

## DUKE UNIVERSITY MEDICAL CENTER

## CURRICULUM VITAE

**For  
Permanent Record  
And the  
Appointments and Promotion Committee**

**Date Prepared:** November 22, 2006

**Name (complete with degree):** Jeremy Naftali Rich, M.D.

**Primary academic appointment:** Department of Medicine

**Secondary appointments:** Department of Neurobiology  
Department of Surgery

**Present academic rank:** Associate Professor, Dept. of Medicine  
Assistant Professor, Dept. of Neurobiology  
Assistant Professor, Dept. of Surgery

**Date and rank of first Duke faculty appointment:** July, 1998; Associate in Medicine

**Date of current Duke faculty appointment:** January 1, 2000 (Medicine)  
September 1, 2003 (Neurobiology)  
September 1, 2004 (Surgery)

**Medical licensure:** North Carolina (98-00127)

**Specialty certification:** Board Certified in Neurology, June 1999  
Certificate Number 47148

**Date of birth:** December 5, 1967

**Place of birth:** Washington, D.C.

**Citizen of:** United States of America

<b>Education:</b>	<u>Institution</u>	<u>Date (Year)</u>	<u>Degree</u>
High School:	Walt Whitman High School Bethesda, MD	1985	Diploma
College:	Washington University Saint Louis, MO	1989	Bachelor of Science
Graduate or: Professional School	Duke Univ. School of Medicine Durham, NC	1993	Medicinæ Doctor
	Duke Univ. School of Medicine Durham, NC	2005-present	Clinical Research Training Program

**Professional training:**

<u>Institution</u>	<u>Position/Title</u>	<u>Dates</u>
The Johns Hopkins Hospital Baltimore, MD	Internal Medicine Internship	1993 - 1994
The Johns Hopkins Hospital Baltimore, MD	Residency in Neurology	1994 - 1997
The Johns Hopkins Hospital Baltimore, MD	Chief Residency in Neurology	1996 - 1997
Duke University Medical Center Durham, NC	Fellowship in Neuro-Oncology	1997 -1998
Duke University Medical Center Durham, NC	Clinical Research Training Program	2005 - present
Duke University Medical Center Durham, NC	Faculty Development Program in Clinical Teaching	2006

**Positions held:**

Duke University Medical Center Durham, NC	Associate in Medicine Department of Medicine Division of Neurology	1998 - 2000
Duke University Medical Center Durham, NC	Member Comprehensive Cancer Center	1999 - present
Duke University Medical Center Durham, NC	Assistant Professor Department of Medicine Division of Neurology	2000 - 2005
Duke University Medical Center Durham, NC	Assistant Professor Department of Neurobiology	2003 - present
Duke University Medical Center Durham, NC	Assistant Professor Department of Surgery	2004 - present
Duke University Durham, NC	Member Graduate School Faculty	2004 - present
Duke University Medical Center Durham, NC	Member Program in Cell and Molecular Biology	2005 - present
Duke University Medical Center Durham, NC	Associate Professor Department of Medicine Division of Neurology	2005 - present
Duke University Medical Center Durham, NC	Study Program Director Third Year Medical School, Neurosciences	2005 - present

Duke University Medical Center  
Durham, NC

Member  
Program in Molecular Cancer Biology

Rich, Jeremy N.  
2006 - present

### **Professional awards and special recognitions:**

1985 National Merit Scholar  
1985 Alexander S. Langsdorf Fellow  
1985-1989 College Dean's List (eight times)  
1987 Antoinette Frances Dames Award  
1988 Russell R. Pfeiffer Award for the Outstanding Junior Electrical Engineering Student  
1989 Allison Prize (senior engineer with an interest in economics)  
1989 Eta Kappa Nu Electrical Engineering Honorary Society  
1989 Tau Beta Pi Engineering Honorary Society  
1989 Summa Cum Laude  
1991-1992 Howard Hughes Medical Institute Medical Student Fellow  
1992 Alpha Omega Alpha  
1993 Hewlett-Packard Award for Outstanding Medical Student  
1997 American Academy of Neurology Resident Recognition Award  
1998-2002 Mentored Clinical Scientist Development Award (K08) of the National Institute of Neurological Disorders and Stroke  
1998 Howard Hughes Medical Institute Physician Postdoctoral Research Fellow (declined)  
1998-1999 Frances Goodrich and Albert Hackett American Brain Tumor Association Fellowship  
2004-2006 Sidney Kimmel Foundation for Cancer Research Translational Science Fellow  
2004-2009 Damon Runyon-Lilly Clinical Investigator  
2004-2009 K02 NIH Award  
2005 Elected to American Neurological Association  
2006 Preuss Award for Clinical Neuro-Oncology, American Academy of Neurology  
2006 Award for Excellence in Basic Science, Society of Neuro-Oncology

### **Publications:**

#### **Refereed journals**

1. Friedman HS, Dolan ME, Moschel RC, Pegg AE, Felker GM, **Rich JN**, Bigner DD, Schold SC Jr. (1992). Enhancement of nitrosourea activity in medulloblastoma and glioblastoma multiforme. *J Natl Cancer Inst* 84: 1926-1931.
2. **Rich JN**, Elion GB, Wellner D, Colvin OM, Groothuis DR, Hilton JH, Scлагeter KE, Bigner DD, Griffith OW, Friedman HS (1995). The effect of L-amino acid oxidase on activity of melphalan against an intracranial xenograft. *Cancer Chemother Pharmacol* 36: 379-384.
3. Friedman HS, Kokkinakis DM, Pluda J, Friedman AH, Cokgor I, Haglund MM, Ashley DM, **Rich J**, Dolan ME, Pegg AE, Moschel RC, McLendon RE, Kerby T, Herndon JE, Bigner DD, Schold SC Jr (1998). Phase I trial of O6-benzylguanine for patients undergoing surgery for malignant glioma. *J Clin Oncol* 16(11): 3570-3575.
4. Friedman HS, McLendon RE, Kerby T, Dugan M, Bigner SH, Henry AJ, Ashley DM, Krischer J, Lovell S, Rasheed K, Marchev F, Seman AJ, Cokgor I, **Rich J**, Stewart E, Colvin OM, Provenzale JM, Bigner DD, Haglund MM, Friedman AH, Modrich PL (1998). DNA mismatch repair and O<sup>6</sup>-alkylguanine-DNA alkyltransferase analysis and response to Temodal in newly diagnosed malignant glioma. *J Clin Oncol* 16(12): 3851-3857.
5. Friedman HS, Petros WP, Friedman AH, Schaaf LJ, Kerby T, Lawyer J, Parry M, Houghton PJ, Lovell S, Rasheed K, Cloughesy T, Stewart ES, Colvin OM, Provenzale JM, McLendon RE, Bigner DD, Cokgor I, Haglund M, **Rich J**, Ashley D, Malczyn J, Elfring GL, Miller LL (1999). Irinotecan therapy in adults with recurrent or progressive malignant glioma. *J Clin Oncol* 17(5):1516-1525.

