

Curriculum Vitae - Charles G. Eberhart MD PhD

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Ophthalmic Pathology: Wilmer Eye Institute, Maumenee 427, 600 North Wolfe St.
Baltimore, MD 21287. Phone 410-955-3455, FAX 410-614-3457

Email: ceberha@jhmi.edu

Education and Training:

BA	1985-1988	University of Texas at Austin, <i>Summa Cum Laude</i> Major: Biochemistry
Graduate Fellow	1988-1989	Max Planck Institute for Biochemistry, Munich, Germany. Laboratory of Dr. Dieter Oesterheldt
MD/PhD	1989-1997	University of Texas Southwestern Medical School, Dallas, Texas. Laboratory of Dr. Steven Wasserman
Resident	1997-1999	Anatomic Pathology, Johns Hopkins Hospital, Baltimore, MD
Fellow	1999-2001	Neuropathology, Johns Hopkins Hospital, Baltimore, MD.

Professional Experience:

Instructor	2001-2002	Johns Hopkins University School of Medicine, Department of Pathology
Assistant Professor	2003-2006	Johns Hopkins University School of Medicine, Departments of Pathology and Oncology
Associate Professor	2006-present	Johns Hopkins University School of Medicine, Departments of Pathology, Ophthalmology and Oncology

Awards and Honors:

Lucien J. Rubenstein Award for Best Paper in Neuro-oncology, 2005 AANP Meeting
Jean D Wilson Distinguished Alumni Lecturer, UT Southwestern MSTP, 2004
Burroughs Wellcome Fund Career Award 2001-2005
Howard Hughes Postdoctoral Research Fellowship for Physicians 2000-2003
Merck MSTP Fellow 1996-1997
March of Dimes Graduate Fellow 1992-1994
Deutesches Akademisches Austauschdienst Graduate Fellow 1988-1989
UT Southwestern Medical School: Honors in Pathology, Urology, Medicine
University of Texas at Austin: National Merit Scholar, Phi Beta Kappa

Professional Associations:

American Association for Cancer Research
American Association of Neuropathology
American Society for Investigative Pathology
Society for Neuro-Oncology
Eastern Cooperative Oncology Group
New Approaches to Brain Tumor Therapy (NABTT) Consortium
New York Academy of Sciences
Verhoeff Zimmerman Society
Association for Research in Vision and Ophthalmology

CLINICAL ACTIVITIES

Certification:

2001 – present, Maryland Medical Licensure
2003 – present, Board Certified, Anatomical Pathology
2003 – present, Board Certified, Neuropathology

Service Responsibilities:

2001 – present, Autopsy Attending, Johns Hopkins Hospital
2001 – present, Surgical Neuropathology Attending, Johns Hopkins Hospital
2006 – present, Chief of Ophthalmic Pathology

RESEARCH ACTIVITIES

Editorial Boards

Journal of Neuropathology and Experimental Neurology (2005-present)
Neuro-Oncology (2006-present)

Ad Hoc Manuscript Reviewer:

Proceedings of the National Academy of Sciences (PNAS)
Nature Genetics
Cancer Research
Clinical Cancer Research
Molecular Cancer Research
Journal of Biological Chemistry
Oncogene
PLoS Genetics
PLoS One
American Journal of Pathology
Brain Pathology
Lancet Oncology
Journal of the NCI
Annals of Neurology
Investigative Ophthalmology and Visual Science (IOVS)
Journal of Molecular Histology

Journal of Histochemistry and Cytochemistry
Pediatric Blood and Cancer
Neuropathology and Applied Neurobiology
Laboratory Investigation
Journal of Clinical Oncology
Acta Neuropathologica
British Journal of Cancer
Neoplasia
International Journal of Cancer
Neurosurgery

Ad Hoc Grant Reviewer:

2002, 2004 Canadian Institutes of Health Research
2004 - 2005 Dutch Cancer Society
2006 UK Medical Research Council
2005 - 2007 Children's Brain Tumor Foundation
2005 Singapore Biomedical Research Council
2005, 2007 Hong Kong Research Grants Committee
2006 Cancer Research UK
2007 The Brain Tumor Society
2007 Volkswagen Stiftung
2007 Raine Medical Research Foundation

