

## **CURRICULUM VITAE**

### **R. TIMOTHY MULCAHY, Ph.D.**

Born: May 4, 1951, Glens Falls, New York

#### **EDUCATION**

1973            B.A. in Biology with Distinction, University of Rochester  
1979            Ph.D. (Pathology and Radiological Sciences), University of Wisconsin-Madison,  
                  Thesis title: "Quantitative Radiation Biology of the Thyroid Gland: Cell  
                  Survival, Neoplasia and Hormonal Effects"

#### **CURRENT POSITION**

2005-present Vice President for Research, University of Minnesota  
2005-present Professor of Biochemistry, Molecular Biology and Biophysics, University of  
                  Minnesota

#### **PREVIOUS POSITIONS**

2001-2005     Associate Vice Chancellor for Research Policy, University of Wisconsin  
1999-2004     Professor of Pharmacology, University of Wisconsin  
1996-2004     Associate Dean for Biological Sciences, Graduate School, University of  
                  Wisconsin  
1991-1999     Professor of Human Oncology, University of Wisconsin  
1985-1991     Associate Professor of Human Oncology, University of Wisconsin  
1981-1985     Assistant Professor of Oncology in Pathology and the University of Rochester  
                  Cancer Center; Division of Experimental Therapeutics, University of Rochester  
                  School of Medicine and Dentistry  
1980-1981     NIH Postdoctoral Fellow, University of Rochester Cancer Center  
1979-1981     Instructor/Fellow, University of Rochester Cancer Center

#### **BOARD SERVICE**

2007-present   Minneapolis Regional Chamber of Commerce; Board of Directors  
2005-present   BioBusiness Alliance of Minnesota; Board of Directors  
2005-2007      University Enterprise Laboratories, Board of Directors  
2007-2009      University Industry Demonstration Partnership, GUIRR, NAS; Vice President,  
                  President-Elect

**CONSULTING, GRANT AND MANUSCRIPT REVIEW**

1. Grant Review:
  - a. NIH, Division of Research Grants Study Section
    - i. Chair, Experimental Therapeutics I Study Section, 1993-1995
    - ii. Member, Experimental Therapeutics I Study Section, 1990-1995
    - iii. Member, NIH National Review Reserve, 1995-present
    - iv. ET-1 representative to NIH Director's Study Section Chairman's Meeting, 1/92
  - b. Ad Hoc Reviews (NIH-DRG)
    - i. Experimental Therapeutics Study Section, 2/89, 2/90, 6/90
    - ii. Ad Hoc RFA Review Committee, Boron-Neutron Capture Therapy, 7/90
    - iii. Small grants to stimulate correlative laboratory studies and clinical trials in radiation therapy, 8/91
    - iv. Ad Hoc Review, DOE; Nuclear Medicine Research Program-Boron Neutron Capture Therapy, 8/92
    - v. Ad Hoc Review, Minority Biomedical Research Support, Fisk University, 6/96
  - c. Site Visit Review (NIH-DRG)
    - i. Colorado State University, "Comparative Oncology Research Program", 1/89
    - ii. Case Western Reserve University, "Modulation of Alkylating Agent Chemotherapy in Colon Cancer", 7/89
    - iii. Case Western Reserve University, "Modulation of Alkylating Agent Chemotherapy in Colon Cancer, 7/90
    - iv. Colorado State University, "Comparative Oncology Research Program", 9/90
    - v. Johns Hopkins University, "Novel Strategies for Chemoprotection Against Cancer", 6/00
  - d. Expert Reviewer for Other Funding Programs
    - i. Medical Research Council – Canada, Grant Reviewer (1/90, 10/90, 6/96)
    - ii. Allegheny-Singer Research Institute, Grant Reviewer (3/90, 8/90)
    - iii. American Cancer Society, Grant Reviewer (8/92)
    - iv. Association for International Cancer Research
2. Consulting:
  - a. Invited review for "The Basic Science of Oncology", I.F. Tannock and R.P. Hill (eds.), Pergamon Press, New York, 1987. (Chap. 7, Radiation Carcinogenesis).
  - b. Ad Hoc Advisory Group, Chemical and Biological Modifiers Committee, RTOG, 1/90
  - c. Consultant, Lange Medical Publication, 5/90
  - d. Consultant, Modification of Hyperthermia Response, PO1 application – Thomas Jefferson University Hospital, D. Leeper, PI

- e. Consultant, Radiation and Free Radical Biology Graduate Program and Training Grant, University of Iowa, Iowa City, IA
  - f. External Advisory Committee, “Exploiting Base Repair Processes in Human Cancers”, PO1 program, Case Western Reserve University, T.J. Kinsella, PI, 2001-present.
3. Reviewing:
- a. Editorial Board Appointments
    - i. Associate Editor: Journal of Cellular Pharmacology, 9/91-12/96
    - ii. Associate Editor: Radiation Research, 7/93-6/96
    - iii. Invited to Serve on Editorial Board, The Biochemical Journal, 1998. Declined because of Associate Dean responsibilities.
  - b. Manuscript Review
    - i. Archives of Biochemistry & Biophysics
    - ii. Biochemical Journal
    - iii. Biochimica Biophysica Acta
    - iv. Biochemical Pharmacology
    - v. British Journal of Cancer
    - vi. Cancer Chemotherapy Pharmacology
    - vii. Cancer Research
    - viii. Cancer Treatment Reports
    - ix. European Journal of Cancer and Clinical Oncology
    - x. Free Radical Biology and Medicine
    - xi. In Vitro
    - xii. International Journal of Cancer
    - xiii. International Journal of Hyperthermia
    - xiv. International Journal of Peptide and Protein Research
    - xv. International Journal of Radiation Biology
    - xvi. International Journal of Radiation Oncology, Biology and Physics
    - xvii. Journal of Biological Chemistry
    - xviii. Journal of Cellular Physiology
    - xix. Journal of Clinical Investigation
    - xx. Journal of Histochemistry and Cytochemistry
    - xxi. Journal of the National Cancer Institute
    - xxii. Journal of Physiology
    - xxiii. Molecular and Cellular Biochemistry
    - xxiv. Molecular Pharmacology
    - xxv. New England Journal of Medicine
    - xxvi. Oncology
    - xxvii. Radiation Research

**FACILITY DIRECTOR**

Analytical Laboratory Shared Facility, UWCCC, 1990-1996

Radiation Sources Shared Facility, UWCCC, 1985-1993

**TEACHING**

1. Graduate Program Affiliations:
  - a. Member, Medical Scientist Training Program, 1997-present
  - b. Member, Oncology Training Program, 1999-present
  - c. Member, Graduate Faculty, Environmental Toxicology Center, 1994-present
  - d. Member, Graduate Faculty, Molecular and Cellular Pharmacology, 1997-2001
  - e. Member, Graduate Faculty, Human Cancer Biology, 1985-1999
  - f. Program Director, Graduate Training Program in Human Cancer Biology (5T32-CA09471), 1995-1997
  
