CURRICULUM VITAE

**January 11, 2018**

**Mary Elizabeth Blue, Ph.D.**

**DEMOGRAPHIC INFORMATION**

**Current Appointments**:

Associate Professor, Departments of Neurology and Neuroscience, The Johns Hopkins University School of Medicine

Research Scientist, Neuroscience Laboratory, Hugo W. Moser Research Institute at Kennedy Krieger

**Personal Data**:

**Business Address:**

Hugo W. Moser Research Institute at Kennedy Krieger

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Baltimore, MD 20205

office: 443-923-2693

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**Education and Training**:

BA, 1977 Biology, *cum laude* Cornell College, Mount Vernon, Iowa,

PhD, 1982 Cell Biology, University of Texas Health Science Center at Dallas, Dallas, Texas; Ph.D. Mentor: John G. Parnavelas, Ph.D.

1982 – 1989 Postdoctoral Fellow with Mark E. Molliver, M.D., Departments of Cell Biology and Neuroscience, The Johns Hopkins University School of Medicine

**Professional Experience**:

1989 – present Research Scientist, Hugo W. Moser Research Institute at Kennedy Krieger

1989 – 1992 Instructor, Department of Neurology, The Johns Hopkins University School of Medicine

1992 – 1999 Assistant Professor, Department of Neurology, The Johns Hopkins University School of Medicine

2012 – 2014 Visiting Lecturer (Neurosciences), Perdana University Graduate School of Medicine

2000 – present Associate Professor, Department of Neurology, The Johns Hopkins University School of Medicine

2001 – present Associate Professor, Department of Neuroscience, The Johns Hopkins University School of Medicine

**PUBLICATIONS**

1-79

1. Ebersole P, Parnavelas JG, Blue ME. Development of the visual cortex or rats treated with 6-hydroxydopamine in early life*.* Anat Embryol. 1981; 162(4): 489-92.

2. Blue ME, Parnavelas JG. The effect of neonatal 6-hydroxydopamine treatment on synaptogenesis in the visual cortex of the rat*.* J Comp Neurol. 1982; 205(2): 199-205.

3. Parnavales JG, Blue ME. The role of the noradrenergic system on the formation of synapses in the visual cortex of the rat*.* Dev. Brain Res. 1982; 3: 140-144.

4. Blue ME, Parnavelas JG. The formation and maturation of synapses in the visual cortex of the rat. II. Quantitative analysis*.* J Neurocytol. 1983; 12(4): 697-712.

5. Blue ME, Parnavelas JG. The formation and maturation of synapses in the visual cortex of the rat. I. Qualitative analysis*.* J Neurocytol. 1983; 12(4): 599-616.

6. Blue ME, Molliver ME. 6-Hydroxydopamine induces serotonergic axon sprouting in cerebral cortex of newborn rat*.* Brain Res. 1987; 429: 255-269.

7. D'Amato RJ, Blue ME, Largent BL, Lynch DR, Ledbetter DJ, Molliver ME, Snyder SH. Ontogeny of the serotonergic projection to rat neocortex: transient expression of a dense innervation to primary sensory areas*.* Proc Natl Acad Sci U S A. 1987; 84(12): 4322-6.

8. Blue ME, Yagaloff KA, Mamounas LA, Hartig PR, Molliver ME. Correspondence between 5-HT2 receptors and serotonergic axons in rat neocortex*.* Brain Res. 1988; 453: 315-328.

9. Blue ME, Erzurumlu RS, Jhaveri S. A comparison of pattern formation by thalamocortical and serotonergic afferents in the rat barrel field cortex*.* Cereb Cortex. 1991; 1: 380-389.

10. Redmond JM, Gillinov AM, Blue ME, Zehr KJ, Troncoso JC, Cameron DE, Johnston MV, Baumgartner WA. The monosialoganglioside, GM1, reduces neurologic injury associated with hypothermic circulatory arrest*.* Surgery. 1993; 114(2): 324-32; discussion 332-3.

11. Redmond JM, Gillinov AM, Zehr KJ, Blue ME, Troncoso JC, Reitz BA, Cameron DE, Johnston MV, Baumgartner WA. Glutamate excitotoxicity: a mechanism of neurologic injury associated with hypothermic circulatory arrest*.* J Thorac Cardiovasc Surg. 1994; 107(3): 776-86; discussion 786-7.

12. Blue ME, Johnston MV. The ontogeny of glutamate receptors in rat barrel field cortex*.* Brain Res Dev Brain Res. 1995; 84: 11-25.

13. Johnston MV, Hohmann C, Blue ME. Neurobiology of Rett syndrome*.* Neuropediatrics. 1995; 26(2): 119-22.

14. Mamounas LA, Blue ME, Siuciak JA, Altar CA. Brain-derived neurotrophic factor promotes the survival and sprouting of serotonergic axons in rat brain*.* J Neurosci. 1995; 15(12): 7929-39.

15. Redmond JM, Zehr KJ, Blue ME, Lange MS, Gillinov AM, Troncoso JC, Cameron DE, Johnston MV, Baumgartner WA. AMPA glutamate receptor antagonism reduces neurologic injury after hypothermic circulatory arrest*.* Ann Thorac Surg. 1995; 59(3): 579-84.

16. Brock MV, Blue ME, Lowenstein CJ, Northington FA, Lange MS, Johnston MV, Baumgartner WA. Induction of neuronal nitric oxide after hypothermic circulatory arrest*.* Ann Thorac Surg. 1996; 62(5): 1313-20.

17. Dori I, Dinopoulos A, Blue ME, Parnavelas JG. Regional differences in the ontogeny of the serotonergic projection to the cerebral cortex*.* Exp Neurol. 1996; 138(1): 1-14.