6. **Rich JN**, Zhang M, Datto MB, Bigner DD, Wang XF. Transforming growth factor-beta-mediated p15(INK4B) induction and growth inhibition in astrocytes is SMAD3-dependent and a pathway prominently altered in human glioma cell lines (1999). *J Biol Chem* 274(49): 35053-35058.
7. Friedman HS, Pluda J, Quinn JA, Ewesuedo RB, Long L, Friedman AH, Cokgor I, Colvin OM, Haglund MM, Ashley DM, **Rich JN**, Sampson J, Pegg AE, Moschel RC, McLendon RE, Provenzale JM, Stewart ES, Tourt-Uhlig S, Garcia-Turner AM, Herndon JE 2nd, Bigner DD, Dolan ME (2000). Phase I trial of carmustine plus O6-benzylguanine for patients with recurrent or progressive malignant glioma. *J Clin Oncol* 18(20): 3522-8.
8. **Rich JN**, Borton AJ, Wang X-F (2001). Transforming growth factor-beta signaling in cancer. *Microsc Res Tech* 52(4): 363-373.
9. **Rich JN**, Guo C, Bigner DD, McLendon R, Wang X-F, Counter CM (2001). A genetically tractable model of human glioma formation. *Cancer Res* 61(9): 3556-3560.
10. Gururangan S, Cokgor L, **Rich JN**, Edwards S, Affronti ML, Quinn JA, Herndon JE 2nd, Provenzale JM, McLendon RE, Tourt-Uhlig S, Sampson JH, Stafford-Fox V, Zaknoen S, Early M, Friedman AH, Friedman HS (2001). Phase I study of Gliadel wafers plus temozolomide in adults with recurrent supratentorial high-grade gliomas. *Neuro-oncol* 3(4): 246-250.
11. Reardon DA, Akabani G, Coleman RE, Friedman AH, Friedman HS, Herndon JE, II, Cokgor I, McLendon RE, Pegram CN, Provenzale JM, Quinn JA, **Rich J**, Regalado LV, Sampson JH, Shafman TD, Wikstrand CJ, Wong TZ, Zhao X-G, Zalutsky MR, and Bigner DD (2002). Phase II trial results of murine <sup>131</sup>I-labeled anti-tenascin monoclonal antibody 81C6 administered into surgically created resection cavities of patients with newly diagnosed malignant gliomas. *J Clin Oncol* 20: 1389-1397.
12. Hamad NM, Elconin JH, Karnoub AE, Bai W, **Rich JN**, Abraham RT, Der CJ, Counter CM (2002). Distinct requirements for Ras oncogenesis in human versus mouse cells. *Genes Dev* 16(16): 2045-2057.
13. Quinn JA, Pluda J, Dolan ME, Delaney S, Kaplan R, **Rich JN**, Friedman AH, Reardon DA, Sampson JH, Colvin OM, Haglund MM, Pegg AE, Moschel RC, McLendon RE, Provenzale JM, Gururangan S, Tourt-Uhlig S, Herndon JE 2nd, Bigner DD, Friedman HS (2002). Phase II trial of carmustine plus O(6)-benzylguanine for patients with nitrosourea-resistant recurrent or progressive malignant glioma. *J Clin Oncol* 20(9): 2277-2283.
14. **Rich JN** (2003). The role of transforming growth factor-beta in primary brain tumors. *Front Biosci* 8: E245-E260.
15. Quinn, JA, Reardon, DA, Friedman, AH, **Rich, JN**, Sampson, JH, Provenzale, JM, McLendon, RE, Gururangan, S, Bigner, DD, Herndon II, JE, Avgeropoulos, N, Finlay, J, Tourt-Uhlig, S, Affronti, ML, Evans, B, Stafford-Fox, V, Zaknoen, S, Friedman, HS (2003). Phase II trial of temozolomide in patients with progressive low grade glioma. *J Clin Oncol* 21: 646-651.
16. **Rich JN**, Shi Q, Hjelmeland M, Cummings TJ, Kuan CT, Bigner DD, Counter CM, Wang XF (2003). Bone-related genes expressed in advanced malignancies induce invasion and metastasis in a genetically defined human cancer model. *J Biol Chem* 278(18):15951-15957.
17. Sampson JH, Akabani G, Archer GE, Bigner DD, Berger MS, Friedman AH, Friedman HS, Herndon JE II, Kunwar S, Marcus S, McLendon RE, Paolino A, Penne K, Provenzale J, Quinn J, Reardon DA, **Rich J**, Stenzel T, Tourt-Uhlig S, Wikstrand C, Wong T, Williams R, Yuan F, Zalutsky MR, and Pastan I (2003). Progress report of a phase I study of the intracerebral microinfusion of a recombinant chimeric protein composed of transforming growth factor (TGF)- $\alpha$  and a mutated form of the Pseudomonas exotoxin termed PE-38 (TP-38) for the treatment of malignant brain tumors. *J Neuro-Oncol* 65: 27-35.
18. **Rich JN**, Reardon DA, Peery T, Quinn JA, Penne KL, Wikstrand CJ, Van Duyn LB, Dancy JE, McLendon RE, Kao JC, Stenzel TT, Rasheed BAK, Tourt-Uhlig SE, Dowell JM, Herndon JE, II, Vredenburgh JJ, Sampson JH, Friedman AH, Bigner DD, Friedman HS (2004). Phase II trial of gefitinib (ZD1839) in recurrent glioblastoma. *J Clin Oncol* 22: 133-42.
19. Reardon DA, Quinn JA, **Rich JN**, Gururangan S, Vredenburgh J, Sampson JH, Provenzale JM, Walker A, Badrudojja M, Tourt-Uhlig S, Herndon JE, Dowell JM, Affronti ML, Jackson S, Allen D, Ziegler K, Silverman S, Bohlin C, Friedman AH, Bigner DD, Friedman HS (2004). Phase 2 trial of BCNU plus irinotecan in adults with malignant glioma. *Neuro-onc* 6: 134-144.

20. Quinn JA, Reardon DA, Friedman AH, **Rich JN**, Sampson JH, Vredenburgh J, Gururangan S, Provenzale JM, Walker A, Schweitzer H, Bigner DD, Tourt-Uhlig S, Herndon JE, Affronti ML, Jackson S, Allen D, Ziegler K, Bohlin C, Lentz C, Friedman HS (2004). Phase 1 trial of irinotecan plus BCNU in patients with progressive or recurrent malignant glioma. *Neuro-onc* 6: 145-154.
21. Bao S, Ouyang G, Bai X, Huang Z, Ma C, Liu M, Shao R, Anderson RM, **Rich JN**, Wang XF (2004). Periostin potently promotes metastatic growth of colon cancer by augmenting cell survival via the Akt/PKB pathway. *Cancer Cell* 5: 329-39.
22. **Rich JN** and Bigner DD (2004). The development of novel targeted therapies in the treatment of malignant glioma. *Nature Rev Drug Discov* 3: 430-446.
23. Learn CA, Hartzell TL, Archer GE, **Rich JN**, Friedman AH, Friedman HS, Bigner DD, Sampson JH (2004). Inhibition of cell cycle progression, downstream signaling and invasion of cells expressing wild-type epidermal growth factor receptor (EGFR) but not mutant EGFR variant III by the EGFR tyrosine kinase inhibitor gefitinib. *Clin Cancer Res* 10: 3216-3224.
24. Bos TJ, Cohn SL, Kleinman HK, Koblinski J, Murphy-Ullrich JE, Podhajcer OL, Rempel SA, **Rich JN**, Rutka JT, Sage EH, Thompson EW (2004). International Hermelin Brain Tumor Symposium on Matricellular Proteins in Normal and Cancer Cell-Matrix Interactions. *Matrix Biol* 23: 64-70.
25. Hjelmeland M, Hjelmeland A, Sathornsumetee S, Herbstreith MH, Laping NJ, Bigner DD, Wang XF, and **Rich JN** (2004). SB-431542, a small molecule transforming growth factor- $\beta$ -receptor antagonist, inhibits human glioma cell line proliferation and motility. *Mol Cancer Ther* 3: 737-745.
26. **Rich JN**, Friedman HS, Dancey JE (2004). Gefitinib in glioblastoma, in reply. *J Clin Oncol* 22: 2755-2756 (letter).
27. **Rich JN**, Rasheed BKA, Yan H (2004). In response to: Activating mutations in the epidermal growth factor receptor underlying responsiveness of non-small-cell lung cancer to gefitinib. *N Engl J Med* 351: 1260 (letter).
28. Shi Q, Bao S, Maxwell JA, Reese ED, Friedman HS, Bigner DD, Wang XF, **Rich JN** (2004). Secreted protein acidic, rich in cysteine (SPARC) mediates cellular survival of gliomas through AKT activation. *J Biol Chem* 279(50):52200-52209.
29. Reardon DA, Quinn JA, Vredenburgh J, **Rich JN**, Gururangan S, Badruddoja M, Herndon JE 2nd, Dowell JM, Friedman AH, Friedman HS. (2005) Phase II trial of irinotecan plus celecoxib in adults with recurrent malignant glioma. *Cancer* 103(2):329-338.
30. Goudar RK, Shi Q, Hjelmeland MD, Keir ST, McLendon RE, Wikstrand CJ, Reese E, Conrad CA, Traxler P, Lane HA, Reardon DA, Cavenee WK, Wang XF, Bigner DD, Friedman HS, **Rich JN**. (2005) Combination therapy of inhibitors of epidermal growth factor receptor/vascular endothelial growth factor receptor 2 (AEE788) and the mammalian target of rapamycin (RAD001) offers improved glioblastoma tumor growth inhibition. *Mol Cancer Ther* 4(1):101-112.
31. **Rich JN**, Hans C, Jones B, McLendon R, Rasheed BKA, Bigner DD, Dressman H, Nevins J, and West M. (2005) Gene expression profiling and graphical association in glioblastoma survival. *Cancer Res* 65(10): 4051-4058.
32. Desjardins A, **Rich JN**, Quinn JA, Vredenburgh J, Gururangan S, Sathornsumetee S, Reardon DA, Friedman AH, Bigner DD, Friedman HS. (2005) Chemotherapy and novel therapeutic approaches in malignant glioma. *Front Biosci.* 10:2645-2668.
33. Reardon DA, Quinn JA, **Rich JN**, Desjardins A, Vredenburgh J, Gururangan S, Sathornsumetee S, Badruddoja M, McLendon R, Provenzale J, Herndon JE 2nd, Dowell JM, Burkart JL, Newton HB, Friedman AH, Friedman HS. (2005) Phase I trial of irinotecan plus temozolomide in adults with recurrent malignant glioma. *Cancer* 104(7):1478-1486.
34. Quinn JA, Desjardins A, Weingart J, Brem H, Dolan ME, Delaney SM, Vredenburgh J, **Rich J**, Friedman AH, Reardon DA, Sampson JH, Pegg AE, Moschel RC, Birch R, McLendon RE, Provenzale JM, Gururangan S, Dancey JE, Maxwell J, Tourt-Uhlig S, Herndon JE 2nd, Bigner DD, Friedman HS. (2005) Phase I trial of temozolomide plus O6-benzylguanine for patients with recurrent or progressive malignant glioma. *J Clin Oncol.* 23(28):7178-87.