2. Course Director and Primary Lecturer:
  - a. General Pathology (for graduate students in medically related disciplines), University of Rochester, 1981-1985
  - b. Cancer Biology (for graduate students and postdoctoral trainees), University of Rochester, 1985
  - c. \*Radiation Biology (for residents in Diagnostic and Therapeutic Radiology and Nuclear Medicine), 1986-1989
  - d. \*Special Topics in Human Cancer Biology (for graduate students and postdoctoral trainees), Experimental Techniques for Assessing Response to Cancer Treatment, 1988-1989
  - e. \*Human Oncology 620, Pharmacology of Anti-Cancer Agents (graduate students), 1990, 1991, 1993
  - f. \*Human Oncology 704, Introduction to Cancer Treatment (Originator; course director), 1994, 1996
  - g. \*Human Oncology 721, Module 1, Introduction to Tumor Biology (course director; sole lecturer), (graduate students), 12 lectures, 1993, 1994
  - h. \*Human Oncology 770, Student Seminar Course (for graduate students in Human Oncology)
  - i. \*Human Oncology 721, Pathophysiology of Neoplasia and Introduction to Cancer Therapy, 19 - 75 minute lectures, 1998
  
3. Lecturer:
  - a. \*Human Oncology 402: Introduction to Human Cancer Biology (graduate students)
  - b. \*Human Oncology 410: Radiation Biology (graduate students)
  - c. \*Pathology 703: General Pathology (1<sup>st</sup> year medical students)
  - d. \*Neoplasia Course: Second Year Medical School Program

- e. \*Pharmacology 461 (undergraduates in the Pharmacology program)
  - f. \*Pharmacology 727: Cancer Chemotherapy (2<sup>nd</sup> year medical students)
  - g. \*Nursing 802: AFraud and Misconduct@  
\*While at the UW-Madison
4. Teaching Awards:
- a. UW Distinguished Teaching Award Nominee, 1993
  - b. Recognized by DHO Graduate Students as Outstanding Teacher, 1995
  - c. Departmental Representative, Faculty Symposium on "Teaching at a Major Research University: Values and Rewards", 5/91

## **GRADUATE STUDENTS AND POSTDOCTORAL TRAINEES**

1. Postdoctoral Trainees:
- a. Juliet W. Brosing, Ph.D., (1983-1985), Department of Physics, Pacifica University, OR
  - b. David F. Gibson, Ph.D., (1990), Galderma Pharmaceuticals, San Diego, CA
  - c. Julie Moran, Ph.D., (1999-2001), University of Colorado, Denver, CO
2. Graduate Students:
- a. Doctoral
    - i. Helen Moinova, Ph.D. awarded 1/99
    - ii. Angela Borel Wild, Ph.D. awarded 8/99
    - iii. Erica Dahl, Ph.D. awarded 6/02
    - iv. Laurie Zipper, Ph.D. awarded 7/02
  - b. Masters
    - i. Eugenia Payseur, M.S., 1990
    - ii. Gregg Ublacker, M.S., 1990
    - iii. Seema Untawale, M.S., 1993
    - iv. Angela Borel, M.S., 1993
    - v. Aileen Erickson, M.S., 2001
3. Medical Fellows (laboratory rotations of 1 or more years):
- a. William Giese, M.D., 1987-1988
  - b. Howard Bailey, M.D., 1990-1992
  - c. Jann Sarkaria, M.D., 1992-1993
  - d. William Noyes, M.D., 1993-1994
  - e. Gregory Ripple, M.D., 1996-1997
  - f. James Thomas, M.D., 1997-1998
4. Medical Students:
- a. David Lange
  - b. Mark Van Handel

## GRANT SUPPORT HISTORY

1. Current:
  - a. None
2. Pending:
  - a. None
3. Past:
  - a. NIH, RO1,  $\gamma$ -GCS Regulation: Regulatory and Catalytic Subunit Genes, 2/1/99-1/31/03 (\$1,036,911 TC), R.T. Mulcahy, P.I. (Y 04: 2/1/02-1/31/03, \$185,273 DC; \$266,793 TC)
  - b. NIH, RO1-CA57549-04, Glutathione Biosynthesis and Drug Resistance, 5/25/96-1/31/00 (\$1,015,232 TC), R.T. Mulcahy, P.I. (Y 06: \$179,573 DC; \$258,585 TC)
  - c. NIH, 5T32-CA09471, Training in Human Cancer Biology, 5/1/94-4/30/99, R.T. Mulcahy, P.D. (Y 12: \$170,907 DC)
  - d. NIH, RO1-CA50595, Radiation and Chemosensitization with Iododeoxyuridine, 2/1/94-1/31/97, T.J. Kinsella, P.I., R.T. Mulcahy, Co-P.I.
  - e. NIH, NO1-CM-17565, Master Agreement: Mechanism of Action and Biochemical Pharmacology of Anti-tumor Agents, R.T. Mulcahy, P.I.
  - f. ACS, DHP-78592, Regulation of  $\gamma$ -GCS Expression and Glutathione-Associated Drug Resistance, 7/1/95-3/31/96, R.T. Mulcahy, P.I. (\$300,000 TC)
  - g. NIH, RO1-CA42325, Radiation Sensitizers: Interactions With Other Modalities, 4/1/90-3/31/94 (years 05-08), R.T. Mulcahy, P.I.
  - h. NIH-NCI, RO1-CA44381, Systemic Hyperthermia and Misonidazole Chemopotentiation, 5/1/87-4/30/90, R.T. Mulcahy, P.I.
  - i. Elsa U. Pardee Foundation, Effect of Tumor Microenvironment on Gene Expression and Drug Resistance, 9/1/89-8/31/90, R.T. Mulcahy, P.I.
  - j. NIH, PO1-CA52686, Growth Factor Alteration of Radiation Response in Tumors, 9/15/90-2/28/94, T.J. Kinsella, P.I., R.T. Mulcahy, Leader, Project 3.
  - k. UWCCC Core Grant Developmental Funds, Determinants of Glutathione Regulation and Chemotherapy of Ovarian Cancer, \$32,215, 8/1/93-3/31/95, R.T. Mulcahy, P.I.