18. Haydar TF, Blue ME, Molliver ME, Krueger BK, Yarowsky PJ. Consequences of trisomy 16 for mouse brain development: corticogenesis in a model of Down syndrome*.* J Neurosci. 1996; 16(19): 6175-6182.

19. Baumgartner WA, Redmond M, Brock M, Tseng E, Blue ME, Troncoso JC, Johnston MV. Pathophysiology of cerebral injury and future management*.* J Card Surg. 1997; 12(2 Suppl): 300-10; discussion 310-1.

20. Blue ME, Martin LJ, Brennan EM, Johnston MV. Ontogeny of non-NMDA glutamate receptors in rat barrel field cortex: I. Metabotropic receptors*.* J Comp Neurol. 1997; 386(1): 16-28.

21. Brennan EM, Martin LJ, Johnston MV, Blue ME. Ontogeny of non-NMDA glutamate receptors in rat barrel field cortex: II. AMPA and kainate receptors*.* J Comp Neurol. 1997; 386(1): 29-45.

22. Lavdas AA, Blue ME, Lincoln J, Parnavelas JG. Serotonin promotes the differentiation of glutamate neurons in organotypic slice cultures of the developing cerebral cortex*.* J Neurosci. 1997; 17(20): 7872-80.

23. Tseng EE, Brock MV, Lange MS, Blue ME, Troncoso JC, Kwon CC, Lowenstein CJ, Johnston MV, Baumgartner WA. Neuronal nitric oxide synthase inhibition reduces neuronal apoptosis after hypothermic circulatory arrest*.* Ann Thorac Surg. 1997; 64(6): 1639-47.

24. Baumgartner WA, Redmond JM, Zehr KJ, Brock MV, Tseng EE, Blue ME, Troncoso JC, Johnston MV. The role of the monosialoganglioside, GM1 as a neuroprotectant in an experimental model of cardiopulmonary bypass and hypothermic circulatory arrest*.* Ann N Y Acad Sci. 1998; 845: 382-90.

25. Hohmann CF, Wallace SA, Johnston MV, Blue ME. Effects of neonatal cholinergic basal forebrain lesions on excitatory amino acid receptors in neocortex*.* Int J Dev Neuroscience. 1998; 16: 645-660.

26. Tseng EE, Brock MV, Lange MS, Troncoso JC, Blue ME, Lowenstein CJ, Johnston MV, Baumgartner WA. Monosialoganglioside GM1 inhibits neurotoxicity after hypothermic circulatory arrest*.* Surgery. 1998; 124(2): 298-306.

27. Baumgartner WA, Walinsky PL, Salazar JD, Tseng EE, Brock MV, Doty JR, Redmond JM, Blue ME, Goldsborough MA, Troncoso JC, Johnston MV. Assessing the impact of cerebral injury after cardiac surgery: will determining the mechanism reduce this injury? Ann Thorac Surg. 1999; 67(6): 1871-3; discussion 1891-4.

28. Blue ME, Naidu S, Johnston MV. Altered development of glutamate and GABA receptors in the basal ganglia of girls with Rett syndrome*.* ExpNeurol. 1999; 156(2): 345-52.

29. Blue ME, Naidu S, Johnston MV. Development of amino acid receptors in frontal cortex from girls with Rett syndrome*.* Ann Neurol. 1999; 45(4): 541-5.

30. Lange MS, Johnston MV, Tseng EE, Baumgartner WA, Blue ME. Apoptosis detection in brain using low-magnification dark-field microscopy*.* Exp Neurol. 1999; 158(1): 254-60.

31. Tseng EE, Brock MV, Lange MS, Troncoso JC, Lowenstein CJ, Blue ME, Johnston MV, Baumgartner WA. Nitric oxide mediates neurologic injury after hypothermic circulatory arrest*.* Ann Thorac Surg. 1999; 67(1): 65-71.

32. Mamounas LA, Altar CA, Blue ME, Kaplan DR, Tessarollo L, Lyons WE. BDNF promotes the regenerative sprouting, but not survival, of injured serotonergic axons in the adult rat brain*.* J Neurosci. 2000; 20(2): 771-82.

33. Nakajima W, Ishida A, Lange MS, Gabrielson KL, Wilson MA, Martin LJ, Blue ME, Johnston MV. Apoptosis has a prolonged role in the neurodegeneration after hypoxic ischemia in the newborn rat*.* J Neurosci. 2000; 20(21): 7994-8004.

34. Wilson MA, Johnston MV, Goldstein GW, Blue ME. Neonatal lead exposure impairs development of rodent barrel field cortex*.* Proc Natl Acad Sci U S A. 2000; 97(10): 5540-5.

35. Ishida A, Ishiwa S, Trescher WH, Nakajima W, Lange MS, Blue ME, Johnston MV. Delayed increase in neuronal nitric oxide synthase immunoreactivity in thalamus and other brain regions after hypoxic-ischemic injury in neonatal rats*.* Exp Neurol. 2001; 168(2): 323-33.

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37. Johnston MV, Nishimura A, Harum K, Pekar J, Blue ME. Sculpting the developing brain*.* Adv Pediatr. 2001; 48: 1-38.

38. Purcell AE, Jeon OH, Zimmerman AW, Blue ME, Pevsner J. Postmortem brain abnormalities of the glutamate neurotransmitter system in autism*.* Neurology. 2001; 57(9): 1618-1628.

39. Caparrelli DJ, Cattaneo SM, 2nd, Bethea BT, Shake JG, Eberhart C, Blue ME, Marban E, Johnston MV, Baumgartner WA, Gott VL. Pharmacological preconditioning ameliorates neurological injury in a model of spinal cord ischemia*.* Ann Thorac Surg. 2002; 74(3): 838-44; discussion 844-5.

