

Gregory Robert James Thatcher

Prof. Gregory R.J. Thatcher
Dept. of Pharmacology & Toxicology
College of Pharmacy
University of Arizona
Tucson
AZ 85004

2346 E Placita de la Victoria
Tucson
AZ 85718
269-519-0575

thatcher@arizona.edu

Citizenship & Status

Citizen of USA and Canada
Birthplace: Brighton, Sussex, England

Education

Victoria University of Manchester Manchester, England	1978 - 1981	BSc(hons) Chemistry (1981)
University of Toronto Toronto, ON, Canada	1981 - 1986	PhD Organic Chemistry (1986) in Ron Kluger's lab

Academic Positions Held

Sheffield University Dept. of Chemistry Sheffield, England	1985 - 1986	Postdoctoral Research Associate in Mike Blackburn's lab
Oxford University Dyson Perrins Labs, Oxford, England	1986 - 1988	SERC Research Fellow in Gordon Lowe's lab
Queen's University Kingston, ON, Canada	1988 - 1993	Assistant Professor Dept. of Chemistry
Queen's University Kingston, ON, Canada	1993 - 2002	Associate Professor; tenured Dept. of Chemistry
Queen's University Kingston, ON, Canada	2000 - 2002	Associate Professor of Pharmacology & Toxicology
Columbia University New York, NY, USA	2001	Visiting Scientist, with Nick Turro Dept. of Chemistry

Queen's University Kingston, ON, Canada	2003 - 2004	Adjunct Professor of Chemistry and of Pharmacology & Toxicology
University of Illinois College of Pharmacy, University of Illinois at Chicago, Chicago, IL, USA	2003 – 2020 2006 – 2018 2011 2011 – 2020	Professor of Medicinal Chemistry Associate Head for Research, Dept. of Medicinal Chemistry & Pharmacognosy Acting Head of Department Hans W. Vahlteich Chair in Medicinal Chemistry
University of Illinois at Chicago	2012 – 2020 2017-2020 2017-2020	Founding Director, UICentre (drug discovery @ UIC) co-Leader Translational Oncology Program, University of Illinois Cancer Center co-Director, NIA T32 Training Program in Alzheimer's Disease & Related Dementia
University of Arizona	2020 – present	Professor & R. Ken and Donna Coit Endowed Chair in Drug Discovery, Dept. of Pharmacology & Toxicology, College of Pharmacy

PERSONAL STATEMENT: I was founding director of a campus-wide center for drug discovery, UICentre, at the University of Illinois at Chicago, the mission of which is transformative: to engage academic, biomedical researchers in collaborative teams to translate ideas and inventions to small molecule, proprietary lead compounds for further drug research and development. From 2012-2020, UICentre successfully engaged and supported collaborative teams, in an innovative model that does not require large institutional support. Disease agnostic projects led to \$90M of grant submissions involving 60-80 faculty in teams across multiple colleges and departments. The Thatcher lab, providing the core of UICentre facilities, incorporates expertise in: bioassay development and high throughput screening (HTS); drug metabolism and pharmacokinetics (DMPK); and medicinal chemistry. My ability to establish UICentre was based on taking small molecule therapeutics from conception through Phase I clinical trials in both oncology and Alzheimer's disease. I have well over 25 issued US patents and over 150 publications. In 2003, I transitioned from a basic science department in Canada to the University of Illinois College of Pharmacy to expand the breadth of my own research and move to a highly collaborative environment. This required establishing entirely new funding for a research program suitable for NIH, which I accomplished successfully via UH, U01, R01, R21, R41/R42 grants. In 2020, I transitioned to the University of Arizona College of Pharmacy with the intention of continuing drug discovery research with a greater focus on specific projects in contrast to engaging with dozens of faculty and building teams. Within my group, we have proficiency in: medicinal, bioanalytical, and organic chemistry; proteomics, enzymology, and metabolism; molecular/cell biology; animal tissue and behavioral analyses. I have supervised or co-supervised over 50 PhD and 10 MSc trainees and been intensively involved in pre and postdoctoral training and education. I currently have two therapeutics that successfully completed Phase I clinical trials for metastatic breast cancer (NCT03201913 and NCT03455270) and are proceeding in the clinic. I was founding co-leader of the Translational Oncology Program for the UI Cancer Center and co-director of the NIA T32 Predoctoral Training Program in Alzheimer's disease & Related Dementia.

AWARDS

2016	Innovator of the Year, University of Illinois at Chicago
2015	UIC Graduate Mentor of the Year
2007-10	University of Illinois University Scholar
2006	ADDF-Elan Alzheimer's Drug Discovery Innovation Award
2000	Fellowship of the Chemical Institute of Canada (FCIC)
2000	Merck Frosst Centre for Therapeutic Research Award of the Canadian Society of Chemistry "for a distinguished contribution in the fields of organic chemistry and biochemistry"
1995	International Union for Pure & Applied Chemistry Award (Canadian National Society of IUPAC)
1990, 1992	Canadian Society of Chemistry, Ichikizaki Awards
1986 - 1988	Science & Engineering Research Council (UK) Research Fellowship
1981 - 1985	University of Toronto Open Scholarship

ACADEMIC REVIEW

2015-2019	Permanent Member NIH Study Section: MDCN and DDNS Drug Discovery
2020	NIGMS MIRA R35 Study Section
2012-14	NIH Study Section: Contraceptive Drug Discovery ZHD1 DRG-H and other NICHD
2014-	NIH Study Section: ZRG1 IMST-11 STTR/SBIR
2013	NIH/NICHD Study Section ZHD1 DSR-K Medicinal Chemistry Facility
2013	NIH Study Section: MDCN-C and DDNS Drug Discovery
2010-2012	NIH/CSR College of Reviewers – member
2009-2013	ACS Division of Chemical Toxicology, Executive Committee - member
2007-present	Alzheimer's Drug Discovery Foundation - Scientific Advisory Board
2012-2017	NIH/NICHD Study Section: Contraceptive Drug Discovery ZHD1 DRG-H
2010	NIH Study Section: Biological Chemistry and Macromolecular Biophysics (BCMB)
2006 – 2009	Chemical Research in Toxicology, ACS Journal Editorial Advisory Board
2009-	NIH Study Sections: Cancer Etiology; Cancer Chemoprevention
2008	NIH Study Section: BDCN Emerging Technologies
2007 -	NIH/NINDS Study Section NSD-C Neurological Sciences and Disorders
2006 - 2008	NIH Study Section: Mental Disorders & Clinical Neuroscience (MDCN) C
2006	NIH/NIDDK Raid Pilot review panel; NINDS NSD-C review panel
2004 - 2008	Permanent member: NIH Study Section: Cancer Etiology
2005	Current Topics in Medicinal Chemistry, Guest Editor
2004 - 2005	NIH Study Section: Brain Disorders and Clinical Neuroscience (BDCN); Neuropharmacology SBIR/STIR
1988 – present	Other grant review: National Science Foundation; NSERC; Am. Chem. Soc. Petroleum Research Fund; Alzheimer's Association; ISOA, ADDF, CIHR-CHRDP; NIH; US Army
1988 – present	Journal reviews: PNAS, J. Am. Chem. Soc.; J. Med. Chem.; Mol. Canc. Ther.; J. Steroid Chem. & Biochem.; J. Org. Chem.; Chem. Res. Toxicol.; Org. Lett.; ACS Med Chem Lett; Brit J Pharmacol.; Free Radical. Biol. Med.; Bioorg. Med. Chem.; Bioorg. Med. Chem. Lett.; Tetrahedron Lett.; New J. Chem.; Bioorg. Chem.; Can. J. Chem.; Heterocycl. Chem.; J Steroid Biochem & Mol Biol; Synlett.; J. Phys. Org. Chem.; Carbohydr. Res.; J. Carbohydr. Chem.; J. Inorg. Biochem.; Pharmacol. Rev., Nat. Commun., etc.

