

CURRICULUM VITAE

David E. Malarkey DVM, PhD, DACVP

Head, National Toxicology Program Pathology Group
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BOARD CERTIFICATION AND LICENSURE

1993-present Diplomate, American College of Veterinary Pathologists.
1989-present Commonwealth of Massachusetts, Veterinary Board.
1989-present National Veterinary Medical Board.

EDUCATION

<u>Degree</u>	<u>year</u>	<u>Field of study</u>	<u>Institution</u>
BS	1981	Biology	University of Bridgeport, CT
-	1984/85	Biomedical Sciences	Boston University School of Medicine, MA
MS	1986	Biology	University of Bridgeport, CT
DVM	1989	Veterinary Medicine	Tufts University, Grafton, MA
PhD	1997	Pathology & Biotechnology	NCSU, Raleigh, NC

PROFESSIONAL EXPERIENCE

2005-present **Head, National Toxicology Program Pathology Group**
National Institute of Environmental Health Sciences, RTP, NC

Jan-May 2007 **Acting Chief, Laboratory of Experimental Pathology**
National Institute of Environmental Health Sciences, RTP, NC

2002-2005 **Pathologist and Staff Scientist**
National Toxicology Program
National Institute of Environmental Health Sciences, RTP, NC

2003-present **Adjunct Assistant Professor**, Population Health and Pathobiology, College of
Veterinary Medicine, North Carolina State University, Raleigh, NC

1997-2002 **Assistant Professor**, Dept. of Microbiology, Pathology, and Parasitology, College
of Veterinary Medicine, North Carolina State University, Raleigh, NC

1993-1997 **Research Fellow**, Environmental Toxicology Program, National Institute
of Environmental Health Sciences, Research Triangle Park, NC

1991-1993 **Instructor in Anatomic Pathology**, College of Veterinary Medicine
North Carolina State University, Raleigh, NC

1989-1991 **Resident in Anatomic Pathology**, Angell Memorial Animal Hospital,
Boston, MA

OTHER APPOINTMENTS / ADVISORY PANELS

2008-present **Associate Editor**, Journal of Toxicologic Pathology

2006-2008 **Editorial Board**, Journal of Toxicologic Pathology

2005-2008 **Board of Directors**, Charles Davis Pathology Foundation

2007 **Pathology Working Group**, ILSI Health and Environmental Sciences Institute,
Washington, DC. HESI PPAR agonist project.

2001-present **Scientific Advisory Panel**, NIEHS Genetic Alterations in Cancer database,
coordinated by Integrated Laboratory Systems, RTP, NC

2000- 2002 **Board of Scientific Counselors**, National Toxicology Program, National
Institute of Environmental Health Sciences, Research Triangle Park, NC.

2000-2002 **Member, Genomic Sciences Faculty**, North Carolina State University

1997-2002 **Guest Researcher**, National Institute of Environmental Health Sciences,
Research Triangle Park, NC.

HONORS/AWARDS

1979-1981 Charles A. Dana Honor Society, University of Bridgeport, Conn.

1993-1997 NIH Intramural Research Training Award, NIEHS, NC.

1996 Research Manuscript Award by Psi Chapter (North Carolina) of Phi Zeta

1999 Inductee to Phi Zeta Veterinary Honor Society, Psi Chapter

2000 Outstanding Alumnus Award, Tufts University School of Veterinary Med.

2008 NIH Merit Award, for contribution to NTP study on Sodium Dichromate

2009 NIH Merit Award, for contributions to NTP Pathology Peer Review

ORGANIZATIONS

American College of Veterinary Pathologists, Diplomate (1993-present)

Society of Toxicologic Pathology (2002-present)

British Society of Toxicological Pathologists (2004-present)

North Carolina Society of Toxicologists, member (1994-2000)

American Veterinary Medical Association, member (1987-2006)

Charles L. Davis Foundation, member (1991 - present)

Genotoxicity & Environmental Mutagen Society (2003-present)

North Carolina Colloquy of Veterinary Pathologists, member (1991-present)

North Carolina Veterinary Medical Association, member (1997-2003)

New England Colloquy of Veterinary Pathologists, member (1989-1991)

Society of Toxicology, Northeast Chapter, member (1985-1989)

RESEARCH INTERESTS

1. Molecular basis of murine hepatocarcinogenesis and hepatotoxicity.
2. Toxicological pathology and chemical carcinogenesis.
3. Animal models of carcinogenesis and pathology of genetically altered mice.
4. Diagnostic molecular pathology.

RESEARCH TECHNIQUES

Slide-based mutation analysis (including use of laser capture microdissection), measuring cell proliferation and apoptosis, polymerase chain reaction (PCR), real-time RT-PCR, *in situ* hybridization, *in situ*-PCR, immunohistochemistry, single-strand conformation polymorphism analysis, RFLP analysis, molecular detection of bacteria in tissues, DNA sequencing, Rnase protection assay, toxicogenomics, and proteomics.

PEER-REVIEWED PUBLICATIONS

1. **Malarkey, DE**, Conner, BH, Rogers, AE, Conner, MW, and Newberne, PM. 1989. Reduction of anguidine toxicity in rats by atropine and methylatropine. *Toxicology and Applied Pharmacology* 97:512-524.
2. Anna, CH, Maronpot, RR, Pereira, MA, Foley, JF, **Malarkey, DE**, and Anderson, MW. 1994. *ras* proto-oncogene activation in dichloroacetic acid-, trichloroethylene-, and tetrachloroethylene-induced liver tumors in B6C3F1 mice. *Carcinogenesis* 15 (10): 2255-2261.
3. Watson, MA, Devereux, TR, Anderson, MW, **Malarkey, DE**, and Maronpot, RR. 1995. H-*ras* oncogene mutation spectra in B6C3F1 and C57BL/6 mouse liver tumors provide evidence for TCDD promotion of spontaneous and vinyl carbamate-initiated liver cells. *Carcinogenesis* 16 (8): 1705-1710.
4. **Malarkey, DE**, Devereux, TR, Dinse, GE, Mann, PC, and Maronpot, RR. 1995. Hepatocarcinogenicity of chlordane in B6C3F1 and B6D2F1 male mice: evidence for regression in B6C3F1 mice and carcinogenesis independent of *ras* proto-oncogene activation. *Carcinogenesis* 16 (11): 2617-2625.
5. Maronpot, RR, Fox, T, **Malarkey, DE**, and Goldsworthy, T. 1995. Mutations in the *ras* proto-oncogene: Clues to etiology and molecular pathogenesis of mouse liver tumors. *Toxicology* 101(3): 125-156.
6. Hardie, EM, Vaden, SL, Spaulding, K, **Malarkey, DE**. 1995. Splenic infarction in sixteen dogs. *J Veterinary Internal Med* 9 (3): 141-148.
7. Breitschwerdt, EB, Kordick, DL, **Malarkey, DE**, Keene, B, Hadfield, TL, and Wilson, K. 1995. Endocarditis in a dog due to infection with a novel *Bartonella* subspecies. *J Clin Microbiology* 33 (1): 154-160.
8. **Malarkey, DE**, and Maronpot, RR. 1996. Polymerase chain reaction and *in situ* hybridization: Applications in toxicological pathology. *Tox Path* 24 (1):13-23.
9. Bagley, RS, Levy, JL, and **Malarkey, DE**. 1996. Hypoglycemia associated with intra-abdominal leiomyoma and leiomyosarcoma in six dogs. *JAVMA* 208 (1):69-71.
10. **Malarkey, DE**, Devereux, TR, Ton, T, Hailey, JR, and Maronpot, RR. 1997. A PCR-RFLP method for the detection of *Helicobacter hepaticus* in frozen and formalin-fixed paraffin-embedded liver from B6C3F1 mice. *Tox Path* 25(6): 606-612.

