

## CURRICULUM VITAE

**Name:** Margaret M. Briehl

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Department of Pathology  
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### Education:

B.S. 1981 Microbiology, The University of Arizona  
Honors Program Research Project: The combined effect of serum and polymorphonuclear granule extract on *Neisseria gonorrhoeae*  
Advisor: Dr. Richard Rest

Ph.D. 1988 Molecular and Cellular Biology, The University of Arizona  
Dissertation: Isolation of a set of mutations linked to the *tag-1* locus of *Bacillus subtilis*, which perturb cell surface properties  
Advisor: Dr. Neil H. Mendelson

### Employment/Academic Positions\*:

1/80 - 5/81 Undergraduate Research Assistant  
Department of Medical Microbiology

6/81 - 2/84 Doctoral Research Assistant  
Department of Molecular and Cellular Biology  
Mentor: Dr. Neil Mendelson

3/84 - 5/85 Doctoral Research Assistant  
Department of Genetics and Microbiology  
University of Lausanne, Switzerland  
Mentor: Dr. Dimitri Karamata

6/85 - 1/88 Doctoral Research Assistant  
Department of Molecular and Cellular Biology  
Mentor: Dr. Neil Mendelson

- 2/88 - 1/91 Postdoctoral Trainee  
Department of Biochemistry/Arizona Cancer Center  
Mentor: Dr. Roger L. Miesfeld
- 2/91 - 2/92 Research Associate  
Arizona Cancer Center  
Mentor: Dr. Richard K. Rosenberg
- 2/92 - 6/92 Research Associate  
Swiss Institute for Experimental Cancer Research  
Lausanne, Switzerland  
Mentor: Dr. Peter Cerutti
- 7/92 - 6/93 Research Associate  
Arizona Cancer Center  
Mentor: Dr. Garth Powis
- 7/93 - 6/97 Research Assistant Professor  
Department of Pathology
- 7/97 - 6/03 Assistant Professor  
Department of Pathology
- 7/03 – 6/09 Associate Professor  
Department of Pathology
- 7/09 – pres. Professor  
Department of Pathology
- 7/13 – pres. Vice-Chair  
Cancer Biology Graduate Interdisciplinary Program

\*Except as noted, positions held at the University of Arizona

**Honors, Awards, Grants and Contracts:**

- 1981 Graduation with Highest Distinction; Phi Beta Kappa; Phi Kappa Phi
- 1987 - 1988 NIH Predoctoral Cancer Biology Training Grant
- 1988 - 1991 NIH Postdoctoral Cancer Biology Training Grant
- 1990 - 1991 American Cancer Society, Institutional Seed Grant
- 1993 University of Arizona Foreign Travel Grant
- 1993 - 1994 Phoenix Friends of the Arizona Cancer Center, Research Starter Grant

- 1994 - 1998 U.S. Army Breast Cancer Project - Career Development Award
- 1994 - 1998 U.S. Army Breast Cancer Project - New Investigator Award
- 1996 Pilot Project Grant - Southwest Environmental Health Sciences Center, University of Arizona
- 1996 - 2001 NIH/NCI R29 Award
- 2000 Pilot Project Grant - Southwest Environmental Health Sciences Center, University of Arizona
- 2000 Dean's Research Council Grant
- 2001 - 2003 NIH/NCI: Pilot Project on a Molecular Targets Program Project Grant
- 2001 - 2011 NIH/NCI: RO1 Award
- 2004 - 2011 NIH/NCI: Co-PI for a Research Project with the NAU/AZCC Partnership for Native American Cancer Prevention
- 2008 - 2013 NIH/NCI: Co-PI for a Research Project on a Lymphoma SPORE
- 2009 - pres. NIH/NCI: Co-PI for the Training Program of the NAU/AZCC Partnership for Native American Cancer Prevention

**Committees and Other Service:**

**Local Community**

- 1991 – 1994 Arizona Cancer Center Judge for the Southern Arizona Regional Science Fair
- 1996 Judge, International Science Fair, Tucson, AZ

**University of Arizona**

- 1994 – 1996 College of Medicine Admission Committee, Substitute Interviewer
- 1994 – 1998 Organizer, Apoptosis Journal Club
- 1996 – 1998 Association for Women Faculty, Treasurer/Membership Secretary
- 1997 – 2000 Member, Commission on the Status of Women, University of Arizona
- 1995 Co-organizer, Arizona Cancer Center Workshop on Breast Cancer
- 1997 – 1999 Southwest Environmental Health Sciences Center, Internal Advisory Board

1998 Family and Community Medicine Clerkship Review Committee

1999 – pres. Cancer Biology Interdisciplinary Graduate Program - Student Progress Committee

1999 – 2000 Commission on the Status of Women - Task Force for Ten Year Report

2000 Search committee for a new Arizona Cancer Center Faculty member, in the area of Molecular Genetics/Cell Biology

2000 Arizona Cancer Center Special Projects Team, Fellowship and Graduate Education Programs

2001 Search committee, Arizona Cancer Center and the Arizona College of Public Health, Linda McCartney Breast Cancer Endowed Chair in Biometry

2001 – 2003 Women’s Studies Advisory Committee, Board Member

2001 – 2002 Search committee for a new Faculty member, Department of Pharmacology & Toxicology

2001 – 2002 Planning committee for the Arizona Cancer Center 2002 Annual Research Retreat

2002 – 2004 Dean of the College of Medicine's Committee for Faculty Input on Career Satisfaction and Inclusive Treatment (FIX-IT)

2002 – 2005 College of Medicine, Nominating Committee

2003 – pres. Cancer Biology Interdisciplinary Graduate Program, Executive Committee