## PUBLICATIONS

1. Clifton, K.H., DeMott, R.K., **Mulcahy, R.T.** and Gould, M.N. Thyroid gland formation from inocula of monodispersed cells: Early results on quantitation, function, neoplasia and radiation effects. *Int. J. Radiat. Oncol. Biol. Phys.* 4:987-990, 1978.
2. DeMott, R.K., **Mulcahy, R.T.** and Clifton, K.H. The survival of thyroid cells following

- irradiation: A directly generated single-dose survival curve. *Radiat. Res.* 77:395-403, 1979.
3. Clifton, K.H. **Mulcahy, R.T.** and DeMott, R.K. The radiobiology of thyroid epithelium: Cell survival and neoplasia. In: Proceedings of the Sixth International Congress of Radiation Research, Okada, S., Imamura, M., Terashima, T. and Yamaguchi, H., eds., Toppan Publishing Co., Tokyo, Japan, 1979.
  4. **Mulcahy, R.T.**, DeMott, R.K. and Clifton, K.H. Transplantation of monodispersed rat thyroid cells: Hormonal effects on follicular unit development and morphology. *Proc. Soc. Exp. Biol. Med.* 163:100-110, 1980.
  5. **Mulcahy, R.T.**, Rose, D.P., Mitchen, J.M. and Clifton, K.H. Hormonal effects on the quantitative transplantation of monodispersed rat thyroid cells. *Endocrinology* 106:1769-1775, 1980.
  6. **Mulcahy, R.T.**, Gould, M.N. and Clifton, K.H. The survival of thyroid cells: *In vivo* irradiation and *in situ* repair. *Radiat. Res.* 84:523-528, 1980.
  7. **Mulcahy, R.T.**, Gould, M.N., Hidvegi, E., Elson, C.E. and Yatvin, M.B. Hyperthermia and surface morphology of P388 ascites tumor cells: Effects of membrane modifications. *Int. J. Radiat. Biol.* 39:95-106, 1981.
  8. **Mulcahy, R.T.**, Siemann, D.W. and Sutherland, R.M. The *in vivo* response of KHT sarcomas to combination chemotherapy with radiosensitizers and BCNU. *Br. J. Cancer* 43:93-99, 1981.
  9. **Mulcahy, R.T.**, Siemann, D.W. and Sutherland, R.M. Nitrosourea-Misonidazole chemotherapy: Effect on KHT sarcoma, bone marrow stem cells and gut. *Br. J. Cancer* 45:835-842, 1982.
  10. Siemann, D.W. and **Mulcahy, R.T.** Cell survival recovery kinetics in the KHT sarcoma following treatment with five alkylating agents and Misonidazole. *Int. J. Radiat. Oncol. Biol. Phys.* 8:619-622, 1982.
  11. **Mulcahy, R.T.** Chemical properties of nitrosoureas: Implications for interaction with Misonidazole. *Int. J. Radiat. Oncol. Biol. Phys.* 8:599-602, 1982.
  12. Watanabe, H., Gould, M.N., Mahler, P.A., **Mulcahy, R.T.** and Clifton, K.H. The influence of donor and recipient age and sex on the quantitative transplantation of monodispersed rat thyroid cells. *Endocrinology* 112:172-177, 1983.
  13. **Mulcahy, R.T.** and Dembs, N.L. Time-dose relationships for simultaneous Misonidazole and 1,3-Bis(2-chloroethyl)-1-nitrosourea exposures *in vitro*. *Cancer*

- Res. 43:3539-3543, 1983.
14. **Mulcahy, R.T.** and Siemann, D.W. *In vivo* chemosensitization by Misonidazole in sensitive and resistant tumor sublines. *Cancer Res.* 43:4709-4713, 1983.
  15. **Mulcahy, R.T.**, Wustrow, D.J. and Kende, A.S. Nitroheterocyclic compounds with an acetohydroxamic acid side chain for treating tumors and method for their use. University of Rochester Reference # UR-0059, November 1983 (patent application).
  16. Gould, M.N., Cathers, L.E., Clifton, K.H., Howard, S., Jirtle, R.L., Mahler, P.A., **Mulcahy, R.T.** and Thomas, F. The influence of *in situ* repair systems on survival of several irradiated parenchymal cell types. *Br. J. Cancer* 49:191-195, 1984.
  17. **Mulcahy, R.T.**, Dembs, N.L. and Ublacker, G.A. Enhancement of nitrosourea cytotoxicity by Misonidazole *in vitro*: Correlation with carbamoylating potential. *Br. J. Cancer* 49:307-313, 1984.
  18. Siemann, D.W. and **Mulcahy, R.T.** Characterization of growth and radiation response of KHT tumor cells metastatic from lung to ovary and kidney. *Clin. Expl. Metastasis* 2:73-81, 1984.
  19. **Mulcahy, R.T.**, Gould, M.N. and Clifton, K.H. Radiogenic initiation of thyroid cancer: A common cellular event. *Int. J. Radiat. Biol.* 45:419-426, 1984.
  20. **Mulcahy, R.T.**, Wustrow, D.J. and Kende, A.S. Preliminary evaluation of isocyanate-generating nitroheterocycles as chemosensitizers, radiosensitizers and hypoxic cell cytotoxic agents. *Int. J. Radiat. Biol. Oncol. Phys.* 10:1609-1613, 1984.
  21. **Mulcahy, R.T.** Effect of oxygen on Misonidazole chemosensitization and cytotoxicity *in vitro*. *Cancer Res.* 44:4409-4413, 1984.
  22. Clifton, K.H., Kamiya, K., **Mulcahy, R.T.** and Gould, M.N. Radiogenic neoplasia in the thyroid and mammary clonogens: Progress, problems and possibilities. In: *Assessment of Risk from Low Level Exposure to Radiation and Chemicals: A Critical Overview*, pp. 329-344, 1985.
  23. **Mulcahy, R.T.** Chemosensitization of CCNU metabolites by Misonidazole. *Br. J. Cancer* 51:733-735, 1985.
  24. **Mulcahy, R.T.**, Rosenkrans, W., Penney, D.P. and Cooper, R.A. Growth and morphology of FRTL-5 thyroid epithelial cells grown as multicellular spheroids *in vitro*. *In Vitro* 21:513-520, 1985.
  25. Brosing, J.W., Keng, P.C. and **Mulcahy, R.T.** Survival characteristics of normal, differentiated rat thyroid cells *in vitro*. *Radiat. Res.* 105:138-146, 1986.