Peer-Reviewed Publications:

1. Castrillon DH, Gönczy P, Alexander S, Rawson R, **Eberhart CG**, Viswanathan S, DiNardo S, Wasserman SA. Toward a molecular genetic analysis of spermatogenesis in *Drosophila melanogaster*: characterization of male-sterile mutants generated by single P element mutagenesis. *Genetics* 1993, 135:489-505.
2. **Eberhart CG** and Wasserman SA. The pelota locus encodes a protein required for meiotic cell division: an analysis of G2/M arrest in *Drosophila* spermatogenesis. *Development* 1995, 121:3477-86.
3. **Eberhart CG**, Maines JZ and Wasserman SA. Meiotic cell cycle requirement for a fly homologue of human Deleted in Azoospermia. *Nature* 1996, 381:783-85.
4. **Eberhart CG**, Tihan T and Burger PC. Nuclear localization and mutation of beta-catenin in medulloblastomas. *J Neuropathology Experimental Neurology* 2000, 59:69-73.
5. Brotman DJ, **Eberhart CG**, Burger PC, McArthur JC and Hellmann DB. PACNS and Alzheimer's disease: clinically and pathologically evident in a single patient. *J Rheumatology* 2000, 27:2935-2937.
6. Czader M, **Eberhart CG**, Cummings C and Westra WH. Metastasizing Mixed Tumor of the Parotid: Initial Presentation as a Solitary Kidney Tumor and Ultimate

Carcinomatous Transformation at the Primary Site. *Am. J. Surgical Pathology* 2000, 24:1159-1164.

7. **Eberhart CG**, Brat DJ, Cohen K and Burger PC. Pediatric neuroblastic tumors containing neuropil and true rosettes. *Pediatric and Developmental Pathology* 2000, 3:346-352.

8. **Eberhart CG**, Kaufman W, Tihan T, Burger PC. Apoptosis, Neuronal maturation and neurotrophin signaling within medulloblastoma nodules. *J Neuropath Exp Neurol* 2001, 60:60-67.

9. Clatterbuck RE, **Eberhart CG**, Crain B, Rigamonti D. Ultrastructural and immunohistochemical evidence that an incompetent blood brain barrier is related to the pathophysiology of cavernous malformations. *J Neurol Neurosurg Psychiatry* 2001, 70:0-4.

10. **Eberhart CG** and Argani P. WNT signaling in human development: beta-catenin nuclear translocation in fetal lung, kidney, placenta, capillaries, adrenal and cartilage. *Pediatr Develop Path* 2001, 4:351-357.

11. **Eberhart CG**, Morrison A, Gyure KA, Frazier J, Smialek J, Troncoso JT. Sudden death due to undiagnosed primary CNS neoplasms. *Arch Path Lab Med* 125(8):1024-1030.

12. Tihan T, Burger PC, Pomper M, Sanchez O, Ramzan M, **Eberhart CG**, Hansen C, Smith TW. Subacute diencephalic angioencephalopathy: biopsy diagnosis and radiological features of a rare entity. *Clin Neurol Neurosurg* 2001, 103(3):160-167.

13. Kwon CH, Zhu X, Zhang J, Knoop LL, Tharp R, Smeyne RJ, **Eberhart CG**, Burger PC, Baker SJ. Pten regulates neuronal soma size: a mouse model of Lhermitte-Duclos disease. *Nat Genet* 2001, 29:404-11.

14. Brat DJ, Scheithauer BW, **Eberhart CG**, Burger PC. Extra-ventricular neurocytic neoplasms: pathologic features and clinical outcome. *Am J Surg Pathol* 2001, 25:1253-1260.

15. **Eberhart CG**, Kratz JE, Schuster A, Goldthwaite P, Cohen KJ, Perlman EJ, and Burger PC. Comparative Genomic Hybridization Detects An Increased Number of Chromosomal Alterations in Large Cell/Anaplastic Medulloblastomas. *Brain Pathology* 2002, 12:36-44.

16. **Eberhart CG**, Kepner JL, Goldthwaite PT, Kun LE, Duffner PK, Friedman HS, Strother DR, Burger PC. Histopathologic grading of medulloblastomas: a pediatric oncology group study. *Cancer* 2002, 94:552-560.