2004 – 2005 College of Medicine, Dean’s Faculty Advisory Committee

2004 – 2005 Center of Excellence in Women’s Health, Research Co-Chair

2004 - 2007 American Cancer Society Institutional Seed Grant Review Committee

2004 – 2008 College of Medicine, Student Progress Committee

2005 - pres. Department of Pathology Executive Committee

2007 - 2012 College of Medicine Dean’s Research Council

2007 - pres. Department of Pathology Space Committee

2008 Chair, Department of Pathology Academic Program Review Self-Study Committee

- 2011 Academic Program Review Committee, Cancer Biology Graduate Interdisciplinary Program
- 2012 – pres. American Cancer Society Institutional Seed Grant Review Committee
- 2013 – pres. College of Medicine Academic Promotion and Tenure Committee
- National**
- 1998 – 1999 Peer review Panel Member, U.S. Army Medical Research and Materiel Command Breast 2001 Cancer Research Program, Clinical and Experimental Therapeutics-3 Study Section
- 2002 Peer review Panel Member, U.S. Army Medical Research and Materiel Command Breast Cancer Research Program, Cell Biology-4 Study Section
- 2003 Ad hoc reviewer, U.S. Army Medical Research and Materiel Command Breast Cancer Research Program
- 2003 – 2006 Program Committee, Annual Meeting of the Society for Free Radical Biology and Medicine
- 2004 - 2005 Peer review Panel Member, U.S. Army Medical Research and Materiel Command Prostate Cancer Research Program, Cell Biology-2 Study Section
- 2006 Peer review Panel Member, U.S. Army Medical Research and Materiel Command Prostate Cancer Research Program, Concept Pathobiology-2 Study Section
- 2006 - 2012 Council Member, Society for Free Radical Biology and Medicine
- 2007, 2008 & 2010 Reviewer, National Institute of Health Director's New Innovator Award
- 2008 - 2012 Vice President for Finance, Society for Free Radical Biology and Medicine
- 2012 Reviewer, National Institute of Health Director's New Innovator Award
- 2013 Reviewer, National Institute of Health Special Emphasis Panel, Fellowships: Oncological Sciences

**Editorial Board Service**

- 2010 – pres. *Apoptosis*
- 2013 – pres. *Redox Biology*

**Ad hoc reviewer**

*American Journal of Physiology*

*Antioxidant and Redox Signaling*  
*Apoptosis*  
*Archives of Biochemistry and Biophysics*  
*Archives of Environmental Contamination and Toxicology*  
*Biochemical Pharmacology*  
*Biochemistry and Cell Biology*  
*British Journal of Cancer*  
*Carcinogenesis*  
*Cancer Research*  
*Clinical Cancer Research*  
*Cell Biochemistry and Function*  
*Cell Biology and Toxicology*  
*Cell Death and Differentiation*  
*Clinical Cancer Research*  
*Free Radical Biology & Medicine*  
*Free Radical Research*  
*International Journal of Cancer*  
*International Journal of Environmental Health Research*  
*Life Sciences*  
*Molecular Cancer Therapeutics*  
*Molecular Carcinogenesis*  
*The Journal of Infectious Diseases*  
*Toxicology Letters*

### **Graduate Student Thesis and Dissertation Committees**

Karen Duncan-Achanzar, 1995 M.S. in Toxicology  
Amanda Baker, 1997 Ph.D. in Pharmacology and Toxicology  
Judd Rice, 2000 Ph.D. in Pharmacology and Toxicology  
Marc Oshiro, 2000 Ph.D. in Pharmacology and Toxicology  
Katerina Dvorakova, 2000 Ph.D. in Pharmacology and Toxicology  
Cara Crowley, 2000 Ph.D. in Microbiology and Immunology  
Antonio Baines, 2001 Ph.D. in Pharmacology and Toxicology  
Maria Lluria-Prevatt, 2001 Ph.D. in Cancer Biology  
Suzanne Stratton, 2001 Ph.D. in Cancer Biology  
David Samuelson, 2001 Ph.D. in Cancer Biology  
Michele Taylor, 2002 Ph.D. in Cancer Biology  
Brent Butts, 2002 Ph.D. in Cancer Biology, **Major Advisor**  
Eric Thompson, 2002 Ph.D. in Pharmacology and Toxicology  
Jason Beliakoff, 2003 Ph.D. in Cancer Biology  
Roberto Flores, 2003 Ph.D. in Nutritional Sciences  
Kevin Kwei, 2004 Ph.D. in Cancer Biology  
Kelli Valdez, 2004 Ph.D. in Physiology  
Mike Bachelor, 2004 Ph.D. in Cancer Biology  
Tommy Turbyville, 2005 Ph.D. in Cancer Biology  
Sally Purdom, Ph.D. 2005 Ph.D. in Genetics  
Warner Bair, 2005 Ph.D. in Cancer Biology  
Kara Rogers, 2006 Ph.D. in Pharmacology and Toxicology

Kerri Kislin, 2006 Ph.D. in Cancer Biology  
Claudia Benavente, 2007 Ph.D. in Cancer Biology  
Sarah Wilkinson, 2008 Ph.D. in Cancer Biology, **Major Advisor**  
Rebecca Feldman, 2008 Ph.D. in Cancer Biology  
Clifford Whattcott, 2009 Ph.D. in Medicinal and Natural Products Chemistry  
Geoff Mitchell, 2010 Ph.D. in Cancer Biology  
Melba Jaramillo, 2010 Ph.D. in Cancer Biology, **Major Advisor**  
Natalie Luhtala, 2011 Ph.D. candidate in Cancer Biology  
Monica Yellowhair, 2011 Ph.D. in Pharmacology and Toxicology  
Sara Centauri, 2011 Ph.D. in Cancer Biology  
Heather Tardif, 2011 Ph.D. candidate Cancer Biology, **Major Advisor**  
Kristy Lee, 2012 Ph.D. candidate in Cancer Biology, **Major Advisor**  
Stoyan Angelov, Ph.D. candidate in Physiological Sciences  
Shuxi Qiao, Ph.D. candidate in Pharmacology and Toxicology  
Brenna Rheinheimer, Ph.D. candidate in Cancer Biology  
Miranda Good, Ph.D. candidate in Physiological Sciences  
Jessica Sapiro, Ph.D. candidate in Pharmacology and Toxicology  
Aaron Havas, Ph.D. candidate in Cancer Biology