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41. Nishimura A, Hohmann CF, Johnston MV, Blue ME. Neonatal electrolytic lesions of the basal forebrain stunt plasticity in mouse barrel field cortex*.* Int J Dev Neurosci. 2002; 20(6): 481-9.

42. Johnston MV, Mullaney B, Blue ME. Neurobiology of Rett syndrome*.* J Child Neurol. 2003; 18(10): 688-92.

43. Naidu S, Bibat G, Kratz L, Kelley RI, Pevsner J, Hoffman E, Cuffari C, Rohde C, Blue ME, Johnston MV. Clinical variability in Rett syndrome*.* J Child Neurol. 2003; 18(10): 662-8.

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45. Mullaney BC, Johnston MV, Blue ME. Developmental expression of methyl-CpG binding protein 2 is dynamically regulated in the rodent brain*.* Neuroscience. 2004; 123(4): 939-49.

46. Patra RC, Blue ME, Johnston MV, Bressler J, Wilson MA. Activity-dependent expression of Egr1 mRNA in somatosensory cortex of developing rats*.* J Neurosci Res. 2004; 78(2): 235-44.

47. Johnston MV, Blue ME, Naidu S. Rett syndrome and neuronal development*.* J Child Neurol. 2005; 20(9): 759-63.

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49. Barreiro CJ, Williams JA, Fitton TP, Lange MS, Blue ME, Kratz L, Barker PB, Degaonkar M, Gott VL, Troncoso JC, Johnston MV, Baumgartner WA. Noninvasive assessment of brain injury in a canine model of hypothermic circulatory arrest using magnetic resonance spectroscopy*.* Ann Thorac Surg. 2006; 81(5): 1593-8.

50. Johnston MV, Blue ME, *Neurobiology of Autism*, in *Autism: A Neurological Disorder of Early Brain Development*, Tuchman R and Rapin I, Editors. 2006, Mac Keith Press. p. 79-92.

51. Metcalf BM, Mullaney BC, Johnston MV, Blue ME. Temporal shift in methyl-CpG binding protein 2 expression in a mouse model of Rett syndrome*.* Neuroscience. 2006; 139(4): 1449-60.

52. Williams JA, Barreiro CJ, Nwakanma LU, Lange MS, Kratz LE, Blue ME, Berrong J, Patel ND, Gott VL, Troncoso JC, Johnston MV, Baumgartner WA. Valproic acid prevents brain injury in a canine model of hypothermic circulatory arrest: a promising new approach to neuroprotection during cardiac surgery*.* Ann Thorac Surg. 2006; 81(6): 2235-41; discussion 2241-2.

53. Boylan CB, Blue ME, Hohmann CF. Modeling early cortical serotonergic deficits in autism*.* Behav Brain Res. 2007; 176: 94-108.

54. Hohmann CF, Walker EM, Boylan CB, Blue ME. Neonatal serotonin depletion alters behavioral responses to spatial change and novelty*.* Brain Res. 2007; 1139: 163-77.

55. Russell JC, Blue ME, Johnston MV, Naidu S, Hossain MA. Enhanced cell death in MeCP2 null cerebellar granule neurons exposed to excitotoxicity and hypoxia*.* Neuroscience. 2007; 150(3): 563-74.

56. Shapiro J, Bibat G, Boskey A, Blue M, Doty S, Khosravi A, Naidu S. Rett Syndrome: Bone Mass in Girls and Mice*.* Am J Bone Min Res. 2007; 22: S499.

57. Blue ME, Johnston, M.,Moloney, C. and Hohmann, C.F., *Serotonin Dysfunction in Autism*, in *Autism: current theories and evidence*, Zimmerman AW, Editor. 2008, Humana Press. p. 111-132.

58. Liu Y, Yoo MJ, Savonenko A, Stirling W, Price DL, Borchelt DR, Mamounas L, Lyons WE, Blue ME, Lee MK. Amyloid pathology is associated with progressive monoaminergic neurodegeneration in a transgenic mouse model of Alzheimer's disease*.* J Neurosci. 2008; 28(51): 13805-14.

59. Weiss ES, Wang KK, Allen JG, Blue ME, Nwakanma LU, Liu MC, Lange MS, Berrong J, Wilson MA, Gott VL, Troncoso JC, Hayes RL, Johnston MV, Baumgartner WA. Alpha II-spectrin breakdown products serve as novel markers of brain injury severity in a canine model of hypothermic circulatory arrest*.* Ann Thorac Surg. 2009; 88(2): 543-50.

60. Allen JG, Weiss ES, Wilson MA, Arnaoutakis GJ, Blue ME, Talbot CC, Jr., Jie C, Lange MS, Troncoso JC, Johnston MV, Baumgartner WA. Hawley H. Seiler Resident Award. Transcriptional profile of brain injury in hypothermic circulatory arrest and cardiopulmonary bypass*.* Ann Thorac Surg. 2010; 89(6): 1965-71.

61. Hohmann CF, Blue ME, *The Role of Serotonin in Cortical Development: Implications for Autism Spectrum Disorder*, in *Handbook of Behavioral Neurobiology of Serotonin*, Muller C and Jacobs B, Editors. 2010, Elsevier: Oxford, UK. p. 637-665.

62. Jain D, Singh K, Chirumamilla S, Bibat GM, Blue ME, Naidu SR, Eberhart CG. Ocular MECP2 protein expression in patients with and without Rett syndrome*.* Pediatr Neurol. 2010; 43(1): 35-40.