INDUSTRIAL POSITIONS

- 1997 – 2001 Founder, GoBang Therapeutics Ltd., Kingston, ON, Canada
 “Founded in 1997 by PARTEQ Innovations and five leading scientists from Queen's University in Kingston, Ontario. This collaboration has resulted in the generation of an innovative library of proprietary compounds that has for the first time separated the cellular protectant properties of nitrates from their unwanted peripheral vasodilatory properties. This breakthrough propriety technology offers tremendous potential for the treatment of cardiac and brain ischemia, neurodegenerative diseases and epilepsy, based on current preclinical data obtained with compounds from the library.”
- 1998 – 2002 Pharmaceutical Chemistry Consultant & Research Director, Anti-Aging International, Toronto, ON, Canada. Bio-nutraceuticals and cosmaceuticals; Vitamin C, bioflavonoid, and related antioxidant research; advisor on patent issues; marketing support anti-aging products
- 1990 – present Other consulting: Eastman Chemicals Ltd., BioMega Pharmaceuticals; PARTEQ Innovations; USPTO;
- 1998 – 2002 VP, GoBang Therapeutics Ltd., Kingston, ON, Canada
 Directed drug design and synthesis research team; wrote patent applications; conferenced with examiners. Co-directed company strategy; co-wrote Business Plans; presented to & negotiated with VC & strategic partners
- 2003 – 2004 Director, Board of Directors, GB Therapeutics Ltd., Mississauga, ON, Canada
 The company was renamed Cita Neuro Pharmaceuticals in 2005 and was sold in Dec. 2005 to Vernalis plc for \$65 million.
- 2003 – 2004 Consultant, Cita NeuroTherapeutics Ltd., Mississauga, ON, Canada
- 2004 – 2005 GT 1061 Investigational New Drug Application from GB Therapeutics received Canadian and FDA regulatory approval for Phase I clinical trials directed at Alzheimer's disease
- 2009 – 2016 Scientific Advisor, sGC Pharma Inc., Boston (US) Ottawa (Canada). Conferencing with pharmaceutical industry partners regarding development of sGC-1061
- 2016 – present Scientific Advisor, Revivo Therapeutics Inc., Research Triangle NC (US). Conferencing with pharma partners regarding development of RIV-1061
- 2016 – present Founder and Chief Technical Officer, TTC Oncology: Inventor of TTC-352 a drug candidate for metastatic treatment-resistant ER+ breast cancer.
- 2017 – present Licensee G1 Therapeutics Inc.: Inventor of Rintodestrant (G1T48) an oral SERD drug candidate for breast cancer currently in clinical trials sponsored by G1 Therapeutics.

PUBLICATIONS

1. Singh SK, Kumar S, Viswakarma N, Principe DR, Das S, Sondarva G, Nair RS, Srivastava P, Sinha SC, Grippo PJ, Thatcher GRJ, Rana B, Rana A. (2021) *MAP4K4 promotes pancreatic tumorigenesis via phosphorylation and activation of mixed lineage kinase 3*. Oncogene. 2021;40(43):6153-65. Epub 2021/09/14; PMID: PMC8553609.
2. Shen Z, Ratia K, Cooper L, Kong D, Lee H, Kwon Y, Li Y, Alqarni S, Huang F, Dubrovskiy O, Rong L, Thatcher GRJ, Xiong R. (2021) *Design of SARS-CoV-2 PLpro Inhibitors for COVID-19 Antiviral Therapy Leveraging Binding Cooperativity*. J Med Chem. Epub 2021/10/20. PMID: PMC8547495.
3. Scheinman SB, Zaldua S, Dada A, Krochmaliuk K, Dye K, Marotto li FM, Thatcher GRJ, Tai LM. *Systemic Candesartan Treatment Modulates Behavior, Synaptic Protein Levels, and Neuroinflammation in*

- Female Mice That Express Human APOE4*. Frontiers in neuroscience. 2021;15:628403. Epub 2021/03/02; PMID: PMC7902885
4. Lewandowski, C. T., Khan, W., Ben Aissa, M., Dubrovskiy, O., Ackerman-Berrier, M., LaDu, M. J., Layden, B. T., and Thatcher, G. R. J. (2021) *Metabolomic analysis of a selective ABCA1 inducer in obesogenic challenge provides a rationale for therapeutic development*, EBioMedicine. 66:103287. Epub 2021/03/23. PMID: PMC8010624.
 5. Shen, Z., Ratia, K., Cooper, L., Kong, D., Lee, H., Kwon, Y., Li, Y., Alqarni, S., Huang, F., Dubrovskiy, O., Rong, L., Thatcher, G. R., and Xiong, R. (2021) *Potent, Novel SARS-CoV-2 PLpro Inhibitors Block Viral Replication in Monkey and Human Cell Cultures*, bioRxiv. Epub 2021/02/18; PMID: PMC7885923.
 6. Schafer, A., Xiong, R., Cooper, L., Nowar, R., Lee, H., Li, Y., Ramirez, B. E., Peet, N. P., Caffrey, M., Thatcher, G. R. J., Saphire, E. O., Cheng, H., and Rong, L. (2021) *Evidence for distinct mechanisms of small molecule inhibitors of filovirus entry*, PLoS pathogens 17, e1009312.
 7. Gaisina IN, Hushpalian DM, Gaisin AM, Kazakov EH, Ammal Kaidery N, Ahuja M, Poloznikov AA, Gazaryan IG, Thatcher GRJ, Thomas B. (2021) *Identification of a potent Nrf2 displacement activator among aspirin-containing prodrugs*. Neurochem Int. 149:105148. Epub 2021/07/31.; PMID: PMC8387448.
 8. Abderrahman, B., Maximov, P. Y., Curpan, R. F., Fanning, S. W., Hanspal, J. S., Fan, P., Foulds, C. E., Chen, Y., Malovannaya, A., Jain, A., Xiong, R., Greene, G. L., Tonetti, D. A., Thatcher, G. R. J., and Jordan, V. C. (2021) *Rapid Induction of the Unfolded Protein Response and Apoptosis by Estrogen Mimic TTC-352 for the Treatment of Endocrine-Resistant Breast Cancer*, Mol Cancer Ther 20, 11-25.
 9. Ben Aissa, M., Lewandowski, C. T., Ratia, K. M., Lee, S. H., Layden, B. T., LaDu, M. J., and Thatcher, G. R. J. (2021) *Discovery of Nonlipogenic ABCA1 Inducing Compounds with Potential in Alzheimer's Disease and Type 2 Diabetes*, ACS Pharmacol Transl Sci 4, 143-154; PMID: PMC7887740
 10. Knopp, R. C., Jastaniah, A., Dubrovskiy, O., Gaisina, I., Tai, L., and Thatcher, G. R. J. (2021) *Extending the Calpain-Cathepsin Hypothesis to the Neurovasculature: Protection of Brain Endothelial Cells and Mice from Neurotrauma*, ACS Pharmacol Transl Sci 4, 372-385; PMID: PMC7887848.
 11. Yu, L., Tasaki, S., Schneider, J.A., Arfanakis, K., Duong, D.M., Wingo, A.P., Wingo, T.S., Kearns, N., Thatcher, G.R.J., Seyfried, N.T., Levey, A.I., De Jager, P.L., and Bennett, D.A.,(2020) *Cortical Proteins Associated With Cognitive Resilience in Community-Dwelling Older Persons*. JAMA Psychiatry. Epub 2020/07/02. PMID: PMC7330835.
 12. Silvestri, I., Lyu, H., Fata, F., Banta, P.R., Mattei, B., Ippoliti, R., Bellelli, A., Pitari, G., Ardini, M., Petukhova, V., Thatcher, G.R.J., Petukhov, P.A., Williams, D.L., and Angelucci, F.,(2020) *Ectopic suicide inhibition of thioredoxin glutathione reductase*. Free Radic Biol Med. 147: p. 200-211
 13. Dudek, A. Z., Liu, L. C., Fischer, J. H., Wiley, E. L., Sachdev, J. C., Bleeker, J., Hurley, R. W., Tonetti, D. A., Thatcher, G. R. J., Venuti, R. P., and O'Regan, R. M. (2020) *Phase 1 study of TTC-352 in patients with metastatic breast cancer progressing on endocrine and CDK4/6 inhibitor therapy*, Breast Cancer Res Treat 183, 617-627.
 14. Kumar, S., Singh, S.K., Viswakarma, N., Sondarva, G., Nair, R.S., Sethupathi, P., Dorman, M., Sinha, S.C., Hoskins, K., Thatcher, G., Rana, B., and Rana, A.,(2020) *Rationalized inhibition of mixed lineage kinase 3 and CD70 enhances life span and antitumor efficacy of CD8(+) T cells*. J Immunother Cancer. 8(2).