35. **Rich JN**, Sathornsumetee S, Keir ST, Kieran MW, Laforme A, Kaipainen A, McLendon RE, Graner MW, Reardon D, Ryan AJ, Wheeler C, Dimery I, Bigner DD, Friedman HS. (2005) ZD6474, A Vascular Endothelial Growth Factor Receptor 2 (VEGFR2) Inhibitor, Inhibits Central Nervous System Tumor Growth. *Clin Cancer Res* 11(22):8145-57.
36. Hjelmeland AB, Hjelmeland MD, Shi Q, Hart J, Bigner DD, Wang XF, Kontos C, **Rich JN**. (2005) Loss of PTEN Increases TGF $\beta$  Mediated Invasion with Enhanced SMAD3 Transcriptional Activity. *Cancer Res.* 65(24):11276-81.
37. Reardon DA, Egorin MJ, Quinn JA, **Rich JN**, Gururangan S, Vredenburgh JJ, Desjardins A, Sathornsumetee S, Provenzale JM, Herndon JE 2nd, Dowell JM, Badruddoja MA, McLendon RE, Lagattuta TF, Kicielinski KP, Dresemann G, Sampson JH, Friedman AH, Salvado AJ, Friedman HS. (2005) Phase II study of imatinib mesylate plus hydroxyurea in adults with recurrent glioblastoma multiforme. *J Clin Oncol.* 23(36):9359-68.
38. Reardon DA, Akabani G, Coleman RE, Friedman AH, Friedman HS, Herndon JE 2nd, McLendon RE, Pegram CN, Provenzale JM, Quinn JA, **Rich JN**, Vredenburgh JJ, Desjardins A, Gururangan S, Badruddoja M, Dowell JM, Wong TZ, Zhao XG, Zalutsky MR, Bigner DD. (2006) Salvage radioimmunotherapy with murine iodine-131-labeled antitenascin monoclonal antibody 81C6 for patients with recurrent primary and metastatic malignant brain tumors: phase II study results. *J Clin Oncol.* 24(1):115-22.
39. Reardon DA, Quinn JA, Vredenburgh JJ, Gururangan S, Friedman AH, Desjardins A, Sathornsumetee S, Herndon JE, II, Dowell JM, McLendon RE, Provenzale JM, Sampson JH, Smith RP, Swaisland AJ, Ochs JS, Lyons P, Tourt-Uhlig S, Bigner DD, Friedman HS, **Rich JN**. (2006) Phase 1 Trial of Gefitinib Plus Sirolimus in Adults with Recurrent Malignant Glioma. *Clin Cancer Res* 12: 860-868.
40. Reardon DA, **Rich JN**, Friedman HS, Bigner DD. (2006) Recent advances in the treatment of malignant astrocytoma. *J Clin Oncol.* 24(8):1253-65.
41. Reardon DA, Quinn JA, Akabani G, Coleman RE, Friedman AH, Friedman HS, Herndon JE II, McLendon RE, Pegram CN, Provenzale JM, Dowell JM, **Rich JN**, Vredenburgh JV, Desjardins A, Sampson JH, Gururangan S, Terence Z. Wong TZ, Badruddoja MA, Zhao XG, Bigner DD, Zalutsky MR. (2006) Novel human IgG2b/murine chimeric antitenascin monoclonal antibody construct radiolabeled with 131I and administered into the surgically created resection cavity of patients with malignant glioma: Phase I trial results. *J Nucl Med.* 47(6):912-918.
42. Sathornsumetee S, **Rich JN**. (2006) New treatment strategies for malignant gliomas. *Expert Rev Anticancer Ther* 6(7): 1087-1104.
43. Sathornsumetee S, Hjelmeland AB, Keir ST, McLendon RE, Batt D, Ramsey T, Yusuff N, Rasheed BKA, Kieran MW, Laforme A, Bigner DD, Friedman HS, **Rich JN**. (2006) AAL881, a novel small molecule inhibitor of RAF and vascular endothelial growth factor receptor activities, blocks growth of malignant glioma. *Cancer Res* 66(17):8722-30.
44. Bao S, Wu Q, Sathornsumetee S, Hao Y, Li Z, Hjelmeland AB, Shi Q, McLendon RE, Bigner DD, and **Rich JN**. (2006) Stem cell-like glioblastoma cells promote tumor angiogenesis through vascular endothelial growth factor. *Cancer Res* 66(16):7843-8 (*selected for margin cover article and press release*).
45. Sathornsumetee S, **Rich JN**. New approaches to primary brain tumor treatment. *Anticancer Drugs.* 2006 Oct;17(9):1003-16.
46. DeKroon R, Robinette JB, Hjelmeland AB, Wiggins E, Blackwell M, Mihovilovic M, Fujii M, York J, Hart J, Kontos C, **Rich J**, Strittmatter WJ. (2006) APOE4-VLDL inhibits the HDL-activated phosphatidylinositol 3-kinase/Akt Pathway via the phosphoinositol phosphatase SHIP2. *Circ Res* 2006 Oct 13;99(8):829-36.
47. Bao S, Wu Q, McLendon RE, Hao Y, Shi Q, Hjelmeland AB, Dewhirst MW, Bigner DD, **Rich JN**. Glioma stem cells promote radioresistance by preferential activation of the DNA damage response. *Nature* 2006 Oct 18; [Epub ahead of print]
48. Sathornsumetee S, **Rich JN**. Signal Transduction Pathways as Novel Therapeutic Targets in Malignant Glioma. *Future Neurology*, in press.
49. Sathornsumetee S, **Rich JN**. (2006) Vandetanib, a novel multitargeted kinase inhibitor, in cancer therapy. *Drugs of Today*, in press.

50. Shi Q, Bao S, Song L, Bigner DD, Hjelmeland AB, **Rich JN**. (2006) Targeting secreted protein acidic and rich in cysteine (SPARC) expression decreases glioma cellular survival and invasion associated with reduced activities of FAK and ILK kinases. *Oncogene*, in press.
51. Sathornsumetee S, Vredenburgh K, Lattimore K, **Rich JN**. (2006) Malignant Glioma Drug Discovery- Targeting Protein Kinases. *Expert Opinion on Drug Discovery*, in press.
52. Shi Q, Hjelmeland AB, Keir ST, Wickman S, Song L, Jackson D, Ohmori O, Bigner DD, Friedman HS, **Rich JN**. A novel low molecular weight inhibitor of focal adhesion kinase, TAE226, inhibits glioma growth. *Molecular Carcinogenesis*, in press.