63. Jentarra GM, Olfers SL, Rice SG, Srivastava N, Homanics GE, Blue M, Naidu S, Narayanan V. Abnormalities of cell packing density and dendritic complexity in the MeCP2 A140V mouse model of Rett syndrome/X-linked mental retardation*.* BMC Neurosci. 2010; 11: 19.

64. Shapiro JR, Bibat G, Hiremath G, Blue ME, Hundalani S, Yablonski T, Kantipuly A, Rohde C, Johnston M, Naidu S. Bone Mass in Rett Syndrome: Association With Clinical Parameters and MECP2 Mutations*.* Pediatr Res. 2010; 68(5): 446-51.

65. Tseng EE, Brock MV, Lange MS, Troncoso JC, Blue ME, Lowenstein CJ, Johnston MV, Baumgartner WA. Glutamate excitotoxicity mediates neuronal apoptosis after hypothermic circulatory arrest*.* Ann Thorac Surg. 2010; 89(2): 440-5.

66. Arnaoutakis GJ, George TJ, Wang KK, Wilson MA, Allen JG, Robinson CW, Haggerty KA, Weiss ES, Blue ME, Talbot CC, Jr., Troncoso JC, Johnston MV, Baumgartner WA. Serum levels of neuron-specific ubiquitin carboxyl-terminal esterase-L1 predict brain injury in a canine model of hypothermic circulatory arrest*.* J Thorac Cardiovasc Surg. 2011; 142(4): 902-910 e1.

67. Blue ME, Kaufmann WE, Bressler J, Eyring C, O'Driscoll C, Naidu S, Johnston MV. Temporal and Regional Alterations in NMDA Receptor Expression in Mecp2-Null Mice*.* Anat Rec (Hoboken). 2011; 294(10): 1624-34.

68. Katz DM, Berger-Sweeney JE, Eubanks JH, Justice MJ, Neul JL, Pozzo-Miller L, Blue ME, Christian D, Crawley JN, Giustetto M, Guy J, Howell CJ, Kron M, Nelson SB, Samaco RC, Schaevitz LR, St Hillaire-Clarke C, Young JL, Zoghbi HY, Mamounas LA. Preclinical research in Rett syndrome: setting the foundation for translational success*.* Dis Model Mech. 2012; 5(6): 733-45.

69. Gipson TT, Gerner G, Wilson MA, Blue ME, Johnston MV. Potential for treatment of severe autism in tuberous sclerosis complex*.* World J Clin Pediatr. 2013; 2(3): 16-25.

70. Kadam SD, French BM, Kim ST, Morris-Berry CM, Zimmerman AW, Blue ME, Singer HS. Altered postnatal cell proliferation in brains of mouse pups prenatally exposed to IgG from mothers of children with autistic disorder*.* J Exp Neurosci. 2013; 7: 93-9.

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75. Lo FS, Blue ME, Erzurumlu RS. Enhancement of postsynaptic GABAA and extrasynaptic NMDA receptor-mediated responses in the barrel cortex of Mecp2-null mice*.* J Neurophysiol. 2015: jn 00944 2015.

76. Grimm JC, Magruder JT, Wilson MA, Blue ME, Crawford TC, Troncoso JC, Zhang F, Kannan S, Sciortino CM, Johnston MV, Kannan RM, Baumgartner WA. Nanotechnology Approaches to Targeting Inflammation and Excitotoxicity in a Canine Model of Hypothermic Circulatory Arrest-Induced Brain Injury*.* Ann Thorac Surg. 2016; 102(3): 743-50.

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78. Shapiro JR, Boskey AL, Doty SB, Lukashova L, Blue ME. Zoledronic acid improves bone histomorphometry in a murine model of Rett syndrome*.* Bone. 2017; 99: 1-7.

79. Zhang F, Trent Magruder J, Lin YA, Crawford TC, Grimm JC, Sciortino CM, Wilson MA, Blue ME, Kannan S, Johnston MV, Baumgartner WA, Kannan RM. Generation-6 hydroxyl PAMAM dendrimers improve CNS penetration from intravenous administration in a large animal brain injury model*.* J Control Release. 2017; 249: 173-182.

**Extramural Sponsorship**

### *Active Funding*

**R01 HL091541** (Baumgartner) 9/1/2014 – 6/30/2018 1.8 CM

NHLBI

Total Direct Costs: $1,251,110

Total KKI Direct Costs: $261,306 1.8 CM

**Excitotoxicity in Circulatory Arrest-Induced Brain Injury**

Neurological injury remains a major and persistent problem in patients undergoing complex heart and aortic surgery, particularly after hypothermic circulatory arrest (HCA). We have used a translational model to show that excitotoxicity and neuroinflammation are important mechanisms of brain injury after HCA. In this project, we use clinically approved drugs to target these pathways and we test a novel method for drug delivery (dendrimer nanoparticles) that may provide better neuroprotection during HCA at lower doses with fewer serious side effects. Our aims are: 1) To determine dose-response relationships for systemic administration of VPA or NAC monotherapy and for dendrimer-coupled VPA or NAC (D-VPA or D-NAC) monotherapy; 2) To assess the efficacy of combined VPA and NAC therapy on neurological injury after HCA; and 3) To assess the efficacy of targeted, combined D-VPA and D-NAC therapy on neurological injury after HCA. Evaluation of dendrimer-based therapies in a clinically relevant large-animal model will provide important information for translation to patients.