26. **Mulcahy, R.T.**, Wustrow, D.J., Hark, R.H. and Kende, A.S. Radiosensitization by acetohydroxamic acid derivatives of 3-nitropyrazole. *Radiat. Res.* 105:296-306, 1986.
27. Siemann, D.W. and **Mulcahy, R.T.** Sensitization of cancer chemotherapeutic agents by nitroheterocyclics. *Biochem. Pharmacology* 35:111-115, 1986.
28. **Mulcahy, R.T.** Carbamoylation, inhibition of glutathione reductase and chemopotential of nitrosoureas by Misonidazole. *Int. J. Radiat. Oncol. Biol. Phys.* 12:1393-1395, 1986.
29. **Mulcahy, R.T.** Cross-link formation and chemopotential of EMT-6/Ro cells exposed to MISO after CCNU treatment *in vitro*. *Int. J. Radiat. Oncol. Biol. Phys.* 12:1389-1392, 1986.
30. **Mulcahy, R.T.** Misonidazole-induced chemopotential of CCNU toxicity in O<sup>6</sup>-methylguanine-DNA methyltransferase proficient (Mer<sup>+</sup>) and deficient (Mer<sup>-</sup>) cell lines. *Cancer Res.* 46:2892-2897, 1986.
31. Anagnost, J., Bennett, J.M., Sutherland, R.M., Boros, L., Siemann, D.W. and **Mulcahy, R.T.** Evaluation of CCNU and Misonidazole in the treatment of advanced colorectal cancer. *Amer. J. Clin. Oncol.* 10:213-215, 1987.
32. **Mulcahy, R.T.**, Gipp, J.J. and Tanner, M.A. Enhancement of Misonidazole chemopotential by mild hyperthermia (41°C) *in vitro* and selective enhancement *in vivo*. *Int. J. Radiat. Biol.* 52:57-65, 1987.
33. **Mulcahy, R.T.**, Wustrow, D.J., Hark, R.H. and Kende, A.S. Enhancement of CCNU toxicity by acetohydroxamic acid analogues of 3-nitropyrazole. *Investigational New Drugs* 5:281-287, 1987.
34. **Mulcahy, R.T.**, Gipp, J.J. and Tanner, M.A. Sensitization of nitrosourea-resistant Mer<sup>+</sup> human tumor cells to CCNU by mild (41°C) hyperthermia. *Cancer Res.* 48:1086-1090, 1988.
35. **Mulcahy, R.T.**, Carminati, A., Barascut, J.-L. and Imbach, J.-L. A new class of mixed-function drugs associating nitroimidazoles and chloroethylnitrosourea: Aerobic and hypoxic toxicity in nitrosourea-sensitive (Mer<sup>-</sup>) and -resistant (Mer<sup>+</sup>) human tumor cells. *Cancer Res.* 48:798-801, 1988.
36. **Mulcahy, R.T.** and Trump, D.L. Clinical chemosensitization by Misonidazole and related compounds: A critical evaluation. *J. Clin. Oncol.* 6:569-573, 1988.
37. Cohen, J.D., Robins, H.I., **Mulcahy, R.T.**, Gipp, J.J. and Bouck, N. Interactions between

- hyperthermia and irradiation in two lymphoblastic leukemia cell lines *in vitro*. *Cancer Res.* 48:3576-3580, 1988.
38. **Mulcahy, R.T.** The potential for chemosensitization of alkylating agents by nitroimidazoles: Has it been tested in the clinic? *Oncology* 2(12):17-27, 1988.
  39. Grem, J.L., **Mulcahy, R.T.**, Miller, E.M. and Fischer, P.H. Interaction of Deoxyuridine and Fluorouracil and Dipyridamole in a human colon cancer cell line. *Biochem. Pharmacol.* 38:51-59, 1989.
  40. Broising, J.W., Giese, W.L. and **Mulcahy, R.T.** Lack of a differential radiation response for proliferative and non-proliferative rat thyroid cells (FRTL-5) *in vitro*. *Int. J. Radiat. Biol. Oncol. Phys.* 16:1511-1517, 1989.
  41. **Mulcahy, R.T.**, Gipp, J.J., Ublacker, G.A., Panicucci, R. and McClelland, R.A. Cytotoxicity and glutathione depletion by 1-methyl 2-nitrosoimidazole in human colon cancer cells. *Biochem. Pharmacol.* 38:1667-1671, 1989.
  42. **Mulcahy, R.T.**, Gipp, J.J., Carminati, A., Barascut, J.-L. and Imbach, J.-L. Chemosensitization at reduced nitroimidazole concentrations by mixed-function compounds combining 2-nitroimidazole and chloroethylnitrosourea. *Eur. J. Cancer Clin. Oncol.* 25:1099-1104, 1989.
  43. **Mulcahy, R.T.**, Gipp, J.J., Ublacker, G.A. and McClelland, R.A. Enhancement of Melphalan (L-PAM) toxicity by reductive metabolites of 1-methyl-2-nitroimidazole, a model nitroimidazole chemosensitizing agent. *Biochem. Pharmacol.* 40:2671-2676, 1990.
  44. Bailey, H., **Mulcahy, R.T.**, Tutsch, K.D., Rozental, J., Alberti, D., Arzoomanian, R.Z., Tombes, M.B., Trump, D.L. and Wilding, G. A Phase I study of SR-2508 and cyclophosphamide administered by intravenous infusion. *Cancer Res.* 51:1099-1104, 1991.
  45. Kinsella, T.J., Gould, M.N., **Mulcahy, R.T.**, Ritter, M.A. and Fowler, J.F. Integration of cytostatic agents and radiation therapy: A different approach to "proliferating" human tumors. *Int. J. Radiat. Biol. Oncol. Phys.* 20:295-302, 1991.
  46. Ublacker, G.A., Johnson, J., Siegel, F.L. and **Mulcahy, R.T.** Quantitation of glutathione by flow cytometry following conjugation with monochlorobimane: Dependence on cellular glutathione-S-transferase isozyme composition. *Cancer Res.* 51:1783-1788, 1991.
  47. Firestone, A., **Mulcahy, R.T.** and Borch, R.F. Nitroheterocycle reduction as a paradigm for intramolecular catalysis of drug delivery to hypoxic cells. *J. Med. Chem.* 34:2933-