11. Trempus, CS, Ward, S, Farris, G, **Malarkey, DE**, Cannon, R, and Mahler, J. 1998. Association of v-Ha-ras expression with development of erythroleukemia in Tg.AC transgenic mice. *Am J Path* Jul; 153(1): 247-254
12. Mahler, JF, Flagler, ND, **Malarkey, DE**, Mann, PC, Haseman, JK, and Eastin, W. 1998. Spontaneous and chemically induced proliferative lesions in Tg.AC transgenic and p53-heterozygous mice. *Tox Path* 26(4): 501-511.
13. Hailey, JR, Haseman, JK, Bucher, JR, Radovsky, AE, **Malarkey, DE**, Miller, RT, Nyska, A, and Maronpot, RR. 1998. Impact of *Helicobacter hepaticus* infection in B6C3F1 mice from twelve National Toxicology Program two-year carcinogenesis studies. *Tox Path* 26 (5): 602-611.
14. Hansen, LA, **Malarkey, DE**, Wilkinson, JE, Burtis, W, Stewart, A, Woychik, RE, and Tennant, RW. 1998. Effect of the viable yellow (A^{vy}) agouti allele on skin tumorigenesis and humoral hypercalcemia in v-Ha-ras transgenic TG.AC mice. *Carcinogenesis* 19 (10): 1837-1845.
15. Christensen, J, Romach, EH, Healy, LN, Gonzales, AJ, Anderson, SP, **Malarkey, DE**, Cattley, RC, Goldsworthy, TL. 1999. Altered Bcl-2 family expression during nongenotoxic hepatocarcinogenesis in mice. *Carcinogenesis* 20(8): 1583-1590.
16. Colitz, C, **Malarkey, DE**, and John Erby Wilkinson. 2000. Persistent hyperplastic tunica vasculosa lentis in transgenic line TgN3261Rpw. *Vet Path* 37:422-427.
17. Colitz, C, **Malarkey, DE**, Dykstra, MJ, McGahan, MC, and Davidson, MG 2000. Histologic and immunohistochemical characterization of lens capsule plaques in dogs with cataracts. *AJVR* 61(2): 139-143.
18. Baty, CJ, **Malarkey, DE**, Atkins, CE, DeFrancesco, TC, Sidley, J, and Keene, BW. 2001. Natural history of hypertrophic cardiomyopathy and aortic thromboembolism in a family of domestic shorthair cats. *J Vet Intern Med* Nov-Dec; 15(6): 595-9.
19. Flowers, JR, Hammerberg, B, Wood, SL, **Malarkey, DE**, van Dam, GJ, Levy, M, and McLawhorn, LD. 2002. *Heterobilharzia americana* infection in a dog. *JAVMA* 220(2): 193-196.
20. Chernoff, N, Hunter, ES, Hall, LL, Rosen, MB, Brownie, CF, **Malarkey, DE**, Marr, M, and Herkovits, J. 2002. Lack of teratogenicity of microcystin-LR in the mouse and toad. *J Appl Toxicol* 22:13-17
21. Nyska, A, Moomaw, CR, Foley, JF, Maronpot, RR, **Malarkey, DE**, Cummings, CM Peddada, S, Moyer, CF, Allen, DG, Travlos, G, and Chan, PC. 2002. The hepatic endothelial carcinogen riddelliine induces endothelial apoptosis, mitosis, S phase, p53, and hepatocytic vascular endothelial-growth-factor expression after short-term exposure. *Tox and App Pharm* 184:153-164.
22. Paramastri, TA, Wallace, JM, Salleng, KJ, Wilkinson, LM, **Malarkey, D.E**, and Cline, JM. 2002. Intracranial lymphomas in simian retrovirus-positive *Macaca fascicularis*. *Vet Path* 39(3): 399-402.
23. Douglass, JJ, Berry, CR, Thrall, **DE**, **Malarkey, DE**, and Spaulding, KA. 2003. Radiographic features of aortic bulb/valve mineralization in 20 dogs. *Vet Radiol Ultrasound* 44(1): 20-27.
24. Williams, KW, **Malarkey, DE**, Patrick, D, Cohn, LA, Patrick, DJ, Dye, JA, and Toews, GB. 2004. Identification of spontaneous feline idiopathic pulmonary fibrosis: Morphology and ultrastructural evidence for a type II pneumocyte defect. *Chest* 125 (6): 2278-2288.
25. Kleiter, M, **Malarkey, DE**, Ruslander, DE, and Thrall, DE. 2004. Expression of cyclooxygenase-2 in canine epithelial nasal tumors. *Vet Radiol Ultrasound* 45 (3):255-60
26. Irwin, RD, Boorman GA, Cunningham, ML, Heinloth, AN, **Malarkey, DE**, and Paules, R. 2004. Application of toxicogenomics to toxicology: Basic concepts in the analysis of microarray data. *Tox Path* 32(Suppl. 1):72-83.

27. Ober, CP, Spaulding, KA, Breitschwerdt, EB, **Malarkey, DE**, and Hegarty, BC. 2004. Orchitis in two dogs with Rocky Mountain spotted fever. *Vet Radiol Ultrasound* Sep-Oct; 45(5):458-65.
28. Voynow, JA, Fisher, BM, **Malarkey, DE**, Burch, L, Wong, T, Longphre, M, Ho, SB, and Foster, WM. 2004. Neutrophil elastase induces mucus cell metaplasia in mouse lung. *Am J Physiol Lung Cell Mol Physio* 1287:L1293-L1302.
29. Stoppini, R, Gilger, BC, **Malarkey, DE**, Ratto, A, Brigati, G. 2005. Bilateral nodular lymphocytic conjunctivitis in a horse. *Vet Ophth* 8(2):129-134.
30. **Malarkey, DE**, Johnson, K, Ryan, L, Boorman, G and Maronpot, RR. 2005. New insights into functional aspects of liver morphology. *Tox Path* 33(1): 27-34.
31. **Malarkey, DE**, Parker, JS, Turman, CA, Scott, AM, Paules, RS and Maronpot, RR. 2005. Microarray data analysis of mouse neoplasia. *Tox Path* 33(1): 127-135.
32. Lewis, DN, Nyska, M, Johnson, K, **Malarkey, DE**, Ward, S, Streiker, M, Peddada, S, Shabat, S, Nyska, A. 2005. 2-Butoxyethanol female-rat model of hemolysis and disseminated thrombosis: X-ray characterization of osteonecrosis and growth plate suppression. *Tox Path* 33(2): 272-282.
33. Kim, YA, Reineke, S, and **Malarkey DE**. 2005. Cutaneous angiomatosis in a young dog. *Vet Path* 42(3):378-381.
34. Cesta M, Baty, C, Keene, B, Smoak, I, and **Malarkey, DE**. 2005. Pathology of end-stage remodeling in a family of cats with hypertrophic cardiomyopathy. *Vet Path* 42:458-467.
35. Boorman, G, Blackshear, PE, Parker, JS, Lobenhofer, EK, **Malarkey, DE**, Vallant, M, Gerkin, DK, and Irwin, RD. 2005. Hepatic gene expression changes throughout the day in the Fisher rat: Implications for toxicogenomics experiments. *Tox Sci* 86(1):185-193.
36. Dang, H, Trempus, C, **Malarkey, DE**, Wei, S, Humble, M, Morris, RJ, and Tennant, RW. 2006. Identification of genes and gene ontology processes critical to skin papilloma development in Tg.AC transgenic mice. *Molecular Carcinogenesis* Feb;45(2):126-140
37. Kleiter, MM, Thrall, DE, **Malarkey DE**, Ji, X, Lee, DY, Chou, SC, and Raleigh, JA. 2006. A comparison of oral and intravenous pimonidazole in canine tumors using intravenous CCI-103F as a control hypoxia marker. *International Journal of Radiation Oncology Biol Phys* Feb1;64(2):592-602.
38. Looper, JS, Ruslander, D, Proulx, D, **Malarkey DE**, and Thrall, D. 2006. Epidermal growth factor receptor expression in feline oral squamous cell carcinomas. *Vet Comp Oncology* 4(1):33-40.
39. Lobenhofer, EK, Boorman, GA, Phillips, KL, Heinloth, AN, Malarkey, DE, Blackshear, PE, Houle, C, Parker, JS, and Hurban, P. 2006. Application of visualization tools to the analysis of histopathological data enhances biological insight and interpretation. *Tox Path* 34(7):921-928.
40. Walker, DM, **Malarkey, DE**, Seilkop, SK, Ruecker, FA, Funk, KA, Wolfe MJ, Treanor, CP, Foley, JF, Hahn, FF, Hardisty, JF, and VE Walker. Transplacental carcinogenicity of 3-azido-3-deoxythymidine in B6C3F1 mice and F344 rats. 2007. *Environmental and Molecular Mutagenesis*. Environ Mol Mutagen. 2007 Apr-May;48(3-4):283-98.
41. P. R. Bushel, A. N. Heinloth, J. Li, L. Huang, J. W. Chou, G. A. Boorman, **D. E. Malarkey**, C. D. Houle, S. M. Ward, R. E. Wilson, R. D. Fannin, M. W. Russo, P. B. Watkins, R. W. Tennant and R. S. Paules 2007. Blood gene expression signatures predict exposure levels. *Proceedings of the National Academy of Sciences of the United States of America* 104(46): 18211-18216
42. J. F. Hardisty, M. R. Elwell, H. Ernst, P. Greaves, H. Kolenda-Roberts, **D. E. Malarkey**, P. C. Mann and P. A. Tellier (2007). "Histopathology of hemangiosarcomas in mice and hamsters and liposarcomas/fibrosarcomas in rats associated with PPAR agonists." *Toxicologic Pathology* 35(7): 928-941

