell-derived inhibitory interneurons modified for rapid maturation 015802/4209	Univ PA, Program in Comparative Animal Biology	2016- 2017	PG	PI, 0%	45,000	0
Evaluation of AAV gene therapy in the feline model of mucopolipidosis II 570840	International Advocate for Glycoprotein Storage Diseases	2017-2019	PG	PI, 0%	48,636	4,864
Intrathecal gene therapy of Niemann-Pick type C disease 566996	Galyatech	2015 - 2017	PG	PI, 15%	432,295	86,459
Intrathecal cyclodextrin therapy of feline Niemann-Pick type C disease 556533	NIH	2011 - 2017	R01	PI, 20%	218,750	131,250
Antemortem 3D EPSI metabolic mapping of the canine MPS I brain	Univ PA, Center for Orphan Disease Research	2013-2015	PG	PI	150,000	0
Fellowship of the cats 562159	National Niemann Pick Disease Foundation	2011-2017	PG	PI, 10%	50,000	5,000
Novel therapies for canine globoid cell leukodystrophy	Washington Univ St Louis (R01 Flowdown)	2014-2015	R01	Site PI, 10% (PI: Sands)	23,000	13,800
AAV Vector Development	REGENX	2013 - 2015	IG	Collab 10%; (PI, Wilson)		Med School
Evaluation of the pharmacokinetics and bioavailability of 2-hydroxypropyl-beta-cyclodextrin	Janssen Pharma	2012-2015	IG	PI, 20%	45,000	4,500
Intracerebroventricular and intravenous injections of AAVrh10-GALC into the dog model of Krabbe disease	Thomas Jefferson University (Legacy of Angels Foundation Flowdown)	2014-2015	PG	Site PI, 10% (PI, Wenger)	103,636	10,364
Intracerebroventricular and intravenous injections of AAVrh10-GALC into the dog model of Krabbe disease	Thomas Jefferson University (Legacy of Angels Foundation Flowdown)	2013-2014	PG	Site PI, 10% (PI, Wenger)	105,270	10,527

Intracerebroventricular and intravenous injections of AAVrh10-GALC into the dog model of Krabbe disease	Thomas Jefferson University (Legacy of Angels Foundation Flowdown)	2012-2013	PG	Site PI, 10% (PI, Wenger)	78,845	7,884
Intracerebroventricular and intravenous injections of AAVrh10-GALC into the dog model of Krabbe disease	Thomas Jefferson University (Legacy of Angels Foundation Flowdown)	2011-2013	PG	Site PI, 10% (PI, Wenger)	78,845	7,884
Combination therapy for feline NPC disease	Support of Accelerated Research (SOAR)	2012-2014	PG	PI, 10%	68,182	6,818
Colony support for feline NPC	Ara Parseghian Medical Research Foundation	2013-2014	PG	PI, 10%	43,636	4,364
Evaluating treatment strategies for feline NPC disease	Ara Parseghian Medical Research Foundation	2010-2011	PG	PI, 10%	81,818	8,182
MRI of MPSI	LA Biomed (NIH R01 flowdown)	2013-2014	R01	Consultant (PI, Dickson)	1,400	0
Novel therapies for globoid cell leukodystrophy	Washington Univ St Louis (NIH flowdown)	2010-2011	R01	PI, 20%	51,433	30,865
Canine status epilepticus: A translational platform for human therapy	Univ Minn (R21 flowdown)	2010-2013	R21	PI, 10%	14,816	8,889
Neurophysiologically Based Responsive Pharmacotherapy for Epilepsy	Mayo Clinic (U01 flowdown)	2011-2013	U01	PI, 10%	193,804	116,282
Quantitative Tissue Distribution Using Whole-Body Autoradiography Following a Single Intrathecal Dose of [14C]Cyclodextrin to Domestic Cats	Johnson and Johnson Pharma ResearchPI	2011-2013	IG	PI, 10%	22,521	2,252
Safety, performance, and efficacy of a seizure advisory system in dogs with epilepsy: A pilot study	NeuroVista Corporation	2010-2012	IG	PI, 20%	166,015	43,164
Shared equipment- translational medicine-cat coil for 3T magnet.	University Research Foundation	2011-2012	PG	PI	20,000	0
Biomarker validation to monitor cyclodextrin therapy in Niemann-Pick C1 disease	Pilots across the SPIRIT (ITMAT)	2012-2013	PG	PI, 10%	25,000	0

Disseminated AAV Vector Transport in the brain via neuronal pathways	NIH	2011-2013	PP	Co-investigator, 10% (PI, Wolfe)		
Retroviral therapy of feline alpha-mannosidosis	NIH	2010-2012	R01	Co-investigator, 10% (PI, Wolfe)		
Enzyme replacement therapy in Krabbe disease in dogs	Shire Human Genetic Therapies	2008-2011	IG	PI, 20%	305,998	183,599
Evaluating treatment strategies for feline NPC disease	Ara Parseghian Medical Research Foundation	2005-2011	PG	PI, 10%	604,546	60,454
Gene transfer & NMR studies in alpha-mannosidosis brain	NIH	2002-2007	R01	Co-investigator, 10% (PI, Wolfe)		
MRI, MTI and MRS of MPS VII and Krabbe Disease	NIH	1998-2004	K08	PI, 100%	132,643	79,586
CT-guided brain biopsy	Penn Vet	1999-2000	PG	PI	1,5000	0
Brain Calcium Quantification in Canine Chronic Renal Failure	Penn Vet	1993-1994	PG	PI	1,500	0