- 2935, 1991.
48. Gipp, J.J., McClelland, R.A. and **Mulcahy, R.T.** DNA damage induced in HT-29 colon cancer cells by exposure to 1-methyl-2-nitrosoimidazole, a reductive metabolite of 1-methyl-2-nitroimidazole. *Biochem. Pharm.* 42:S127-S133, 1991.
  49. Gipp, J.J., Chang, C. and **Mulcahy, R.T.** Cloning and nucleotide sequence of a full-length cDNA for human liver  $\gamma$ -glutamylcysteine synthetase. *Biochem. Biophys. Res. Comm.* 185:29-35, 1992.
  50. Untawale, S. and **Mulcahy, R.T.** Activity of the human metallothionein promoter (hMT-II<sub>A</sub>) in cell populations isolated from varying depths in multicell spheroids following exposure to cadmium. *Chem.-Biol. Interactions* 83:171-181, 1992.
  51. Bailey, H.H., Gipp, J.J., Ripple, M., Wilding, G. and **Mulcahy, R.T.** Increase in  $\gamma$ -glutamylcysteine synthetase activity and steady-state messenger RNA levels in melphalan-resistant DU-145 human prostate carcinoma cells expressing elevated glutathione levels. *Cancer Res.* 52:5115-5118, 1992.
  52. Ripple, M., **Mulcahy, R.T.** and Wilding, G. Changes in the glutathione/glutathione-S-transferase detoxification system in melphalan resistant human prostate cancer cells. *J. Urol.* 150:209-214, 1993.
  53. Ross, D., Siegel, D., Beall, H., Prakash, A.S., **Mulcahy, R.T.** and Gibson, N.W. DT-Diaphorase in activation and detoxification of quinones. Bioreductive activation of Mitomycin C. *Cancer and Metastasis Reviews* 12:83-101, 1993.
  54. Sarkaria, J.N., Gibson, D.F.C., Jordan, V.C., Fowler, J.F., Lindstrom, M.J. and **Mulcahy, R.T.** Tamoxifen induced increase in the potential doubling time ( $T_{pot}$ ) of MCF-7 xenografts as determined by bromodeoxyuridine labeling and flow cytometry. *Cancer Res.* 53:4413-4417, 1993.
  55. Bailey, H.H., **Mulcahy, R.T.**, Tutsch, K.D., Arzoomanian, R.Z., Alberti, D., Tombes, M.B., Wilding, G. and Spriggs, D.R. Phase I study of L-buthionine sulfoximine and melphalan: An attempt at chemomodulation of glutathione. *J. Clin. Oncol.* 12:194-205, 1994.
  56. Beall, H.D., **Mulcahy, R.T.**, Siegel, D., Traver, R.D., Gibson, N.W. and Ross, D. Metabolism of bioreductive antitumor compounds by purified rat and human DT-diaphorases. *Cancer Res.* 54:3196-3201, 1994.
  57. **Mulcahy, R.T.**, Bailey, H.H. and Gipp, J.J. Up-regulation of  $\gamma$ -glutamylcysteine synthetase activity in melphalan-resistant human multiple myeloma cells expressing increased glutathione levels. *Cancer Chemother. Pharmacol.* 34:67-71, 1994.

58. **Mulcahy, R.T.**, Gipp, J.J., Schmidt, J.P., Joswig, C. and Borch, R.F. Nitrobenzyl phosphoramidates as potential hypoxia-selective alkylating agents. *J. Med. Chem.* 37:1610-1615, 1994.
59. Sarkaria, J.N., Miller, E.M., Parker, C.J., Jordan, V.C. and **Mulcahy, R.T.** 4-Hydroxytamoxifen, an active metabolite of Tamoxifen, does not alter the radiation sensitivity of MCF-7 breast carcinoma cells irradiated *in vitro*. *Breast Cancer Res. Treat.* 30:159-165, 1994.
60. **Mulcahy, R.T.**, Untawale, S. and Gipp, J.J. Transcriptional up-regulation of  $\gamma$ -glutamylcysteine synthetase gene expression in melphalan-resistant human prostate carcinoma cells. *Molec. Pharmacol.* 46:909-914, 1994.
61. Bailey, H.H., Gipp, J.J. and **Mulcahy, R.T.** Increased expression of  $\gamma$ -glutamyl transpeptidase in transfected tumor cells and its relationship to drug sensitivity. *Cancer Letters* 87:163-170, 1994.
62. Sarkaria, J.N., Fowler, J.F., Lindstrom, M.J., Jordan, V.C. and **Mulcahy, R.T.** The decreased influence of overall treatment time on the response of human breast tumor xenografts treated following prolongation of the potential doubling time. *Int. J. Radiat. Oncol. Biol. Phys.* 31:833-840, 1995.
63. Gipp, J.J., Bailey, H.H. and **Mulcahy, R.T.** Cloning and sequencing of the cDNA for the light subunit of human liver  $\gamma$ -glutamylcysteine synthetase and relative mRNA levels for heavy and light subunits in human normal tissues. *Biochem. Biophys. Res. Comm.* 206:584-589, 1995.
64. **Mulcahy, R.T.** and Gipp, J.J. Identification of a putative antioxidant response element in the 5' -flanking region of the human  $\gamma$ -glutamylcysteine synthetase heavy subunit gene. *Biochem. Biophys. Res. Comm.* 209:227-233, 1995.
65. Tsuchiya, K., **Mulcahy, R.T.**, Reid, L.L., Distche, C.M., Kavanagh, T.J. Mapping of the glutamate-cysteine ligase catalytic subunit gene (GLCLC) to human chromosome 6p12 and mouse chromosome 9D-E and of the regulatory subunit gene (GLCLR) to human chromosome 1p21-p22 and mouse chromosome 3H1-3. *Genomics* 30:630-632, 1995.
66. **Mulcahy, R.T.**, Bailey, H.H. and Gipp, J.J. Transfection of cDNAs for the heavy and light subunits of human  $\gamma$ -glutamylcysteine synthetase results in an elevation of intracellular glutathione and resistance to melphalan. *Cancer Res. (Advances in Brief)* 55:4771-4775, 1995.
67. Noyes, W.R., **Mulcahy, R.T.**, Craig, B.A. and Kinsella, T.J. The effect of a pure anti-