#### Editorials

53. **Rich JN**. (2006) Cancer Stem Cells: A New Therapeutic Paradigm? *Drugs of Today*, in press.

#### Chapters:

54. **Rich, JN**. Malignant neural tumors in: Johnson RT and Griffin JW (eds.) *Current Therapy of Neurologic Disease*, sixth edition. St. Louis: Mosby, 2001.
55. Ballas M, Sathornsumetee S, **Rich JN**, Dennis PA. PTEN hamartomatous tumor syndromes in: McLendon RE, Rosenblum MK, and Bigner DD (eds.) *Russell & Rubinstein's Pathology of Tumors of the Nervous System*, seventh edition. London: Hodder Arnold, 2006.

#### Presented abstracts:

1. **Rich JN**, Grossman SA. Hematologic toxicities associated with hepatically metabolized chemotherapy in brain tumor trials: Potential role of anticonvulsants. Presentation: American Society of Clinical Oncology, 1997.
2. Colvin OM, Cokgor I, Ashley DM, Kerby T, Arbuck S, Malczyn J, Miller L, Cloughesy T, Houghton PJ, **Rich J**, Friedman AH, Friedman HS. Irinotecan treatment of adults with recurrent or progressive malignant glioma. Presentation: American Society of Clinical Oncology, May 1998. *Proc. Am. Soc. Clin. Oncol.* 17:387a, 1998.
3. Moini M, Grossman SA, **Rich J**, Burger P, Norris L, Eller S. Anatomic dissemination of injected microspheres as a model of CNS tumor invasion. American Society of Clinical Oncology, May 1998.
4. Cokgor I, Kerby T, Houghton PJ, **Rich J**, Malczyn J, Miller L, Colvin OM, Friedman AH, Friedman HS. Treatment of malignant glioma with irinotecan (CPT-11) ± BCNU. Presentation: Third Annual European Association for Neuro-Oncology Congress, September 1998.
5. Friedman HS, Kokkinakis DM, Pluda J, Friedman AH, Cokgor I, Haglund MM, Ashley DM, **Rich JN**, Dolan E, Pegg AE, Moschel RM, McLendon RE, Kerby T, Herndon JE, Bigner DD, Scold SC, Jr. Phase I trial of O6-benzylguanine for patients undergoing surgery for malignant glioma. Presentation: Third annual meeting of the Society for Neuro-Oncology, November 1998. *Neuro-Oncology*, 1999.
6. **Rich JN**, Bigner DD, Wang XF (1999). Loss of cyclin-dependent kinase inhibitor (CdkI) p15 may mediate glioma resistance to the growth inhibitory effects of transforming growth factor beta (TGF-β). Presentation: American Association of Cancer Researchers, April 1999. *Proc. Am. Assoc. Cancer Res.*, 1999.
7. Cohen L, Friedman H, Cokgor I, Kerby T, **Rich J**, Stewart E, McLendon R, Provenzale J, Malczyn J, Miller L, Zaknoen S, Fraass U, Dugan M, Colvin OM, Bigner D, Affronti M, Friedman A. Phase I trials of Gliadel plus CPT-11 or Temodal (temozolomide). Presentation: American Society of Clinical Oncology, May 1999. *Proc. Am. Soc. Clin. Oncol.* 18: 150a, 1999.
8. Friedman A, Cokgor I, Kerby T, Edwards S, **Rich J**, Stewart E, McLendon R, Affronti M, Rasheed K, Provenzale J, Colvin OM, Bigner D, Zaknoen S, Fraass U, Dugan M, Friedman H. Phase II treatment of anaplastic oligodendroglioma and low grade glioma with Temodal.

- Presentation: American Society of Clinical Oncology, May 1999. Proc. Am. Soc. Clin. Oncol. 18: 150a, 1999.
9. Friedman H, Cokgor I, Kerby T, Lawless A, **Rich J**, Stewart E, Rasheed K, Affronti M, Tourt-Uhlig S, Provenzale J, McLendon R, Colvin OM, Bigner D, Malczyn J, Friedman A, Miller L. Phase I trial of CPT-11 plus BCNU in malignant glioma. Presentation: American Society of Clinical Oncology, May 1999. Proc. Am. Soc. Clin. Oncol. 18: 150a, 1999.
  10. Colvin OM, Cokgor I, Kerby T, Lawless A, **Rich J**, Stewart E, Rasheed K, Affronti M, Tourt-Uhlig S, Provenzale J, McLendon R, Bigner D, Zilisch J, Graden D, Fields SZ, Friedman A, Friedman H. Phase I trial of topotecan plus BCNU in malignant glioma. Presentation: American Society of Clinical Oncology, May 1999. Proc. Am. Soc. Clin. Oncol. 18: 150a, 1999.
  11. Friedman A, Cokgor I, Kerby T, Edwards S, **Rich J**, Stewart E, McLendon R, Affronti M, Rasheed K, Provenzale J, Colvin OM, Bigner D, Zaknoen S, Fraass U, Dugan M, Friedman H. Phase II treatment of anaplastic oligodendroglioma and low grade glioma with Temodal. Presentation: The Society of Neuro-Oncology, November 1999. Neuro-Oncology 1999, Vol. 1.
  12. Friedman H, Cokgor I, Kerby T, Albergo G, **Rich J**, Stewart E, Rasheed K, Affronti M, Tourt-Uhlig S, Provenzale J, McLendon R, Bigner D, Zilisch J, Graden D, Fields SZ, Colvin OM, Friedman A. Phase I trial of topotecan plus BCNU in malignant glioma. Presentation: The Society of Neuro-Oncology, November 1999. Neuro-Oncology 1999, Vol. 1.
  13. Friedman HS, Cokgor I, Kerby T, Edwards S, Albergo G, Tourt-Uhlig S, **Rich J**, Stewart E, McLendon R, Provenzale J, Malczyn J, Miller L, Zaknoen S, Fraass U, Dugan M, Colvin OM, Bigner D, Friedman A, Cohen L. Phase I trials of Gliadel plus CPT-11 or Temodal (temozolomide). Presentation: The Society of Neuro-Oncology, November 1999. Neuro-Oncology 1999, Vol. 1.
  14. Friedman HS, Cokgor I, Kerby T, Albergo G, **Rich J**, Stewart E, Rasheed K, Affronti M, Tourt-Uhlig S, Provenzale J, McLendon R, Colvin OM, Bigner D, Malczyn J, Friedman A, Miller L. Phase I trial of CPT-11 plus BCNU in malignant glioma. Presentation: The Society of Neuro-Oncology, November 1999. Neuro-Oncology 1999, Vol. 1.
  15. **Rich JN**, Zhang M, Datto MB, Bigner DD, and Wang X-F. Transforming growth factor- $\beta$  (TGF- $\beta$ ) mediated p15<sup>INK4B</sup> induction and growth inhibition in astrocyte is Smad3-dependent, a pathway prominently altered in human glioma cell lines. Presentation: The Society of Neuro-Oncology, November 1999. Neuro-Oncology 1999, Vol. 1.
  16. Friedman HS, Pluda J, Bigner DD, Pegg AE, Moschel RC, Cokgor I, **Rich J**, Friedman AH, Dolan ME. Phase I trial of BCNU plus O<sup>6</sup>-benzylguanine for patients with recurrent or progressive for malignant glioma. Presentation: 91<sup>st</sup> Annual Meeting of the American Association of Cancer Research, April 2000. Proc. Amer. Assoc. Cancer Res. 41:397, 2000.
  17. Colvin OM, Cokgor I, Edwards S, Albergo G, Tourt-Uhlig S, **Rich JN**, Quinn JA, Stewart B, McLendon RE, Provenzale JM, Sampson JH, Haglund MM, Beason R, Miller L, Zaknoen S, Fraas U, Bigner DD, Stafford-Fox V, Cohen L, Friedman AH, Friedman HS. Phase I trial of Gliadel plus CPT-11 or Temodar. Presentation: American Society of Clinical Oncology, May 2000.
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  21. **Rich JN**, Counter CM, Wang X-F. Development of a model of human astrocyte transformation. Presentation: The American Neurological Association, October 2000.