GIFTS:

Name of Gift	Gift Agency	Date	Annual Direct Cost	Annual Indirect Cost
Salary support	SOAR	2022	22,500	2500
Salary support	SOAR	2021	4500	500
Confocal microscope	Brian Chan	2016	350,000	35,000
Support of feline cat colony	SOAR	2014	44,000	4,400
Support of postdoc on NPC research	Goldman Orphan Disease Fund	2014	50,000	5,000
Support of epilepsy clinic	Private Donor	2013	50,000	5,000
Electroencephalography in dogs and cats	Kindy French Foundation	2006	33,000	3,300

Patents: PCI -Technology: 19-8953-L2176, L2176-AMD1 Neurogene Inc. Optimized GALC Genes and Expression Cassettes and Their Use

ACADEMIC COMMITTEES AT UNIVERSITY OF PENNSYLVANIA:

Department Committees:

1994 - 1997 Hospital Board of the Veterinary Hospital of the University of PA (member)
2001 - 2002 Ward Renovations Committee (member)
2003 – 2006 Radiation Therapy and Imaging Center Committee (member)
2004 – 2007 Section of Neurology (Section Chief)
2004 – 2006 Search Committee Internal Medicine (member)
2005 – 2006 Search Committee Neurology (Chair)
2006 – 2008 Department Chair Search Committee Clinical Studies – Philadelphia (member)
2006 – 2007 Department Chair Search Committee Pathobiology (member)
2008 - 2009 Ryan First Floor Reorganization Feasibility Study Committee (member)
2011 – 2012 Search Committee Neurology (Chair)
2012 – 2015 Section of Neurology and Neurosurgery (Section Chief)

- 2014 – 2015 Search Committee Interventional Radiology Faculty position (member)
- 2014 – 2016 Education Group for Departmental Review (member)
- 2011 – 2016 Department of Clinical Studies Education Committee (member)
- 2015 - 2016 Search Committee Internal Medicine (Chair)
- 2017 – 2018 Inherited Metabolic Disease Division (Organizer)
- 2017 – 2018 Search Committee Internal Medicine (Chair)
- 2020 – 2021 Impact Award Committee (member)
- 2018 – present Companion Animal Research Fund (grant review committee)
- 2020 – 2021 CSAM Departmental Review Committee – Research Mission (member)

School Committees:

- 2002 - 2004 Marie-Lowe Cancer Center Committee (member)
- 2006 – 2008 Penn Annual Conference 2007 Committee (member)
- 2008 – 2009 Committee on Academic Freedom and Responsibility (member)
- 2008 – 2009 Society of Phi Zeta Society – Beta Chapter (President)
- 2009 – 2010 Society of Phi Zeta Society – Beta Chapter (Secretary)
- 2010 Phi Zeta Student Research Day (abstract review)
- 2013- 2014 Phi Zeta Student Research Day planning committee (member)
- 2012 – 2014 Dean’s Working Group on future faculty composition (member)
- 2010 – 2015 Clinical Competency Outcomes Assessments sub-committee (member)
- 2009 – 2016 School of Veterinary Medicine Education Committee (member)
- 2017 – 2018 Dr. Harry Werner Professorship in Equine Medicine at New Bolton Center Search Committee (member)
- 2011 - present NIH/Merial /Boehringer Ingelheim Summer Scholars Program (grant review)
- 2014 – present Faculty Council (member)
- 2019 – 2022 Committee on Appointments and Promotions (member)
- 2020 – present Cognition, Senses, and Responses Committee (Block Leader, curriculum redesign)
- 2020 – present Clinical Majors Committee (member, curriculum redesign)

University Committees:

- 2008 – present The Mahoney Institute of Neurological Sciences at the University of Pennsylvania (member)
- 2008 – present Neuroscience Graduate Group (member)
- 2012 - present Neuroscience Graduate Group Award Committee (member)
- 2012 – 2018 Flexner Dissertation Prize Selection Committee of NGG (member)
- 2012 - present Institute for Translational Medicine and Therapeutics (member)
- 2015 – present Leukodystrophy Center of Excellence (CHOP; member)
- 2018 – present Orphan Disease Center grant review committee (member)
- 2012 – 2018 Institutional Animal Care and Use Committee (member)
- 2018 - present Animal Program Advisory Committee (member)
- 2018 – present Core Directors (member)

ACADEMIC COMMITTEES OUTSIDE OF UNIVERSITY OF PENNSYLVANIA:

- 2016 - present Intellectual and Developmental Disabilities Research Center at CHOP (member)
- 2016 - present Raymond G Perelman Center for Cellular and Molecular Therapeutics (Animal Models Director)

FORMAL FACULTY MENTORING:

- 2015 - 2018 Jantra Suran (committee member)
- 2016 – present Keiko Miyadera (Chair)
- 2021 – present Matthew Atherton (Chair)

- 2022 - present Raghavi Sudharsan (Chair)
2022 – present Charles Assenmacher (committee member)

STUDENT TRAINING:

Undergraduate:

George Washington University DART Internship Program (Mentor):

- 2015 (Summer) “CNS disease in Niemann Pick type C disease (Intern: Nicole Kasica)
2016 (Summer) “Regional cholesterol storage in Niemann Pick type C disease (Intern: Ryan Hodgson)
2017 (Summer) “Fwave abnormalities in Krabbe and Niemann Pick type C disease (Intern: Kate Dalia)
2018 (Summer) “Long term therapy of NPC with cyclodextrin (Intern: Julia Yerger)
2019 (Summer) “Peripheral nerve dysfunction in feline NPC disease” (Intern: Tiffany Ko)

Undergraduate Summer research (Mentor):

- 2016 (Summer). “Developing new therapies for NPC disease” (Denston Carey, West Chester University of Pennsylvania)
2017 (Summer) “Efficacy of postsymptomatic therapy on Niemann-Pick Type C Disease” (Mia Salas, Peddie School)
2022 (Summer) “Optimizing the delivery of AAV9-pGUSB-NPC1 vector for the treatment of feline Niemann-Pick Type C1 Disease using feline models through analyzing transgene expression” (Haoxiang Hou, University of Pennsylvania)

Predoctoral:

NIH/Merck-Merial Veterinary Scholars Program (Mentor):

- 2007 (Summer) “Characterization of cerebrocortical dysfunction in feline Niemann-Pick type C disease” (Fellow: Melissa Lewis)
2008 (Summer) “Migration of endogenous neural progenitor cells in the dog and cat brain” (Fellow: Melissa Lewis)
2009 (Summer) “Clinical and electrophysiological measures of outcome following experimental treatment of feline Niemann-Pick type C disease.” (Fellow: Sarah Ward)
2010 (Summer) “Effect of 2-hydroxypropylbetacyclodextrin on neuropathology in a feline model of Niemann-Pick type C disease.” (Fellow: Sarah Ward)
2011 (Summer) “Cyclodextrin therapy in feline Niemann-Pick type C disease ameliorates cerebellar neurodegeneration.” (Fellow: Su Li)
2013 (Summer) “Problem-based learning with online video modules for topics in veterinary neurology: A model for education in the digital age (Fellow: Scott Petesch)
2014 (Summer) “Assessment of histopathologic CNS disease in canine mucopolysaccharidosis type 1 disease.” (Fellow: Jennifer West)
2014 (Summer) “Neuropathological divergences between Niemann-Pick Type C disease and aging in cats” (Fellow: Emily Shea)
2019 (Summer) “AAV-mediated gene therapy to treat the central nervous system in feline NPC1 disease” (Fellow: Kaitlyn Dreese)
2022 (Summer) “The correlation between chronic cardiac insufficiency and brain degeneration in canines” (Fellow: Estefania Benavides)

Graduate school thesis committee

- 2018 – Marjorie Milne, University of Melbourne (PhD)
2019 – Lauren Boudewyn, Albert Einstein College of Medicine (PhD)
2021 – Ian Hendricks, Thomas Jefferson University (MS)
2022 – Vi Pham, University of Pennsylvania (PhD)

Postdoctoral Fellows (Mentor):

- 2008 – 2010 Veronika Stein, DVM, PhD, Dipl ACVIM (Neurology). “Isolation and characterization of feline microglial cells in normal cats and cats with Niemann-Pick type C”
Current position: Professor, University of Bern, Switzerland
- 2018 – 2019 Sarah Sterling, DVM. “Chronic administration of cyclodextrin to Niemann-Pick disease type C1 cats resolves cerebellar and hepatic disease but deep gray matter and brainstem pathology persist”
Current position: Neurology/Neurosurgery resident, Veterinary Neuro Services, Scottsdale, AZ
- 2018 - 2019 Arielle Ostrager, DVM. “Cerebrospinal fluid volume in pediatric dogs measured by MRI and CT”
Current position: Neurology/Neurosurgery resident, Purdue University
- 2014 – 2019 Allison Bradbury, PhD, “Combined bone marrow transplantation and gene therapy to treat canine Krabbe disease”
Current position: Assistant Professor, Ohio State University Wexner Medical Center
- 2018-2020 Victor Stora, DVM. “Creation of feline NPC2 using CRISPR/Cas9 genome editing”
Current position: Associate veterinarian Eltingville Veterinary Practice
- 2021 – 2022 Chun Kuen Mak, DVM, PhD. “Vectored contraception in the female dog by Mullerian inhibiting substance”
Current position: Assistant Professor, College of Veterinary Medicine – Long Island University.