- estrogen, ICI 182,780, on the *in vitro* radiosensitivity of MCF-7 breast carcinoma cells. *Radiat. Oncol. Invest.* 3:232-237, 1996.
68. **Mulcahy, R.T.**, Wartman, M.A., Bailey, H.H. and Gipp, J.J. Constitutive and  $\beta$ -naphthoflavone-induced expression of the human  $\gamma$ -glutamylcysteine synthetase heavy subunit gene is regulated by a distal antioxidant response element/TRE sequence. *J. Biol. Chem.* 272:7445-7454, 1997.
  69. Bailey, H.H., Ripple, G., Tutsch, K.D., Arzoomanian, R.Z., Alberti, D., Feierabend, C., Mahvi, D., Schink, J., Pomplun, M., **Mulcahy, R.T.** and Wilding, G. Phase I study of continuous-infusion L-S,R-buthionine sulfoximine with intravenous melphalan. *J. Natl. Cancer Inst.* 89:1789-1796, 1997.
  70. Wild, A.C., Gipp, J.J. and **Mulcahy, R.T.** Overlapping ARE and TRE sequences mediate basal and  $\beta$ -naphthoflavone-induced expression of the human  $\gamma$ -glutamylcysteine synthetase catalytic subunit gene. *Biochem. J.*, 332:373-381, 1998.
  71. Moinova, H.R. and **Mulcahy, R.T.** An electrophile responsive element (EpRE) regulates  $\beta$ -naphthoflavone induction of the human  $\gamma$ -glutamylcysteine synthetase regulatory subunit gene; constitutive expression is mediated by a TRE. *J. Biol. Chem.* 273:14683-14689, 1998.
  72. Yamane, Y., Furuichi, M., Song, R., Van, T.N., **Mulcahy, R.T.**, Ishikawa, T., Kuo, M.T. Expression of multidrug resistance protein/GSX pump and  $\gamma$ -glutamylcysteine synthetase genes is regulated by oxidative stress. *J. Biol. Chem.* 273:31075-31085, 1998.
  73. Wild, A.C. and **Mulcahy, R.T.** Pyrollidine Dithiocarbamate (PDTC) up-regulates the expression of the genes encoding the catalytic and regulatory subunits of  $\gamma$ -glutamylcysteine synthetase (GSC) and increases intracellular glutathione. *Biochem. J.* 338:659-665, 1999.
  74. McAndrew, J., Patel, R.P., Moellering, D., Forman, H.J., **Mulcahy, R.T.**, Jo, H., and Darley-Usmar, V.M. The induction of GSH synthesis by nanomolar concentrations of NO in endothelial cells; a role for  $\gamma$ -glutamylcysteine synthetase and  $\gamma$ -glutamyl transpeptidase. *FEBS Letters* 448:292-296, 1999.
  75. Griffith, O.W. and **Mulcahy, R.T.** The enzymes of glutathione biosynthesis:  $\gamma$ -Glutamylcysteine synthetase. In: *Advances in Enzymology and Related Areas of Molecular Biology* 73: 209-267, 1999.
  76. Moinova, H.R., and **Mulcahy, R.T.** Up-regulation of the human  $\gamma$ -glutamylcysteine synthetase regulatory subunit gene involves binding of Nrf-2 to an electrophile responsive element (EpRE). *Biochem. Biophys. Res. Comm.* 261:661-668, 1999.

77. Wild, A.C., Moinova, H.R. and **Mulcahy, R.T.** Regulation of  $\gamma$ -glutamylcysteine synthetase subunit gene expression by the transcription factor Nrf2. *J. Biol. Chem.* 274:33627-33636, 1999.
78. Wild, A.C. and **Mulcahy, R.T.** Regulation of  $\gamma$ -glutamylcysteine synthetase subunit gene expression: Insights into transcriptional control of antioxidant defenses. *Free Radical Research* 32:281-301, 2000.
79. Gipp, J.J. and **Mulcahy, R.T.** Structure of the human  $\gamma$ -glutamylcysteine synthetase catalytic subunit gene. *Cytogenetics and Cell Genetics* 88:130-132, 2000.
80. Borch, R.F., Liu, J., Schmidt, J.P., Marakovits, J.T., Joswig, C., Gipp, J.J. and **Mulcahy, R.T.** Synthesis and evaluation of nitroheterocyclic phosphoramidates as hypoxia selective alkylating agents. *J. Med. Chem.* 43:2258-2265, 2000.
81. Zipper, L.M. and **Mulcahy, R.T.** Inhibition of ERK and p38 MAP kinases inhibits binding of Nrf2 and induction of GCS genes. *Biochem. Biophys. Res. Comm.* 278:484-492, 2000.
82. Dahl, E. L. and **Mulcahy, R.T.** Cell-type Specific differences in Glutamate Cysteine Ligase transcriptional regulation demonstrate independent subunit control. *Toxicol. Sci.* 61:265-272, 2001.
83. Levonen, A-L., Dickinson, D.A., **Mulcahy, R.T.**, Forman, H.J., Darley-Usmar, V.M. Biphasic Effects of 15-Deoxy-12,14 -prostaglandin J2 on Glutathione Induction and Apoptosis in Human Endothelial Cells. *Atheroscler., Thromb. Vasc. Biol.* 21:1846-1851, 2001.
84. Moran, J.A., Dahl, E.L. and **Mulcahy, R.T.** Increased Small Maf Expression Following Exposure to Phase II Enzyme Inducers. *Biochem. J.* 361:371-377, 2002.
85. Erickson, A.M., Nevarea, Z., Gipp, J.J. and **Mulcahy, R.T.** Identification of a Variant Antioxidant Response Element in the Promoter of the Human Glutamate-Cysteine Ligase Modifier Subunit Gene: Revision of the ARE Consensus Sequence. *J. Biol. Chem.* 277:30730-30737.
86. Zipper, L.M. and **Mulcahy, R.T.** The Keap1 BTB/POZ Dimerization Function Is Required to Sequester Nrf2 in Cytoplasm. *J. Biol. Chem.* 277:36544-36552, 2002.
87. Zipper, L.M. and **Mulcahy, R.T.** Erk Activation is Required for Nrf2 Nuclear Localization during Pyrrolidine Dithiocarbamate Induction of Glutamate Cysteine Ligase Modulatory Gene Expression in HepG2 Cells. *Toxicol. Sci.* 73:124-134, 2003.
88. **Mulcahy, R.T.** An Uncertain Partnership (Editorial). *Science* 302:949, 2003.

89. Go, Y.M., Ritsick, D.R., Arnold, R.S., Gipp, J.J, **Mulcahy, R.T.**, Jones, D.P. and Lambeth, J.D. Nox1/H<sub>2</sub>O<sub>2</sub> Signals Transformation Via Kinase Cascades Independent of a Global Oxidative Stress. *J. Biol. Chem.* 279:5837-5845, 2004.

## **BOOK CHAPTERS**

1. Sutherland, R.M. and **Mulcahy, R.T.** Basic principles of radiation biology. In: *Clinical Oncology for Medical Students and Physicians*, P. Rubin, ed., Publ. by American Cancer Society, University of Rochester, NY, pp. 40-57, 1983.
2. **Mulcahy, R.T.**, Hyperthermia and chemotherapy. In: *Categorical Course in Radiation Therapy: Hyperthermia*, (R.A. Steeves and B.R. Paliwal, eds.), Radiological Society of North America, pp. 27-35, 1987.
3. **Mulcahy, R.T.**, Radiation carcinogenesis. In: *Pathobiology of Neoplasia* (A.E. Sirica, ed.), Plenum Press: New York, pp. 111-129, 1989.
4. **Mulcahy, R.T.**, Siemann, D.W. and Sutherland, R.M. Radiation biology. In: *Clinical Oncology: A Multidisciplinary Approach for Physicians and Students*. W.B. Saunders, 1993.