43. J. P. Morrison, H. Satoh, J. Foley, J. L. Horton, J. K. Dunnick, G. E. Kissling and **D. E. Malarkey** (2007). "N-ethyl-N-nitrosourea (ENU)-induced meningiomatosis and meningioma in p16INK4a/p19ARF tumor suppressor gene-deficient mice." *Toxicologic Pathology* 35(6): 838-845
44. K. Yoshizawa, A. Heatherly, **D. E. Malarkey**, N. J. Walker and A. Nyska 2007. "A critical comparison of murine pathology and epidemiological data of TCDD, PCB126, and PeCDF." *Toxicologic Pathology* 35(7): 865-879
45. Stout MD, Kissling GE, Suárez FA, **Malarkey DE**, Herbert RA, Bucher JR. 2008. Influence of Helicobacter hepaticus Infection on the chronic toxicity and carcinogenicity of triethanolamine in B6C3F1 Mice. *Toxicol Pathol* 36(6):783-794.
46. Lobenhofer EK, Auman JT, Blackshear PE, Boorman GA, Bushel PR, Cunningham ML, Fostel JM, Gerrish K, Heinloth AN, Irwin RD, **Malarkey DE**, Merrick BA, Sieber SO, Tucker CJ, Ward SM, Wilson RE, Hurban P, Tennant RW, Paules RS. 2008. Gene expression response in target organ and whole blood varies as a function of target organ injury phenotype. *Genome Biol.* 2008;9(6):R100. Epub 2008 Jun 20.
47. McMullen, RJ, Clode, AB, Pandiri, AK, **Malarkey, DE**, Michau, TM and BC Gilger. 2008. Epibulbar melanoma in a foal. *Vet Ophthalmol* 2008 Sep; 11 Suppl:44-50
48. Kissling GE, **Malarkey DE**, Vallant MK, Johnson JD, Hejtmancik MR, Herbert RA, Boorman GA. 2008. Evaluation of dichloroacetic acid for carcinogenicity in genetically modified Tg.AC hemizygous and p53 haploinsufficient mice. *Toxicol Sci.* 2009 Jan;107(1):19-26. Epub 2008 Oct 30
49. Reynolds, TL, Barnes, HJ, Wolfe, B, Lu, L, Camp, DM and **Malarkey, DE**. 2009. Bilateral nocardial endophthalmitis in a prothonotary warbler (*Protonotaria citrea*). *Vet Path* 24:120-3.
50. Stout, MD, Nyska, A, Collins, BJ, Witt, KL, Kissling, GE, **Malarkey, DE**, Chhabra, RS, and Hooth, MJ. 2009. Toxicity and Carcinogenicity Studies of Chromium Picolinate Monohydrate Administered in Feed to F344/N Rats and B6C3F1 Mice for 2 years. *Food and Chemical Tox* 2009 Apr;47(4):729-33. Epub 2009 Jan 8.
51. Shiomitsu, K; Johnson, C; **Malarkey, DE**; Pruitt, A; Thrall, D. 2009. Expression of Epidermal Growth Factor Receptor (EGFR) and Vascular Endothelial Growth Factor (VEGF) in Malignant Canine Epithelial Nasal Tumours. *Vet Comp Oncol.* 2009 Jun;7(2):106-14. PubMed PMID: 19453364.
52. Nyska A, Cunningham M, Snell M, **Malarkey, DE**, Sutton D, Dunnick J. The Pivotal Role of Electron Microscopic Evaluation in Investigation of the Cardiotoxicity of bis(2-chloroethoxy)methane in Rats and Mice. *Toxicol Pathol.* 2009 Sep 21. [Epub ahead of print] PubMed PMID: 19770349.
53. Ramot Y, Nyska A, Lieuallen W, Maly A, Flake G, Kissling GE, Brix A, **Malarkey, DE**, Hooth MJ. Inflammatory and chloracne-like skin lesions in B6C3F1 mice exposed to 3,3',4,4'-tetrachloroazobenzene for 2 years. *Toxicology.* 2009 Sep 6. [Epub ahead of print] PubMed PMID: 19737593.
54. Hoffler U, Hobbie K, Wilson R, Bai R, Rahman A, **Malarkey, DE**, Travlos G, Ghanayem BI. Diet-induced obesity is associated with hyperleptinemia, hyperinsulinemia, hepatic steatosis, and glomerulopathy in C57Bl/6J mice. *Endocrine.* 2009 Oct;36(2):311-25. Epub 2009 Aug 11. PubMed PMID: 19669948.
55. Witt KL, **Malarkey, DE**, Hobbs CA, Davis JP, Kissling GE, Caspary W, Travlos G, Recio L. No increases in biomarkers of genetic damage or pathological changes in heart and brain tissues in male rats administered methylphenidate hydrochloride (Ritalin) for 28 days. *Environ Mol Mutagen.* 2009 Jul 24. [Epub ahead of print] PubMed PMID: 19634155.

56. Cohen SM, Storer RD, Criswell KA, Doerrer NG, Dellarco VL, Pegg DG, Wojcinski ZW, **Malarkey, DE**, Jacobs AC, Klaunig JE, Swenberg JA, Cook JC. Hemangiosarcoma in rodents: mode-of-action evaluation and human relevance. *Toxicol Sci.* 2009 Sep;111(1):4-18. Epub 2009 Jun 12. PubMed PMID: 19525443.
57. Stout MD, Herbert RA, Kissling GE, Collins BJ, Travlos GS, Witt KL, Melnick RL, Abdo KM, **Malarkey, DE**, Hooth MJ. Hexavalent chromium is carcinogenic to F344/N rats and B6C3F1 mice after chronic oral exposure. *Environ Health Perspect.* 2009 May;117(5):716-22. Epub 2008 Dec 31. PubMed PMID: 19479012; PubMed Central PMCID: PMC2685832.
58. Chandra, SA, Nolan, M, and **Malarkey, DE**. Chemical carcinogenesis of the gastrointestinal tract in rodents: An overview with emphasis on NTP carcinogenesis bioassays. *Toxicol Pathology* (in press).
59. Bache, U, Hailey, JR, Hill, GD, Kaufman, W, Latimer, K, Malarkey, DE, Maronpot, RR, Miller, RA, Moore, RR, Morrison, JP, Nolte, T, Rinke, M Rittinghausen, S, Suttie, AW, Travlos, G, Vahle, JL, Willson, GA, and Elmore, SE. 2009. Proceedings of the 2009 National Toxicology Program Satellite Symposium. *Toxicol Pathology* (in press)
60. Singh, B, Nyska, A, Johansson, SL, **Malarkey, DE**, and MJ Hooth. 2009. Urethral transitional carcinoma and hyperplasia in male B6C3F1 mice treated with tetrachloroazobenzene (TCAB). *Toxicol Pathology* (accept with revisions).
61. Little, PB, Herbert, RA, Chhabra, R, **Malarkey, DE**, and Sills, RC. 2009. A Retrospective Review of Neuropathology Findings From National Toxicology Program Subchronic (90-day) Studies with Prospective Recommendations. *Toxicol Pathology* (revisions submitted)
62. Rogers, EH, Zehr, RD, Gage, MI, **Malarkey, DE**, Bradfield, CA, Liu, Y, Jaskot, RH, Richards, J, Wood, Cr, Rosen, MB, and Chernoff, JN. 2009. Organ toxicity and recovery in the mouse after exposure to the cyanobacterial toxin cylindrospermopsin: Clinical signs, histopathology, serum chemistries and hepatic gene array endpoints. *Toxicol Pathology* (revisions submitted)
63. Betz, BL, Wei, S_J, **Malarkey, DE**, Trempus, CS, Humble, MM, French, JE, and Tennant, RW. 2009. Activated H-ras cooperates with p19ARF deficiency to induce gastrointestinal stromal tumors (GIST) in mice. (submitted)

CHAPTERS / NON-PEER-REVIEWED PUBLICATIONS

64. Devereux, TR, Malarkey, DE, and Maronpot, RR. 1996. The contribution of rodent liver and lung carcinogenesis models to our knowledge of the cancer latent period. In Maltoni, C., Soffritti, M., and Davis, W. (ed), *The Scientific Bases of Cancer Chemoprevention*. Elsevier Publications, Amsterdam, Netherlands. pp. 45-59.
65. Andrews, JM, and **Malarkey, DE**. 2001. Advanced diagnostic techniques: molecular diagnostics. In: Atlas of Canine and Feline Cytology, 1st edition, W.B. Saunders. Raskin, R and Meyer, D, editors
66. **Malarkey, DE** and Maronpot, RR. 2005. Carcinogenesis. In Encyclopedia of Toxicology; 2nd edition; Edited by Philip Wexler; Academic press, San Diego. pp 445-466.
67. Gerrish, K and **Malarkey DE**. 2007. Genomic profiles of liver injury. Chapter in Hepatotoxicity: From genomics to in-vitro and in-vivo, S Sahu, editor published by Wiley & Sons Hoboken, NJ.

MANUSCRIPTS IN PREPARATION 2009

68. Brown, D, Paskel, M, Masinde, T and **Malarkey, DE**. 2008. Morphology and cell lineage of chemically induced atypical thymic hyperplasia and lymphoma in p16^{INK4a}/p19^{ARF} and p53 deficient mice
69. Morrison, J, Satoh, H, Foley, J, Horton, J, Maronpot, RR, and **Malarkey DE**.. 2009. Comparative morphology and incidence of meningiomas in rats and mice of the National Toxicology Program . (in prep)
70. Morrison, J, Satoh, H, Foley, J, Maronpot, RR, and **Malarkey DE**.. 2009. Morphological and immunohistochemical characteristics of rat CNS medulloblastomas from the National Toxicology Program. (in prep)
71. What's your diagnosis?: Leiomyoma in a guinea pig. *JAVMA*

NTP TECHNICAL REPORTS

Have contributed to the pathology peer-review, writing and evaluation of over 40 NTP and NCTR (National Center for Toxicologic Research / FDA) studies including:

1. Toxicity studies of aspartame in FVB/N-TgN (*v-HA-ras*) Led (Tg.AC) hemizygous mice and carcinogenicity studies of aspartame in B6.129-Trp53^{tm1Brd} (N5) haploinsufficient mice and 9-month study in Cdkn2a deficient mice. NTP Technical report GMM #1, NIH publication # 03-4459.
2. Toxicity studies of acesulfame potassium in FVB/N-TgN (*v-HA-ras*) Led (Tg.AC) hemizygous mice and carcinogenicity studies of aspartame in B6.129-Trp53^{tm1Brd} (N5) haploinsufficient mice. NTP Technical report GMM #2, NIH publication # 03-4460.
3. Toxicology and carcinogenesis study of glycidol in genetically modified haploinsufficient p16/p19 mice. NTP Technical report GMM #13, NIH publication #06-5962.
4. Toxicology and carcinogenesis study of benzene in genetically modified haploinsufficient p16/p19 mice. NTP Technical report GMM #8, NIH publication #06-4425.
5. Toxicology and carcinogenesis study of phenolphthalein in genetically modified haploinsufficient p16/p19 mice. NTP Technical report GMM #12, NIH publication #06-5961.
6. Toxicology studies of allyl bromide in genetically modified Tg.AC mice and carcinogenicity studies of allyl bromide in genetically modified haploinsufficient p53 mice. NTP Technical report GMM #7, NIH publication #06-4424.
7. TR-516 Toxicology and Carcinogenesis Studies of 2-Methylimidazole (CAS No. 693-98-1) in F344/N Rats and B6C3F1 Mice (Feed Studies)
8. TR-518 Toxicology and Carcinogenesis Studies of Triethanolamine (CAS No. 102-71-6) in B6C3F1 Mice (Dermal Studies)
9. TR-523 Toxicology and Carcinogenesis Studies of Diisopropylcarbodiimide (CAS No. 693-13-0) in F344/N Rats and B6C3F1 Mice (Dermal Studies)
10. TR-524 Photocarcinogenesis Study of Glycolic Acid and Salicylic Acid (CAS Nos. 79-14-1 and 69-72-7) in SKH-1 Mice (Simulated Solar Light and Topical Application Study)
11. TR-532 Toxicology and Carcinogenesis Studies of Bromodichloromethane (CAS No. 75-27-4) in Male F344/N Rats and Female B6C3F1 Mice (Drinking Water Studies)
12. TR-533 Toxicology and Carcinogenesis Studies of Benzophenone (CAS No. 119-61-9) in F344/N Rats and B6C3F1 Mice (Feed Studies)
13. TR-534 Toxicology and Carcinogenesis Studies of Divinylbenzene-HP (CAS No. 1321-74-0) in F344/N Rats and B6C3F1 Mice (Inhalation Studies)

14. TR-535 Toxicology and Carcinogenesis Studies of 4-Methylimidazole (CAS No. 822-36-6) in F344/N Rats and B6C3F1 Mice (Feed Studies)
15. TR-536 Toxicology and Carcinogenesis Studies of bis(2-Chloroethoxy)methane (CAS No. 111-91-1) in Male F344/N Rats and Female B6C3F1 Mice (Dermal Studies) - DRAFT
16. TR-537 Toxicology and Carcinogenesis Studies of Dibromoacetic Acid (CAS No. 631-64-1) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies)
17. TR-538 Toxicology and Carcinogenesis Studies of Methyl Isobutyl Ketone (CAS No. 108-10-1) in F344/N Rats and B6C3F1 Mice (Inhalation Studies)
18. TR-539 Multigenerational Reproductive Toxicology Study of Genistein (CAS No. 446-72-0) in Sprague-Dawley Rats (feed study)
19. TR-540 Toxicology and Carcinogenesis Studies of Methylene Blue Trihydrate (CAS No. 7220-79-3) in F344/N Rats and B6C3F1 Mice (gavage studies)
20. TR-541 Toxicology and Carcinogenesis Studies of Formamide (CAS No. 75-12-7) in F344/N rats and B6C3F1 Mice (Gavage Studies)
21. TR-542 Toxicology and Carcinogenesis Studies of Cumene (CAS No. 98-82-8) in F344/N Rats and B6C3F1 Mice (Inhalation Studies) - DRAFT
22. TR-543 Toxicology and Carcinogenesis Studies of A-Methylstyrene (CAS No. 98-83-9) in F344/N Rats and B6C3F1 Mice (inhalation studies)
23. TR-544 Toxicology and Carcinogenesis Studies of Dibromoacetonitrile (CAS No. 3252-43-5) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies) – DRAFT
24. TR-545 pdf Toxicology and Carcinogenesis Study of Genistein (CAS No. 446-72-0) in Sprague-Dawley Rats (feed study)
25. TR-546 Toxicology and carcinogenesis Studies of Sodium Dichromate Dihydrate (CAS No. 7789-12-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies)
26. TR-547 Multigenerational Reproductive Toxicology Study of Ethinyl Estradiol (multigenerational) (CAS No. 57-63-6) in Sprague-Dawley Rats (Feed Studies) – DRAFT
27. TR-548 Toxicology and Carcinogenesis Study of Ethinyl Estradiol (CAS No. 57-63-6) in Sprague-Dawley Rats (Feed Studies) – DRAFT
28. TR-549 Toxicology and Carcinogenesis Studies of Bromochloroacetic Acid (CAS 5589-96-8) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies) – DRAFT
29. TR-550 Toxicology and Carcinogenesis Studies of Cresols (CAS No. 1319-77-3) in Male F344/N Rats and Female B6C3F1 Mice (Feed Studies)
30. TR-551 Toxicology and Carcinogenesis Studies of Isoeugenol (CAS No. 97-54-1) in F344/N Rats and B6C3F1 Mice (Gavage Studies) – DRAFT
31. TR-552 Toxicology and Carcinogenesis Studies oropargyl Alcohol (CAS No. 107-19-7) in F344/N Rats and B6C3F1 Mice (Inhalation Studies)
32. TR-553 Photocarcinogenesis Study of Aloe Vera [CAS No. 481-72-1 (Aloe-emodin)] in SKH-1 Mice (Simulated Solar Light and Topical Applicaton Study) – DRAFT
33. TR-554 Toxicology and Carcinogenesis Studies of 5-(Hydroxymethyl)-2-furfural (CAS No. 67-47-0) in F344/N Rats and B6C3F1 Mice (Gavage Studies) – DRAFT
34. TR-555 Toxicology and Carcinogenesis Studies of 1,2-Dibromo-2,4-dicyanobutane (CAS No. 35691-657) in F344/N Rats and B6C3F1 Mice (Dermal Studies) – DRAFT
35. TR-556 Toxicology and Carcinogenesis Studies of Chromium Picolinate Monohydrate (CAS No. 27882 76-4) in F344/N Rats and B6C3F1 Mice (Feed Studies) – DRAFT
36. TR-557 Toxicology and Carcinogenesis Studies of B-Myrcene (CAS No. 123-35-3) in F344/N Rats and B6C3F1 Mice (Gavage studies) – DRAFT
37. TR-558 Toxicology and Carcinogenesis Studies of 3,3',4,4-Tetrachloroazobenzene (CAS No. 14047-09-7) in Sprague Dawley rats and B6C3F1 mice (Gavage studies) – DRAFT

38. TR-559 Toxicology and Carcinogenesis Studies of 2,3',4,4',5-Pentachlorobiphenyl (PCB 118)(CAS No. 31508-00-6) in Sprague Dawley Rats (Gavage studies)- DRAFT
39. TR-560 Toxicology and Carcinogenesis Studies of Androstenedione (CAS No. 63-05-8) in F344/N Rats and B6C3F1 Mice (Gavage studies) – DRAFT
40. TR-561 Toxicology and Carcinogenesis Studies of Tetralin (CAS No. 119-64-2) in F344/N Rats and B6C3F1 Mice (Inhalation studies) – DRAFT
41. TR-562 Toxicology and Carcinogenesis Studies of Goldenseal Root Powder (GOLDENSEALRT) in F344/N Rats and B6C3F1 Mice (Feed studies) – DRAFT
42. TR-563 Toxicology and Carcinogenesis Studies of Pulegone (CAS No. 89-82-7) in F344/N Rats and B6C3F1 Mice (Gavage studies) - DRAFT
43. TR-564 Toxicology and Carcinogenesis Studies of 1-Bromopropane (CAS No. 106-94-5) in F344/N Rats and B6C3F1 Mice (Inhalation studies) - DRAFT
44. TR-565 Toxicology and Carcinogenesis Studies of Milk Thistle Extract (CAS No. 84604-20-6) in F344/N Rats and B6C3F1 Mice (Feed studies) - DRAFT
45. TR-566 Toxicology and Carcinogenesis Studies of Diethylamine (CAS No. 109-89-7) in F344/N Rats and B6C3F1 Mice (Inhalation studies) - DRAFT
46. TR-567 Toxicology and Carcinogenesis Studies of Ginseng (CAS No. 50647-08-0) in F344/N Rats and B6C3F1 Mice (Gavage studies) - DRAFT