#### **Publications:**

1. Mendelson, N. H., Thwaites, J.J., Favre, D., Surana, U., Briehl, M. M. and Wolfe, A. (1985) Factors contributing to helical shape determination and maintenance in *Bacillus subtilis* macrofibers. *Ann. Inst. Pasteur Microbiol.* 136A:99-103
2. Briehl, M. M., and Mendelson, N. H. (1987) Helix hand fidelity in *Bacillus subtilis* macrofibers after spheroplast regeneration. *J. Bacteriol.* 169:5838-5840
3. Briehl, M.M., Pooley, H. M. and Karamata, D. (1989) Mutants of *Bacillus subtilis* 168 thermosensitive for growth and wall teichoic acid synthesis. *J. Gen. Micro.* 135: 1325-1334
4. Briehl, M. M., Flomerfelt, F. A., Wu, X.-P. and Miesfeld, R. L. (1990) Transcriptional analyses of steroid-regulated gene networks. *Mol. Endocrin.* 4:287-294
5. Briehl, M. M. and Miesfeld, R. L. (1991) Isolation and characterization of transcripts induced by androgen withdrawal and apoptotic cell death in the rat ventral prostate. *Mol. Endocrin.* 5:1381-1388
6. Flomerfelt, F. A., Briehl, M. M., Dowd, D. R., Dieken, E. S. and Miesfeld, R. L. (1993) Elevated glutathione S-transferase gene expression is an early event during steroid-induced lymphocyte apoptosis. *J. Cell Physiol* 154:573-581
7. Briehl, M. M., Cotgreave, I. A. and Powis, G. (1995) Downregulation of the antioxidant defense during glucocorticoid-mediated apoptosis. *Cell Death Differ.* 2:41-46
8. Powis, G., Briehl, M. and Oblong, J. (1995) Redox signalling and the control of cell growth and death. *Pharmac. Ther.* 68:149-173

9. Briehl, M. M. and Baker, A. F. (1996) Modulation of the antioxidant defence as a factor in apoptosis. *Cell Death Differ.* 3:63-70
10. Baker, A. F., Briehl, M. M., Dorr, R. and Powis, G. (1996) Decreased antioxidant defence and increased oxidant stress during dexamethasone-induced apoptosis: *bcl-2* prevents the loss of antioxidant enzyme activity. *Cell Death Differ.* 3:207-213
11. Gallegos, A., Gasdaska, J.R., Taylor, C.W., Paine-Murrieta, G.D., Goodman, D., Gasdaska, P.Y., Berggren, M., Briehl, M.M. and Powis, G. (1996) Transfection with human thioredoxin increases cell proliferation and a dominant-negative mutant thioredoxin reverses the transformed phenotype of human breast cancer cells. *Cancer Res.* 56:5765-5770.
12. Briehl, M.M. (1996) Apoptosis - New ideas in pathology. *In*, Advances in Pathology and Laboratory Medicine, vol. 9. R.S. Weinstein, A.R. Graham, R.E. Anderson, E.S. Benson, R.S. Cotran, L. Jarett, M.R. Wick and R.E. Zumwalt (eds.), Mosby-Year Book, Inc., Chicago, IL. pp. 431-450
13. Briehl, M.M., Baker, A.F. Siemankowski, L.M. and Morreale, J. (1997) Modulation of antioxidant defenses during apoptosis. *Oncol. Res.* 9:281-285
14. Baker, A., Payne, C. M., Briehl, M. M., and Powis, G. (1997) Thioredoxin, a gene found overexpressed in human cancer, inhibits apoptosis *in vitro* and *in vivo*. *Cancer Res.* 57:5162-5167
15. Payne, C.M., Crowley, C., Washo-Stultz, D., Briehl, M., Bernstein, H., Bernstein, C., Beard, S., Holubec, H., Warneke, J. (1998). The stress-response proteins poly(ADP-ribose) polymerase and NF- $\kappa$ B protect against bile salt-induced apoptosis. *Cell Death Differ.* 5:623-636
16. Yan, Q., Briehl, M., Crowley, C.L., Payne, C.M., Bernstein, H. and Bernstein, C. (1999) The NAD<sup>+</sup> precursors, nicotinic acid and nicotinamide upregulate glyceraldehyde-3-phosphate dehydrogenase and glucose-6-phosphate dehydrogenase mRNA in Jurkat cells. *Biochem. Biophys. Res. Commun.* 255:133-136.
17. Siemankowski, L.M., Morreale, J. and Briehl, M.M. (1999) Antioxidant defenses in TNF-treated MCF-7 cells: Selective increase in MnSOD. *Free Radical Biol. Med.* 26:919-924
18. Briehl, M.M. (2000) Techniques for detection of apoptosis as an endpoint of oxidant exposure. *In*, Models and methods in cell signaling and gene expression: applications to oxidative stress research. Bray, T.M. and Schoene, N. (eds.) OICA International, London
19. Dvorakova, K., Payne, C.M., Tome, M. E., Briehl, M. M., McClure, T. and Dorr, R.T. (2000) Induction of oxidative stress and apoptosis in myeloma cells by the aziridine-containing agent imexon. *Biochem. Pharmacol.* 60:749-758



20. Siemankowski, L.M., Morreale, J., Butts, B.D. and Briehl, M.M. (2000) Increased tumor necrosis factor- $\kappa$  sensitivity of MCF-7 cells transfected with NAD(P)H:quinone reductase. *Cancer Res.* 60:3638-3644
21. Dvorakova, K., Waltmire, C.N., Payne, C.M., Tome, M.E., Briehl, M.M., and Dorr, R.T. (2001) Induction of mitochondrial changes in myeloma cells by imexon. *Blood* 97:3544-3551
22. Tome, M.E., Baker, A.F., Powis, G., Payne, C.M. and Briehl, M.M. (2001) Catalase-overexpressing thymocytes are resistant to glucocorticoid-induced apoptosis and exhibit increased net tumor growth *Cancer Res.* 61:2766-2773
23. Tome, M.E. and Briehl, M.M. (2001) Thymocytes selected for resistance to hydrogen peroxide show altered antioxidant enzyme profiles and resistance to dexamethasone-induced apoptosis. *Cell Death Differ.* 8:953-961
24. Gupta, A., Butts, B., Kwei, K.A., Dvorakova, K., Stratton, S.P., Briehl, M.M. and Bowden, G.T. (2001) Attenuation of catalase activity in the malignant phenotype plays a functional role in an in vitro model for tumor progression. *Cancer Letts.* 173:115-125
25. Dvorakova, K., Payne, C.M., Tome, M.E., Briehl, M.M., Vasquez, M.A., Waltmire, C.N., Coon, A. and Dorr, R.T. (2002) Molecular and cellular characterization of imexon-resistant RPMI8226/I myeloma cells. *Mol. Cancer Therapeutics* 1:185-195
26. Lutz, N.W., Tome, M.E., Aiken, N.R. and Briehl, M.M. (2002) Changes in phosphate metabolism in thymoma cells suggest mechanisms for resistance to dexamethasone-induced apoptosis. A  $^{31}\text{P}$  NMR spectroscopic study of cell extracts. *NMR Biomed* 15:356-366
27. Welsh, S.J., Bellamy, W.T., Briehl, M.M. and Powis, G. (2002) The redox protein thioredoxin-1 (Trx-1) increases hypoxia-inducible factor 1 $\alpha$  protein expression: Trx-1 overexpression results in increased vascular endothelial growth factor production and enhanced tumor angiogenesis. *Cancer Res.* 62:5089-5095
28. Butts, B.D., Kwei, K.A., Bowden, G.T. and Briehl, M.M. (2003) Elevated basal reactive oxygen species and phospho-Akt in murine keratinocytes resistant to ultraviolet B-induced apoptosis. *Mol. Carcinog.* 37:149-157
29. Tome, M.E., Lutz, N.W. and Briehl, M.M. (2003) Overexpression of catalase or Bcl-2 delays or prevents alterations in phospholipid metabolism during glucocorticoid-induced apoptosis in WEHI7.2 cells. *Biochim Biophys Acta* 1642:149-162
30. Efferth, T. Briehl, M.M. and Tome, M.E. (2003) Role of antioxidant genes for the activity of artesunate against tumor cells. *Int. J. Oncol.* 23:1231-1235
31. Butts, B.D., Tran, N.L. and Briehl, M.M. (2004) Identification of a functional peroxisome proliferator activated receptor response element in the 3' untranslated region of the human *bcl-2* gene. *Int. J. Oncol.* 24:1305-1310