15. Gaisina, I.N., Peet, N.P., Wong, L., Schafer, A.M., Cheng, H., Anantpadma, M., Davey, R.A., Thatcher, G.R.J., and Rong, L.,(2020) *Discovery and Structural Optimization of 4-(Aminomethyl)benzamides as Potent Entry Inhibitors of Ebola and Marburg Virus Infections*. J Med Chem. 63(13): p. 7211-7225.
16. Jastaniah, A., Gaisina, I. N., Knopp, R. C., and Thatcher, G. R. J. (2020) *Synthesis of alpha-Ketoamide-Based Stereoselective Calpain-1 Inhibitors as Neuroprotective Agents*, ChemMedChem 15, 2280-2285.
17. Li, Y., Zhao, J., Gutgesell, L.M., Shen, Z., Ratia, K., Dye, K., Dubrovskyi, O., Zhao, H., Huang, F., Tonetti, D.A., Thatcher, G.R.J., and Xiong, R.,(2020) *Novel Pyrrolopyridone Bromodomain and Extra-Terminal Motif (BET) Inhibitors Effective in Endocrine-Resistant ER+ Breast Cancer with Acquired Resistance to Fulvestrant and Palbociclib*. J Med Chem. 63(13): p. 7186-7210.
18. Abderrahman, B., Maximov, P. Y., Curpan, R. F., Hanspal, J. S., Fan, P., Xiong, R., Tonetti, D. A., Thatcher, G. R. J., and Jordan, V. C. (2020) *Pharmacology and Molecular Mechanisms of Clinically Relevant Estrogen Estetrol and Estrogen Mimic BMI-135 for the Treatment of Endocrine-Resistant Breast Cancer*, Mol Pharmacol 98, 364-381.
19. Yu, L., Tasaki, S., Schneider, J.A., Arfanakis, K., Duong, D.M., Wingo, A.P., Wingo, T.S., Kearns, N., Thatcher, G.R.J., Seyfried, N.T., Levey, A.I., De Jager, P.L., and Bennett, D.A.,(2020) *Cortical Proteins Associated With Cognitive Resilience in Community-Dwelling Older Persons*. JAMA Psychiatry.
20. Li, Y., Zhao, J., Gutgesell, L., Shen, Z., Ratia, K., Dye, K., Dubrovskyii, O., Zhao, H., Huang, F., Tonetti, D.A., Thatcher, G.R., and Xiong, R.,(2020) *Novel pyrrolopyridone bromodomain and extra-terminal motif (BET) inhibitors effective in endocrine-resistant ER+ breast cancer with acquired resistance to fulvestrant and palbociclib*. J Med Chem.
21. Lyu, H., Petukhov, P.A., Banta, P.R., Jadhav, A., Lea, W.A., Cheng, Q., Arner, E.S.J., Simeonov, A., Thatcher, G.R.J., Angelucci, F., and Williams, D.L. (2020) *Characterization of Lead Compounds Targeting the Selenoprotein Thioredoxin Glutathione Reductase for Treatment of Schistosomiasis*. ACS Infect Dis. 6(3): p. 393-405.
22. Kumar, S., Singh, S.K., Viswakarma, N., Sondarva, G., Nair, R.S., Sethupathi, P., Sinha, S.C., Emmadi, R., Hoskins, K., Danciu, O., Thatcher, G.R.J., Rana, B., and Rana, A.,(2020) *Mixed lineage kinase 3 inhibition induces T cell activation and cytotoxicity*. Proc Natl Acad Sci U S A. 117(14): p. 7961-7970.
23. Knopp, R.C., Lee, S.H., Hollas, M., Nepomuceno, E., Gonzalez, D., Tam, K., Aamir, D., Wang, Y., Pierce, E., BenAissa, M., and Thatcher, G.R.J.,(2020) *Interaction of oxidative stress and neurotrauma in ALDH2(-/-) mice causes significant and persistent behavioral and pro-inflammatory effects in a tractable model of mild traumatic brain injury*. Redox Biol. 32: p. 101486.
24. Andreano, K.J., Wardell, S.E., Baker, J.G., Desautels, T.K., Baldi, R., Chao, C.A., Heetderks, K.A., Bae, Y., Xiong, R., Tonetti, D.A., Gutgesell, L.M., Zhao, J., Sorrentino, J.A., Thompson, D.A., Bisi, J.E., Strum, J.C., Thatcher, G.R.J., and Norris, J.D.,(2020) *GIT48, an oral selective estrogen receptor degrader, and the CDK4/6 inhibitor lerociclib inhibit tumor growth in animal models of endocrine-resistant breast cancer*. Breast Cancer Res Treat. 180(3): p. 635-646.
25. Gaisina, I.N., Peet, N.P., Cheng, H., Li, P., Du, R., Cui, Q., Furlong, K., Manicassamy, B., Caffrey, M., Thatcher, G.R.J., and Rong, L.,(2020) *Optimization of 4-Aminopiperidines as Inhibitors of Influenza A Viral Entry That Are Synergistic with Oseltamivir*. J Med Chem. 63(6): p. 3120-3130.
14. Silvestri, I., Lyu, H., Fata, F., Banta, P.R., Mattei, B., Ippoliti, R., Bellelli, A., Pitari, G., Ardini, M., Petukhova, V., Thatcher, G.R.J., Petukhov, P.A., Williams, D.L., and Angelucci, F.,(2020) *Ectopic suicide inhibition of thioredoxin glutathione reductase*. Free Radic Biol Med. 147: p. 200-211