17. Liu JM, Garonzik IM, Wang PP, **Eberhart CG**, Sampath P and Brem H. Ectopic recurrence of craniopharyngioma after an interhemispheric, transcallosal approach. *Neurosurgery* 2002, 50:639-645.
18. Berman DM, Karhadkar SS, Hallahan AR, Pritchard JI, **Eberhart CG**, Watkins DN, Chen JK, Cooper MK, Taipale J, Olson JM, Beachy PA. A critical role for Hedgehog pathway activity in tumor growth. *Science* 2002, 297:1559-61.
19. 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, 74:838-44.
20. DE Kang, S Soriano, **CG Eberhart**, B De Strooper, H Zheng, and EH Koo. Presenilin Couples the Paired Phosphorylation of beta-Catenin Independent of Axin. Implications for beta-Catenin Activation in Tumorigenesis. *Cell* 2002, 110:751.
21. **Eberhart CG**, Medulloblastoma in Mice Lacking p53 and PARP – All Roads Lead To Gli, *Am J Pathol.* 2003, 162:7-10.
22. JE. Kratz, D Stearns, DL Huso, HH Slunt, DL Price, DR Borchelt, **CG Eberhart**. Expression of stabilized beta-catenin in the CNS of adult transgenic mice does not result in tumor formation. *BMC Cancer* 2002, 2:33.
23. **Eberhart CG**, Cohen KJ, Tihan T, Goldthwaite PT, Burger PC. Medulloblastomas with systemic metastases: an evaluation of tumor histopathology and clinical behavior in 23 patients. *J Pediatr Hematol Oncol.* 2003, 25:198-203.
24. Gabikian P, Clatterbuck RE, **Eberhart CG**, Tyler BM, Tierney TS, Tamargo RJ. Prevention of Experimental Cerebral Vasospasm by Intracranial Delivery of a Nitric Oxide Donor from a Controlled-release Polymer: Toxicity and Efficacy Studies in Rodents. *Stroke* 2002, 33:2681-6.
25. X Fan, Y Wang, J Kratz, DJ Brat, Y Robitaille, A Moghrabi, EJ Perlman, CV. Dang, PC Burger, **CG Eberhart**. hTERT Gene Amplification and Increased mRNA Expression in CNS Embryonal Tumors. *Am J Pathol* 2003, 162(6):1763-9.
26. G Seidel, CA Pardo, D Newman-Toker, A Olivi, **CG Eberhart**. Neurobrucellosis Presenting as Leukoencephalopathy: The Role of Cytotoxic T Lymphocytes. *Arch Pathol Lab Med.* 2003, 127(9):e374-7.
27. KBoon, JB Edwards, I-M Siu, D Olschner, **CG Eberhart**, MA. Marra, RL Strausberg and GJ Riggins. Comparison of Medulloblastoma and Normal Neural Transcriptomes Identifies a Restricted Set of Activated Genes. *Oncogene* 2003, 22(48):7687-94.