32. Tome, M.E., Lutz, N.W. and Briehl, M.M. (2004) Overexpression of catalase or Bcl-2 alters glucose and energy metabolism concomitant with dexamethasone resistance. *Biochim. Biophys. Acta* 1693:57-72
33. Efferth, T., Rauh, R., Kahl, S., Tomicic, M., Böchzelt, H., Tome, M.E., Briehl, M.M., Bauer, R. and Kaina, B. (2005) Molecular modes of action of cantharidin in tumor cells. *Biochem. Pharmacol.* 69:811-818
34. Tome, M.E., Briehl, M.M. and Lutz, N.W. (2005) Increasing the antioxidant defense in WEHI7.2 cells results in a more tumor-like metabolic profile. *Int. J. Mol. Med.* 15:497-501
35. Tome, M.E., Johnson, D.B.F., Rimsza, L.M., Roberts, R.A., Grogan, T.M., Miller, T.P., Oberley, L.W., Briehl, M.M. (2005) A redox signature score identifies diffuse large B-cell lymphoma patients with a poor prognosis. *Blood* 106:3594-3601
36. Tome, M.E., Johnson, D.B.F., Samulitis, B., Dorr, R.T., Briehl, M.M. (2006) Glucose 6-phosphate dehydrogenase overexpression models glucose deprivation and sensitizes lymphoma cells to apoptosis. *Antioxid Redox Signal* 8:1315-1327
37. Chow, H-H.S., Hakim, I.A., Vining, D.R., Crowell, J.A., Tome, M.E., Ranger-Moore, J., Cordova, C.A., Mikhael, D.M., Briehl, M.M., , Alberts, D.S. (2007) Modulation of human glutathione S-transferases by polyphenon E intervention. *Cancer Epidemiol Biomarkers Prev* 16:1662-1666
38. Jaramillo, M.C., Frye, J.B., Crapo, J.D., Briehl, M.M., Tome, M.E. (2009) Increased manganese superoxide dismutase expression or treatment with a manganese porphyrin potentiates dexamethasone-induced apoptosis in lymphoma cells. *Cancer Res.* 69: 5450-5457
39. Skalska, J., Brookes, P.S., Nadtochiy, S.M., Hilchey, S.P., Jordan, C.T., Guzman, M.L., Maggirwar, S.B., Briehl, M.M., Bernstein, S.H. (2009) Modulation of cell surface protein free thiols: a potential novel mechanism of action of the sesquiterpene lactone parthenolide. *PLoS ONE* 4:e8115
40. Wilkinson, S.T., Johnson, D.B.F., Tardif, H.L., Tome, M.E., Briehl, M.M. (2010) Increased cytochrome c correlates with poor survival in aggressive lymphoma. *Oncol Letts* 1:227-230
41. Tome, M.E., Jaramillo, M.C., Briehl, M.M. (2011) Hydrogen peroxide signaling is required for glucocorticoid-induced apoptosis in lymphoma cells. *Free Radical Biol. Med.* 51:2048-2059
42. Jaramillo, M.C., Briehl, M.M., Crapo, J.D., Batinec-Haberle, I., Tome, M.E.(2012) Manganese porphyrin, MnTE-2-PyP<sup>5+</sup>, acts as a pro-oxidant to potentiate glucocorticoid-induced apoptosis in lymphoma cells. *Free Radical Biol. Med.* 52:1272-1284
43. Tome, M.E., Frye, J.B., Coyle, D.L., Jacobson, E.L., Samulitis, B.K., Dvorak, K., Dorr, R.T., Briehl, M.M. (2012) Lymphoma cells with increased antioxidant defenses acquire chemoresistance. *Exp. Ther. Med.* 3:845-852