Role: Co-Investigator

**1U54 HD079123** (Silverman) 9/23/2014 – 6/30/2019 1.20 CM

NICHD

Total Direct Costs: $871,320

Translational Neuroscience Core Direct Costs: $91,621

**Intellectual and Developmental Disabilities Research Centers**

This award continues supporting activities of the Intellectual and Developmental Disabilities Research Center (IDDRC) at the Kennedy Krieger Institute and Johns Hopkins University. The Center’s primary goals focus on supporting actively funded projects targeting developmental disorders through Cores (Clinical Translational Research, Genetics, Neuroscience, Neuroimaging, and Behavior Science. In addition, the grant directly supports a research project exploring novel treatments for hypoxic-ischemic injury in a mouse model.

Role: Core Director

**R21NS10085** (Kannan, Blue Co-PIs) 9/1/2016 – 8/31/2018 1.80 CM

NINDS

NIH

Total Direct Costs $259,951

Total KKI Direct Costs: $48,480

**Dendrimer Therapies for Treatment of Rett Syndrome**

The goals of this project are 1) to evaluate the efficacy of dendrimer conjugated to N-acetyl cysteine (D-NAC) and dendrimer conjugated to a potent anti-glutaminase inhibitor (D-JHU29) in Mecp2-null and HET mice, and 2) to determine whether combination therapy with D-NAC and D-JHU will be more effective than monotherapy in improving survival and long-term neurologic outcomes in Mecp2-null and HET mice.

Role: Co-Principal Investigator

### *Past Funding*

**Treatment of Osteoporosis in Murine Rett Syndrome Models: A Comparison of Zoledronic Acid versus Teriparatide on Osteoblast Function, Gene Expression and Bone Mass**

IRSF (Shapiro) 9/1/11—12/31/13 3%

The goal of this study is to evaluate the efficacy of two drugs that target bones in mouse model of Rett Syndrome (RTT), to better define treatment options for osteoporosis in children and adults with RTT. Dr. Blue is Co-Investigator on this grant.

### Neurotransmitter Injury Mechanism in Developing Brain

NINDS R01NS28208 3/05/07 – 02/28/12 2%

Dr. Blue is Co-Investigator on this grant and devotes 2% effort (Michael V. Johnston, M.D. is the P.I.). To examine the ontogeny of EAA receptor subtypes in the developing rat brain and determine how these changes correlate with neurotoxicity produced by EAA agents.

**Effects of Lead on Cortical Development and Plasticity**

NIEHS R01ES012904 04/03/06 - 02/28/11 10%

Dr. Blue is a Co-Investigator on this grant and devotes 10% effort (Mary Ann Wilson, Ph.D. is the P.I.). This project uses the rodent somatosensory barrel field model to investigate the effects of lead exposure on the development and plasticity of neocortex. We have shown that neonatal lead exposure impairs the development and plasticity of the cortical representation of the whiskers. This project examines the effect of lead exposure on axonal and dendritic morphology and investigates postsynaptic mechanisms that may underlie the effects of lead on cortical development.

### Pathogenesis of Rett Syndrome

NICHD PO1HD24448 07/01/03 – 06/30/08 25%

Dr. Blue was Co-Investigator for Project 4 and Co-Director of the Animal Core for the Rett Syndrome Program Project grant. Dr. Michael Johnston was the Principal Investigator for Project 4; Dr. Sakkubai Naidu was Principal Investigator for the Program Project. The goal of this program project was to further characterize the gene and brain defects in girls that suffer from Rett syndrome (RTT) and based on the findings to design new therapeutic approaches. Project 4 focused on the pathogenesis of the neuronal and neurotransmitter abnormalities in a mouse model for Rett syndrome.

### A Mouse Model for Autism: Postnatal Serotonergic Effects

NIMH U54MH066417 07/01/03 – 04/30/08 20%

Dr. Blue was Principal Investigator for project 2 of a STAART autism center grant and devotes 20% effort. Rebecca Landa, Ph.D. was Principal Investigator for the STAART Center. Project 2 explored the serotonin hypothesis in autism using a mouse model in which serotonergic afferents to the cortex are depleted neonatally. The STAART mechanism ended in 2008.

### Genes, Aneuploidy and Mammalian Development

NICHD PO1-HD24605 12/01/99 – 11/30/04 15%

Dr. Blue was a Co-Investigator on this grant and devoted 15% effort to Core B. Dr. Roger Reeves was the Principal Investigator for the program project. This program utilized recombinant DNA technology, comparative genetics and animal models in attempts to identify and characterize the genes involved in Down syndrome, particularly those producing neurobiological and cognitive deficits. Dr. Blue directed the Brain Morphology/Neurochemical Anatomy Component of Core B. This component of Core B provided qualitative histologic surveys, quantitative histological examinations, autoradiographic studies and immunocytochemical analyses in the Ts65Dn mouse model of Down syndrome (DS) and in other transgenic models of DS.

### Molecular Mechanisms of Inorganic Lead Neurotoxicity

NIEHS P01ES08131 04/01/98‑11/30/03 20%

Dr. Blue was a Co-Investigator on this grant and devoted 20% effort to Project 4. Dr. Michael Johnston was Principal Investigator for Project 4 and Dr. Gary Goldstein was the Principal Investigator for the program project. The goal of the program project was to determine the mechanisms by which lead poisoning disrupts the function of the child’s brain. Project 4 examined the potential effects of lead on GluR expression in the developing brain and evaluated the effects of lead on synaptic plasticity in the developing barrel field.

### EDUCATIONAL ACTIVITIES

Dr. Blue receives 10% of her salary from the administration and 10% of her salary from Department of Neurology for teaching in the Neurology and Special Senses Section (NSS) of the Genes to Society Course for first year medical students at Johns Hopkins University School of Medicine.