ABSTRACTS

1. **Malarkey, DE**, Devereux, TR, and Maronpot, RR. 1994. Hepatocarcinogenicity of chlordane in B6C3F1 and B6D2F1 male mice: evidence for regression in B6C3F1 mice and carcinogenesis independent of *ras* proto-oncogene activation. ILSI Mouse Liver Tumor Workshop, Washington, DC.
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4. Trempus, CS, Hansen LA, Mahler, JF, **Malarkey, DE**, Cannon, RE, and Tennant, RW. 1995. Association of transgene expression with myeloproliferative disorders in v-Ha-*ras* transgenic TG.AC mice. Proceedings of 1995 International Meeting on Signal Transduction of Normal and Tumor cells.
5. **Malarkey, DE**, Hansen, LA, Burtis, W, Stewart, A, Woychik, RE, and Tennant, RW. 1995. Humoral hypercalcemia associated with cutaneous papillomas in TG.AC transgenic hybrid mice which carry the viable yellow (A^{VY}) agouti allele. Proceedings, Annual meeting of the American College of Veterinary Pathologists.
6. **Malarkey, DE**, Devereux, TR, and Maronpot, RR. 1996. H-*ras* proto-oncogene mutations occur in different types of altered hepatocellular foci (AHF) in male B6C3F1 mice treated with TCDD. Proceedings, Annual Meeting of the American College of Veterinary Pathologists.
7. **Malarkey, DE**, Goldsworthy, SM, and Maronpot, RR. 1997. *Brca1* mRNA is elevated in hepatocellular foci and adenomas but not in hepatocellular carcinomas in B6C3F1 mice. SOT

- satellite conference on “Mechanisms of susceptibility to mouse liver carcinogenesis”, Chapel Hill, NC
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 13. Brown, ME, Turman, CA, and **Malarkey, DE**. Mar 2000. PCR-based clonality analysis of canine B- and T-cell lymphosarcoma using paraffin-embedded tissues. 2000 NCSU-CVM Research Forum, Raleigh NC.
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 35. Proulx, DR, Ruslander, DM, **Malarkey, DE**, and Thrall, DE. 2004. Epidermal growth factor receptor expression in canine epithelial neoplasms. Vet Cancer Society, Annual Meeting.
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 37. Satoh, H, Foley, J, Maronpot, RR, and **Malarkey DE**. 2005. Morphological and immunohistochemical characteristics of rat pineal parenchymal tumors in the National Toxicology

- Program studies. 2005 Annual meeting of the Society of Toxicological Pathology, Washington DC.
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 40. **Malarkey, DE**. Comparative pathology of hemangiosarcoma. 2006 Annual Meeting of the Society of Toxicology. San Diego, CA.
 41. Cimon, KY, **Malarkey, DE**, and Miller, RA. Incidence of Mesenchymal Neoplasms In The Nasal Cavity in NTP Rodent Studies. 2006 Annual Meeting of the Society of Toxicological Pathology, Vancouver, BC, Canada.
 42. Singh, B, Bushel, PR, and **Malarkey, DE**. Correlation of transcriptome profiles and histologic alterations for 7 known rodent hepatotoxicants. 2006 Annual Meeting of the Society of Toxicological Pathology, Vancouver, BC, Canada.
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 50. P.W. Farin, **D.E. Malarkey**, J.E. Alexander, and C.E. Farin. 2007. Liver and kidney function in bovine fetuses from embryos produced in vivo or in vitro. Poster presentation at the 2008 International Embryo Transfer Society Annual Conference, Denver, CO. Proceedings in the January, 2008 issue of Journal of Reproduction, Fertility and Development.
 51. K. Shiomitsu, C.L. Johnson, **D.E. Malarkey**, A.F. Pruitt, D.E. Thrall. 2007. Expression of epidermal growth factor receptor (EGFR) in malignant canine epithelial nasal tumors. Annual Meeting of American College of Veterinary Radiology, Chicago, Ill.

52. Kolenda-Roberts, H, Hardisty, J, Elwell, MR, Ernst, H, Greaves, P, Malarkey, DE, Mann, PC, Tellier, L. 2007. Histopathology of hemangiosarcomas in mice and hamsters and liposarcomas/fibrosarcomas in rats associated with PPAR agonists. Annual Meeting of the Society of Toxicologic Pathology, Puerto Rico.
53. Singh, BP, Gerrish K, Vallant M, Irwin R, Boorman G, Tam, S, and **Malarkey, DE**. 2007. Identification of early (90 day) differentially expressed proteins in the rat liver associated with exposure to hepatic carcinogens. Annual Meeting of the ACVP, Savannah, GA.
54. Heatherly, A, Yoshizawa, K, **Malarkey, DE**, Walker, N, and Nyska, A. 2007. A critical comparison of murine pathology and epidemiological data of dioxins and PCBs. Annual Meeting of the Society of Toxicologic Pathology, Puerto Rico.
55. Flagler, N, Ney, E, Johnson, K and **Malarkey, DE**. 2007. Comparison of Current Technologies for Capturing Photomicrographs for Journal Submission. Annual Meeting of the Society of Toxicologic Pathology, Puerto Rico.
56. Flagler, N, Ney, E, Mahler, B, and **Malarkey, DE**. 2007. Publication Images: To Adjust or Not to Adjust. Annual Meeting of the Society of Toxicologic Pathology, Puerto Rico.
57. Brown, D, Paskel, M, Masinde, T and **Malarkey, DE**. 2008. Morphology and cell lineage of chemically induced atypical thymic hyperplasia and lymphoma in p16^{INK4a}/p19^{ARF} and p53 deficient mice. Annual Meeting of the Society of Toxicologic Pathology.
58. Singh, B, Nyska, A, Johansson, SL, **Malarkey, DE**, and MJ Hooth. 2008. Urethral transitional carcinoma and hyperplasia in male B6C3F1 mice treated with tetrachloroazobenzene (TCAB). Annual Meeting of the Society of Toxicologic Pathology.
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60. P. W. Farin, **D. E. Malarkey**, J. E. Alexander and C. E. Farin 2008. Liver and kidney function in bovine fetuses from embryos produced in vivo or in vitro. *Reproduction, Fertility and Development* 20(1) 180 – 180. International Embryo Transfer Society Annual Conference, Denver, CO
61. M.C. Schladweiler, A.D. Ledbetter, J. Shannahan, J.G. Wallenborn, A. Nyska, **D. Malarkey**, J. Richards, H. Tong, R.B. Devlin and U.P. Kodavanti 2008. Subchronic episodic exposure of rats to diesel plus ozone induces minimal cardiopulmonary effects.
62. Haines, WT Borghoff, SJ, **Malarkey, DE**, Painter, TJ, Travlos GS, Thayer, K, Melnick, RL. 2009. Precision-Organ Slice Technology to Evaluate Liver Toxicity of Perfluorinated Compounds (PFCs). 2009 Annual Meeting of Society of Toxicology.
63. Stout, MD. Elmore, SA, Fomby, LM, Foster, PM, Germolec, D, Kissling, GE, **Malarkey, DE** Travlos, GS, Vallant, MK, and Chhabra, R. Evaluation of subchronic toxicity and estrogenicity of an ethanolic extract of black cohosh in female weanling Wistar Han rats exposed by gavage. 2009 Annual Meeting of Society of Toxicology.
64. Winston, JA, Cesta, MF, Hard, GC and Malarkey, DE. 2009. Early Renal Injury and Alpha2u-Globulin Nephropathy May Play a Role in the Development of Renal Neoplasia in Male F344/N Rats Exposed to β -Myrcene. Annual Meeting of the Society of Toxicologic Pathology.
65. Moore, R; Willson, G; Miller, R; Malarkey, DE; and Kissling, G. 2009. Annual Meeting of the Society of Toxicologic Pathology Hepatocholangiocarcinomas in B6C3F1 Mice in National Toxicology Program (NTP) Studies.

66. Medulloblastoma in the F-344 Rat: National Toxicology Program (NTP) Experience. 2009. Rao, DB, *Morrison, JP, **Sato, H, and **Malarkey, DE**. Annual Meeting of the Society of Toxicologic Pathology
67. Walker, NJ, Easterling, M., Nyska, A, Smith, CS, **Malarkey, DE**, Hooth, MJ. 2010. Carcinogenic potency of 2,3',4,4',5-pentachlorobiphenyl (PCB118) in female Harlan Sprague-Dawley rats. Annual Meeting of the SOT.
68. Stout M, Elmore SA, Fomby, LM, Foster, P, Germolec, DR, Kissling, GE, Malarkey, Travlos,GS, Vallant, MK and Chhabra, RS. 2010. Evaluation of subchronic toxicity and estrogenic activity of black cohosh in female weanling Wistar Han rats exposed by gavage. Annual Meeting of the SOT.