15. Taha, T.Y., Aboukhatwa, S.M., Knopp, R.C., Ikegaki, N., Abdelkarim, H., Neerasa, J., Lu, Y., Neelarapu, R., Hanigan, T.W., Thatcher, G.R.J., and Petukhov, P.A.,(2019) *Correction to Design, Synthesis, and Biological Evaluation of Tetrahydroisoquinoline-Based Histone Deacetylase 8 Selective Inhibitors*. ACS Med Chem Lett. 10(9): p. 1358.
16. Lu, Y., Gutgesell, L.M., Xiong, R., Zhao, J., Li, Y., Rosales, C.I., Hollas, M., Shen, Z., Gordon-Blake, J., Dye, K., Wang, Y., Lee, S., Chen, H., He, D., Dubrovskiy, O., Zhao, H., Huang, F., Lasek, A.W., Tonetti, D.A., and Thatcher, G.R.J.,(2019) *Design and Synthesis of Basic Selective Estrogen Receptor Degradable for Endocrine Therapy Resistant Breast Cancer*. J Med Chem. 62(24): p. 11301-11323.
17. Hollas, M. A., Ben Aissa, M., Lee, S. H., Gordon-Blake, J. M., and Thatcher, G. R. J. (2019) *Pharmacological manipulation of cGMP and NO/cGMP in CNS drug discovery*, Nitric Oxide 82, 59-74.
18. Ben Aissa, M., Tipton, A.F., Bertels, Z., Gandhi, R., Moye, L.S., Novack, M., Bennett, B.M., Wang, Y., Litosh, V., Lee, S.H., Gaisina, I.N., Thatcher, G.R.J., and Pradhan, A.A.,(2018) *Soluble guanylyl cyclase is a critical regulator of migraine-associated pain*. Cephalalgia: 38, 1471-1484.
19. Schafer, A., Cheng, H., Xiong, R., Soloveva, V., Retterer, C., Mo, F., Bavari, S., Thatcher, G., and Rong, L. (2018) *Repurposing potential of 1st generation H1-specific antihistamines as anti-filovirus therapeutics*, Antiviral Res. 157, 47-56.
20. Silvestri, I., Lyu, H., Fata, F., Boumis, G., Miele, A.E., Ardini, M., Ippoliti, R., Bellelli, A., Jadhav, A., Lea, W.A., Simeonov, A., Chen, Q., Arner, E.S.J., Thatcher, G.R.J., Petukhov, P.A., Williams, D.L., and Angelucci, F.,(2018) *Fragment-Based Discovery of a Regulatory Site in Thioredoxin Glutathione Reductase Acting as "Doorstop" for NADPH Entry*. ACS Chem Biol. 13, 2190-2202.
21. Gaisina, I.N., Lee, S.H., Kaidery, N.A., Ben Aissa, M., Ahuja, M., Smirnova, N.N., Wakade, S., Gaisin, A., Bourassa, M.W., Ratan, R.R., Nikulin, S.V., Poloznikov, A.A., Thomas, B., Thatcher, G.R.J., and Gazaryan, I.G.,(2018) *Activation of Nrf2 and Hypoxic Adaptive Response Contribute to Neuroprotection Elicited by Phenylhydroxamic Acid Selective HDAC6 Inhibitors*. ACS Chem Neurosci. 9(5): p. 894-900.
22. Bhattacharjee, A., Sinha, A., Ratia, K., Yin, L., Delgado-Rivera, L., Petukhov, P.A., Thatcher, G.R.J., and Wardrop, D.J.,(2017) *2-Arylidene Hydrazinecarbodithioates as Potent, Selective Inhibitors of Cystathionine gamma-Lyase (CSE)*. ACS Med Chem Lett. 8(12): p. 1241-1245.
23. Abdelkarim, H., Neelarapu, R., Madriaga, A., Vaidya, A.S., Kastrati, I., Karumudi, B., Wang, Y.T., Taha, T.Y., Thatcher, G.R.J., Frasor, J., and Petukhov, P.A.,(2017) *Design, Synthesis, Molecular Modeling, and Biological Evaluation of Novel Amine-based Histone Deacetylase Inhibitors*. ChemMedChem. 12(24): p. 2030-2043.
24. Taha, T.Y., Aboukhatwa, S.M., Knopp, R.C., Ikegaki, N., Abdelkarim, H., Neerasa, J., Lu, Y., Neelarapu, R., Hanigan, T.W., Thatcher, G.R.J., and Petukhov, P.A.,(2017) *Design, Synthesis, and Biological Evaluation of Tetrahydroisoquinoline-Based Histone Deacetylase 8 Selective Inhibitors*. ACS Med Chem Lett. 8(8): p. 824-829.
25. Xiong, R., Zhao, J., Gutgesell, L.M., Wang, Y., Lee, S., Karumudi, B., Zhao, H., Lu, Y., Tonetti, D.A., and Thatcher, G.R.,(2017) *Novel Selective Estrogen Receptor Downregulators (SERDs) Developed against Treatment-Resistant Breast Cancer*. J Med Chem. 60(4): p. 1325-1342.
26. Kastrati, I., Delgado-Rivera, L., Georgieva, G., Thatcher, G.R., and Frasor, J.,(2017) *Synthesis and Characterization of an Aspirin-fumarate Prodrug that Inhibits NFkappaB Activity and Breast Cancer Stem Cells*. J Vis Exp, (119).
27. Kastrati, I., Siklos, M.I., Brovkovich, S.D., Thatcher, G.R.J., and Frasor, J.,(2017) *A Novel Strategy to Co-target Estrogen Receptor and Nuclear Factor kappaB Pathways with Hybrid Drugs for Breast Cancer Therapy*. Horm Cancer. 8(3): p. 135-142.