28. F Zindy, LM Nilsson, L Nguyen, C Meunier, R Smeyne, J Regh, **CG Eberhart**, C Sherr, MR Roussel. Hemangiosarcomas, Medulloblastomas, and Other Tumors in Ink4c/p53-Null Mice. *Cancer Res.* 2003, 63:5420-7.
29. AV Parwani, I Mikolaenko, **CG. Eberhart**, PC. Burger, DL. Rosenthal, SZ. Ali. Rhabdoid meningioma: Cytopathologic findings in cerebrospinal fluid. *Diagnostic Cytopathology* 2003, 29:297-299.
30. Samdani AF, Garonzik IM, Jallo G, **Eberhart CG**, Zahos P. Spinal angioliopoma: case report and review of the literature. *Acta Neurochir* 2004, 146:299-302.
31. **CG. Eberhart**, J Kratz, Y Wang, K Summers, D Stearns, K Cohen, CV Dang. and PC Burger. Histopathological and Molecular Prognostic Markers in Medulloblastoma: c-myc, N-myc, TrkC and Anaplasia. *J Neuropath. Exp. Neurol* 2004, 63(5):441-9
32. K Boon, JB Edwards, **CG Eberhart**, GJ Riggins. Identification of astrocytoma associated genes including cell surface markers. *BMC Cancer* 2004, 4:39.
33. X Fan, I Mikolaenko, I Elhassan, XZ Ni, Y Wang, D Ball, DJ Brat, A Perry, and **CG. Eberhart**. Notch1 and Notch2 have opposite effects on embryonal brain tumor growth. *Cancer Res.* 2004, 64(21):7787-93
34. K Boon, **CG. Eberhart** and GJ. Riggins. Genomic amplification of *Orthodenticle Homolog 2 (OTX2)* in Medulloblastomas. *Cancer Res.* 2005, 65:703-707
35. TW Abel, SJ Baker, MM Fraser, T Tihan, JS Nelson, A Yachnis, J Bouffard, H Mena, PC Burger, **CG Eberhart**. Lhermitte-Duclos Disease: a Report of 31 Cases with Immunohistochemical Analysis of the PTEN/AKT/mTOR Pathway. *J Neuropath Exp Neurol.* 2005, 64:1-9.
36. **CG Eberhart**, A Chaudhry, R Daniel, L Khaki, K Shah, P Gravitt. Increased p53 immunopositivity in anaplastic medulloblastoma and supratentorial PNET is not caused by JC virus. *BMC Cancer.* 2005, 5:19.
37. Purow BW, Raqeeb MH, Noel MW, Su Q, Burdick MW, Lee J, Sundaresan T, Pastorino S, Park JK, Mikolaenko I, Maric D, **Eberhart CG** and Fine HA. Expression of Notch-1 and its ligands Delta-like-1 and Jagged-1, is critical for glioma cell survival and proliferation. *Cancer Res.* 2005, 65:2353-2363.
38. E Pan, M Pellarin, E Holmes, I Smirnov, A Misra, **CG. Eberhart**, PC. Burger, JA. Biegel, BG. Feuerstein. Isochromosome 17q is a Negative Prognostic Factor in Poor Risk Childhood Medulloblastoma Patients. *Clin Cancer Res.* 2005, 11:4733-4740.
39. Uziel T, Zindy F, Xie S, Lee Y, Forget A, Magdaleno S, Rehg JE, Calabrese C, Solecki D, **Eberhart CG**, Sherr SE, Plimner S, Clifford SC, Hatten ME, McKinnon

PJ, Gilbertson RJ, Curran T, Sherr CJ, Roussel MF. The tumor suppressors Ink4c and p53 collaborate independently with Patched to suppress medulloblastoma formation. *Genes Dev.* 2005, 19:2656-67.

40. M Inda, C Perot, M Guillaud-Bataille, G Danglot, JA Rey, MJ Bello, X Fan, **C Eberhart**, I Zazpe, E Portillo, T Tuñón, JM Martínez-Peñuela, A Bernheim, JS Castresana. Genetic heterogeneity in supratentorial and infratentorial primitive neuroectodermal tumors of the central nervous system. *Histopathology* 2005, 47:631-7.

41. V Rand, J Huang, T Stockwell, S Ferriera, O Buzko, S Levy, D Busam, K Li, JB Edwards, **C Eberhart**, KM. Murphy, A Tsiamouri, K Beeson, AJG Simpson, JC Venter, GJ Riggins and RL Strausberg. Sequence survey of receptor tyrosine kinases reveals novel mutations in glioblastomas. *PNAS* 2005, 102:14344-14349.

42. Raza SM, Anderson WS, **Eberhart CG**, Wolinsky JP, Gokaslan ZL. The Application of Surgical Corpectomy in the Management of an Intramedullary-Extramedullary Atypical Meningioma: Case Report and Literature Review. *J Spinal Disord Tech* 2005, 18:449-454.

43. Dang L, Fan X, Chaudhry A, Wang M, Gaiano N, and **CG Eberhart**. Notch3 Signaling Initiates Choroid Plexus Tumor Formation. *Oncogene* 2006, 25(3):487-91.