INVITED PRESENTATIONS

SCIENTIFIC

1. **Toxicological significance of hepatocyte hypertrophy.** 2009. 10th Annual Meeting of the IET, Tokyo, Japan.
2. **Toxicological significance of hepatocyte hypertrophy.** 2009. Daichi Sankyo, Pathology and Safety Group, Tokyo, Japan
3. **Comparative Pathology of Cancer: Animal Models in the NTP.** 2009. Tokyo University, College of Veterinary Medicine, Dept of Pathology, Japan.
4. **Genomics of liver toxicity and carcinogenesis.** 2009. Contemporary topics in toxicologic pathology at University of Illinois, College of Veterinary Medicine.
5. **Comparative Pathology of Cancer: Animal Models in the NTP.** 2009. Tufts University Cummings School of Veterinary Medicine, MA.
6. **Comparative Pathology of Cancer: Animal Models in the NTP.** 2009. Boston University School of Medicine, Dept of Pathology, Boston, MA.
7. **Pathology of treatment-induced hemangiosarcoma in NTP studies.** 2008 at the Society of Toxicology's Current Concepts in Toxicology workshop on "Hemangiosarcoma in Rodents: Mode-of-action evaluation and human relevance". The workshop was held on December 4-5, 2008 in Arlington Virginia
8. **Overview of the National Toxicology Program Pathology Review.** 2008. The Ohio State University, Dept of Pathology.
9. **Fantastic Voyage: Functional Anatomy of the liver.** 2008. EPA and Integrated Lab Systems, Dept Seminar series, RTP NC.
10. **Relevance of animal tumors to human disease.** January 2007. Invited speaker. Joint meeting of the US TLVS and German MAKs commission advisory panels. Washington, DC.
11. **Comparative pathology of hemangiosarcoma.** 2006 Annual Meeting of the Society of Toxicology. San Diego, CA
12. **New insights into the functional anatomy of the liver.** February 2005. NIEHS and NCT Toxicologic Pathology Team meeting, NIEHS
13. **Toxicogenomics of the liver: interpreting cell toxicity and neoplasia.** September, 2004. Invited speaker. NCSU Toxicology Department Seminar Series. Raleigh, NC.
14. **The liver in toxicogenomics studies.** July, 2004. Invited speaker. NIEHS toxicogenomics seminar series.
15. **New insights into the functional aspects of hepatic morphology.** Invited speaker. June 2004. Society of Toxicologic Pathology International Symposium, Salt Lake City, Utah.

16. **Microarray data analysis of rodent neoplasia.** Invited speaker. June 2004. Society of Toxicologic Pathologists International Symposium, Salt Lake City, Utah.
17. **Genetics of chlordane-associated tumor regression in B6C3F1 mice.** Dec. 2001. Annual Meeting of the American College of Veterinary Pathologists, Salt Lake City, Utah.
18. **Molecular Basis of Mouse Hepatocarcinogenesis.** April 2000. NCSU Toxicology Department Seminar Series. Raleigh, NC.
19. **Mutations in the H-ras protooncogene: Clues to the etiology of mouse liver tumorigenesis?** Fall 99, Dept. of Microbiology, Pathology, and Parasitology Research in Progress seminar series; NCSU-CVM.
20. **Laser Capture Microdissection detection of H-ras mutations in hepatoproliferative lesions in mice: reliability and pitfalls.** 1999. Invited speaker. NIH Conference on Laser Capture Microdissection, Bethesda, Md. and at CIIT post-doc seminar series, Research Triangle Park, NC.
21. **Diagnostic molecular pathology in veterinary medicine.** 1998. Invited speaker. Session on Advances in Diagnostic Pathology. Annual Meeting of the American College of Veterinary Pathologists, St. Louis, MO.
22. **Helicobacter hepatitis in mice: Diagnosis and pathogenesis.** 1998. Invited speaker. C.L. Davis DVM Foundation Continuing Education Symposium on "Current Issues in Toxicologic Pathology", College of Veterinary Medicine, North Carolina State University, Raleigh, North Carolina, June 14-18.
23. **Strain differences in H-ras proto-oncogene activation: chemical-specific and dose responses.** 1997. Invited speaker. Society of Toxicology conference on "Mechanisms of susceptibility to mouse liver carcinogenesis", Chapel Hill, NC.
24. **Slide-based molecular pathology.** 1996. Invited speaker. Session on Advances in Diagnostic Pathology and Oncology, ACVP Educational Program on Neoplasia. Annual Meeting of the American College of Veterinary Pathologists, Seattle, WA.
25. **H-ras proto-oncogene mutations occur in different types of altered hepatocellular foci (AHF) in male B6C3F1 mice treated with TCDD.** Platform presentation. 1996 Annual Meeting of the American College of Veterinary Pathologists, Seattle, WA.
26. **Humoral hypercalcemia associated with cutaneous papillomas in TG.AC transgenic hybrid mice which carry the viable yellow (AVY) agouti allele.** Platform presentation. 1995 Annual meeting of the American College of Veterinary Pathologists, Atlanta, GA.
27. **Polymerase chain reaction and in situ hybridization: Applications in toxicological pathology.** 1995. Invited speaker. Society of Toxicologic Pathologists 14th International Symposium: Toxicologic Pathology of the Liver. San Diego, CA.
28. **Hepatocarcinogenicity of chlordane in B6C3F1 and B6D2F1 male mice: evidence for regression in B6C3F1 mice and carcinogenesis independent of ras proto-oncogene activation.** 1994. Poster/platform. ILSI Mouse Liver Tumor Workshop, Washington D.C.
29. **Techniques to help solve mysterious perinatal deaths.** 1994. Invited speaker. Veterinary Conference and Homecoming, Continuing Education Program for Practicing Veterinarians, College of Veterinary Medicine, North Carolina State University.
30. **Gastrointestinal toxicity of anguidine: contributions to lethality.** 1988. Platform speaker at FASEB Research Conference on Trichothecene, Blue-green, and Marine Toxins: Mechanisms, Detection, and Therapy; Copper Mountain, CO.
31. **The rat as an animal model in breast cancer research.** 1986. Veterinary Student Research Night. Tufts University, Boston.

WORKSHOPS / COURSES

1. **NTP Satellite Symposium at STP.** June 2009. NTP Satellite symposium in conjunction with Society of Toxicologic Pathology International Symposium, San Francisco..
2. **Mystery slide review.** June 2008. NTP Satellite symposium in conjunction with Society of Toxicologic Pathology International Symposium, San Francisco..
3. **NTP Pathology Peer Review.** 2008. Integrated Laboratory Services, Pathology Group. RTP, NC.
4. **Mystery slide review.** June 2007. NTP Satellite symposium in conjunction with Society of Toxicologic Pathology International Symposium, San Juan, Puerto Rico.
5. **Animals models of carcinogenesis.** May, 2005. Invited speaker, Radiation and cancer biology lecture series. Radiation Oncology Dept., Duke University Medical Center.
6. **Pathology techniques for generation X and Y.** November 2004. Invited speaker, NCSU Pathhead Student Pathology Chapter of the ACVP.
7. **Molecular pathology and toxicogenomics: fundamentals and applications.** October 2004. Continuing Education shortcourse. Invited speaker. European Center for Toxicologic Pathology, Royal Veterinary College, United Kingdom
8. **Mystery slide review.** June 2004. NTP Satellite symposium in conjunction with Society of Toxicologic Pathology International Symposium, Salt Lake City, Utah
9. **Molecular pathology of murine hepatocarcinogenesis.** April 2002. Continuing Education shortcourse. Invited speaker along with Dr. R. Maronpot. Meeting of the British Society of Toxicologic Pathologists, Paris, France.
10. **Basics of Molecular Biology and Diagnostic Molecular Pathology:** Dec. 2000. Coordinator and presenter of shortcourse on **Molecular Biology for Veterinary Pathologists.** Annual Meeting of the American College of Veterinary Pathologists, Emelia Island, Fla.
11. **Molecular Pathology for Toxicologic Pathologists: Techniques and Applications.** Nov. 1999. Invited speaker. Continuing Education Course on Molecular Pathology at Annual Meeting of the British Society of Toxicologic Pathologists, London, England.
12. **Molecular Pathology for Toxicologic Pathologists: Techniques and Applications.** 1999 and 1998. Invited speaker. Continuing Education Course on Molecular Pathology at Society of Toxicologic Pathologists 17th and 18th International Symposium, Vancouver, Canada and Washington DC.
13. **Toxicologic Pathology.** Part of a course in basics of toxicologic pathology for toxicologists and technical staff. March 1999. Glaxo-Wellcome, RTP, NC.
14. **Methods of detecting mutations.** 1996. Invited speaker. AFIP Registry of Comparative Pathology's symposium on Oncogenes and other molecular aspects of cancer - a comparative approach; Joint meeting with Society of Toxicologic Pathologists 15th International Symposium, St. Louis, MO.
- 15.

PROFESSIONAL MEETINGS / SYMPOSIA ATTENDED

2003-2009 & 1995-1999 Annual Meeting, Society of Toxicologic Pathologists
2000-2007, 1998, 1996, 1995, 1991 & 1989 Annual Meeting, American College of Veterinary Pathologists
2006 Annual meeting of Society of Toxicology
2002, 1999 British Society of Toxicologic Pathology Annual Meetings, London and Paris
1999 Laser Capture Microdissection and Macromolecular Analysis of Normal Development and Pathology: Advances in Laser Capture Microdissection. NIH, Bethesda, MD.