###### Teaching

1974 - 1977 Participant in teaching Introductory Biology and Embryology, Cornell College, Mount Vernon, Iowa

1979 - 1981 **Instructor** in the Gross Anatomy course given to first year medical students, University of Texas Health Science Center at Dallas

1984, 1989 **Instructo**r in the Neuroscience Course given to first year medical students, Johns Hopkins University School of Medicine

* 1. **Co-director** of a neuroanatomy lab in the Neuroscience Course given to first year medical and graduate students, Johns Hopkins University School of Medicine

2006-2009 **Director** of a neuroanatomy lab in the Neuroscience Course given to first year medical and graduate students, Johns Hopkins University School of Medicine

2009-present **Small Group Leader** in Genes to Society- Neuroscience and Special Senses Section for first year medical students, Johns Hopkins Univ Sch of Med, Baltimore, MD

2009-2016 **Small Group Leader** in Neurocognition I and II Course for first year graduate students, Neuroscience Graduate Program, Johns Hopkins Univ Sch of Med, Baltimore, MD

2012-2014 **Lecturer and small group leader** in Genes to Society- Neurology and Special Senses Section for second year medical students, Perdana University Graduate School of Medicine, Kuala Lumpur, Malaysia, a joint venture with Johns Hopkins University School of Medicine

**Mentoring:**

1992-Present Teaching autoradiographic methods, image analysis, experimental design to Cardiac Surgery fellows including Drs. **Mark Redmond**, **Malcolm Brock, Elaine Tseng**, **David Caparelli**, **Torin Fitton**, **Christopher Barriero**, **Jason Williams**, **Lois Nwakanma**, **Eric Weiss**, **Jeremiah Geoff Allen**, **George Arnaoutakis,** **Timothy George**, **Claude Beaty**, **Joshua Grimm**, **Trent Magruder, Todd Crawford**.

1992-1996 Teaching autoradiographic methods, image analysis, experimental design to Fellows and new faculty members within the Hopkins community including Drs. **Estelle Gauda**, **Mark Helfaer**, **Rebecca Ichord** and Frances **Northington**.

* 1. Research mentor for **Lisa M. Brennan**, an undergraduate student at Western Maryland College (now McDaniel’s College). Lisa worked in my laboratory in the summer while she was a college student and then as a research associate for a year after graduation from college. She characterized the ontogeny of glutamate receptor expression in the rodent barrel field and was an author on two research publications. Lisa graduated form the University of Maryland Medical School, and completed a residency in Pediatrics at Sinai Hospital and a fellowship in neonatology at Georgetown. She is now a Pediatrician at Johns Hopkins All Children’s Hospital in St. Petersburg, Florida.
	2. Research Mentor for **Priti Patel**, an undergraduate at Johns Hopkins University. Priti worked as a volunteer, a paid summer student and for credit during the school year. Over this time period, Priti assisted me with in a series of experiments examining the role of excitatory amino acid transmitters (excitotoxicity) and activation of nitric oxide synthase in brain injury in a canine model of hypothermic circulatory arrest (HCA). Priti received a Masters in Public Health at Johns Hopkins, MD from the University of Vermont Medical School, a residency in internal medicine at Stanford and is currently Senior Medical Director at Acerta-Pharma, San Carlos, CA.
	3. Postdoctoral mentor for **Akira Nishimura, MD, PhD**. While visiting as a postdoctoral fellow from Japan, Dr. Nishimura worked with me on characterizing the effects of neonatal cholinergic depletion of the cortex, on plasticity in the rodent barrel field. Dr. Nishimura is a productive faculty member in the Department of Pediatrics at Kyoto Prefectural University, Kyoto Japan.
	4. Research mentor for **Brendan Mullaney**, an undergraduate student at Johns Hopkins University. Brendan worked in my laboratory for 4 years during the school year and summers and was involved in research for the Down syndrome and Rett syndrome grants. He graduated cum laude from Hopkins in December 2002. He is first author on a manuscript that we recently published. Brendan obtained his PhD in 2010 from UCSF, was a postdoctoral fellow at the University of California at Berkley from 2011-2015 and is currently a scientist at Invitae in San Francisco, CA.

2000-2007 Research mentor for **Brandon Metcalf**, an undergraduate at Washington College, Chestertown, MD. Brandon began working with me in the laboratory in the summers when he was a junior in high school and has continued to work during breaks and the summers in college. His research efforts focused on a mouse model for Rett syndrome. He presented his findings at the 2004 Society for Neuroscience meeting in San Diego and was the first author on a published manuscript in the journal *Neuroscience*. Brandon spent the intervening year between college graduation and medical school working in my laboratory. Brandon completed a Masters in Public Health at the Bloomberg School of Public Health graduated from Johns Hopkins University School of Medicine in 2012. He is currently a resident in Neuro-ophthalmology at the University of Wisconsin, Madison, WI.

2003-2007 Research mentor for **Carolyn Boylan Moloney, MD, PhD**, NICU Fellow, Johns Hopkins University School of Medicine. As part of her NICU fellowship, Carolyn was required to spend some time on research. Based on her PhD work on the ontogeny of the serotonergic innervation to barrel field cortex, Carolyn spent her research time working on a serotonin depletion model for autism. She characterized the effects of the serotonergic cortical depletion on glutamate and serotonergic receptors. In July 2006, Carolyn joined the neonatology faculty at Johns Hopkins. She continued to work with me on the autism model research, funded by a training grant in the Department of Pediatrics. Presently, Carolyn is an attending neonatologist at St. Agnes Hospital in Catonsville, MD.