## **R. TIMOTHY MULCAHY, PH.D.**

### **ADMINISTRATIVE RÉSUMÉ**

(includes summaries for administrative roles at the University of Minnesota and the University of Wisconsin)

University of Minnesota  
419 Johnston Hall  
101 Pleasant Street S.E.  
Minneapolis, MN 55455  
(612) 624-5054  
FAX (612) 626-741  
mulcahy@umn.edu

### **EDUCATION**

Ph.D. in Pathology and Radiological Sciences, University of Wisconsin	1979
Bachelors degree in Biology, with Distinction, University of Rochester	1973

### **ACADEMIC APPOINTMENTS**

<b>Vice President for Research, University of Minnesota</b>	<b>(2005-present)</b>
<b>Professor of Biochemistry, Molecular Biology and Biophysics, University of Minnesota</b>	<b>(2005-present)</b>
Associate Vice Chancellor for Research Policy, University of Wisconsin	(2002-2005)
Associate Dean for the Biological Sciences, University of Wisconsin Graduate School	(1996-2005)
Professor of Pharmacology, University of Wisconsin Medical School	(1999-2005)
Professor of Human Oncology, University of Wisconsin Medical School	(1991-1999)
Associate Professor of Human Oncology, University of Wisconsin Medical School	(1985-1991)
Assistant Professor of Pathology, University of Rochester, Rochester, NY	(1981-1985)

### **NATIONAL AND REGIONAL APPOINTMENTS**

➤ Vice President and President-elect; University/Industry Demonstration Partnership; National Academy of Sciences	(2008-2010)
➤ Chair, CIC Senior Research Officers	(2007-2009)

### **BOARD APPOINTMENTS AND COMMUNITY SERVICE**

➤ Minneapolis Regional Chamber of Commerce; Board of Directors	(2007-present)
➤ BioBusiness Alliance of Minnesota; Board of Directors	(2005-present)
➤ University Enterprise Laboratories, Board of Directors	(2005-2007)
➤ Co-Chair, University of Minnesota Community Fund Drive	(2008)

### **MAJOR ADMINISTRATIVE RESPONSIBILITIES AS VICE PRESIDENT FOR RESEARCH, UNIVERSITY OF MINNESOTA (2005 – Present)**

- Oversight and management of the University's \$600M research portfolio
- Advise on research components of the University's strategic plan and research priorities
- Advocate for University research to all constituencies
- Supervision of staff of approximately 200 involved in System-wide (5 campuses) research policy development, grants administration, and research compliance. Operational units include:

- Sponsored Project Administration
- Research Subjects Protection Programs (IRB, IACUC, IBC)
- Office of Regulatory Affairs
- Office of Analysis and Reporting
- Office for Technology Commercialization
- Academic and Corporate Relations Center
- Fostering Integrity in Research, Scholarship and Teaching (FIRST)
- Advise President and Senior Vice Presidents on research issues and research infrastructure priorities
- Regularly advise the Board of Regents on research performance, trends, opportunities, challenges and risks
- Supervise development and implementation of University research policies (human subjects, animal research, conflicts of interest, scholarly misconduct, intellectual property)
- Institutional Official for human subjects research and research involving animals
- Communicate on research issues with federal agencies, state and federal legislators and media
- Foster interdisciplinary, collaborative research and scholarship
- Negotiate institutional match for major grant proposals; leverage funding in support of research
- Establish, maintain and enhance strong relationships with strategic corporate partners, civic groups and governmental agencies

**MAJOR ADMINISTRATIVE RESPONSIBILITIES AS GRADUATE SCHOOL ASSOCIATE DEAN AND ASSOCIATE VICE CHANCELLOR FOR RESEARCH POLICY, UNIVERSITY OF WISCONSIN (1996-2005)**

***Research***

- Supervise development and implementation of campus research policies (human subjects, animal research, conflicts of interest, scholarly misconduct, intellectual property)
- Designated Institutional Official for human subjects research and research involving animals
- Advise Vice Chancellor for Research on research issues and research infrastructure priorities
- Supervise campus biosecurity efforts and coordinate campus response to anti-terrorism legislation
- Communicate on research issues with federal agencies, state and federal legislators and media
- Advise the Vice Chancellor for Research on intellectual property issues and University/Industry relations
- Negotiate institutional support for faculty start-up/retention packages for the biological sciences (~\$2.5 million in 2003)
- Negotiate institutional match for major grant proposals

***Graduate Education***

- Responsible for academic aspects of 39 graduate degree programs (~1600 graduate students) in the biological sciences
- Negotiate support for cross-campus interdisciplinary graduate programs in the biological sciences
- Institutional contact for over 25 training grants in the biological sciences
- Advise on new degree development, degree changes, and graduate degree program reviews

**NOTABLE ADMINISTRATIVE ACCOMPLISHMENTS**

(While at the University of Wisconsin or the University of Minnesota)

- Directed complete re-structure of the technology commercialization operation; currently ranked 6<sup>th</sup> nationally in terms of royalties (UMN)
- Created the Academic and Corporate Relations Center; awarded the 2007 Tekne Award as “Collaborative Innovation of the Year” by the Minnesota High Tech Association (UMN)
- Instituted a complete review of University research policies and procedures to streamline administrative processes (UMN)

- Credited with improving the overall research environment in 17 of 21 categories since appointment as VP for Research (UMN)
- Re-established the Vice President for Research as a member of the University's strategic leadership team (UMN)
- Developed an unprecedented analytical Annual Research Report for presentation to the Board of Regents (UMN)
- Devised an innovative funding mechanism (Minnesota Futures) to encourage development of new collaborative, interdisciplinary research initiatives (UMN)
- Directed re-structure of campus Institutional Review Board system (UW) and reorganization of veterinary care and animal care and use programs (UW & UMN)
- Led efforts in preparation for a successful for-cause site visit by the Office of Human Research Protections (UW)
- Engineered process and criteria for institutional review of faculty conflicts of interest (UW)
- Established the campus-wide Conflict of Interest Committee (UW)
- Supervised development and implementation of institutional policy on COI in clinical research; drafted the COI in clinical research policy (UW)
- Directed the campus response to the USA PATRIOT Act and PL107-188 (notification of possession of select agents, pathogens of high consequence and plant pathogens) (UW)
- Engineered and directed campus Select Agent security program (UW)
- Initiated and supervised development of a unified Web-based financial disclosure process for campus (UW)
- Was an invited participant: "Balancing National Security and Open Scientific Communication: Implications of September 11<sup>th</sup> for the Research University", National Academy of Science, December 13-14, 2001 (UW)
- Testified before two National Academy committees addressing bioterrorism, access to scientific information and university research
- Appointed to the COGR Working Group on Institutional Conflicts of Interest, 2002 (UW)
- Nominated by the Chancellor for appointment to the National Science Advisory Board for Biosecurity, DHHS, 2004 (status of nomination pending)

## **MAJOR COMMITTEE APPOINTMENTS – University of Minnesota**

(and summary of committee function)

**President's Executive Team:** Advise the President on strategic and operational issues; strategic planning.

**Executive Steering Committee, Enterprise Financial System:** Institutional decision-making and oversight of implementation of PeopleSoft Enterprise Financial System; establish policy and procedures for implementation and operation.