22. **Rich JN**, Counter CM, Wang X-F. A retroviral model of human astrocyte transformation. Presentation: Society of Neuro-Oncology, November 2000.
23. **Rich JN**, Guo C, Bigner DD, McLendon R, Wang X-F, Counter CM. A genetically malleable model of human brain tumor formation. Cold Spring Harbor Laboratories. Telomeres & Telomerase Meeting, March 2001.
24. Quinn JA, **Rich JN**, Reardon DA, Sampson JH, Provenzale JM, McLendon RE, Edwards SD, Tourt-Uhlig SE, Gururangan S, Affronti ML, Stewart ES, Buchanan MW, Bigner DD, Stafford-Fox V, Zaknoen S, Haglund MM, Friedman AH, Friedman HS: Phase II trial of Temodar® for progressive low grade glioma. Presentation: 92<sup>nd</sup> Annual Meeting, American Association for Cancer Research, March 24-28, 2001, New Orleans, LA. Proc. Am. Assoc. Cancer Res. 42:652, 2001.
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28. **Rich J**, Reardon D, Allen D, Affronti ML, Carter J, Edwards S, Friedman A, Gururangan S, Herndon J, Jackson S, McLendon R, Quinn J, Tourt-Uhlig S, Sampson J, Bigner D, Stafford-Fox V, Zaknoen S, Friedman H.: Phase I/II trial of Gliadel plus Temodar for adult patients with recurrent high-grade glioma. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:75b, 2001.
29. Affronti M, Reardon D, Allen D, Friedman A, Gururangan S, Herndon J, Houghton P, Jackson S, McLendon R, Quinn J, **Rich J**, Sampson J, Tourt-Uhlig S, Walker A, Bigner D, Friedman H.: Phase I trial of topotecan with BCNU in the treatment of adult patients with recurrent high grade glioma. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:63a, 2001.
30. Friedman HS, Petros W, **Rich JN**, Glantz MJ, Sands H, Tourt-Uhlig, S, Stewart, ES, Gururangan, S, Sampson, J., Friedman, AH, Colvin, M., Quinn, J: Phase I trial of intrathecal Spartaject™ busulfan for patients with neoplastic meningitis. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:57a, 2001.
31. Cavazos, CM, Gururangan S, Herndon J, II, Tourt-Uhlig S, Moghrabi A, **Rich JN**, Quinn JA, Reardon D, Friedman AH, Friedman HS: A Phase II study of low-dose carboplatin (CBDCA) chemotherapy in adults with progressive low-grade gliomas. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:63a, 2001.
32. Quinn JA, Dolan M, Pegg AE, Moschel RC, Pluda J, McLendon RE, Provenzale J, Petros W, Tourt-Uhlig S, **Rich JN**, Gururangan S, Affronti ML, Buchanan W, Colvin O, Stewart ES, Friedman AH, Bigner DD, Friedman HS: Phase II trial of BCNU plus O<sup>6</sup>-benzylguanine for patients with recurrent or progressive malignant glioma. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:64a, 2001.

33. Tourt-Uhlig S, Quinn JA, **Rich JN**, Reardon DA, Sampson JH, Provenzale JM, McLendon RE, Edwards S, Gururangan S, Affronti ML, Buchanan W, Jackson S, Allen D, Penne K, Lentz C, Bigner DD, Haglund M, Friedman AH, Avgeropoulos N, Korones D, Stafford-Fox V, Zaknoen S, Friedman HS: Phase II trial of temozolomide (Temodar®) in patients with progressive or recurrent low grade glioma. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:76b, 2001.
34. Friedman AH, Quinn JA, Tourt-Uhlig S, **Rich JN**, Stewart ES, Affronti ML, Provenzale J, McLendon R, Gururangan S, Buchanan W, Colvin O, Bigner DD, Beason R, Sampson J, Haglund M, Miller L, Friedman HS: Phase I trial of CPT-11 plus BCNU in malignant glioma. Presentation: American Society of Clinical Oncology, 37<sup>th</sup> Annual Meeting, May 12-15, 2001, San Francisco, CA. Proc. Am. Soc. Clin. Oncol. 20:64a, 2001.
35. Reardon D, Akabani G, Friedman A, Friedman H, Herndon II J, Cokgor I, McLendon R, Quinn J, **Rich J**, Regalado L, Sampson J, Shafman T, Wong T, Zalutsky M, Bigner D. Phase II trial results of iodine-131 murine anti-tenascin monoclonal antibody 81C6 via surgically created resection cavities among newly diagnosed patients with high-grade glioma. Presentation: Fourteenth International Conference on Brain Tumor Research and Therapy, May 27-30, 2001, Asheville, NC. Neuro-Oncology 3 (Suppl 1):S34-S35, 2001.
36. Reardon D, Affronti ML, Allen D, Friedman A, Herndon J, Houghton P, Jackson S, McLendon R, Quinn J, **Rich J**, Walker A, Sampson J, Bigner D, Friedman H. Results of a Phase I trial of Topotecan with BCNU for adult patients with recurrent high grade glioma. Presentation: Fourteenth International Conference on Brain Tumor Research and Therapy, May 27-30, 2001, Asheville, NC. Neuro-Oncology 3 (Suppl 1): S35, 2001.
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38. Shafman T, Friedman H, Akabani G, Cokgor I, Herndon J, McLendon R, Quinn J, Reardon D, **Rich J**, Regalado L, Sampson J, Wong T, Zalutsky M, Bigner D: Iodine-131-labeled anti-tenascin monoclonal antibody for the treatment of patients with recurrent brain tumors: recent update of a Phase II trial. Presentation: Fourteenth International Conference on Brain Tumor Research and Therapy, May 27-30, 2001, Asheville, NC. Neuro-Oncology 3 (Suppl 1):S40, 2001.
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40. Quinn JA, Friedman HS, Petros W, **Rich JN**, Glantz MJ, Sands H, Tourt-Uhlig S, Stewart E, Gururangan S, Sampson J, Friedman AH, Colvin OM, Quinn JA: Phase I trial of intrathecal Spartaject™ busulfan for patients with leptomeningeal metastases. Presentation: Fourteenth International Conference on Brain Tumor Research and Therapy, May 27-30, 2001, Asheville, NC. Neuro-Oncology 3 (Suppl 1):S33, 2001.
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42. **Rich JN**, Guo C, Bigner DD, Wang X-F, Counter CM: A genetically tractable model of human brain tumor formation. Presentation: Fourteenth International Conference on Brain Tumor Research and Therapy, May 27-30, 2001, Asheville, NC. Neuro-Oncology 3 (Suppl 1):S36, 2001. (oral presentation)