44. YL Li, B Lal, S Kwon, X Fan, U Saldanha, TE Reznik, E Kuchner, **CG Eberhart**, J Lattera, R Abounader. The scatter factor/hepatocyte growth factor:c-Met pathway in human embryonal CNS tumor malignancy. *Cancer Research* 2005, 65:9355-62

45. X Su, V Gopalakrishnan, D Stearns, K Aldape, FF Lang, G Fuller, X Fan, E Snyder, **CG Eberhart**, S Majumder. Abnormal expression of REST/NRSF and Myc in neural stem/progenitor cells causes cerebellar tumors by blocking neuronal differentiation. *MCB* 2006, 26:1666-1678.

46. D Stearns, A Chaudhry, T Abel, PC. Burger, CV. Dang, **CG Eberhart**. c-Myc Overexpression Causes Anaplasia in Medulloblastoma. *Cancer Res.* 2006, 66:673-81.

47. **CG. Eberhart**, J Copeland and TW. Abel. S6 Ribosomal Protein Phosphorylation in Autistic Frontal Cortex and Cerebellum: a Tissue Array Analysis. *Journal of Autism and Developmental Disorders* 2006 (July 15 ePub).

48. SL Connors, DE Crowell, **CG Eberhart**, J Copeland, CJ Newschaffer, SJ Spence, AW Zimmerman. Beta-2 Adrenergic Receptor Activation and Genetic Polymorphisms in Autism: Data from Dizygotic Twins. *Journal of Child Neurology* 2006, 20:876-84.

49. VD Dixit, AT Weeraratna, H Yang, D Bertak, GJ Riggins, **CG Eberhart** and DD Taub. Ghrelin and Growth Hormone Secretagogue Receptor Constitute a Novel Autocrine Pathway in Astrocytoma Cell Motility. *JBC* 2006, 281:16681-90.

50. JT. Park, M Li, N Nakayama, B Davidson, Z Zheng, **CG. Eberhart**, RJ. Kurman, IM Shih, TL Wang. Genome wide analysis identifies Notch3 gene amplification in ovarian cancer. *Cancer Research* 2006, 66:6312-8.

51. LC. Chu, **CG. Eberhart**, SA. Grossman, JG. Herman. Epigenetic Silencing Involves Critical Pathways in Primary CNS Lymphoma. *Int J Cancer* 2006, 119(10):2487-91.

52. X Fan, W Matsui, L Khaki, D Stearns, J Chun, YM Li, **CG Eberhart**. Notch Pathway Blockade Selectively Depletes Stem-like Embryonal Brain Tumor Cells. *Cancer Research* 2006 66:7445-52.

53. G Gallia, V Rand, IM Siu, **C Eberhart**, C James, S Marie, S Oba-Shinjo, C Carlotti, O Caballero, A Simpson, M Brock, P Massion, B Carson Jr, G Riggins. PIK3CA Gene Mutations in Pediatric and Adult Glioblastoma Multiforme. *Molecular Cancer Research* 2006, 4(10):709-14.

54. E Bar, A Chaudhry, **CG Eberhart**. Hedgehog Signaling Promotes Medulloblastoma Survival via Bcl2. *American Journal of Pathology* 2007, 170(1):347-55.

55. AO von Bueren, T Shalaby, J Rajtarova, D Stearns, **CG Eberhart**, L Helson, A Arcaro, MA Grotzer. Anti-proliferative activity of the quassinoid NBT-272 in childhood medulloblastoma cells. *BMC Cancer*. 2007, 7:19.

56. Cheslack-Postava K, Fallin MD, Avramopoulos D, Connors SL, Zimmerman AW, **Eberhart CG**, Newschaffer CJ. beta(2)-Adrenergic receptor gene variants and risk for autism in the AGRE cohort. *Mol Psychiatry*. 2007 12(3):283-91.

57. Lo KC, Rossi MR, **Eberhart CG**, Cowell JK. Genome Wide Copy Number Abnormalities in Pediatric Medulloblastomas as Assessed by Array Comparative Genome Hybridization. *Brain Pathol*. 2007 Apr 30

58. Rodriguez FJ, **Eberhart C**, O'neill BP, Slezak J, Burger PC, Goldthwaite P, Wu W, Giannini C. Histopathologic grading of adult medulloblastomas. *Cancer*. 2007 May 8

Invited Reviews:

1. **Eberhart CG**, Medulloblastoma in Mice Lacking p53 and PARP – All Roads Lead To Gli. *Am J Pathol*. 2003, 162(1):7-10.