**Interdisciplinary Leadership Team:** Responsibility for guiding and supporting interdisciplinary research and education; monitor interdisciplinary centers; encourage interdisciplinary initiatives; develop policies and procedures to foster and reward interdisciplinary activities.

**Executive Compliance Oversight Committee:** Executive responsibility for campus compliance policies; adequacy of compliance coverage; advice to leadership on compliance risks.

**Occupational Health and Safety Steering Committee:** Oversight responsibility for re-organization of the University's occupational health and safety programs.

**Emergency Management Steering Committee:** Provide leadership and management in response to emergency and disaster situations; establish university policy and procedures related to emergency preparedness.

**President's Policy Committee:** Review and approval of all new or established administrative policies.

**Budget Advisory Committee:** Develop overall budget plans, preparation of biennial and capital budget requests to the State; prepare legislative strategy in support of budget requests; development of strategic plans to secure funding to support the University's mission.

**Strategic Planning Executive Committee:** Monitor implementation of strategic plans, assess and prioritize programmatic needs; assess progress toward achievement of strategic objectives.

**University Development Committee:** Planning for fund raising and campaigns

**Space Committee:** Review space utilization, major space commitments; plan relocations to accommodate remodeling; and assess building plans to ensure

**Search Committee (Chair); University of Minnesota-Rochester Chancellor**

**Search Committee; Institutional Compliance Officer**

### **MAJOR COMMITTEE APPOINTMENTS – University of Wisconsin** (and summary of committee function)

**Research Policy Advisory Council (Chair):** Develop, implement and coordinate campus research policy.

**Graduate School Biological Sciences Research Committee (Chair):** Conduct the annual faculty research competition (~\$1.4 million awarded in 2003); select recipients of University professorships.

**All Campus Human Subjects Committee (Chair):** Review and establish campus policy for research involving human subjects; oversee the function of 4 campus IRBs.

**All Campus Animal Care and Use Committee (Chair):** Review and establish campus policy for research involving animals; oversee the function of 5 campus IACUCs.

**Conflict of Interest Committee (Chair):** Develop University conflict of interest policies; review individual faculty COI situations; advise on COI issues.

**Biosecurity Task Force (Chair):** Supervise campus responsibilities for security of select agents and hazardous materials; risk assessments; communicate the impact of anti-terrorism legislation to campus community; coordinate campus response to anti-terrorism legislation.

**Chancellor=s HIPAA Task Force (member); Research sub-committee (Chair):** Develop and implement campus policy for compliance with the research provisions of HIPAA. Research sub-committee is responsible for drafting policy and procedures for research use of protected health information (PHI) by campus investigators.

**Graduate Faculty Executive Committee:** Responsible for review of graduate programs; review and approval of new graduate degrees; review and approve graduate student and graduate program policies; review graduate student appeals and grievances.

**Council of BioDeans:** Address academic and research issues in the biological sciences. The council consists of the Deans of the colleges hosting biological sciences departments or programs.

**Bioethics Advisory Committee:** Advise the Vice Chancellor for Research on ethical issues associated with university research activities (i.e., stem cell research; cloning; xenotransplantation).

**Technology Transfer Council:** Advise the Vice Chancellor for Research on intellectual property issues;

university-industry relations; faculty start-ups; entrepreneurship.

**Wisconsin Stem Cell Research Program Advisory Board** (Chair): Oversee the operations of the umbrella stem cell research program at the University of Wisconsin.

**Committee on Sponsorship Arrangements** (Co-chair): Develop policy for third-party sponsorship of research-related activities for the campus.

**Biological Sciences Strategic Planning Committee** (ex officio): Responsible for strategic planning for the biological sciences division.

### GRANTS ON BEHALF OF THE UNIVERSITY

(R. T. Mulcahy as Principal Investigator)

- *Professional Masters Programs in the Natural Sciences: Environmental Monitoring; Bioinformatics and Computational Sciences*, \$403,000; Alfred P. Sloan Foundation
- *Development of a Human Subjects Information System*, \$250,000; NIH, September 2002
- *Enhancements to the UW's Human Subjects Protection Program*, \$250,000; NIH, November 2003

### RESEARCH SUMMARY

(full academic CV available upon request)

**Research interests:** molecular biology of glutathione synthesis; cancer biology; experimental therapeutics

#### Research history:

- continuously funded for 20+ years
- most recent funding: NIH, RO1, *γ-GCS Regulation: Regulatory and Catalytic Subunit Genes*, 2/1/99-1/31/03 (\$1,036,911 TC), R.T. Mulcahy, P.I. (Y04: 2/1/02-1/31/03, \$185,273 DC; \$266,793 TC) [**NB:** laboratory program discontinued 2/1/03]
- served 2 terms as Chair of the Experimental Therapeutics Study Section (NIH ET-1)
- trained doctoral students, post-docs, medical fellows, medical students, undergraduates
- 88 peer-reviewed publications

#### 5 most recent research publications:

1. Moran, J.A., Dahl, E.L. and **Mulcahy, R.T.** Increased Small Maf Expression Following Exposure to Phase II Enzyme Inducers. *Biochem. J.* 361:371-377, 2002.
2. Erickson, A.M., Nevarea, Z., Gipp, J.J. and **Mulcahy, R.T.** Identification of a Variant Antioxidant Response Element in the Promoter of the Human Glutamate-Cysteine Ligase Modifier Subunit Gene: Revision of the ARE Consensus Sequence. *J. Biol. Chem.* 277:30730-30737.
3. Zipper, L.M. and **Mulcahy, R.T.** The Keap1 BTB/POZ Dimerization Function Is Required to Sequester Nrf2 in Cytoplasm. *J. Biol. Chem.* 277:36544-36552, 2002.
4. Zipper, L.M. and **Mulcahy, R.T.** Erk Activation is Required for Nrf2 Nuclear Localization during Pyrrolidine Dithiocarbamate Induction of Glutamate Cysteine Ligase Modulatory Gene Expression in HepG2 Cells. *Toxicol. Sci.* 73:124-134, 2003.
5. Go, Y.M., Ritsick, D.R., Arnold, R.S., Gipp, J.J., **Mulcahy, R.T.**, Jones, D.P. and Lambeth, J.D. Nox1/H<sub>2</sub>O<sub>2</sub> Signals Transformation Via Kinase Cascades Independent of a Global Oxidative Stress. *J. Biol. Chem.* 279:5837-5845, 2004.