28. Koster, K.P., Smith, C., Valencia-Olvera, A.C., Thatcher, G.R., Tai, L.M., and LaDu, M.J.,(2017) *Rexinoids as Therapeutics for Alzheimer's Disease: Role of APOE*. Curr Top Med Chem. 17(6): p. 708-720.
29. Yao, Y., Kong, C., Yin, L., Jain, A.D., Ratia, K., Thatcher, G.R., Moore, T.W., Driver, T.G., and Miller, L.W.,(2017) *Time-Gated Detection of Cystathionine gamma-Lyase Activity and Inhibition with a Selective, Luminogenic Hydrogen Sulfide Sensor*. Chemistry. 23(4): p. 752-756.
30. Luo, J., Lee, S.H., VandeVrede, L., Qin, Z., Ben Aissa, M., Larson, J., Teich, A.F., Arancio, O., D'Souza, Y., Elharram, A., Koster, K., Tai, L.M., LaDu, M.J., Bennett, B.M., and Thatcher, G.R.,(2016) *A multifunctional therapeutic approach to disease modification in multiple familial mouse models and a novel sporadic model of Alzheimer's disease*. Mol Neurodegener. 11(1): p. 35.
31. Ben Aissa, M., Lee, S.H., Bennett, B.M., and Thatcher, G.R.,(2016) *Targeting NO/cGMP Signaling in the CNS for Neurodegeneration and Alzheimer's Disease*. Curr Med Chem. 23(24): p. 2770-2788.
32. Pierce, E.N., Piyankarage, S.C., Dunlap, T., Litosh, V., Siklos, M.I., Wang, Y.T., and Thatcher, G.R.,(2016) *Prodrugs Bioactivated to Quinones Target NF-kappaB and Multiple Protein Networks: Identification of the Quinonome*. Chem Res Toxicol. 29(7): p. 1151-9.
33. Wang, Y.-T., Piyankarage, S.C., and Thatcher, G.R.J., *Quantitative Profiling of Reversible Cysteine Modification Under Nitrosative Stress*, in *Neuromethods*. 2016, Humana Press: Totowa, NJ. p. 1-18.
34. Xiong, R., Patel, H. K., Gutgesell, L. M., Zhao, J., Delgado-Rivera, L., Pham, T. N., Zhao, H., Carlson, K. E., Martin, T. A., Katzenellenbogen, J. A., Moore, T. W., Tonetti, D., and Thatcher, G. R. J. (2016) *Selective human Estrogen Receptor Partial Agonists (ShERPAs) for Tamoxifen-Resistant Breast Cancer*, J Med Chem. 59, 219-37.
35. Kastrati, I.; Siklos, M. A.; Calderon-Gierszal, E. L.; El-Shennawy, L.; Georgieva, G.; Thayer, E. N.; Thatcher, G. R.; Frasor, J. (2016) *Dimethyl Fumarate Inhibits the Nuclear Factor kappaB Pathway in Breast Cancer Cells by Covalent Modification of p65*. J Biol Chem. 291, 3639-47.
36. Ziniel, P. D.; Karumudi, B.; Barnard, A. H.; Fisher, E. M.; Thatcher, G. R.; Podust, L. M.; Williams, D. L. (2015) *The Schistosoma mansoni Cytochrome P450 (CYP3050A1) Is Essential for Worm Survival and Egg Development*. PLoS Negl Trop Dis. Dec;9(12):e0004279.
37. Kastrati, I.; Litosh, V. A.; Zhao, S.; Alvarez, M.; Thatcher, G. R. J.; Frasor, J. (2015) *A novel aspirin prodrug inhibits NFkappaB activity and breast cancer stem cell properties*. BMC Cancer, 15, 845.
38. Fa M, Zhang H, Staniszewski A, Saeed F, Shen LW, Schiefer IT, Siklos MI, Tapadar S, Litosh VA, Libien J, Petukhov PA, Teich AF, Thatcher GR, Arancio O (2015) *Novel Selective Calpain 1 Inhibitors as Potential Therapeutics in Alzheimer's Disease*. J Alzheimers Dis. 49, 707-21.
39. Luo J, Lee SH, VandeVrede L, Qin Z, Piyankarage S, Tavassoli E, Asghodom RT, BenAissa M, Fa M, Arancio O, Yue L, Pepperberg DR, Thatcher GRJ (2015) *Re-engineering a neuroprotective, clinical drug as a procognitive agent with high in vivo potency and with GABAA potentiating activity for use in dementia*. BMC Neurosci 16, 67.
40. Siklos, M. I.; BanAissa, M.; Thatcher, G. R. J. (2015) *Cysteine proteases as therapeutic targets: does selectivity matter? A systematic review of calpain and cathepsin inhibitors*. Acta Pharm Sin B. 5, 506-519.
41. Tai, L. M.; Koster, K. P.; Luo, J.; Lee, S. H.; Wang, Y. T.; Collins, N. C.; Ben Aissa, M.; Thatcher, G. R. J.; LaDu*, M. J. (2014) *Amyloid-beta Pathology and APOE Genotype Modulate Retinoid X Receptor Agonist Activity in vivo*. J Biol Chem. 289, 30538-55.
42. Mary Ellen Molloy, Bethany Perez White, Teshome Gherezghiher, Bradley T. Michalsen, Rui Xiong, Hitisha Patel, Huiping Zhao, Philipp Y Maximov, V. Craig Jordan, Gregory R. J. Thatcher, Debra A.

- Tonetti, (2014) *Novel Benzothioephene Selective Estrogen Mimics for the Treatment of Tamoxifen-Resistant Breast Cancer*. Mol Cancer Ther, 13, 2515-26.
43. Yue-Ting Wang, Sujeewa Piyankarage, David Williams, Gregory R. J. Thatcher, (2014) *Proteomic profiling of nitrosative stress: Protein S-oxidation accompanies S-nitrosylation*. ACS Chem. Biol. **9**, 821-30. PMID 24397869.
44. L VandeVrede, E Tavassoli, J Luo, Z Qin, L Yue, D R Pepperberg, G R J Thatcher, (2014) *Novel Analogues of Chlormethiazole are Neuroprotective in Four Models of Neurodegeneration with Variable Dependence on GABA_A Receptor Potentiation* Br. J. Pharmacol. 171, 389-402.
45. Patel, H. K.; Siklos, M. I.; Abdelkarim, H.; Mendonca, E. L.; Vaidya, A.; Petukhov, P. A.; Thatcher, G. R. J. (2014) *A chimeric SERM-Histone deacetylase inhibitor approach to breast cancer therapy*, ChemMedChem, **9**, 602-13. PMID 23956109.
46. Hemachandra, L. P.; Patel, H.; Chandrasena, R. E.; Choi, J.; Piyankarage, S. C.; Wang, S.; Wang, Y.; Thayer, E. N.; Scism, R. A.; Michalsen, B. T.; Xiong, R.; Siklos, M. I.; Bolton, J. L.; Thatcher, G. R. J. (2014) *SERMs Attenuate Estrogen-Induced Malignant Transformation of Human Mammary Epithelial Cells by Upregulating Detoxification of Oxidative Metabolites*. Cancer Prev Res (Phila) **7**, 505-15. PMID 24598415.
47. Lawren VandeVrede, Ramy Abdelhamid, Zhihui Qin, Jaewoo Choi, Sujeewa Piyankarage, Jia Luo, John Larson, Brian M. Bennett, and Gregory R. J. Thatcher, (2013) *An NO donor approach to neuroprotective and procognitive estrogen therapy overcomes loss of NO synthase function and potentially thrombotic risk* PloS One, **8**, e70740.
48. Isaac T. Schiefer, Subhasish Tapadar, Vladislav Litosh, Marton Siklos, Rob Scism, Gihani T. Wijewickrama, Esala P. Chandrasena, Vaishali Sinha, Ehsan Tavassoli, Michael Brunsteiner, Mauro Fa' , Ottavio Arancio, Pavel Petukhov, and Gregory R. J. Thatcher, (2013) *Design, Synthesis, and Optimization of Novel Epoxide Incorporating Peptidomimetics as Selective Calpain Inhibitors*, J. Med. Chem. **56**, 6054-68.
49. Adrian C. Nicolescu, Gregory R.J. Thatcher, (2014) *Differential activation of soluble guanylate cyclase by a series of aryl disulfanyl dinitrate esters*, Med Chem Commun, **5**, 51-56.
- Zhihui Qin, Jia Luo , Lawren VandeVrede, Ehsan Tavassoli, Mauro Fa' , Andrew Teich , Ottavio Arancio, and Gregory R. J. Thatcher, (2012) *Design and Synthesis of Neuroprotective Methylthiazoles and Modification as NO-Chimeras for Alzheimer's Disease Therapy*. J. Med. Chem. **55**: 6784-6801.
50. Isaac T. Schiefer, Lawren VandeVrede, Mauro Fa' , Ottavio Arancio, and Gregory R. J. Thatcher, (2012) *Furoxans (1, 2, 5 Oxadiazole-N-Oxides) as Novel NO Mimetic Neuroprotective and Procognitive Agents*. J. Med. Chem. **55**: 3076-3087.
51. Dunlap, T. L., Piyankarage, S., Wijewickrama, G. T., Abdul-Hay, S., Vanni, M., Litosh, V. A., Luo, J., and Thatcher, G. R. J. (2012) *Quinone Induced Activation of Keap1/Nrf2 Signaling by Aspirin Prodrugs Masquerading as Nitric Oxide*. Chem Res Toxicol. **25**: 2725-36.
52. Overk, C. R., Lu, P. Y., Wang, Y. T., Choi, J., Shaw, J. W., Thatcher, G. R. J., and Mufson, E. J. (2012) *Effects of aromatase inhibition versus gonadectomy on hippocampal complex amyloid pathology in triple transgenic mice*. Neurobiol. Dis., **45**, 479-487.
53. Michalsen, B. T., Gherezghiher, T. B., Choi, J., Chandrasena, R. E., Qin, Z., Thatcher, G. R. J., and Bolton, J. L. (2012) *Selective estrogen receptor modulator (SERM) lasofoxifene forms reactive quinones similar to estradiol*. Chem Res Toxicol **25**, 1472-1483
54. Teshome B. Gherezghiher, R. Esala P. Chandrasena, Zhihui Qin, Johann Sohn, Gregory R.J. Thatcher, and Judy L. Bolton (2012) *The Naphthol Selective Estrogen Receptor Modulator (SERM)*,

LY2066948, is Oxidized to an *o*-Quinone Analogous to the Naphthol Equine Estrogen, Equilenin. Chem Biol Interac. **196**: 1-10.