43. **Rich JN**, Guo C, Bigner DD, Wang X-F, Counter CM: A genetically defined model of human brain tumor formation. Development of a model of human astrocyte transformation. Presentation: The American Neurological Association, October 2001.
44. Hjelmeland MD, Kao J, Bigner DD, Wang X-F, Friedman HS, **Rich JN**. The use of EGFR and mTOR inhibitors in glioma. Presentation: Seventh Annual Meeting of the Society for Neuro-Oncology, 2002.
45. **Rich JN**, Shi Q, Hjelmeland AB, Cummings TJ, Kuan C-T, Bigner DD, Counter CM, Wang X-F. Osteonectin expression induces metastasis and tumor invasion in a glioma model. Presentation: Seventh Annual Meeting of the Society for Neuro-Oncology, 2002.
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47. Badruddoja, MA, Reardon, D, Beason, R, Friedman, A, Quinn, JA, **Rich J**, Sampson J, Stafford-Fox V, Bigner DD, Friedman HS. Phase 1 study of temozolomide plus irinotecan (CPT-11) in adults with recurrent malignant glioma. Proc Am Soc Clin Oncol 22: 102, 2003 (abstr 409).
48. Quinn JA, Weingart J, Brem H, **Rich J**, Reardon D, Sampson J, Friedman A, Friedman HS, Colvin OM, Dolan E. Phase I trial of temozolomide plus O<sup>6</sup>-benzylguanine in the treatment of patients with recurrent or progressive cerebral anaplastic gliomas. Proc Am Soc Clin Oncol 22: 103, 2003 (abstr 411).
49. Peery, TS, Reardon DA, Quinn J, Ochs J, Wikstrand C, Stenzel T, Bigner DD, Friedman HS, **Rich JN**, Dancy J. Phase II trial of ZD1839 for patients with first relapse glioblastoma. Proc Am Soc Clin Oncol 22: 99, 2003 (abstr 396).
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51. Friedman HS, Evans B, Reardon D, Quinn J, **Rich J**, Gururangan S, Stafford-Fox V, Chen C, Pati A, Schmidt W. Phase II trial of temozolomide for patients with progressive brain metastases. Proc Am Soc Clin Oncol 22: 102, 2003 (abstr 408).
52. **Rich JN**, Keir ST, Wheeler C, Reardon DA, Bigner DD, Friedman HS. ZD6474, a vascular endothelial growth factor receptor 2 (VEGFR2) inhibitor, inhibits central nervous system tumor growth following oral administration. Presentation: 94<sup>th</sup> Annual Meeting, American Association for Cancer Research, June 2003, Washington, DC.
53. **Rich JN**, Shi Q, Kuan C-T, Cummings T, Bigner DD, Counter CM, Wang X-F. The bone-related genes osteonectin and osteoactivin expressed in advanced malignancies induce invasion and metastasis in a genetically defined human cancer model. Presentation: 94<sup>th</sup> Annual Meeting, American Association for Cancer Research, June 2003, Washington, DC.
54. Goudar RK, Hjelmeland MD, Keir ST, Traxler P, Lane H, Reardon DA, Bigner DD, Friedman HS, **Rich JN**. Combination of AEE788, an epidermal growth factor/vascular endothelial growth factor receptor 2 (VEGFR2) inhibitor, and RAD001, an inhibitor of the mammalian target of rapamycin, inhibits glioblastoma tumor growth following oral administration. AACR-NCI-EORTC Molecular Targets Meeting, Boston, November, 2003.
55. **Rich JN**, Keir ST, Goudar RK, Hjelmeland MD, Wheeler C, Reardon DA, Bigner DD, Friedman HS. ZD6474, a vascular endothelial growth factor receptor 2 (VEGFR2) inhibitor, inhibits central nervous system tumor growth following oral administration. AACR-NCI-EORTC Molecular Targets Meeting, Boston, November, 2003 (poster presentation).
56. Hjelmeland MD, Sathornsumetee S, Friedman HS, Laping NJ, Bigner DD, Wang X-F, Friedman HS, **Rich JN**. Small molecule inhibitor of transforming growth factor beta receptors blocks TGF-beta-mediated signal transduction and inhibits cellular proliferation in malignant glioma cell lines. AACR-NCI-EORTC Molecular Targets Meeting, Boston, November, 2003 (poster presentation).
57. Hjelmeland AB, Shi Q, Wang XF, **Rich JN**. Cell type dependent effects of SPARC on tumor development and progression. Proceedings of the AACR, Volume 45, March 2004 (abstr 3327) (poster presentation).

58. Shi Q, Bao S, Bigner DD, Wang XF, **Rich JN**. SPARC/Osteonectin expression induces glioma invasion and survival under serum-free conditions. Proceedings of the AACR, Volume 45, March 2004 (abstr 4899) (poster presentation).
59. **Rich JN**, Loncar D, Sathornsumetee S, Keir S, Wheeler C, Dimery I, Bigner DD, Friedman HS. ZD6474, a vascular endothelial growth factor receptor 2 (VEGFR2) inhibitor inhibits growth of multiple primary central nervous system tumor types. 11<sup>th</sup> International Symposium on Pediatric Neuro-Oncology (abstr. Bio50) (oral presentation).
60. Goudar RK, Hjelmeland MD, Keir ST, Conrad CA, McLendon RE, Wikstrand CJ, Traxler P, Lane HA, Reardon DA, Cavenee WK, Wang XF, Bigner DD, Friedman HS, **Rich JN**. Inhibition of receptor tyrosine kinases and mammalian target of rapamycin offers combinatorial benefit in tumor control. 11<sup>th</sup> International Symposium on Pediatric Neuro-Oncology (abstr. Bio23) (oral presentation).
61. Hjelmeland M, Hjelmeland A, Sathornsumetee S, Herbstreith MH, Laping NJ, Bigner DD, Wang XF, **Rich JN**. SB-431542, a small molecule transforming growth factor- $\beta$ -receptor antagonist, inhibits human glioma cell line proliferation and motility. 11<sup>th</sup> International Symposium on Pediatric Neuro-Oncology (abstr. Bio28) (oral presentation).
62. Shi Q, Bao S, Hjelmeland M, Reese E, Wang XF, **Rich JN**. SPARC/osteonectin expression induces glioma invasion and survival under serum-free conditions. 11<sup>th</sup> International Symposium on Pediatric Neuro-Oncology (abstr. Bio53) (poster presentation).
63. **Rich JN**. Terminating the terminator? Novel small molecule targeted therapies for glioblastoma. ANA Annual Meeting, 2004 (oral presentation).
64. Reese ED, Hjelmeland AB, Bigner DD, Wang XF, **Rich JN**. Expression level of the transforming growth factor- $\beta$  mediator SMAD3 determines glioma phenotype in a genetically defined human glioma model and a transgenic murine glioma model. Keystone Symposium, Roles of TGF-beta in Disease Pathogenesis: Novel Therapeutic Strategies, Mar 28 - Apr 2, 2005 (poster presentation).
65. Hjelmeland AB, Hjelmeland MD, Kontos C, Bigner DD, Wang WF, **Rich JN**. The Pten tumor suppressor gene shifts cellular responses to transforming growth factor- $\beta$  towards tumor suppression in malignant gliomas. Keystone Symposium, Roles of TGF-beta in Disease Pathogenesis: Novel Therapeutic Strategies, Mar 28 - Apr 2, 2005 (oral presentation).
66. **Rich JN**, Hans C, Jones B, McLendon RE, Rasheed A, Dobra A, Dressman H, Bigner DD, Nevins J, West M. Bayesian analysis of gene expression profiles links invasion related genes to poor survival in older glioblastoma patients. Proceedings of the AACR, 96th Annual Meeting April 16-20, 2005 Anaheim/Orange County, CA (poster presentation).
67. Hjelmeland AB, Hjelmeland M, Kontos C, Bigner D, Wang SF, **Rich J**. Cellular responses to transforming growth factor- $\beta$  shift towards tumor suppression in the presence of the Pten tumor suppressor gene. Proceedings of the AACR, 96th Annual Meeting April 16-20, 2005 Anaheim/Orange County, CA (oral presentation).
68. Alzate O, Osorio C, Herbstreith MH, Hjelmeland M, Buechler R, Bao S, Ehlers M, **Rich JN**. Differential protein expression analysis of the impact of transforming growth factor- $\beta$  (TGF $\beta$ ) and a specific TGF $\beta$  inhibitor in glioma cell lines. Proceedings of the AACR, 96th Annual Meeting April 16-20, 2005 Anaheim/Orange County, CA (poster presentation).
69. Sathornsumetee S, Batt D, Kieran M, Keir S, Ramsey T, Yusuff N, Reardon D, Bigner DD, Friedman HS, **Rich JN**. AAL881, a novel small molecule inhibitor of RAF and VEGFR activities, blocks growth of malignant gliomas. Proceedings of the AACR, 96th Annual Meeting April 16-20, 2005 Anaheim/Orange County, CA (poster presentation).
70. **Rich JN**, Keir ST, Sathornsumetee S, Reardon DA, Bigner DD, Friedman HS. Imatinib mesylate (STI-571, Gleevec®) offers combinatorial benefit with temozolomide (Temodar®) against gliomas. Proceedings of the AACR, 96th Annual Meeting April 16-20, 2005 Anaheim/Orange County, CA (poster presentation).
71. **Rich JN**, Hans C, Jones B, McClendon RE, Rasheed BKA, Dobra A, Dressman H, Bigner DD, Nevins JR, West M. Gene expression profiling links invasion related genes to poor survival in older glioblastoma patients. World Federation of Neuro-oncology, May 2005 (oral presentation).