2003-2007 Research mentor for **Andrew Bauerschmidt**, an undergraduate at Johns Hopkins University pursuing a pre-med program. Andrew began work in the lab during his freshman year and did research for credit in my laboratory for several semesters. He worked on the Rett syndrome animal model, and in particular the brainstem nuclei that control respiration. Andrew spent an additional year working on this project as part of a Masters in Science Program at Hopkins. Andrew graduated in May 2007 and spent a year working before enrolling in medical school SUNY at Stony Brook in 2008. After finishing Medical school at Stony Brook University, Andrew was an intern at North Shore-LIJ, NY and is currently is a Neurology Resident at Columbia University, New York, NY.

2005-2006 Research mentor for **Suruchi Dewoolkar**, an undergraduate at Johns Hopkins University pursuing a pre-med program. Suruchi also worked on the Rett project. Suruchi graduated from Hopkins in May 2008, and is now a Doctor of Osteopathy practicing in Jersey City, NJ.

* 1. Research mentor for **Lucy Liu**, an undergraduate at Johns Hopkins University pursuing a pre-med program. Lucy began work in the lab during her freshman year and did research for credit in my laboratory for several semesters. She also worked in the lab over the summers as a lab assistant. Lucy worked on the hypothermic circulatory arrest (HCA) model. Lucy graduated from Hopkins in May 2008. She worked in a laboratory for a year and graduated from Johns Hopkins University School of Medicine in May 2013. She is a resident in Internal Medicine at Kaiser Permanente in Oakland, CA.

2008-2011 Research mentor for **Maria Braileanu**, an undergraduate at Johns Hopkins University pursuing a degree in Neuroscience. Maria spent the summers after her freshman, sophomore and junior years working in the lab for research credit. She did research on the autism and Rett projects. Maria presented her work in November 2011 at the Society for Neuroscience meeting. Maria graduated from Georgetown University in 2015. She is a resident in Radiology at Georgetown University, Washington, DC.

2008-2009 Research mentor for **Nauroz Syed**, an undergraduate at Johns Hopkins University pursuing a degree in Neuroscience. Nauroz spent the spring semester and summer after her junior year working in the lab for research credit. She did research on the Rett project. After graduating from Johns Hopkins in 2009, Nauroz completed a Masters in Public Health at Johns Hopkins Bloomberg School of Public Health, and received her MD from Eastern Virginia Medical School. She is currently a resident in Internal Medicine at the University of Maryland Medical Center, Baltimore, MD.

2011-2012 Research mentor for **Delia Vahey**, an undergraduate at Liberty University who majored in Biochemistry and Molecular Biology. Delia spent the summer of 2011 working on the Rett project. She graduated from State University of New York Upstate Medical University in 2016.

2013 Research mentor for **Shaliza Manmohan**, a medical student from Perdana University Graduate School of Medicine. Shaliz spent 7 weeks in the lab working on the canine HCA project. She is now a fourth year student at Perdana.

2014 Research mentor for **Maxine Garcia**, an undergraduate student from Pomona College. Maxine spent two months in the lab working on a collaborative project with Dr. Harvey Singer on a deer mouse model of stereotypic behavior. She graduated in May 2016 and is currently a research associate at Kennedy Krieger Institute In Baltimore in the laboratory of one of my colleagues.

2014 Research mentor for **Yew Ei Tan**, a medical student from Perdana University Graduate School of Medicine. Yew Ei spent 6 weeks in the lab working on a project exploring in a mouse model of Rett Syndrome the effects on neonatal whisker follicle ablation. She is now a third year student at Perdana.

2015-2016 Research mentor for **Nishell Savory**, a senior at Morgan State University. Nishell never had any neuroscience training and learned basic morphological techniques and knowledge about the brain. She is also worked on a project exploring in a mouse model of Rett Syndrome the effects on cortical volume. Nishell graduated from MSU in May and will begin a post-baccalaureate program in Neuroscience at Brown University this summer.

2015-2016 Research mentor for **Serena Kline**, a senior at Johns Hopkins University. She is working on the Rett Syndrome Project. Serena is graduating from Hopkins in December 2016.

2015-present Research co-mentor along with Dr. Sujatha Kannan for **Liz Smith**, a postdoctoral fellow at JHSOM.

2016-2017 Research mentor for **Jonathan Paris** and **Carol Cheney**, two undergraduate students at Johns Hopkins University. Both are working on the Rett Syndrome Project.

**Editorial Activities:**

*Journal Peer Reviews:* Brain, Cerebral Cortex, Experimental Neurology, Neuroscience Letters, Journal of Comparative Neurology, Journal of Neurobiology, Journal of Neuroscience, Somatosensory and Motor Research, Neuroscience, European Journal Of Neuroscience, Anatomical Record, Behavioral Brain Research

ORGANIZATIONAL ACTIVITIES

**Administrative Appointments:**

Director of the Neurohistology Imaging Facility, Kennedy Krieger Institute

1990-present

Dr. Blue established the Neurohistology Imaging Facility when she joined the Faculty in Neurology at the Kennedy Krieger Research Institute. This core facility has expanded over the years and is used by all the biomedical researchers in the Institute as well as researchers within the Hopkins community. Over the years, I have provided training in histological, autoradiographic and immunocytochemical techniques and in image analysis for many research fellows, new faculty members and research associates.

**Professional Societies**:

Society for Neuroscience

2000-2002: President of the Baltimore Chapter of the Society for Neuroscience.

**Review Groups:**

NIDA, 1990 *Ad hoc* Reviewer

NSF, 1993-1997 *Ad hoc* Reviewer

NICHD, 1999 Site Visit Reviewer

NICHD, April 2005 Mental Retardation Research CenterGrants Review, *Ad hoc* Reviewer

NICHD, March, 2006 Mental Retardation Research CenterGrants Review, *Ad hoc* Reviewer

IRSF, September, 2008 Reviewer for Research proposals.