44. Sertel, S., Tome, M., Briehl, M.M., Bauer, J., Hock, K., Plinkert, P.K., Efferth, T. (2012) Factors determining sensitivity and resistance of tumor cells to arsenic trioxide. *PloS One* 7:e35584
45. Tome, M.E., Lee, K., Jaramillo, M.C., Briehl, M.M. (2012) Mitochondria are the primary source of the H<sub>2</sub>O<sub>2</sub> signal for glucocorticoid-induced apoptosis of lymphoma cells. *Exp. Ther. Med.* 4:237-242.
46. Wilkinson, S.T., Tome, M.E., Briehl, M.M. (2012) Mitochondrial adaptations to oxidative stress confer resistance to apoptosis in lymphoma cells. *Int. J. Mol. Sci.* 13:10212-10228
47. Lee, K., Briehl, M.M., Mazar, A.P., Batinec-Haberle, I., Reboucas, J.S., Glinsmann-Gibson, B., Rimsza, L.M., Tome, M.E. (2013) Copper chelator ATN-224 induces peroxynitrite-dependent cell death in hematological malignancies *Free Radical Biol. Med.* 60:157-167.
48. Briehl, M.M., Unger, J.M., Hummel, M., Pfreundschuh, M., Trümper, L., Ziepert, M., Lenze, D., Schwartz, M., LeBlanc, M.L., Persky, D.O., Miller, T.P., Rimsza, L.M. RICOVER-60 Trial reveals germinal center and redox genes as predictors of survival in diffuse large B cell lymphoma (submitted)
49. Gustafson, H.L., Yao, S., Goldman, B.H., Lee, K., Spier, C.M., LeBlanc, M.L., Rimsza, L.M., Persky, D.O., Miller, T.P., Fisher, R.I., Ambrosone, C. B., Briehl, M.M. Genetic polymorphisms in oxidative stress-related genes are associated with outcomes following anthracycline-based therapy for aggressive B-cell non-Hodgkin lymphoma (submitted)
50. Lee, K., Briehl, M.M., Mazar, A.P., Tome, M.E. copper chelator ATN-224 induces caspase-independent cell death in diffuse large B cell lymphoma (submitted)

## **Scholarly Presentations:**

### **Invited Talks**

#### **Local**

Role of oxidative stress in the mechanism of apoptosis. Cancer Biology Seminar Series, University of Arizona. September 19, 1994

Life and Death in Cancer Cells. Arizona Cancer Center-Sponsored Public Lecture, Green Valley, AZ, March, 1995 and February, 1998

Modulation of antioxidant defenses during apoptosis. NIEHS' 52nd Center Directors' Meeting. Tucson, AZ. December 8-10, 1996

Altered antioxidant defenses affect susceptibility to apoptosis. Cancer Biology Seminar Series, University of Arizona. September 28, 1998

Redox control and apoptosis. Cancer Prevention and Control Seminar Series, University of Arizona. November 29, 2000

Altering apoptosis sensitivity through genetic modulation of antioxidant defenses. Genetics Seminar Series, University of Arizona. October 24, 2001

Apoptosis: A metabolic decision. Special Brown Bag Seminar in Recognition of Research Achievement by College of Medicine's Dean's Research Council Small Grant Recipients, University of Arizona. May 28, 2002

Targeting the Cellular Redox Environment in the Treatment of Lymphoma. Biomedical Engineering Seminar Series. University of Arizona. March 6, 2006

Redox Environment and Treatment Efficacy in Lymphoma. Frontiers in Medical Research Seminar Series. University of Arizona. November 6, 2007.

Targeted Lymphoma Therapy: From Bench to Bedside. Frontiers in Medical Research Seminar Series. University of Arizona. April 28, 2009.

Redox Control of Apoptosis Signaling & Implications for Cancer Therapy. Cancer Biology Seminar Series. University of Arizona, February 8, 2010

Redox-Based Approaches to Lymphoma Treatment. Basic Medical Science Seminar Series. University of Arizona College of Medicine, Phoenix, Arizona, April 28, 2010

### **National/International**

Modulation of antioxidant defenses during apoptosis. 9th Gordon Research Conference on Oxygen Radicals in Biology. Ventura, CA. February 11-16, 1996

Modulation of antioxidant defenses during apoptosis. Second International Conference on Redox Processes and Cancer. Banff, Alberta, Canada. April 7-10, 1997

Techniques for detection of apoptosis as an endpoint of oxidative exposure. 5th Annual Meeting of The Oxygen Society. Washington, D.C. November 19-23, 1998

Altering apoptosis sensitivity through genetic modulation of antioxidant defenses. 6<sup>th</sup> World Congress on Advances in Oncology and 4<sup>th</sup> International Symposium on Molecular Medicine. Hersonissos, Crete, Greece. October 18-20, 2001.

Building and managing a research team. 6th Annual Division of Cancer Biology New Grantee Workshop. Bethesda, MD, September 21-22, 2006.

Building and Leading a Research Team. 7th Annual Division of Cancer Biology New Grantee Workshop. Bethesda, MD, September 19-20, 2007.

Building and Leading a Research Team. National Cancer Institute's Integrative Cancer Biology Program, Junior Investigator Meeting. Bethesda, MD, October 17-18, 2007.

Building and Leading a Research Team. 8th Annual Division of Cancer Biology New Grantee Workshop. Bethesda, MD, September 16-18, 2008.

Building and Leading a Research Team. 9th Annual Division of Cancer Biology New Grantee Workshop. Bethesda, MD, November 16-17, 2009.

Redox-Active Agents as Chemotherapeutics. South African Congress for Pharmacology and Toxicology. Cape Town, South Africa, October 3-6, 2010

Minority Mentoring Workshop Leader, Cancer Biology Training Consortium Meeting, November 2012, La Jolla, CA

### Poster Presentations

The expression of glutathione S-transferase distinguishes mechanisms of lymphocyte apoptosis. Briehl, M. M., Dowd, D. R., Dieken, E. S., Miesfeld, R. L. and Rosenberg, R. K. AACR Conference on Negative Controls on Growth and Their Breakdown during the Pathogenesis of Cancer. Chatham, MA, October 20-24, 1991.

Induction of GST gene expression during hormone-mediated apoptosis. International Conference on Glutathione S-Transferases. Briehl, M. Asilomar Conference Center, Monterey, CA. January 17-20-1993

Cloning of a new form of human NAD(P)H: Quinone acceptor oxidoreductase (NQO) and levels of NQO gene expression during apoptosis. Briehl, M., Gasdaska, P, and Powis, G. AACR 84th Annual Meeting, Orlando, FL, May 19-22, 1993

Downregulation of antioxidant defense genes infers oxidative stress during hormone-mediated apoptosis. Briehl, M. M., Cotgreave, I. A. and Powis, G. Fortieth Harden Conference; Regulation of Gene Expression by Oxidative Stress: Implications for Health and Disease. Nethy Bridge, Scotland, August 29-September 3, 1993

Differences in the antioxidant defense between apoptosis-sensitive and resistant WEHI7.2 cells. Baker, A. F., Powis, G., and Briehl, M.M, American Society for Biochemistry and Molecular Biology, Fall Symposium I, Lake Tahoe, CA, October 7-10, 1994

Oxidative stress during TNF- $\alpha$ -mediated apoptosis of breast cancer cells. Siemankowski, L. M., Morreale, J. and Briehl, M.M. AACR Histopathobiology of Neoplasia Workshop. Keystone, Co. July 21-28, 1996

Studies of the role of oxidative stress in TNF-induced apoptosis of MCF-7 cells. Linda M. Siemankowski, Morreale, J. and Briehl, M.M. AACR Special Conference. Programmed Cell Death. Bolton Landing, NY. October 19-23, 1996.