Neurology Residents:

<u>Dates</u>	<u>Name</u>	<u>Present Position</u>
1994 - 1996	Deena Tiches	Clinical Specialist
1996 - 1998	Rocco Lombardo	Faculty, University of Milan
1996 - 1998	Francesca Cozzi	Clinical Specialist
1997 - 1999	Eric Glass	Clinical Specialist
1998 - 2000	Noemie Bernier	Clinical Specialist
1999 - 2001	Bill Bush	Clinical Specialist
2000 - 2002	Gina Barone	Clinical Specialist
2000 - 2002	Katia Marioni	Clinical Specialist
2001 - 2004	Mark Troxel	Clinical Specialist
2002 – 2005	Jessica Mikszewski	Clinical Specialist
2003 - 2006	Ed Darrin	Clinical Specialist
2004 - 2007	Kersten Johnson	Clinical Specialist
2005 - 2008	Erika Gibson	Clinical Specialist
2006 – 2009	Carrie Journey	Clinical Specialist
2007 - 2010	Evelyn Galban	Faculty, University of Pennsylvania
2008 - 2012	Johnny Cross	Clinical Specialist
2008 - 2012	Amy Johnson	Faculty, University of Pennsylvania
2010 – 2013	Adam Moeser	Clinical Specialist
2011 – 2014	Emily Davis	Clinical Specialist
2012 – 2015	Leontine Benedicenti	Faculty, University of Pennsylvania
2013 – 2016	Jonathan Wood	Faculty, Cornell University
2014- 2017	Laura Krzykowski	Clinical Specialist

SEMINARS AND ORAL PRESENTATIONS BY INVITATION:

- 1999 Evaluation of intracranial pathology using non-conventional MR methods. 17th Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, Chicago, IL June.
- 2001 MRI-Pathology correlation. Techniques to enhance specificity of MR diagnosis. 19th Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, Denver, CO, June.

- 2003 Neurologic Diseases. Faculty workshop on dog and cat models of human disease. The Walter Flato Goodman Center for Comparative Medical Genetics. University of Pennsylvania, Philadelphia, PA. December 17.
- 2004 AAV vector-mediated gene transfer to the brains of cats with alpha-mannosidosis. The Glycoproteinoses: An International Workshop on Advances in Pathogenesis and Therapy. Rockville, MD. National Institute of Health (NINDS & ORD) and International Society for Mannosidosis and Related Diseases (sponsors). March.
- 2004 Adeno-associated virus vector-mediated gene transfer to the brain of cats with alpha-mannosidosis. Lysosomal Storage Diseases and the Brain. Bethesda, MD. National Institute of Health and Children's Gaucher Research Fund (sponsors). May.
- 2005 Adeno-associated virus vector-mediated gene transfer to the brain of cats with alpha-mannosidosis. Gregg Conference Center, Bryn Mayr, PA. Veterinary School Research Retreat.
- 2005 Effective gene therapy for an inherited diffuse CNS disease in a feline animal model. 2nd International Conference on Advances in Canine and Feline Genomics. Utrecht, The Netherlands.
- 2006 Gene therapy of genetic diseases of the nervous system (State of the Art Lecture). British Small Animal Veterinary Association Congress, Birmingham, England, April.
- 2006 Nuclear magnetic resonance measurements of brain pathology. American Society of Gene Therapy, 9th Annual Meeting, Baltimore, MD.
- 2006 A history of stiff dogs, goats, horses, and people. American College of Veterinary Internal Medicine, 24th mtg, Louisville, KY.
- 2006 Clinical, electrodiagnostic, and nuclear magnetic resonance data in feline Niemann-Pick type C disease. Ara Parseghian Medical Research Foundation Scientific Conference, Tucson, Arizona, June 9-10.
- 2006 Gene therapy for inherited neurological diseases of the dog and cat. European Society of Veterinary Neurology, 29th mtg, Barcelona, Spain.
- 2006 Nuclear magnetic resonance evaluation of brain pathology in the dog and cat. European Society of Veterinary Neurology, 29th mtg, Barcelona, Spain (Keynote speaker).
- 2007 MRI of brain pathology and its therapy. Towards Clinical Progress in the Mucopolysaccharidoses. National Institutes of Health and National MPS Society (sponsors). Washington DC, March.
- 2007 Quantitative imaging of gray matter disease associated with feline alpha-mannosidosis. 2nd International Conference on Glycoprotein and Related Storage Disease. National Institutes of Health, International Society for Mannosidosis and Related Diseases (sponsors). Ann Arbor, MI, July.
- 2007 Neurosteroid therapy in the feline NPC1 model. Ara Parseghian Medical Research Foundation Scientific Conference, Tucson, Arizona, June.
- 2007 Genetic Disease: State of the Art Presentations. Veterinarians in Biomedical Research: Building National Capacity. Merck-Merial-NIH National Veterinary Scholars Symposium. Washington DC, August.
- 2008 Allopregnanolone in beta-cyclodextrin significantly effects hepatic disease without effect on neurological disease in feline Niemann-Pick type C disease. Ara Parseghian Medical Research Foundation Scientific Conference, Tucson, Arizona, June.
- 2009 The role of cholesterol in neurodegenerative diseases of small animals. American College of Veterinary Internal Medicine, 27th mtg, Montreal, Canada.
- 2009 Update on miglustat and beta-cyclodextrin effect on hepatic and neurological disease in feline Niemann-Pick type C disease. Ara Parseghian Medical Research Foundation Scientific Conference, Tucson, Arizona, May.
- 2009 Immunophenotyping and functional characterization of microglial activation in feline Niemann-Pick type C disease. Ara Parseghian Medical Research Foundation Scientific Conference, Tucson, Arizona, May.
- 2010 Cholesterol metabolism in Niemann-Pick type C disease. University of Texas, Southwestern Medical School, March
- 2010 Intrathecal and subcutaneous cyclodextrin therapy of feline Niemann-Pick type C disease. Promising Therapies for Niemann-Pick type C disease. National Institute of Health (NINDS) sponsor. Rockville, MD June