NIMH, June, 2009 Write in Reviewer and Editorial Board Member for NIMH RFA.

IRSF, September, 2009 Reviewer for Research proposals.

#### IRSF, June, 2010 Reviewer for Research proposals.

IRSF, November, 2011 Reviewer for Research proposals, Scientific Board Member.

NIH, CSR June, 2013 *Ad hoc* Reviewer for F03 Application Study Section

IRSF, November, 2013 Reviewer for Research proposals, Scientific Board Member.

NINDS, February, 2014 *Ad hoc* Reviewer for F03 Application Study Section

NSF, April, 2014 Activation-1 Pre-proposal Panel, Reviewer

NIH, CSR February, 2015 *Ad hoc* Reviewer for DBD study section

NIH, CSR June, 2015 *Ad hoc* Reviewer for DBD study section

IRSF, November, 2015 Reviewer for Research proposals

NIH, CSR June, 2016 *Ad hoc* Reviewer for F03 Application Study Section

NIH, CSR November, 2016 *Ad hoc* Reviewer for F03 Application Study Section

NIH, CSR February, 2017 *Ad hoc* Reviewer for F03 Application Study Section

NIH, CSR October, 2017 *Ad hoc* Reviewer for F03 Application Study Section

#### RECOGNITION

**Awards:**

August, 1996 Award for Best Poster Presentation from the Research for Rett Foundation at the World Congress on Rett Syndrome, Gothenburg, Sweden

**Invited Talks:**

October, 1987 Seminar on Serotonin Development, Department of Biology, New York University, New York, New York

April, 1988 Seminar on Serotonin Neurotoxicity, Department of Biology, Catholic University of America, Washington, DC

May, 1989 Seminar on Serotonin Development and Neurotoxicity, Department of Anatomy, St. Louis University School of Medicine, St. Louis, Missouri

March, 1994 Tuesday Research Seminar on Glutamate Receptor Development, Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, Maryland

February, 1995 Seminar on Glutamate Receptor Development, Department of Pharmacology, University of Maryland School of Medicine, Baltimore, Maryland

February, 1996 Invited speaker for AAAS Symposium on Brain Development, “How our early sensory experiences shape brain development”, Baltimore, Maryland

February, 1996 Invited panelist for National Public Radio Show *Science Friday*, Baltimore, Maryland

October, 1998 Seminar on Glutamate Receptors in Development and Disease, Department of Anatomical Sciences, University of Louisville School of Medicine, Louisville, Kentucky

November, 1998 Seminar on Brain Mapping for MARC students, Department of Biology, Morgan State University, Baltimore, Maryland

November, 1998 Invited speaker for Panel on Barrel Development at the Barrels XI Symposium, La Jolla, California

September, 1999 Seminar on Glutamate Receptors in Development and Disease, Department of Pharmacology and Neuroscience, Albany Medical College, Albany, New York

October, 1999 Invited Speaker for Royal Society of Medicine Symposium “The Rett Disorder and the Developing Brain”, London, England

October, 1999 Seminar on Glutamate Receptors in the Developing Brain, Physiology Department, University of Oxford, Oxford, England

March, 2000 Seminar on Barrel Field Cortex Model for Assessing the Role of Neurotransmitters and Neurotoxicants in Cortical Development and Plasticity, Department of Biomedical Engineering, Johns Hopkins University School of Medicine

January, 2003 Invited speaker for a workshop entitled “Serotonin as a Trophic Factor” at the 36th Annual Winter Conference on Brain Research, January 25-31, 2003 Snowbird, Utah

June, 2003 Invited speaker for the Kennedy Krieger Institute Center for Autism and Related Disorders Annual Conference on Autism, Baltimore, MD

January, 2004 Invited seminar speaker for the Johns Hopkins Clinical Neuroscience Seminar, Baltimore, MD

March, 2004 Invited speaker in Spectrum of Developmental Disabilities XXVI: “Disorders of Communication in the School Aged Child: From Autism to ADHD”, Baltimore, MD

May, 2004 Invited seminar speaker at Children’s Medical Center in Washington, DC

June, 2004 Invited speaker for the Kennedy Krieger Institute Center for Autism and Related Disorders Annual Conference on Autism, Baltimore, MD

June, 2004 Invited speaker for symposium on animal models of developmental disorders entitled “modeling abnormal behavior, when more is better” at the International Behavioral Neuroscience Society Annual Meeting, Key West, Florida

July, 2004 Invited participant for a working group exploring the commonalities and differences in the developmental disorders autism, Fragile X and Rett syndrome, Newport, Rhode Island

May, 2005 Invited guest on local TV and radio program, WJZ-13, *Just in Time*, with Kai Jackson, Baltimore, MD

May, 2006 Invited participant for Clinical Trials for Rett Syndrome meeting in San Francisco, CA

September, 2006 Invited speaker for GTC Bio meeting on Epigenetics in Developmental Disorders in Beltsville, MD

November, 2006 Invited speaker for Defense Science Research Council (DSRC) Data Fusion Workshop in Arlington, VA

January, 2008 Invited lecturer for Neuropsychology Program, Kennedy Krieger Institute

April, 2009 Invited Speaker, Mid Atlantic Research Consortium of IRDDRC Centers, Children’s Hospital of Philadelphia, Philadelphia, Pennsylvania.

September, 2010 Invited speaker, Department of Neuroradiology, Johns Hopkins University School of Medicine, Baltimore, MD.

October, 2014 Invited speaker, Meet the Expert Series, Perdana University Graduate School of Medicine, Kuala Lumpur, Malaysia

March, 2017 Invited speaker for International Symposium in Pediatrics, University of Sassari, Sassari, Sardinia