55. Jason R. Hickok, Divya Vasudevan, Gregory R. J. Thatcher, and Douglas D. Thomas, (2012) *Is S-nitrosocysteine a true surrogate for nitric oxide?* Antioxid. Redox Signal. **17**, 962-968.
56. L.P.Madhubhani P. Hemachandra, R. Esala P. Chandrasena, Shao-Nong Chen, Matthew Main, David C. Lankin, Robert A. Scism, Birgit M. Dietz, Guido F. Pauli, Gregory R. J. Thatcher, and Judy L. Bolton, (2012) *Hops (Humulus lupulus) inhibits Oxidative Estrogen Metabolism and Estrogen-Induced Malignant Transformation in Human Mammary Epithelial cells (MCF-10A).* Canc. Prev. Res. (Phila), **5**, 73-81.
57. Irida Kastrati, Praneeth D. Edirisinghe, L-P-Madhubani P. Hemachandra, Esala R. Chandrasena, Jaewoo Choi, Yue-Ting Wang, Judy L. Bolton, and Gregory R. J. Thatcher (2011) *Raloxifene and Desmethylarxoxifene Block Estrogen-Induced Malignant Transformation of Human Breast Epithelial Cells.* PloS One. **6**: e27876.
58. Abdul-Hay, S., Chandrasena, E. R., Li, M., Abdelhamid, R., Schiefer, I.T., Luo, J., Thatcher, G. R. J., (2011) *NO-SSRIs: Nitric Oxide Chimera Drugs Incorporating a Selective Serotonin Reuptake Inhibitor.* ACS Med. Chem. Lett. **2**, 656-661.
59. Schiefer, I.T., Abdul-Hay, S., Wang, H., Vanni, M., Qin, Z., Thatcher, G. R. J., (2011) *Inhibition of amyloidogenesis by non-steroidal anti-inflammatory drugs and their hybrid nitrates.* J. Med. Chem. **54**: 2293-2306.
60. Abdelhamid, R., Luo, J., VandeVrede, L., Kundu, I., Michalsen, B., Litosh, V.A., Schiefer, I.T., Gherezghiher, T., Yao, P., Qin, Z., and Thatcher, G.R.J., (2011) *Benzothiophene Selective Estrogen Receptor Modulators Provide Neuroprotection by a Novel GPR30-Dependent Mechanism.* ACS Chem Neurosci **2**: 256-268.
61. Pathi, S. S.; Jutooru, I.; Chadalapaka, G.; Sreevalsan, S.; Anand, S.; Thatcher, G. R.; Safe, S. H. (2010), *GT-094, a NO-NSAID, Inhibits Colon Cancer Cell Growth by Activation of a Reactive Oxygen Species (ROS)-MicroRNA-27a:ZBTB10-Specificity Protein (Sp) Pathway.* Mol Cancer Res **9**: 195-202.
62. Kastrati, I., Edirisinghe, P. D., Wijewickrama, G. T., Thatcher, G. R. J. (2010), *Estrogen-induced apoptosis of breast epithelial cells is blocked by NO/cGMP and mediated by extranuclear estrogen receptors.* Endocrinology, **151** (12), 5602-16.
63. Wang, Z., Chandrasena, E. R., Yuan, Y., Peng, K. W., van Breemen, R. B., Thatcher, G. R.J. and Bolton, J. L. (2010) *Redox Cycling of Catechol Estrogens Generating Apurinic/Apyrimidinic Sites and 8-oxo-Deoxyguanosine via Reactive Oxygen Species Differentiates Equine and Human Estrogens.* Chem Res Toxicol. **23**: 1365-73.
64. Sinha, V., Wijewickrama, G. T., Chandrasena, R. E., Xu, H., Edirisinghe, P. D., Schiefer, I. T. and Thatcher, G. R. J. (2010). *Proteomic and Mass Spectroscopic Quantitation of Protein S-Nitrosation Differentiates NO-Donors.* ACS Chem Biol. **5**: 667-80.
65. Peng, K. W., Chang, M., Wang, Y. T., Wang, Z., Qin, Z., Bolton, J. L. and Thatcher, G. R. J. (2010) *Unexpected Hormonal Activity of a Catechol Equine Estrogen Metabolite Reveals Reversible Glutathione Conjugation.* Chem Res Toxicol. **23**: 1374-83.
66. Anand, S.; Thatcher, G. R. J., *Nitric oxide-releasing molecules for cancer therapy and chemoprevention.* In Nitric oxide (NO) and cancer : prognosis, prevention, and therapy, 1st ed.; Bonavida, B., Ed. Springer: New York, 2010; pp 361-386.
67. Bolton, J.L., and Thatcher, G.R.J., *Genotoxic estrogen pathway: endogenous and equine estrogen hormone replacement therapy.* In The Chemical Biology of DNA Damage, Geacintov, N.E., Broyde, S., Eds, Wiley-VCH Verlag GmbH, Weinheim, 2010; pp 185-196.