Effects of antioxidant defenses on TNF-induced apoptosis of MCF-7 cells. Siemankowski, L. M., Morreale, J. and Briehl, M.M. AACR 88th Annual Meeting. San Diego, CA. April 12-16, 1997.

Altering apoptosis by genetic modulation of antioxidant defenses. Briehl, M.M. 15th Annual Meeting, Mountain West Chapter of the Society of Toxicology. Taos, NM. October 16-17, 1997.

Examination of parameters that could influence MCF-7 cells' sensitivity to TNF. Morreale, J., Payne, C. and Briehl, M.M. 15th Annual Meeting, Mountain West Chapter of the Society of Toxicology. Taos, NM. October 16-17, 1997.

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Dexamethasone-induced apoptosis in thymocytes is subject to redox control. Tome, M.E., Jacobson, E.L. and Briehl, M.M. 7th Annual Meeting of the Oxygen Society. San Diego, CA, November 16-20, 2000.

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<sup>31</sup>P MRS of thymoma cell extracts indicates increased phospholipase activity following dexamethasone treatment, in correlation with apoptotic parameters. Tome, M. E., Briehl, M. M. and Lutz, N. W. 9<sup>th</sup> Annual Meeting of the International Society for Magnetic Resonance in Medicine, Glasgow, Scotland, UK, April 23 - 27, 2001.

Resistance to glucocorticoid-induced thymocytes apoptosis is seen in WEHI7.2 cells having an oxidized redox balance. Briehl, M.M., Tome, M.E., Jacobson, E., Dvorakova, K., Dorr, R.T. and Lutz, N. Gordon Research Conference on Cell Death, Queen's College, Oxford, UK, July 15-20, 2001.

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Changes in phospholipid composition in thymoma cells suggest mechanism for resistance to dexamethasone-induced apoptosis. A <sup>31</sup>P NMR spectroscopic study of cell extracts. Lutz, N.W., Tome, M.E. and Briehl, M.M. 10th Annual Meeting of the International Society for Magnetic Resonance in Medicine, Honolulu, HI, May 18-24, 2002.

Increased MnSOD sensitizes thymocytes to steroid-induced apoptosis. Tome, M.E., Beischel, J.A., and Briehl, M.M. 4th International Cell Death Symposium on the Mechanisms of Cell Death. Noosaville, AUS, May 31 - June 3, 2002.

Resistance to glucocorticoid-induced apoptosis is linked to altered glucose metabolism in mouse thymoma cells. Tome, M.E., Briehl, M.M. and Lutz, N.W. 2002. 19<sup>th</sup> Annual Meeting of the European Society for Magnetic Resonance in Medicine and Biology. Cannes, France, August 22-25, 2002.

Overexpression of catalase or Bcl-2 delays or prevents alterations in phospholipid metabolism during glucocorticoid-induced apoptosis. Tome, M.E., Lutz, N.W. and Briehl, M.M. 9th Annual Meeting of the Oxygen Society. San Antonio, TX., November 19-24, 2002. (Published in Free Radic Biol Med 33:S406)

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Increased antioxidant defense alters cellular redox environment and protects against glucocorticoid-induced apoptosis. Nelson, E.R., Dvorakova, K, Briehl, M.M., Tome, M.E.. American Association for Cancer Research 94th Annual Meeting, Washington, D.C., July 11-14, 2003.

Response of cellular metabolism to overexpression of antioxidant enzymes. Tome, M.E., Beischel, J.A., Coyle, D.L., Jacobsen, E.L., Dvorakova, K, Dorr, R.T., Briehl, M.M. 10th Annual Meeting of the Oxygen Society. Seattle, WA, November 20-24, 2003. (Published in Free Radic Biol Med 35:S75)

Downregulated antioxidant defense enzyme expression is correlated with poor survival in DLBCL. Johnson, D.B., Tome, M.E., Rimsza, L.M., Roberts, R.A., Browne, L.W., Grogan, T.M., Miller, T.P., Briehl, M.M. Experimental Biology 2004. Washington, D.C., April 17-24, 2004. (Published in FASEB J. 18:A953)

Modulation of antioxidant defense enzymes alters the apoptotic response to glucocorticoids. Briehl, M.M., Beischel, J.A., Oberley, L.W., Tome, M.E. 3<sup>rd</sup> International Conference on Superoxide Dismutases. Institut Pasteur, Paris, France, June 10-11, 2004.

Decreased MnSOD is correlated with poor survival in DLBCL. Tome, M.E., Johnson, D.B., Rimsza, L.M., Roberts, R.A., Oberley, L.W., Grogan, T.M., Miller, T.P., Briehl, M.M. 3<sup>rd</sup> International Conference on Superoxide Dismutases. Institut Pasteur, Paris, France, June 10-11, 2004.

Tolerance of increased reactive oxygen species protects against glucocorticoid-induced apoptosis in lymphoid cells. Tome, M.E., Nelson, E.R., Beischel, J.A., Margaret M. Briehl. 11<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. St. Thomas, U.S. Virgin Islands, November 17-21, 2004. (Published in Free Radic Biol Med 37:S128)

A redox score based on microarray data identifies lymphoma patients with poor survival. Briehl, M.M., Johnson, D.B., Tome, M.E., Rimsza, L.M., Roberts, R.A., Grogan, T.M., Miller, T.P. 11<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. St. Thomas, U.S. Virgin Islands, November 17-21, 2004. (Published in Free Radic Biol Med 37:S170)



Increased expression of glucose-6-phosphate dehydrogenase sensitizes murine thymocytes to glucocorticoid-induced apoptosis. Johnson, D.B., Tome, M.E., Briehl, M.M. American Association for Cancer Research 96<sup>th</sup> Annual Meeting, Anaheim, Calif., April 16-20, 2005.