- 2010 Intrathecal cyclodextrin therapy of feline Niemann-Pick type C disease Ara Parseghian Medical Research Foundation Scientific Conference, Tucson, Arizona, September.
- 2010 Miglustat therapy of feline Niemann-Pick type C disease. Zavesca NPC Expert meeting, Washington, DC, October.
- 2010 Biomarker update in feline Niemann-Pick type C disease. Niemann-Pick type C Biomarker Workshop, Actelion Pharmaceuticals Ltd. , Berlin, Germany, November.
- 2011 Intrathecal cyclodextrin therapy of feline Niemann-Pick type C disease. Biomarin Pharmaceutical Inc Science Seminar, Novato, CA, January.
- 2011 Drug therapy of inherited neurological disease. Annual Faculty Research Retreat. July, Kennett Square, PA.
- 2011 Therapeutic approaches to hereditary neurodegeneration in large animal models. Johnson and Johnson Global Drug Safety Sciences Learning Seminar, Raritan, NJ. July 25
- 2011 Stopping Purkinje cell death and dysfunction in cats. European Society of Veterinary Neurology, 34th mtg, Trier, Germany (Keynote speaker).
- 2011 Glycosphingolipids in health and disease. The Department of Animal Biology Seminar Series. November 11.
- 2011 Canine epilepsy as a model of human epilepsy. Seizure in Non-Clinical Studies Workshop. Food and Drug Administration, November 2011 17.
- 2011 Intrathecal versus parenteral therapy of feline Niemann-Pick type C disease. Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, Denver, CO June
- 2012 Intrathecal cyclodextrin ameliorates neurological dysfunction and improves Purkinje cell survival in presymptomatic and postsymptomatic cats with Niemann-Pick disease type C. 2012 Scientific Conference on Niemann-Pick Type C Disease, Notre Dame College of Science, IN, June 7-9.
- 2012 The neurobiology of music and the healing power of the blues. Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, New Orleans, LA June.
- 2012 Treatment of Krabbe Disease with hematopoietic cell therapy. The 5th Annual Workshop on Krabbe Disease, Ellicottville, NY. July 31-August 1.
- 2012 Cyclodextrin therapy in the Niemann-Pick disease type C cat model. National Niemann-Pick Disease Foundation 20th Annual Family Support and Medical Conference, Nashville, TN, August 16-19.
- 2012 The NPC story – lessons learned from mice and cats. DIA-NORD U.S. Conference on Rare Diseases & Orphan Products. Washington, DC.
- 2013 From cats to children: Treating Niemann-pick type C disease in multiple species. Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, Seattle, WA June
- 2013 A critical review of zombies in the arts: Neuroanatomy, neurophysiology, and neuropathology. Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, Seattle, WA June
- 2013 Intrathecal 2-hydroxypropylbetacyclodextrin therapy in aged cats. Ara Parseghian Medical Research Foundation, June 2013, Notre Dame, IN
- 2013 An update on treating NPC disease with intrathecal cyclodextrin. National Niemann Pick Disease Foundation, August 2013, Baltimore, MD
- 2014 Limiting auditory toxicity associated with intrathecal cyclodextrin therapy. Support for Accelerated Research for Niemann Pick type C disease. February, Albert Einstein College of Medicine, NY.
- 2014 Canine globoid cell leukodystrophy – Benefits of the model and what we have learned so far. 4th Annual Krabbe Translational Research Network, March 2014 Ft Lauderdale, FL.
- 2014 The Pleasure Lab. Annual Veterinary Medical Forum, American College of Veterinary Internal Medicine, Nashville, TN.
- 2014 An update on treating NPC disease with intrathecal cyclodextrin. National Niemann Pick Disease Foundation, August 2014, San Francisco, CA