68. Anand, S.; Schiefer, I. T.; Thatcher, G. R., (2010) *Nitric oxide donor and mimetic molecules in cancer chemotherapy and chemoprevention*. Forum Immun Dis Ther, **1** (4), 251-279.
69. Kim, H. Y., Sohn, J., Wijewickrama, G. T., Edirisinghe, P., Gherezghiher, T., Hemachandra, M., Lu, P. Y., Chandrasena, R. E., Molloy, M. E., Tonetti, D. A. and Thatcher, G. R. J. (2009) *Click synthesis of estradiol-cyclodextrin conjugates as cell compartment selective estrogens*. Bioorg Med Chem **18**: 809-821.
70. Peng, K. W., Wang, H. L., Qin, Z. H., Wijewickrama, G. T., Lu, M., Wang, Z., Bolton, J. L., and Thatcher, G. R. J. (2009). *Selective Estrogen Receptor Modulator Delivery of Quinone Warheads to DNA Triggering Apoptosis in Breast Cancer Cells*. ACS Chem Biol **4**: 1039-49.
71. Abdul-Hay, S. O., Luo, J., Ashghodom, R. T., and Thatcher, G. R. J. (2009). *NO-flurbiprofen reduces amyloid-beta, is neuroprotective in cell culture, and enhances cognition in response to cholinergic blockade*. J. Neurochem. **111**:766-776.
72. Chirapu, S. R., Pachaiyappan, B., Nural, H. F., Cheng, X., Yuan, H., Lankin, D. C., Abdul-Hay, S. O., Thatcher, G. R. J., Shen, Y., Kozikowski, A. P., and Petukhov, P. A. (2009). *Molecular modeling, synthesis, and activity studies of novel biaryl and fused-ring BACE1 inhibitors*. Bioorg Med Chem Lett **19**:264-274.
73. Abdul-Hay, S. O., Edirisinghe, P., and Thatcher, G. R. J. (2009). *Selective modulation of amyloid-beta peptide degradation by flurbiprofen, fenofibrate, and related compounds regulates Abeta levels*. J. Neurochem. **111**:683-695.
74. Wang, Z., Wijewickrama, G. T., Peng, K. W., Dietz, B. M., Yuan, L., van Breemen, R. B., Bolton, J. L., and Thatcher, G. R. J. (2009). *Estrogen Receptor α Enhances the Rate of Oxidative DNA Damage by Targeting an Equine Estrogen Catechol Metabolite to the Nucleus*. J Biol Chem **284**:8633-8642.
75. Yu, B., Qin, Z., Wijewickrama, G. T., Edirisinghe, P., Bolton, J. L., and Thatcher, G. R. J. (2009). *Comparative methods for analysis of protein covalent modification by electrophilic quinoids formed from xenobiotics*. Bioconjug Chem **20**:728-741.
76. Wang, Z., Edirisinghe, P., Sohn, J., Qin, Z., Geacintov, N. E., Thatcher, G. R. J., and Bolton, J. L. (2009). *Development of a liquid chromatography electrospray ionization tandem mass spectrometry method for analysis of stable 4-hydroxyequilenin-DNA adducts in human breast cancer cells*. Chem Res Toxicol **22**:1129-1136.
77. Qin, Z., Kastrati, I., Ashghodom, R. T., Lantvit, D. D., Overk, C. R., Choi, Y., van Breemen, R. B., Bolton, J. L. and Thatcher, G. R. J., (2009) *Structural Modulation of Oxidative Metabolism in Design of Improved Benzothiophene Selective Estrogen Receptor Modulators (SERMs)*, Drug Metab Dispos., **37**, 161-169.
78. Hagos, G. K., Abdul-Hay, S. O., Sohn, J., Edirisinghe, P. D., Chandrasena, R. E., Wang, Z., Li, Q. and Thatcher, G. R.J, (2008) *Anti-inflammatory, antiproliferative, and cytoprotective activity of NO chimera nitrates of use in cancer chemoprevention*, Mol Pharmacol. **74**, 1381-1391.
79. Chandrasena, R. E., Edirisinghe, P. D., Bolton, J. L. and Thatcher, G. R. J. (2008) *Problematic detoxification of estrogen quinones by NAD(P)H-dependent quinone oxidoreductase and glutathione-S-transferase*. Chem Res Toxicol, **21**, 1324-1329.
80. Chang, M., Overk, C. R., Kastrati, I., Peng, K. W., Yao, P., Qin, Z. H., Petukhov, P., Bolton, J. L. and Thatcher, G. R. J. (2008) *Estrogenic activity of the equine estrogen metabolite, 4-methoxyequilenin*. Adv Exp Med Biol, **617**, 601-607.
81. Dunlap, T., Abdul-Hay, S. O., Chandrasena, R. E., Hagos, G. K., Sinha, V., Wang, Z., Wang, H. and Thatcher, G. R. J. (2008) *Nitrates and NO-NSAIDs in cancer chemoprevention and therapy: in vitro evidence querying the NO donor functionality*. Nitric Oxide, **19**, 115-124.

82. Bolton, J.L., Thatcher, G.R.J., (2008) *Potential mechanisms of estrogen quinone carcinogenesis*, Chem. Res. Toxicol., **21**, 93-101.
83. Ghenet K. Hagos, Robert E. Carroll, Tatiana Kouznetsova, Qian Li, Violeta Toader, Patricia A. Fernandez, Steven M. Swanson, and Gregory R.J. Thatcher, (2007) *Colon cancer chemoprevention by a novel NO chimera that shows anti-inflammatory and antiproliferative activity in vitro and in vivo*, Mol Cancer Therap. **6**, 2230-9.
84. Dunlap, T., Chandrasena, R.E., Wang, Z., Sinha, V. and Thatcher, G.R. (2007) *Quinone formation as a chemoprevention strategy for hybrid drugs: balancing cytotoxicity and cytoprotection*. Chem Res Toxicol, **20**, 1903-12.
85. Yu, B., Dietz, B. M., Dunlap, T., Kastrati, I., Lantvit, D. L., Overk, C. R., Yao, P., Qin, Z., Bolton, J. L., Thatcher, G. R. J., (2007) *Structural modulation of reactivity/activity in design of improved benzothiophene SERMs: Induction of chemopreventive mechanisms*, Mol. Cancer Therap., **6**, 2418-28.
86. Chang, M., Peng, K. W., Kastrati, I., Overk, C. R., Qin, Z. H., Yao, P., Bolton, J. L., Thatcher, G. R. J., (2007) *Activation of Estrogen Receptor-Mediated Gene Transcription by the Equine Estrogen Metabolite, 4-Methoxyequilenin, in Human Breast Cancer Cells*, Endocrinology, **148**, 4793-802.
87. Overk, C. R., Peng, K. W., Asghodom, R. T., Kastrati, I., Lantvit, D. D., Qin, Z., Frasor, J., Bolton, J. L., Thatcher, G. R.J. (2007) *Structure-Activity Relationships for a Family of Benzothiophene Selective Estrogen Receptor Modulators Including Raloxifene and Arzoxifene*, ChemMedChem, **2**, 1520-6.
88. Qin, Z., Kastrati, I., Chandrasena, R. E., Liu, H., Yao, P., Petukhov, P. A., Bolton, J. L., Thatcher, G. R.J., (2007), *Benzothiophene selective estrogen receptor modulators with modulated oxidative activity and receptor affinity*, J. Med. Chem. **50**, 2682-92.
89. Thatcher, G. R. J., (2007) *Organic nitrates and nitrites as stores of NO bioactivity*. In "Radicals for life: the various forms of nitric oxide", eds van Faassen and Vanin, Elsevier Science, Amsterdam.
90. Liu, H., Qin, Z., Thatcher, G.R.J. and Bolton, J.L. (2007) *Uterine peroxidase catalyzed formation of di-quinone methides from the selective estrogen receptor modulators raloxifene and desmethylated arzoxifene*. Chem Res Toxicol, **20**, 1676-84.
91. Bennett, B.M., Reynolds, J.N., Prusky, G.T., Douglas, R.M., Sutherland, R.J. and Thatcher, G.R. (2007) *Cognitive deficits in rats after forebrain cholinergic depletion are reversed by a novel NO mimetic nitrate ester*. Neuropsychopharmacol **32**, 505-13.
92. Gregory R. J. Thatcher, James N. Reynolds, Brian M. Bennett, (2006) *Nitric oxide chimeras for treatment of Alzheimer's disease*, Curr. Alzheimer's Res., **3**, 237-45.
93. Dowers, T.S., Qin, Z., Thatcher, G.R.J. and Bolton, J.L. (2006) *Bioactivation of selective estrogen receptor modulators (SERMs)*. Chem Res Toxicol, **19**, 1125-37.
94. Hong Liu, Judy L. Bolton, and Gregory RJ Thatcher, (2006) *Chemical modification modulates estrogenic activity, oxidative reactivity, and metabolic stability in 4'-F-DMA, a new benzothiophene selective estrogen receptor modulator*. Chem. Res. Toxicol. **19**, 779-87.
95. Nicolescu, A.C., Li, Q., Brown, L. and Thatcher, G.R. (2006) *Nitroxidation, nitration, and oxidation of a BODIPY fluorophore by RNOS and ROS*. Nitric Oxide. **15**(2), 163-76.
96. Jennifer L Clarke, Irida Kastrati, Linda Johnstone, Gregory RJ Thatcher (2006), *Photochemical reactions of thiols with organic nitrates: oxygen atom transfer*, Can. J. Chem. **84**, 709-19.
97. Liu, J., Li, Q., Yang, X., van Breemen, R.B., Bolton, J.L. and Thatcher, G.R.J. (2005) *Analysis of protein covalent modification by xenobiotics using a covert oxidatively activated tag: raloxifene proof-of-principle study*. Chem Res Toxicol, **18**, 1485-96.