Metabolic phenotypes of cells resistant to oxidative stress and apoptosis: common patterns and variations in glycolysis and glutaminolysis observed in 6 thymocyte cancer variants. Lutz, N.W., Tome, M.E., Briehl, M.M. 13<sup>th</sup> Scientific Meeting of the International Society for Magnetic Resonance in Medicine, South Beach, Miami, Florida, May 7-13, 2005.

Integrated metabolomic NMR spectroscopy (MRS) contributes to the elucidation of metabolic events characteristic of apoptosis. Lutz, N.W., Tome, M.E. and Briehl, M.M. 1<sup>st</sup> Scientific Meeting of the Metabolomics Society. Tsuruoka City, Japan. June 20-23, 2005.

The cellular redox environment as a target in the treatment of lymphoma. Briehl, M.M., Johnson, D.B.F, Tome M.E., Rimsza, L.M, Roberts, R., Grogan, T.M, Miller, T.P. Think Tank on Molecular Targets in Lymphoid Malignancies, Bethesda, Maryland, August 24-26, 2005.

Redox control of drug resistance in lymphoma. Tome, M.E., Rudinsky, S., Johnson, D.B. and Briehl, M.M. 10<sup>th</sup> Annual World Congress on Advances in Oncology and 8<sup>th</sup> International Symposium on Molecular Medicine. Crete, Greece. October 13-15, 2005.

Glucose 6-phosphate dehydrogenase overexpression models glucose deprivation and sensitizes lymphoma cells to apoptosis. Johnson, D.B.F., Briehl, M.M., Samulitis, B., Dorr, R.T., Tome, M.E. 12<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. Austin, TX, November 16-20, 2005. (Published in Free Radic Biol Med 39:S163)

Cellular redox environment influences the chemotherapeutic response in lymphoid cells. Tome, M.E, Beischel, J.A., Coyle, D.E., Jacobson, E.L., Samulitis, B., Dorr, R.T., Rudinsky, S. and Briehl, M.M. 12<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. Austin, TX, November 16-20, 2005. (Published in Free Radic Biol Med 39:S170)

Tolerance of oxidative stress and maintenance of mitochondrial hexokinase as a mechanism of resistance to lymphoma treatment. Tome, M.E., Johnson, D.B.F., Briehl, M.M. Keystone Meeting on, "Metabolomics: From Bioenergetics to Apoptosis. Snowbird, UT, April 2-7, 2006.

Integrated metabolomic NMR spectroscopy of cells resistant to apoptosis: Variations in glycolysis, glutaminolysis and energy metabolism observed in 6 thymic lymphoma variants. Lutz, N.W., Tome, M.E., Briehl, M.M. Keystone Meeting on, "Metabolomics: From Bioenergetics to Apoptosis. Snowbird, UT, April 2-7, 2006.

Induced major histocompatibility class II (MHCII) expression does not alter chemosensitivity, radiosensitivity, redox potential, or proliferation rate in a CIITA-transfected diffuse large B Cell Lymphoma (DLBCL) cell line. Glinsmann-Gibson, B.J., Cycon, K.A., Murphy, S.P., Miller, T.P., Grogan, T.M., Tome, M.E., Briehl, M.M., Rimsza, L.M. 48<sup>th</sup> Annual Meeting of the American Society of Hematology, Orlando, FL, December 9-12, 2006 (Published in Blood 108(11):2040)

Pharmacologic and genetic manipulation of MnSOD increases the sensitivity of lymphoid cells to glucocorticoid-induced apoptosis. Tome, M.E., Frye, J.B., Crapo, J.D., Larry W. Oberley, L.W., Briehl, M.M. 13<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. Denver, CO, November 15-19, 2006. (Published in Free Radic Biol Med 41:S114)

Mitochondrial alterations in apoptosis-resistant lymphoma. Wilkinson, S.T., Margaret E. Tome, M.E., Briehl, M.M. 13<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. Denver, CO, November 15-19, 2006. (Published in Free Radic Biol Med 41:S115)

Mechanisms of apoptosis resistance in oxidative stress-resistant lymphoma. Wilkinson, S.T., Tome, M.E., Briehl, M.M. American Association for Advancement of Science, Annual Meeting, Feb 15-19, San Francisco, CA, 2007.

Ability to remove or tolerate increased hydrogen peroxide is a critical determinant of steroid-induced apoptosis sensitivity in lymphoid cells. Tome, M.E., Frye, J.B., Briehl, M.M. Keystone Meeting on Cell Death Pathways, Monterey, CA, April 15-19, 2007.

Mitochondria: A crossroads for oxidative stress and apoptosis resistance in lymphoma. Wilkinson, S.T., Tome, M.E., Johnson, D.B.F., Briehl, M.M. 14<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. Washington, D.C., November 14-18, 2007.

Removal of hydrogen peroxide by catalase-overexpressing lymphocytes protects against steroid-induced apoptosis. Jaramillo, M.C., Tome, M.E., Briehl, M.M. 14<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine. Washington, D.C., November 14-18, 2007.

Model systems for investigating the cancer risk from environmental uranium: Lymphoma cell lines and yeast cells take up uranium from culture media. Kahn, C., Edgewater, L., Creamer, J., Ennis, H.E., Ingram, J.C., Briehl, M.M.. American Association for Cancer Research Conference on The Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved. Atlanta, GA, November 27-30, 2007.

Role of hydrogen peroxide in glucocorticoid-induced lymphoid cell apoptosis. Tome, M.E., Jaramillo, M.C., Briehl, M.M. Cell Death and Cellular Senescence Keystone Meeting. Breckenridge, CO, February 7-12, 2008.

Ratio of thioredoxin to thioredoxin-interacting protein does not dictate thioredoxin activity but may be important for patient survival in lymphoma. Tardif, H.L., Tome, M.E., Root, J.L., Roberts, R.A., Rimsza, L.M., Briehl, M.M. 99<sup>th</sup> Annual Meeting of the American Association for Cancer Research, San Diego, CA, April, 2008.

Manganese porphyrin increases oxidative stress and sensitizes lymphoma cells to glucocorticoid-induced apoptosis. Jaramillo, M.C., Tome, M.E., Crapo, J.D., Briehl, M.M. 15<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine, Indianapolis, IN, November 19-23, 2008.

C/EBP $\beta$  and MnSOD as targets of mTOR inhibitors in mantle cell lymphoma. Tardif, H.L., Tome, M.E., Briehl, M.M. 100<sup>th</sup> Annual Meeting of the American Association for Cancer Research. Denver, CO, April 18-22, 2009.