- 2014 Identification of HPBCD ototoxicity in the NPC1 cat model and dog toxicology studies. Therapeutics for Rare and Neglected Disorders. NPC-cyclodextrin Ototoxicity Meeting, Rockville, MD.
- 2014 Penn Neurology Basic Science Lecture Series – Animal models of human disease. Department of Neurology, School of Medicine, University of Pennsylvania, October.
- 2014 Canine globoid cell leukodystrophy. Krabbe Translational Research Network. July 11, New York, New York.
- 2015 The comparative medicine team approach to treating neurodegenerative diseases. NIH "One Health: Integrating the Veterinarian Scientist into the Biomedical Research Enterprise" April 7.
- 2015 Penn Vet's National Referral Center for Animal Models of Human Genetic Disease. BioMarin Pharmaceutical, San Rafael, CA April 16.
- 2016 The effect of aging on human and canine performance. Penn Vet Working Dog Conference. Essington, PA. April 8.
- 2016 Canine models of lysosomal storage disorders. Emerging and Translational Biology of Leukodystrophies. Moser Center for Leukodystrophies at Kennedy Krieger Institute, Johns Hopkins University. May, 2016. Baltimore, MD.
- 2016 Update on experimental therapies for Niemann Pick type C in the feline model. National Niemann Pick Disease Foundation Meeting. August, 2016. Boston, MA.
- 2017 Preclinical studies in animal models. Gordon Research Conference, Lysosomal Diseases, March 2017, Barga, Italy.
- 2017 Autophagy and its therapy in lysosomal storage disease. ACVIM Forum, Maryland.
- 2017 Abnormal autophagy in olivocerebellar projections in feline Niemann-Pick type C1 and its amelioration by intrathecally-administered cyclodextrin. Ara Paresghian Medical Research Foundation, Tucson, AZ.
- 2017 The National Referral Center for Animal Models of Human Genetic Disease. Waisman Center, University of Wisconsin.
- 2018 A Wind in the Door – 10 years within the lysosome. Keystone Seminar Series. University of PA.
- 2018 Animal models of human neurologic disease. SAVMA Conference, Philadelphia, PA.
- 2018 Canine and feline models of human neurological disease. Clinical Neurosciences Training Seminar. Penn Med Translational Neuroscience Center. Philadelphia, PA
- 2018 Gene therapy for LSDs in larger animals. Gene Therapy Activation Meeting, International Niemann-Pick Disease Alliance, Blois, France.
- 2019 Therapy of peripheral nerve disease in lysosomal storage diseases. Gordon Research Conference, Lysosomal Diseases, March 2019, Galveston, Texas.
- 2019 Adrabetadex preclinical results in the cat. Mallinckrodt Pharmaceuticals Advisory Board. Tucson, AZ.
- 2019 Preclinical studies for Niemann-Pick type C1. Support for Accelerated Research for NPC disease. Tucson, AZ.
- 2019 Long-term evaluation of Niemann-Pick disease type C1 cats administered intracisternal cyclodextrin or a combination of intracisternal and subcutaneous cyclodextrin. Michael, Marica, and Christa Parseghian Scientific Conference for Niemann-Pick Type C Research. Tucson, AZ.
- 2019 Novel therapeutic options for treatment of epilepsy. ACVIM Forum, Phoenix, AZ
- 2019 Gene therapy for Niemann-Pick type C. International Niemann-Pick Disease Alliance, June 2019, Lyon, France.
- 2019 Large animal models contribute to the development of therapies for central and peripheral nervous system dysfunction in patients with lysosomal storage diseases. 6th International Glycoproteinoses Conference, July 2019, Atlanta, GA.
- 2020 Preclinical trials and the development of therapies for rare diseases. School of Medicine, University of Pennsylvania, Neurology Residents, April 2020.
- 2020 Virtual Workshop on Validation of Animal Models and Tools for Biomedical Research, ORIP, NIH.

- 2021 Developing therapies for pediatric neurodegenerative disorders. Departmental Seminar, Koret School of Veterinary Medicine, August 2021
- 2021 Gene therapy of the brain. Gene therapy symposium for veterinary summer research students. Michigan State University Veterinary Medical Center, August 2021
- 2021 Canine and feline models of neurological disease. Thirteenth Comparative Medicine Resource Directors Meeting. NIH Office of Research Infrastructure Programs, August 2021
- 2022 Markers of disease severity and progression in large animal models of neurodegenerative disease. Experimental Biology; ACVP/ASIP symposium. Philadelphia, PA April 2022.
- 2022 Optimizing intracisternal magna gene therapy for Niemann-Pick type C disease. Michael, Marica, and Christa Parseghian Scientific Conference for Niemann-Pick Type C Research. Tucson, AZ May 2022.