72. Reese ED, Hjelmeland AB, Bigner DD, Wang XF, **Rich JN**. Expression levels of the transforming growth factor-beta mediator SMAD3 critically determines glioma phenotype in a genetically defined human glioma model and a transgenic murine glioma model. World Federation of Neuro-oncology, May 2005 (poster presentation).
73. Hjelmeland AB, Hjelmeland MD, Kontos C, Bigner DD, Wang XF, **Rich JN**. The Pten tumor suppressor gene shifts cellular responses to transforming growth factor-beta towards tumor suppression. World Federation of Neuro-oncology, May 2005 (poster presentation).
74. Shi Q, Bao S, Bigner DD, **Rich JN**. Vascular endothelial growth factor (VEGF) cooperates with secreted protein acidic and rich in cysteine (SPARC) to activate intracellular glioma survival pathways. World Federation of Neuro-oncology, May 2005 (oral presentation).
75. **Rich JN**, Hans C, Jones B, McClendon RE, Rasheed BKA, Dobra A, Dressman H, Bigner DD, Nevins JR, West M. Gene expression profiling links invasion related genes to poor survival in older glioblastoma patients. World Federation of Neuro-oncology, May 2005 (oral presentation).
76. **Rich JN**, Shi Q, Hjelmeland MD, Keir ST, McLendon RE, Reese ED, Traxler P, Lane HA, Bigner DD, Friedman HS. Low molecular weight epidermal growth factor receptor (EGFR)/vascular endothelial growth factor receptor (VEGFR) tyrosine kinase inhibitor offers combinatorial benefit with a rapamycin derivative based on Pten status. World Federation of Neuro-oncology, May 2005 (oral presentation).
77. **Rich JN**, Keir ST, Sathornsumetee S, Reardon DA, Bigner DD, Friedman HS. Combination of imatinib mesylate (STI-571, Gleevec®) and temozolomide (Temodar®) displays increased activity against glioma xenografts. World Federation of Neuro-oncology, May 2005 (poster presentation).
78. **Rich JN**. Molecular Therapeutics of Cancer Gordon Research Conference, July 2005.
79. Shi Q, Bao S, Bigner DD, **Rich JN**. Secreted protein acidic and rich in cysteine (SPARC) activates focal adhesion kinase and integrin-linked kinase to induce AKT-dependent glioma survival and invasion. Proceedings of the AACR, 97th Annual Meeting, April 2006, Washington, DC (poster presentation).
80. **Rich JN**, Bao S, Hjelmeland AB, Shi Q, Sathornsumetee S, Wu Q, Fee B, Wickman S, Keir ST, McLendon RE, Friedman HS, Bigner DD. Targeting glioblastoma signal transduction. 16<sup>th</sup> Biennial International Brain Tumor Research and Therapy Meeting, April 26-30, 2006, Napa Valley, CA (oral presentation).
81. **J. N. Rich**, Q. Shi, A. B. Hjelmeland, S. T. Keir, S. Wickman, G. Wu, D. Jackson, O. Ohmori, D. D. Bigner, H. S. Friedman. A novel low molecular weight inhibitor of focal adhesion kinase and insulin-like growth factor-1 receptor, TAE226, inhibits glioma growth. *Journal of Clinical Oncology*, 2006 ASCO Annual Meeting Proceedings Part I. Vol 24, No. 18S (June 20 Supplement), 2006: 11505
82. **Rich JN**. Targeting glioblastoma signal transduction. SPORE Annual Meeting, July 16-19, 2006, Baltimore, MD (plenary session oral presentation).
83. Shideng Bao, Qiulian Wu, Sith Sathornsumetee, Yueling Hao, Zhizhong Li, Anita B. Hjelmeland, Qing Shi, Roger E. McLendon, Darell D. Bigner, and **Jeremy N. Rich**. Glioma Cancer Stem Cells Promote Tumor Angiogenesis through Vascular Endothelial Growth Factor. (*Award for Excellence in Basic Research*). Abstracts for the Eleventh Annual Meeting of the Society for Neuro-Oncology (SNO), November 16-19, 2006, Neuro-oncol 2006; 8(4): 391-500.
84. Qing Shi, Shideng Bao, Anita B. Hjelmeland, Darell D. Bigner, **Jeremy N. Rich**. Secreted Protein Acidic and Rich in Cysteine (SPARC) Induces Glioma Invasion and Survival Through Activation of Focal Adhesion Kinase and Integrin-Linked Kinase. Abstracts for the Eleventh Annual Meeting of the Society for Neuro-Oncology (SNO), November 16-19, 2006, Neuro-oncol 2006; 8(4): 391-500.
85. Anita B. Hjelmeland, Katie Lattimore, Brian Fee, Sarah Wickman, Stephen T. Keir, Mark D. Hjelmeland, David Batt, Heidi Lane, Darell D. Bigner, Henry S. Friedman, **Jeremy N. Rich**. The Combination of Novel Low-Molecularweight Inhibitors of Raf (LBT 613) and Tor (RAD001, Everolimus) Decreases Glioma Proliferation and Invasion. Abstracts for the Eleventh Annual Meeting of the Society for Neuro-Oncology (SNO), November 16-19, 2006, Neuro-oncol 2006; 8(4): 391-500.

86. Sith Sathornsumetee, Anita B. Hjelmeland, Stephen T. Keir, Roger E. McLendon, David Batt, Timothy Ramsey, Naeem Yusuff, B.K. Ahmed Rasheed, Mark W. Kieran, Andrea Laforme, Darell D. Bigner, Henry S. Friedman, **Jeremy N. Rich**. AAL881, a Novel Small Molecule Inhibitor of Raf and Vegfr Activities, Blocks Growth of Malignant Glioma. Abstracts for the Eleventh Annual Meeting of the Society for Neuro-Oncology (SNO), November 16-19, 2006, Neuro-oncol 2006; 8(4): 391-500.
87. Qing Shi, Anita B. Hjelmeland, Stephen T. Keir, Sarah K. Wickman, Dowdy Jackson, Osamu Ohmori, Darell D. Bigner, Henry S. Friedman, **Jeremy N. Rich**. TAE226, a Novel Low-Molecular-Weight Inhibitor of Focal Adhesion Kinase, Inhibits Glioma Growth. Abstracts for the Eleventh Annual Meeting of the Society for Neuro-Oncology (SNO), November 16-19, 2006, Neuro-oncol 2006; 8(4): 391-500.

#### Invited talks:

1. Neurology Grand Rounds, Duke University Medical Center, February 1998
2. Neuroscience Research Conference, The Johns Hopkins Hospital, September 2000
3. Duke Brain Tumor Center, November 6, 2001
4. Neuro-Oncology Research Conference, The Henry Ford Hospital, April 2002
5. Neurology Grand Rounds, Duke University Medical Center, May 2002
6. University of Alabama, Birmingham, July, 2003
7. Prashant & Saloni Fadia International Hermelin Brain Tumor Center Symposium on Matricellular Proteins in Normal and Cancer Cell-Matrix Interactions, October 24, 2003
8. University of Alabama, Birmingham, August 2004
9. ANA Annual Meeting, October 4, 2004
10. Toronto Citywide Neuro-oncology meeting, October, 2004
11. University of Connecticut Health Center, Molecular Medicine Seminar Series, December 8, 2004
12. M.D. Anderson Cancer Center, May 2005
13. 2005 Henry A. Gamson Visiting Professor and Lecturer, June 2005
14. Genentech, August 2005.
15. Damon Runyon Clinical Investigator Meeting, 2006
16. Eli Lilly, 2006
17. ASCO Annual Meeting, "Translational studies on glioblastoma stem cells: Implications for the treatment of human malignancies". Educational Day, June 2007

#### Ad hoc manuscript reviews

1. Nature
2. New England Journal of Medicine
3. Neuro-Oncology
4. Annals of Neurology
5. Cancer
6. Cancer Research
7. Clinical Cancer Research
8. Oncogene
9. Glia
10. Molecular Cancer Therapeutics

#### Ad hoc grant reviews

1. Brain Cancer P01 Review Cluster (NCI-D RPRB (K8)), September 2004
2. Special Emphasis Panel/Scientific Review Group 2006/10 ZCA1 SRRB-3 (O1) (R) Tumor Microenvironment Network, August 2006
3. Tumor Microenvironment (TME) NIH Study Section, October 2006 and February 2007

#### **Scholarly societies and participation:**

1992-present Alpha Omega Alpha  
1995-present American Academy of Neurology  
1999-present Society of Neuro-Oncology  
2001-present American Association for Cancer Research  
2003-present American Society for Biochemistry and Molecular Biology  
2004-present American Society of Clinical Oncology  
2005-present American Neurological Association  
2006-present Neuro-Oncology Topic Working Group, AAN