- 1997 Society of Toxicology satellite meeting on "Susceptibility to Mouse Liver Tumorigenesis", Chapel Hill, NC
1996 AFIP Registry of Comparative Pathology's Symposium on "Oncogenes and other molecular aspects of cancer - a comparative approach", St Louis, MO
1994 ILSI Mouse Liver Tumor workshop
1994 Applications of Apoptosis, La Jolla, CA
1993 Concepts in Molecular Biology by American Society for Investigative Pathology
1988 FASEB Summer Research Conference on "Trichothecene, blue-green algal, and marine toxins: Mechanisms, Detection, and Therapy"

OTHER PROFESSIONAL ACTIVITIES

- Triangle Array Users Group, attendee (1999-2004)
NCSU Oncology Journal Club (1991-present)
NCSU Ophthalmic Pathology Rounds (1991-93, 1997-present)
Triangle Carcinogenesis Club (1994-1997)
Ophthalmic Pathology Conference; coordinator, *Angell Memorial Animal Hospital* ('90-91)
Comparative Oncology Conference; coordinator, *Angell Memorial Animal Hospital* ('89-91)

CONSULTATIONS

- Toxicologic pathology, Contract for EPA, 2001-2002, Dynamac Corp, Environmental Sciences, Durham, NC. Provide assessment and interpretation of rodent carcinogenicity data.
Diagnostic Veterinary Pathology, 1994-2002, Marshfield Clinic, Veterinary Division, Diagnostic Lab, Marshfield, WI
Diagnostic veterinary pathology, 2000-2001. Veterinary Laboratory Services of Rex Healthcare, Raleigh, NC
Pathology Quality Assurance, Contract for National Toxicology Program, 2001-2002, Dynamac Corp, Environmental Sciences, Durham, NC. Performed wet tissue audit and slide review.
Molecular Pathology, Pathology Contract for National Toxicology Program, 1999-2002, Integrated Laboratory Services, Durham, NC.
Diagnostic Veterinary Pathology, 1998-2002, Biogaia Biologics, Raleigh, NC. Review of gastrointestinal pathology in mice and nonhuman primates.
Ad hoc consultant to Expert Panel of Scientists for the Flavor and Extract Manufacturers' Association of the United States, Washington DC, 9/97, on "Molecular biology and risk assessment implications of the mouse liver tumor response".

PEER REVIEW ACTIVITIES

12th NTP Report on Carcinogens, ad hoc member for review of Ridelliline

Board of Scientific Counselors, National Toxicology Program, National Institute of Environmental Health Sciences, Research Triangle Park, NC. 2000-2002.

Scientific review panels (4) for the National Institute of Environmental Health Sciences, NIH, Research Triangle Park, NC. 1998, 1999, and 2001 contract proposals for NTP carcinogenesis and special mechanistic studies.

Peer review participant, Pathology Working Group, National Toxicology Program, 1993-present National Institute of Environmental Health Sciences, Research Triangle Park, NC.

Ad hoc reviewer of submitted manuscripts for Environmental Health Perspectives, Cancer Investigation, Toxicologic Pathology, Toxicology, JAVMA, AJVR, Veterinary Clinical Pathology, Veterinary Ophthalmology, Small Ruminant Research, and Veterinary Radiology and Ultrasound, 1995-present.

TEACHING EXPERIENCE

North Carolina State University, College of Veterinary Medicine:

2006-present	Careers in pathology; 1 lecture/year
2005	General Pathology:Neoplasia VMM 831 /VMM 931
1992-2005	Dermatopathology VMM 841 /VMM 941
1998-2002	Molecular basis of cancer, guest lecture, Adv Cell Bio grad course
1998-2002	Review of Gross Pathology, Resident training
1998-2002	Surgical Pathology, veterinary student selective
1991-present	Surgical Pathology Conference
1991-93, 1997-2002	Training necropsy and surgical pathology to residents VMM977
1991-93, 1997-2002	Techniques in necropsy to senior veterinary students
1998	Patterns of inflammation, guest lecture/lab General Pathology
1997	Molecular Diagnosis of <i>Helicobacter</i> infections (Selective)
1993	Advanced Systemic Histopathology: Cardiovascular VMS 642

Duke University Medical Center, Radiation and Cancer Biology Lecture Series, Durham, NC
2003 and 2005 Animal Models of Carcinogenesis

UNC-Chapel Hill, Toxicology Dept
2007-present Advanced Toxicology / Team leader for Hepatotoxicity

COMMITTEES

2006-present	Education Committee, Society of Toxicologic Pathology
2004-present	Annual NIEHS Science Awards day committee
2004-present	Recruitment Committee, American College of Veterinary Pathologists
2001-present	Training Coordinator committee, American College of Veterinary Pathologists
2001-present	Externship subcommittee, American College of Veterinary Pathologists, chair 2006
2006-present	NIEHS Committee on Promotions II
2001-2006	Education Committee, American College of Veterinary Pathologists , Chair "02/03
2006	Organizing committee, NTP workshop on biomarkers
2006	Search committee, Staff scientist (pathologist), ETP, NIEHS
2006	Rappateur, NTP workshop on significance of rodent reproductive neoplasms.

2006	Program Co-Chair, 3 rd RTP Rodent Pathology Course, Cardiopulmonary, RTP, NC
2005	Chair, Search committee, Staff scientist (pathologist), ETP, NIEHS
2004	Tufts V'89 Reunion Committee co-chair
2004	NIEHS Environmental Toxicology Program Management committee chair
2004	Program Chair, American College of Veterinary Pathologists Annual Meeting, Orlando
2004	Program Co-Chair, 2 nd RTP Rodent Pathology Course, Neuropathology, RTP, NC
2003-2004	National Toxicology Program vision committee
2003	Chair, Search committee, Staff scientist (pathologist), ETP, NIEHS
2002	Program Co-Chair, 1 st RTP Rodent Pathology Course, Reproductive path., RTP, NC
2001	Search committee, Staff scientist, Environmental Toxicology Program, National Institute of Environmental Health Sciences
1999-2002	NCSU CVM Safety Committee
1998-2000	NCSU Library and Educational Resource committee; chair, 1999-2000
1999	Search committee, Clinical Pathology position, Dept. of Microbiology Pathology and Parasitology, College of Veterinary Medicine, NCSU
1999-2001	Search committees, Clinical Oncologist Positions(4), Dept. of Clinical Sciences, College of Veterinary Medicine, NCSU

PROFESSIONAL EDUCATIONAL PROGRAMS

2009	Session co-chair, Pathology of Rodent Cancer , Society Toxicologic Pathology, Annual meeting
2001-present	Organizing committee member and co-chair, 1 st -4 th RTP Rodent Pathology Course, RTP, NC
2006	Session Co-chair, Environmental Respiratory Disease , 2006 Annual Meeting of the Society of Toxicologic Pathology, Vancouver, Canada.
2005	Program Co-chair, National Toxicology Program Satellite Symposium on " Pathology of the Immune System ", Washington DC.
2005	Session Co-chair, Pathology of Metabolic Diseases , 2005 Annual Meeting of ACVP, Boston, MA.
2004	Program Chair, 2004 Annual Meeting of ACVP , Orlando, Fla
2004	Session Chair, Environmental Pathology , 2004 Annual Meeting of ACVP, Orlando, Fla
2003	Session Co-chair, Oxidative stress and tissue injury , 2003 Annual Meeting of ACVP, Banff Canada
2002	Session Chair, Issues in Genetically altered mice in 2002 RTP Rodent Pathology Course, RTP, NC
2002	Concurrent session Co-chair, Cell cycle and cell death , 2002 Annual Meeting of ACVP, New Orleans, Louisiana
2000	Chair, Shortcourse on Molecular Biology for Veterinary Pathologists , given at the Annual Meeting of the American College of Veterinary Pathologists, Emelia Island, Fla

PATHOLOGY SERVICE RESPONSIBILITIES

Administrative:

1999-2002	Assistant Director of Pathology Residency Program
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1999-2002 Asst. Director of Surgical Pathology Service

Veterinary Teaching Hospital service:

1997 - 2002 Clinical Necropsy and Surgical Biopsy Service, NCSU, CVM 45% yearly responsibility, includes instruction of senior veterinary students and pathology residents as well as maintaining and improving the diagnostic pathology service.

STUDENT / RESIDENT MENTORSHIP AND TRAINING

NIEHS Visiting Scientists:

2003-2004 Dr. Hiroshi Satoh

NIEHS pathology trainees:

2003- 2005 Mark Cesta, DVM, DACVP
2003- 2004 Kristi Mozzachio, DVM, DACVP
2003- 2004 Susan Elmore, DVM, DACVP
2005- 2006 Amera Remick, DVM, DACVP
2005- 2007 Nobuko Wakamatsu, DVM, PhD, DACVP
2006- 2007 Becky Moore, DVM, DACVP
2006-present Bhanu Singh, M Sc , DACVP
2008-present Deepa Rao, DVM, PhD
2009-present Michael Boyle, DVM
2009-present

NIEHS Visiting Student Externs and Summer students

2004 Jennifer Spedick, NCSU
2004 Danielle Lewis, NCSU
2004 Stacy Fossey, Louisiana State University
2005 , NCSU
2005 Allison Heatherly, NCSU
2005 Bhanu Singh, Royal Veterinary College, UK
2006 Lyn Wanket, U. of Illinois
2006 Kim Weber, U. of Illinois
2006 Louise Fitzgerald, U. of Sydney, Australia
2006 Alice Liou, UC
2006 Melody Caldwell, Virginia Maryland
2006 Julianne Davis, NCSU
2007 Chris Boyd, Virginia (high school student)
2007 Catherine Benson, U Ill
2008 Cynthia Willson, NCSU
2008 Laura Wilding, NCSU
2008 Mike Nolan, Virginia Maryland
2008 Chris Koivisto, NCSU
2009 Brad Goupil, MN
2009 Janessa Andrews. NCSU
2009 Kristen Lewis

2009 Robert Blair

NCSU Pathology residents:

1991-1993 Jerry Ritchey, DVM, PhD, Pathology resident
1991-1993 Lester Khoo, DVM, PhD, Pathology resident
1992-1993 Steve Anderson, DVM, Pathology resident
1992-1993 John Bond, DVM, Pathology resident
1997-1998 Norman Barlow, DVM, Pathology resident
1997-1998 Audrey Bostian, DVM, Pathology resident
1997-1999 Nikos Gurfield, DVM, Pathology resident
1997-1999 Michael Thibodeau, DVM, Pathology resident, faculty advisor
1998-1999 Kevin Jones, DVM, Pathology resident
1999-2000 Michelle Fleetwood, DVM, Pathology resident, faculty advisor
1999-2001 Brigid Troan, DVM, Pathology resident
2000-2001 David Rotstein, DVM, MS, Pathology resident
2000-2002 Mark Cesta, DVM, Pathology resident and graduate student
2000-2002 Kristen Hobbie, DVM, Pathology resident, faculty advisor
2001-2002 Taylor Reynolds, DVM, Pathology resident
2001-2002 Kristie Karli, DVM, Pathology resident
2001-2002 Susan Elmore, DVM, Pathology resident
2002-2002 Kyleigh Geisller, DVM, Pathology resident

NCSU Veterinary students:

1998-2002 Linda Sands, CVM '02, faculty mentor
1998-2002 Lila Bagshaw, CVM '02, faculty mentor
2000-2002 Jennifer Marin, CVM '04, faculty mentor
2000-2002 Eason Hildreth, CVM '04, faculty mentor
2001-2002 Kristi Pierce, CVM '05, faculty mentor

NCSU student organizations:

1999-2002 Pathheads student pathology club, advisor
1999-2002 Summer research programs symposium, organizer and presenter

NCSU resident / student special projects:

1999 Mari Ellen Brown, CVM '02, summer research intern. **Project: PCR-based clonality assay in the diagnosis of canine B-cell lymphoma.**
2000 Amera Dame, CVM '03, NCSU summer research intern. **Project: GST π expression in a rat model of prostatitis and prostate carcinogenesis.**
2001 Dr. Miriam Kleiter, resident in radiology. **Cox-2 expression in canine nasal tumors.**
2002 Dr. Jeffrey Phillips, resident in oncology **Hsp 70 as a prognostic indicator in canine osteosarcomas.**
2003 James Hummel, CVM '05, NCSU summer research intern. **Brcal expression in chicken ovarian cancer.**
2004 Jennifer Spedick, CVM '06, NIEHS student extern. **MRI microscopy of acetaminophen induced hepatotoxicity in the rat.**

- 2004 Danielle Lewis, CVM '06, NIEHS summer research intern. **2-Butoxyethanol-female rat model of hemolysis and disseminated thrombosis: X-ray characterization of osteonecrosis and growth plate suppression**
- 2005 Carin VanderKlok, CVM '07, NIEHS summer research intern. **Ultrasonic Analysis, In Vivo Analysis of Cardiotoxicity in B6C3F1 Mice**
- 2005 Allison Heatherly, NCSU undergraduate, senior student. NIEHS summer research intern, **The Effects of Early Estrogen Exposure on Bone Density in CD-1 Mice.**
- 2006 Drs. Crystal Johnson and Keiji Shiomitsu, NCSU pathology and oncology residents. **EGFR and VEGF expression in canine nasal tumors.**
- 2007 Dr. Jerome Bennett, NCSU oncology resident. **Comparative genomic hybridization in canine nasal tumors.**

<u>Graduate student committees</u>	<u>Institution</u>	<u>Degree</u>	<u>Date Comp.</u>	<u>Major Advisor</u>	<u>Major</u>
Michele Hawk, DVM	NCSU	M.S.	1999	J. Barnes	Pathology
Donghui Tan	NCSU	M.S.	1999	J. Cullen	Pathology
Larissa Lynn Bailey	NCSU	Ph.D.	2000	T. Simons	Zoology
David Allen	NCSU	Ph.D.	2001	N. Monteiro	Toxicology
Alicia Chavez	NCSU	Ph.D.	2001	D. Shea	Toxicology
Gautam Ghatnekar	NCSU	Ph.D.	2004	I. Smoak	Comp Bio. Sci.
Christopher Houle, DVM	NCSU	Ph.D.	2005	R. Sills	Pathology
Kristen Hobbie, DVM	NCSU	PhD	2009	M. Law	Pathology
Yoshi Azuma, DVM	NCSU	Ph.D.	In Progress	D. Thrall	Cell Biology
Mark Cesta, DVM	NCSU	Ph.D.	In Progress	P. Sannes	Cell Biology
Kevin Woolard, DVM	NCSU	Ph.D.	In Progress	J. Cullen	Molecular Path
Dominique Williams	NCSU	Ph.D.	In Progress	R Smart	Toxicology
Andrea Young	NCSU	Ph.D.	In Progress	M Breen	Molec Oncol

PAST GRANT SUPPORT

Principal Investigator:

DuPont CEA Grant, DuPont Haskell Laboratories, Newark, DE. "Genetics of liver tumor regression in B6C3F1 mice., 7/1/01-6/30/02. \$15,000. Principal investigator: David Malarkey

North Carolina Biotechnology Center/ARG, RTP, NC. "Microarray gene expression analysis of liver tumor regression in B6C3F1 mice". (7/1/00 - 12/31/01). \$20,000. Principal investigator: David Malarkey

DuPont CEA Grant, DuPont Haskell Laboratories, Newark, DE. "Genetics of liver tumor regression in B6C3F1 mice., 2000-2002. \$20,000. Principal investigator: David Malarkey

NCSU-CVM State Research Grant. Frequency and spectrum of H-ras codon 61 mutations in microdissected foci of altered hepatocytes and normal liver in mice exposed to vinyl carbamate and/or TCDD. 1999-2000. \$9475. Principal investigator: David Malarkey

NCSU-CVM State Research Grant. PCR-based clonality analysis of canine B-cell lymphoma in paraffin-embedded tissues. 1999-2000. \$2315. Principal investigator: David Malarkey

NCSU-CVM State Research Grant. Sensitivity and specificity of laser capture microdissection for the detection of *H-ras* codon 61 mutations in hepatoproliferative lesions in B6C3F1 mice. 1998-1999. \$7300. Principal investigator: David Malarkey

NCSU-CVM State Research Grant. Dose effects of diethylnitrosamine on the *H-ras* codon 61 mutation profile in liver tumors of male B6C3F1 and C57/BL mice 1997-1998. \$7408. Principal investigator: David Malarkey

Co-Investigator:

National Institutes of Health. Program Project. "Hyperthermia and perfusion effects in cancer therapy: Animal Core Project". (11/01/00-6/30/04). \$496,819. Principal investigators: Mark Dewhirst, Duke University and Donald Thrall, North Carolina State University.

National Institutes of Health. NIEHS 1T32 ES07311-01 "Environmental Cellular and Molecular Pathology". (7/01/99-6/30/02). Total \$783,456.00. Principal investigator: Ken Adler

US EPA CT826512010 "Cooperative Training in Environmental Sciences Research". (4/01/01-3/31/06). Total; \$3,206,219 (approx.). Principal Investigator: Ken Adler

Animal Health Foundation. "Cellular genomics of canine soft tissue sarcoma" (1/01/03-12/31/04). Total \$100,000. Principal investigator: Matthew Breen

Cavalier Health Foundation. "Identification of Mitogenic receptors associated with chronic valvular heart disease in Cavalier King Charles spaniels". (7/01/01-6/30/02). Total: \$10,258. Principal Investigator: Bruce Keene.

NCSU-CVM State Research Grant. "Efficacy of vinblastine as a single agent in treatment of canine mast cell tumors". (2001-2002). Total: \$15,500. Principal Investigator: Laurel Williams.

US EPA CT826512010 "Cooperative Training in Environmental Sciences Research". (4/01/98-3/31/01). Total; \$1,682,393.00.

NCSU-CVM State Research Grant. Inflammation as a predisposing factor for the development of prostatic dysplasia. 1999-2000. \$19,400 Principal investigator: Lee Robinette

NCSU-CVM State Research Grant. Bartonella species as a cause of chronic debilitating disease in dogs. 1999-2000. \$13,568. Principal investigator: Ed Brietschwerdt

NCSU-CVM State Research Grant. Search for bacterial etiology in canine granulomatous meningoencephalitis (GME). 1998-1999. \$6106. Principal investigator: Nick Sharp

NCSU-CVM State Research Grant. Is canine granulomatous meningoencephalitis (GME) caused by a non-bacterial, infectious agent? 2000-2001. \$14,753. Principal investigator: Nick Sharp

NCSU-CVM State Research Grant. Evaluation of clinical monitoring parameters in doxorubicin-induced cardiotoxicity. 2000-2001. \$5,400. Principal investigator: Theresa DeFrancesco

Quill Medical Inc, Chapel Hill, NC. "Pig wound closure efficacy study using Quill™ sutures". 2000-2002. \$13,385. Principal investigator: Kyle Matthews.

NCSU-CVM State Research Grant. Efficacy of vinblastine as a single agent in treatment of canine mast cell tumors. 2001-2002. \$15,500. Principal investigator: Laurel Williams.

EGFr expression in canine neoplasms. ACVIM. ~\$10,000. Principal Investigator: David Proulx