PROFESSIONAL EDUCATION LECTURES:

- 1998 6th International Veterinary Emergency and Critical Care Symposium. San Antonio, Texas, September. Three lectures:
The seizing dog: Differential diagnoses, diagnostic testing, and treatment protocols.
Disease of the lower motor neuron and endplate in the dog: Diagnostics and therapy.
Vestibular disease. Dealing with rolling dogs.
- 2004 Clinical MRI in Veterinary Medicine: Applications in Neurology and Orthopedics" Grand Rounds, School of Veterinary Medicine, University of Pennsylvania January 20.
- 2005 93rd Annual Fall Conference for Veterinarians and Veterinary Technicians. Purdue University, West Lafayette, IN. September. Six lectures:
Brain disorders in dogs and cats
Cranial nerve diseases in dogs and cats
Brain tumors in cats
Vestibular disease in dogs and cats
Disease of the lower motor neuron and endplate
Evaluating gait abnormalities in the dog and cat
- 2006 British Small Animal Veterinary Association Congress, Birmingham, England, April. Four lectures:
Vestibular disease in the dog and cat: Old and new diagnostic methods
Peripheral nerve disease in the dog and cat.
Veterinary Masterclass on Neurological Disease (three hour lab)
- 2006 Veterinary MRI of the Nervous System Short Course. North Carolina State University College of Veterinary Medicine, Raleigh, NC. Four lectures:
MR diagnosis of CNS abnormalities
MR in disease of the spinal column
MR in neoplasia of the nervous system
MR in encephalitis and meningitis
- 2006 A history of stiff dogs, goats, horses, and people. Grand Rounds, School of Veterinary Medicine, University of Pennsylvania December.
- 2007 Neurologists don't cure disease they admire it, true or false? Experiences in the therapy of inherited feline neurological diseases. Grand Rounds, School of Veterinary Medicine, University of Pennsylvania April.
- 2007 Things you never see. Tierärztliches Überweisungszenrum. Tenniken, Switzerland, September 2007.
- 2008 Veterinary MRI of the Nervous System Short Course. North Carolina State University College of Veterinary Medicine, Raleigh, NC, 2008. Four lectures:
MR diagnosis of CNS abnormalities
MR in disease of the spinal column
MR in neoplasia of the nervous system
MR in encephalitis and meningitis
- 2009 North American Veterinary Conference, Orlando, FL, January. Five lectures:
Seizing dogs and cats: What else can you do?

- Evaluation and treatment of vestibular disease
- Imaging the brain: History and current methods
- Using serum titers to diagnose encephalitis
- How to treat encephalitis in dogs
- 2011 European Society of Veterinary Neurology, 34th mtg, Trier, Germany
MRI of congenital and degenerative brain disease
- 2012 Leipziger Tierarztekongress, Leipzig Germany (January 19-21)
How much neurologic knowledge is needed in general practice today - the American perspective
Storage diseases: really a new problem or just time to diagnose them.
- 2012 Canine epilepsy. Animal Lovers Lecture Series, School of Veterinary Medicine, Kennett Square, June 28.
- 2013 Predicting When Seizures Occur, Preventing Those That Might, and Treating Those That Do. Penn Annual Conference, Philadelphia, PA March 6
- 2016 Preclinical trials for peripheral neuropathy studies. ACVIM ACE course (2 hours). Las Vegas, NV.
- 2017 Molecular therapies for nervous system disease. Penn Annual Conference. Wilmington, DE.
- 2019 Developing therapies for rare genetic diseases. School of Veterinary Medicine, Ross University November.
- 2019 Brain disease in small animal patients (3 hours). School of Veterinary Medicine, Ross University November.

TEACHING RESPONSIBILITIES

Summary of teaching history

- 2004-2012 VSCP 718/778: Neurology clinical rotation; examine client owned animals with fourth year veterinary students and teach weekly rounds (5 days a week for 8 weeks each year).
- 2004-present VMED 613 (9003): Medicine/Surgery III; “Cranial nerve diseases”, “Brain diseases”, “Seizures”, “Diagnostic testing for nervous system diseases”, “Therapeutics for nervous system diseases” (lectures 8 hrs)
- 2004-present VCSP 642: Topics in Neurology; Course Organizer; seminar course where students research neuroscience topics and are paired with experts for presentations (seminar course 14 hrs).
- 2011 – present CAMB/PHRM 542: Topics in Molecular Medicine. Prepare two graduate students to present on both a clinical and basic science article on a topic of interest and lead class discussion (seminar course 1.5 hrs)
- 2012 – present VANB604: Introduction to Neurosciences; “Cerebellum”, “Brainstem”, “Segmental reflexes”; “Upper motor neuron system” (lectures 4 hrs). Laboratory teaching (lab 26 hrs). .
- 2012 – present VPTH 615: Intro Comparative Biomedical Research; “Referral Center for Animal Models of Genetic Disease” (lecture 1 hr)
- 2014 – present VCSN636: Clinical Applications of Pharmacology; “Antiepileptic drugs” (lecture 1 hr)
- 2016 – present CAMB610; Gene Therapy; “Lysosomal storage diseases” (lecture 1.5 hr).