**External support - gifts, grants, and contracts:**

**ONGOING RESEARCH SUPPORT**

Project Number: 1 R01 CA116659-01A1

Dates of Approval/Proposed Project: 7/1/06-6/30/11

Source: NIH/NCI

Title of Project: TGF-beta-PTEN Interactions in Glioma Biology & Therapy

Role: PI (25% effort subsumed into K02)

Project Number: 1 R01 NS054276-01 A1

Dates of Approval/Proposed Project: 2/15/06-1/31/11

Source: NIH/NINDS

Title of Project: Molecular Mechanisms of SPARC Mediated Glioma Invasion

Role: PI (25% effort subsumed into K02)

Project Number: K02 NS047409

Dates of Approval/Proposed Project: 6/1/04-4/30/09

Source: NIH/NINDS

Title of Project: The Roles of Osteonectin and Osteoactivin in Gliomas

Role: PI (75% effort)

Project Number: Translational Research Fellow

Dates of Approval/Proposed Project: 7/1/04-6/30/07

Source: The Sidney Kimmel Foundation for Cancer Research

Title of Project: Transforming Growth Factor Beta Signaling and Targeting in Malignant Gliomas

Role: PI (5% effort)

Project Number: Damon Runyon-Lilly Clinical Investigator Award

Dates of Approval/Proposed Project: 7/1/04-6/30/09

Source: Damon Runyon Cancer Research Foundation

Title of Project: Maximizing Clinical Efficacy of Epidermal Growth Factor Receptor Tyrosine Kinase Inhibitors in Glioblastoma Therapy

Role: PI (10% effort)

Project Number: Project Research Grant

Dates of Approval/Proposed Project: 8/01/05-7/31/07

Source: Childhood Brain Tumor Foundation

Title of Project: Targeting DNA Damage Checkpoint Signaling in Pediatric Glioma Radioresistance

Role: PI (5% effort)

Project Number: N/A (Bigner)

Dates of Approval/Proposed Project: 4/1/03-3/31/07

Source: Pediatric Brain Tumor Foundation of the United States

Title of Project: The Pediatric Brain Tumor Foundation Research Institute

SubProject 2: Signal transduction Analysis of Malignant Pediatric Central Nervous System Tumors

Role: SubProject 2 PI

Project Number: Developmental Research Funding Opportunity: Stem Cells, Signaling and Cancer

Dates of Approval/Proposed Project: 07/01/06-06/30/07

Source: Duke Comprehensive Cancer Center

Title of Project: Contribution of Glioblastoma Cancer Stem Cells to Therapeutic Resistance

Role: PI

Project Number: Testing Program (Bigner)

Dates of Approval/Proposed Project: 07/01/05-06/30/10

Source: Accelerate Brain Cancer Cure

Title of Project: In vivo efficacy of novel low molecular weight kinase inhibitors for gliomas

Role: Investigator

Project Number: Paul Brazen/American Brain Tumor Association Fellow (Hjelmeland)  
Source: American Brain Tumor Association  
Title of Project: Glioma Responses to TGF-beta Shift Towards Pro-Tumorigenesis in the Absence of PTEN  
Role: Mentor

### **PENDING**

Project Number: 1R01CA129958-01 (Rich)  
Dates of Approval/Proposed Project: 07/01/2007- 06/30/2012  
Source: NCI/NIH  
Title of Project: Stem Cell-Like Glioma Cells in Angiogenesis  
Role: PI (25% effort to be subsumed into K02 effort)

### **RECENTLY COMPLETED**

Project Number: 2005 Project Grant (Hjelmeland)  
Source: Southeastern Brain Tumor Foundation  
Title of Project: PTEN Loss in Gliomas Promotes Pro-Tumorigenic Responses to Transforming Growth Factor-beta  
Role: Mentor

Project Number: N/A  
Dates of Approval/Proposed Project: 7/1/05-6/30/06  
Source: Accelerate Brain Cancer Cure  
Title of Project: Targeting DNA Damage Checkpoint Signaling in Glioma Radioresistance  
Role: PI

Project Number: N01-CM-42216 (Houghton/Friedman)  
Dates of Approval/Proposed Project: 9/30/04-9/29/05  
Source: NIH/NCI  
Title of Project: Pediatric Preclinical Testing Program  
Role: Investigator

Project Number: N/A  
Dates of Approval/Proposed Project: 5/1/04-4/30/05  
Source: Accelerate Brain Cancer Cure  
Title of Project: Targeting Non-mitogenic Receptor Kinases and Intracellular Mediators in Glioma Therapy  
Role: PI

Project Number: N/A  
Dates of Approval/Proposed Project: 5/1/03-4/30/04  
Source: Accelerate Brain Cancer Cure  
Title of Project: Development of Potential Synergistic Therapies with Small Molecule Inhibitors of Receptor Tyrosine Kinases, Intracellular Signal Transduction Elements, and Cytotoxic Therapies  
Role: PI

Project Number: K08 NS02055-Competitive Renewal  
Dates of Approval/Proposed Project: 7/01-6/03  
Source: NIH/NINDS  
Title of Project: The Role of TGF- $\beta$  in Brain Tumors  
Role: PI

Project Number: N/A  
Dates of Approval/Proposed Project: 12/02-11/03

Source: Southeastern Brain Tumor Foundation

Title of Project: Targeting Efficacy of Brain Tumor Chemotherapeutics Through The Use Of Small Molecule PDGFR Inhibitors

Role: PI

Project Number: N/A (Yao)

Dates of Approval/Proposed Project: 2/03-12/03

Source: Duke Comprehensive Cancer Center

Title of Project: Exploring Specific Deacetylase Inhibitors as Novel Agents to Suppress EGFR Signaling in Cancer Cells

Role: Investigator

Project Number: 1 P50 CA108786 (Bigner) Cancer Development Award

Dates of Approval/Proposed Project: 1/05-1/06

Source: NIH Brain Tumor SPORE

Title of Project: PTEN Tumor Suppressor Gene as a Molecular Determinant of Glioma Sensitivity to Small Molecule Signal Transduction Inhibitors

Role: SubProject PI

NIH/NINDS K08 NS02055 (Rich)

7/98-6/01

The Role of TGF-beta in Brain Tumors

Pediatric Brain Tumor Foundation of the United States (Rich)

7/00-6/02

Development of a Model of Human Fetal Astrocyte Transformation

Accelerate Brain Cancer Cure (Rich)

9/01-8/02

Optimizing the Use of Signal Transduction Inhibitors for the Treatment of Gliomas

Finding the Cures for Glioblastoma (Rich)

12/01-11/02

Maximizing the Efficacy of Epidermal Growth Factor Receptor Inhibitors for the Treatment of Gliomas

American Cancer Society Institutional Research Grant (Rich)

12/99-12/00

The Molecular Characterization of Loss of TGF-beta Growth Inhibition in Gliomas

Frances Goodrich and Albert Hackett/American Brain Tumor Association Fellowship

7/98-6/99

**TRAINEES**

<u>Name</u>	<u>Prior Position</u>	<u>Time in Lab</u>	<u>Current Position</u>
Ming Zhang	Medical Student	1998-1999	Resident in Surgery
Ranjit Goudar	Medical Student	2003	Intern (Medicine)
Dragutin Loncar	Fellow	2003-2004	Attending, Texas
Naim Rashid	Undergraduate	2002-present	Same
Sith Sathornsumetee	Resident (Neurology)	2003-present	Neuro-oncology Fellow
Anita Hjelmeland	Postdoctoral fellow	2003-present	Research Asst. Professor
Carolyn Vaughn	Undergraduate	2004-present	Same
Yolanda Chik	Medical Student	2004-2005	HHMI Med. Stud. Fellow
Kunal Kothari	Undergraduate	2004-2005	Same
Deepika Mittal	Undergraduate	2004-2005	Same
Alisa Prager	Undergraduate	2005-present	Same
Katie Lattimore	Undergraduate	2005-present	Same
Zhizhong Li	Graduate student	2006-present	Same
Kate Vredenburgh	Undergraduate	2006-present	Same