Manganese porphyrins as novel chemosensitizers for lymphoma treatment. Jaramillo, M.C., Crapo, J.D., Briehl, M.M., Tome, M.E. 100<sup>th</sup> Annual Meeting of the American Association for Cancer Research. Denver, CO, April 18-22, 2009.

Involvement of oxidative stress in the anti-tumor effect of mTOR inhibitors in mantle cell lymphoma. Tardif, H.L., Tome, M.E., Briehl, M.M. Frontiers in Basic Cancer Research, Boston, MA, October 8-11, 2009.

Mitochondria are the primary source of the hydrogen peroxide signal in glucocorticoid-induced lymphoma cell apoptosis. Lee, K., Tome, M.E., Jaramillo, M.C., Briehl, M.M. 16<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine, San Francisco, CA, November 18-22, 2009.

Manganese porphyrin acts as a pro-oxidant to enhance glucocorticoid-induced apoptosis in lymphoma. Jaramillo, M.C., Crapo, J.D., Briehl, M.M., Tome, M.E. 16<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine, San Francisco, CA, November 18-22, 2009.

Hydrogen peroxide signaling is required for glucocorticoid-induced apoptosis in lymphoma. Jaramillo, M.C., Tome, M.E., Lee, K., Briehl, M.M. Cell Death Pathways: Apoptosis, Autophagy and Necrosis Keystone Meeting, Vancouver, BC, Canada March 12-17, 2010.

Manganese porphyrin glutathionylates the p65 subunit of NF- $\kappa$ B to potentiate glucocorticoid-induced apoptosis in lymphoma cells. Jaramillo, M.C., Margaret M. Briehl, M.B., Tome, M.E. 17<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine, Orlando, FL, November 17-21, 2010.

Glucocorticoid resistance in lymphoma cells mediated by hydrogen peroxide removal and dysregulation of MAPK signaling. Tome, M.E., Jaramillo, M.C. and Briehl M.M. 17<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine, Orlando, FL, November 17-21, 2010.

Genetic polymorphisms in oxidative stress-related genes correlated with outcome following anthracycline-based therapy for aggressive B-cell non-Hodgkin lymphomas. Tardif, H.L., Yao, S., Goldman, B.H., Spier, C.M., LeBlanc, M.L., Rimsza, L.M., Persky, D.O., Miller, T.P., Fisher, R.I., Ambrosone, C.B., Briehl, M.M. 52<sup>nd</sup> Annual Meeting of the American Society of Hematology, Orlando, FL, December 4-7, 2010.

Increasing superoxide by targeting copper to overcome drug resistance in lymphomas. Lee, K., Briehl, M.M, Tome, M.E. VII Meeting of the SFRBM South American Group Sao Pedro, Sao Paulo, Brazil August 17-21, 2011.

Role of MnSOD and hydrogen peroxide in rapamycin-induced cytostasis. Tardif, H.L., Tome, M.E., Briehl MM. AACR: Molecular Targets and Cancer Therapeutics. San Francisco, CA, November 12-16, 2011.

Targeting copper as an adjuvant to current lymphoma therapies. Lee, K., Briehl, M.M, Tome, M.E. 18th Annual Meeting of the Society for Free Radical Biology and Medicine, Atlanta, GA, November 16-20, 2011.

Rapamycin treatment of mantle cell lymphoma inhibits mTORC2 signaling, resulting in increased MnSOD expression and hydrogen peroxide generation. Briehl, M.M., Gustafson H.L., Lee, K., Tome, M.E. 19th Annual Meeting of the Society for Free Radical Biology and Medicine, San Diego, CA, November 14-18, 2012.

Jaramillo, M.C., Briehl, M.M., Batinic-Haberle, I., Tome, M.E. Inhibition of the electron transport chain via the pro-oxidative activity of manganese porphyrin-based SOD mimetics modulates bioenergetics and enhances the response to chemotherapy. 20th Annual Meeting of the Society for Free Radical Biology and Medicine, San Antonio, TX, November 20-24, 2014.

## **Teaching and Advising:**

### **Laboratory Research**

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|--------------|--|
| 1997 - 2002  | Dissertation Director for Brent Butts, Doctoral Candidate in the Cancer Biology Interdisciplinary Graduate Program     |
| 2004 - 2008  | Dissertation Director for Sarah Wilkinson, Doctoral Candidate in the Cancer Biology Interdisciplinary Graduate Program |
| 2007 - 2010  | Dissertation Director for Melba Jaramillo, Doctoral Candidate in the Cancer Biology Interdisciplinary Graduate Program |
| 2007 - 2011. | Dissertation Director for Heather Tardif, Doctoral Candidate in the Cancer Biology Interdisciplinary Graduate Program  |
| 2009 – 2012  | Dissertation Director for Kristy Lee, Doctoral Candidate in the Cancer Biology Interdisciplinary Graduate Program      |

### **University Courses**

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|--------------|---|
| 1995 - pres. | Course Co-Director, Basic Human Pathology (Graduate-Level Course)       |
| 1997         | Course Co-Director, Cancer Biology Graduate Student Research Colloquium |

- 1998 - 2012 Course Director, Cancer Biology Graduate Student Research Colloquium
- 1998 - 2006 Lecturer and Laboratory Instructor, General and Systemic Pathology University of Arizona College of Medicine Curriculum
- 1999 – 2011 Lecturer, Cancer Genetics (Graduate-Level Course)
- 2000 Exam and Grading Coordinator, General and Systemic Pathology University of Arizona College of Medicine Curriculum
- 2000 - 2004 Lecturer, Molecular and Cellular Toxicology (Graduate-Level Course)
- 2005 Lecturer, SAVAHCS Molecular Biology Lecture Series
- 2006 - pres. Lecturer and Laboratory Instructor, Foundations Block, AzMed, University of Arizona College of Medicine Curriculum
- 2007 - pres. Lecturer and Laboratory Instructor, Life Cycle Block, AzMed, University of Arizona College of Medicine Curriculum
- 2008 - pres. Lecturer and Laboratory Instructor, Cancer Block, AzMed, University of Arizona College of Medicine Curriculum
- 2011 – pres. Lecturer, Cancer Biology Graduate Interdisciplinary Program Core Curriculum