Course organizer

- 2017 – present VANB604: Introduction to Neurosciences
- 2012 – present VCSP642: Topics in Neurology

Block leader (Curriculum redesign)

- 2020 – present Cognition, Senses, and Responses

TEACHING CHRONICLE

	Semester	Course		# students	Lectures taught	Lecture hours	Lab hours

2018	Fall	CAMB 610	Gene therapy	About 10	Lysosomal storage diseases	1	
	Fall	CAMB/PHRM 542	Topics in Molecular Medicine	About 20	Neurodegenerative disease	1	
	Fall	VPTH 615	Introduction to Comparative Biomedical Research	About 110	Referral Center for Animal Models of Human Disease	1	
	Fall	VMED 613 (9003)	Med Surg III	About 110	Cranial nerve diseases; Brain disease; Seizures; Diagnostics; Therapeutics	8	
	Spring	VCSP 642 (Course organizer)	Topics in Neurology	30	Seminar course on neuroscience topics	14	
	Spring	VANB 604 (Course organizer)	Neurobiology of Disease	About 110	Cerebellum; Brainstem; Segmental reflexes; Upper motor neuron system	4	26
Total= 15 lecture hours; 26 lab hours; 14 seminar hours							
2019	Fall	CAMB 610	Gene therapy	About 10	Lysosomal storage diseases	1	
	Fall	CAMB/PHRM 542	Topics in Molecular Medicine	About 20	Neurodegenerative disease	1	
	Fall	VPTH 615	Introduction to Comparative Biomedical Research	About 110	Referral Center for Animal Models of Human Disease	1	
	Fall	VMED 613 (9003)	Med Surg III	About 110	Cranial nerve diseases; Brain disease; Seizures; Diagnostics; Therapeutics	8	
	Spring	VCSP 642 (Course organizer)	Topics in Neurology	30	Seminar course on neuroscience topics	14	
	Spring	VANB 604 (Course organizer)	Neurobiology of Disease	About 110	Cerebellum; Brainstem; Segmental reflexes; Upper motor neuron system	4	26
Total= 15 lecture hours; 26 lab hours; 14 seminar hours							
2020	Fall	CAMB 610	Gene therapy	About 10	Lysosomal storage diseases	1	
	Fall	CAMB/PHRM 542	Topics in Molecular Medicine	About 20	Neurodegenerative disease	1	
	Fall	VPTH 615	Introduction to Comparative Biomedical Research	About 110	Referral Center for Animal Models of Human Disease	1	
	Fall	VMED 613 (9003)	Med Surg III	About 110	Cranial nerve diseases; Brain	8	

					disease; Seizures; Diagnostics; Therapeutics		
	Spring	VCSP 642 (Course organizer)	Topics in Neurology	30	Seminar course on neuroscience topics	14	
	Spring	VANB 604 (Course organizer)	Introduction to the Neurosciences	About 110	Overview of the brain; Functional neuroanatomy (x2); Spinal reflexes; Cerebellum;	5	26
Total= 15 lecture hours; 26 lab hours; 14 seminar hours							
2021	Fall	CAMB 610	Gene therapy	About 10	Lysosomal storage diseases	1	
	Fall	CAMB/PHRM 542	Topics in Molecular Medicine	About 20	Neurodegenerative disease	1	
	Fall	VPTH 615	Introduction to Comparative Biomedical Research	About 110	Referral Center for Animal Models of Human Disease	1	
	Fall	VMED 613 (9003)	Med Surg III	About 110	Cranial nerve diseases; Brain disease; Seizures; Diagnostics; Therapeutics	8	
	Spring	VCSP 642 (Course organizer)	Topics in Neurology	30	Seminar course on neuroscience topics	14	
	Spring	VANB 604 (Course organizer)	Introduction to the Neurosciences	About 110	Overview of the brain; Functional neuroanatomy (x2); Spinal reflexes; Cerebellum	5	26
Total= 15 lecture hours; 26 lab hours; 14 seminar hours							
2022	Fall	VMED-6300	Foundational Toolkit 1	About 125	Speed Dating	1	
	Fall	VMED-6300	Foundational Toolkit 1	About 125	CNS, PNS, and ANS	4	
	Fall	VMED-6308	Support and Movement 1	About 125	Integration case – Myasthenia gravis	2	
	Fall	VMED-6308	Support and Movement 1	About 125	Myotonia congenita	.5	
	Fall	CAMB/PHRM 542	Topics in Molecular Medicine	About 20	Neurodegenerative disease	1	
	Fall	VPTH 615	Introduction to Comparative Biomedical Research	About 110	Referral Center for Animal Models of Human Disease	1	
	Fall	VMED 613 (9003)	Med Surg III	About 110	Cranial nerve diseases; Brain disease; Seizures; Diagnostics; Therapeutics	8	

	Spring	VCSP 642 (Course organizer)	Topics in Neurology	30	Seminar course on neuroscience topics	14	
	Spring	VANB 604 (Course organizer)	Introduction to the Neurosciences	About 110	Overview of the brain; Functional neuroanatomy (x2); Spinal reflexes; Cerebellum	5	26
Total= 22 lecture hours; 26 lab hours; 14 seminar hours							