2. **Eberhart CG** and Burger PC, Anaplasia and Grading in Medulloblastomas, *Brain Pathology*. 2003, 13:376-85.

3. Fisher PG, Burger PC, **Eberhart CG**, Biologic Risk Stratification of Medulloblastoma: The Real Time Is Now. *J Clin Oncol*. 2004, 22:1-3.

4. **Eberhart CG**, In Search of the Medulloblast – Neural Stem Cells and Medulloblastoma. *Neurosurgery Clinics of North America*. 2007 18(1):59-69, viii-ix.

Invited Talks:

January 2001. Pathology Grand Rounds, Johns Hopkins University
September 2002. Neurosurgery Grand Rounds, Johns Hopkins University
January 2003. Carnegie Institution of Washington, Baltimore, MD
February 2003. Glioma Epidemiology Workshop, National Cancer Institute, MD
July 2003. XVth International Congress of Neuropathology, Turin, Italy
October 2003. St. Jude Hospital, Memphis, TN
March 2004. University of Washington, Seattle, WA
June 2004. American Association of Neuropathology Annual Meeting, Cleveland, OH
July 2004 Neurosurgery Grand Rounds, Johns Hopkins University
September 2004. University of Texas Southwestern Medical School, Dallas, TX.
October 2004. Brain Tumor Seminar Series, Duke University, Durham, NC
November 2004. IXth Annual Meeting, Society for Neuro-Oncology, Toronto
December 2004. University of Texas Merck Scholars Symposium, Boston, MA
October 2005. Memorial Sloan Kettering Cancer Center, New York, NY
November 2005. Pathology Grand Rounds, Johns Hopkins University
November 2005. Pathology Grand Rounds, U Pennsylvania, Philadelphia, PA
January 2006. Pathology Grand Rounds, Massachusetts General Hospital, Boston, MA
March 2006. Children's Oncology Group Semi-annual Meeting, Chicago, IL
April 2006. AACR Annual Meeting, Washington, DC
April 2006. New York Academy of Sciences Symposium. New York, NY
May 2006. Pathology Grand Rounds, Ohio State University, Columbus, OH
July 2006. Neural Differentiation and Brain Tumors Course, Cold Spring Harbor , NY.
September 2006. XVIth International Congress of Neuropathology, San Francisco, CA
September 2006. German Neuropathology Society Annual Meeting, Mannheim
October 2006. Texas Children's Cancer Center Research Seminar Series, Houston, TX
October 2006. Biosymposia: Diagnosis/Therapeutic Discovery in Neuro-Oncology, TX
December 2006. Labatt BTRC/Hospital for Sick Children, Toronto, Canada
April 2007. American Association of Neuropathology Annual Meeting, Washington, DC
June 2007. Hermlin Brain Tumor Center, Detroit, MI

Other Professional Activities:

2002, 2007	Invited Pathology Reviewer NCI/MMHCC Neurooncology Mouse Models Forum
2003 - 2006	Co-Chair, Pathology and Tissue Committee, New Approaches to Brain Tumor Therapy (NABTT) Consortium

2003 - 2007	Pathology Reviewer, ECOG Study E1F02: (Systemic High-Dose Methotrexate Followed by Radiation for the Treatment of GBM)
2003 – 2007	Principal Investigator (Johns Hopkins). NABTT Study “A Prospective National Study to Molecularly and Genetically Characterize Human Gliomas”.
2004- 2007	Scientific Review Council Member. Cure Autism Now (CAN)
2006	Organizer and Chair, Medulloblastoma minisymposium XVIth International Congress of Neuropathology
2006	WHO Classification of Tumours of the Nervous System Editorial and Consensus Conference, Heidelberg Invited Participant and Group D Rapporteur
2006, 2007	Society for Neurooncology (SNO) Annual Meeting Abstract Review for Scientific Program
2007 – present	Autism Tissue Program Scientific Board Member