98. Thatcher, G.R.J. (2005) *An introduction to NO-related therapeutic agents*. Curr Top Med Chem, **5**, 597-601.
99. Thatcher, G.R.J., Bennett, B.M. and Reynolds, J.N. (2005) *Nitric oxide mimetic molecules as therapeutic agents in Alzheimer's disease*. Curr Alzheimer Res, **2**, 171-82.
100. Liu, H., Liu, J., van Breemen, R.B., Thatcher, G.R.J. and Bolton, J.L. (2005) *Bioactivation of the selective estrogen receptor modulator desmethylated arzoxifene to quinoids: 4'-fluoro substitution prevents quinoid formation*. Chem Res Toxicol, **18**, 162-73.
101. Liu, J., Liu, H., van Breemen, R.B., Thatcher, G.R.J. and Bolton, J.L. (2005) *Bioactivation of the selective estrogen receptor modulator acolbifene to quinone methides*. Chem Res Toxicol, **18**, 174-82.
102. Thatcher, G.R.J., Nicolescu, A.C., Bennett, B.M. and Toader, V. (2004) *Nitrates and NO release: Contemporary aspects in biological and medicinal chemistry*. Free Radical Biol Med, **37**, 1122-1143.
103. Thatcher, G.R.J., Bennett, B.M., Dringenberg, H.C. and Reynolds, J.N. (2004) *Novel nitrates as NO mimetics directed at Alzheimer's disease*. J Alzheimers Dis, **6**, S75-84.
104. Wang, Z., Chang, L., Klein, W.L., Thatcher, G.R.J. and Venton, D.L. (2004) *Per-6-substituted-per-6-deoxy beta-cyclodextrins inhibit the formation of beta-amyloid peptide derived soluble oligomers*. J Med Chem, **47**, 3329-33.
105. Nicolescu, A.C., Reynolds, J.N., Barclay, L.R. and Thatcher, G.R.J. (2004) *Organic nitrites and NO: inhibition of lipid peroxidation and radical reactions*. Chem Res Toxicol, **17**, 185-96.
106. Yu, L., Liu, H., Li, W., Zhang, F., Luckie, C., van Breemen, R.B., Thatcher, G.R. and Bolton, J.L. (2004) *Oxidation of raloxifene to quinoids: potential toxic pathways via a diquinone methide and o-quinones*. Chem. Res. Toxicol., **17**, 879-88.
107. Bolton, J.L., Yu, L. and Thatcher, G.R.J. (2004) *Quinoids formed from estrogens and antiestrogens*. Methods Enzymol., **378**, 110-123.
108. Akhter, S., Green, J.R., Root, P., Thatcher, G.J. and Mutus, B. (2003) *Peroxynitrite and NO⁺ donors form colored nitrite adducts with sinapinic acid: potential applications*. Nitric Oxide, **8**, 214-21.
109. Toader, V., Xu, X., Nicolescu, A., Yu, L., Bolton, J.L. and Thatcher, G.R. (2003) *Nitrosation, nitration, and autoxidation of the selective estrogen receptor modulator raloxifene by nitric oxide, peroxynitrite, and reactive nitrogen/oxygen species*. Chem Res Toxicol, **16**, 1264-76.
110. DiFabio, J., Ji, Y., Vasiliou, V., Thatcher, G.R. and Bennett, B.M. (2003) *Role of mitochondrial aldehyde dehydrogenase in nitrate tolerance*. Mol Pharmacol, **64**, 1109-16.
111. Buncel, E., Nagelkerke, R. and Thatcher, G.R.J. (2003) *Metal ion catalysis and inhibition in nucleophilic displacement reactions at carbon, phosphorus and sulfur centers. 10. Alkali metal ion catalysis in nucleophilic displacement by ethoxide ion on p-nitrophenyl phenylphosphonate: Evidence for multiple metal ion catalysis*. Can J Chem, **81**, 53-63.
112. Nagelkerke, R., Thatcher, G.R. and Buncel, E. (2003) *Alkali-metal ion catalysis and inhibition in nucleophilic displacement reactions at carbon, phosphorus and sulfur centres. IX. p-Nitrophenyl diphenyl phosphate*. Org Biomol Chem, **1**, 163-7.
113. Nicolescu, A.C., Zavorin, S.I., Turro, N.J., Reynolds, J.N. and Thatcher, G.R. (2002) *Inhibition of lipid peroxidation in synaptosomes and liposomes by nitrates and nitrites*. Chem Res Toxicol, **15**, 985-98.
114. Reynolds, J.N., Bennett, B.M., Boegman, R.J., Jhamandas, K., Ratz, J.D., Zavorin, S.I., Scutaru, D., Dumitrascu, A. and Thatcher, G.R.J. (2002) *Neuroprotection against ischemic brain injury conferred by a novel nitrate ester*. Bioorg Med Chem Lett, **12**, 2863-6.

115. Murray, J., Macartney, D. and Thatcher, G.R. (2001) *Catalysis of NO production by a molybdoenzyme model*. Org Lett, **3**, 3635-8.
116. Zavorin, S.I., Artz, J.D., Dumitrascu, A., Nicolescu, A., Scutaru, D., Smith, S.V. and Thatcher, G.R. (2001) *Nitrate esters as nitric oxide donors: SS-nitrates*. Org Lett, **3**, 1113-6.
117. Toong, S., Xiong, Z.G., Zavorin, S.I., Bai, D., Orser, B.A., Thatcher, G.R., Reynolds, J.N. and MacDonald, J.F. (2001) *Modulation of AMPA receptors by a novel organic nitrate*. Can J Physiol Pharmacol, **79**, 422-9.
118. Lei, S., Orser, B.A., Thatcher, G.R., Reynolds, J.N. and MacDonald, J.F. (2001) *Positive allosteric modulators of AMPA receptors reduce proton-induced receptor desensitization in rat hippocampal neurons*. J Neurophysiol, **85**, 2030-8.
119. Artz, J.D., Toader, V., Zavorin, S.I., Bennett, B.M. and Thatcher, G.R. (2001) *In vitro activation of soluble guanylyl cyclase and nitric oxide release: a comparison of NO donors and NO mimetics*. Biochemistry, **40**, 9256-64.
120. Smith, S., Dringenberg, H.C., Bennett, B.M., Thatcher, G.R. and Reynolds, J.N. (2000) *A novel nitrate ester reverses the cognitive impairment caused by scopolamine in the Morris water maze*. Neuroreport, **11**, 3883-6.
121. S. Smith, A. Nicolescu, H. Dringenberg, G.R.J. Thatcher and J.N. Reynolds, "Cognition enhancement and neuroprotection with a novel nitrate ester", FASEB J. 14 (2000) A1438.
122. J.N. Reynolds, S. Smith, J.T. Douglas, H.C. Dringenberg and G.R.J. Thatcher, "Cognition enhancement and sedative-hypnotic properties with a novel nitrate ester", Soc. Neurosci. 26 (2000).
123. A.E. Clarke, B.M. Bennett, G.R.J. Thatcher, K. Jhamandas, J.N. Reynolds and R.J. Boegman, "A novel organic nitrate exerts neuroprotection in an in vitro stroke model: role of cGMP", FASEB J. 14 (2000) A1500.
124. Ferguson, C.G., Gorin, B.I. and Thatcher, G.R. (2000) *Design of novel derivatives of phosphonofornate (Foscarnet) as prodrugs and antiviral agents*. J Org Chem, **65**, 1218-21.
125. Vizitiu, D., Walkinshaw, C.S., and Thatcher, G.R.J. (1999) *Binding of phosphates to aminocyclodextrin biomimetics*. J Org Chem, **64**, 6235-6238.
126. J.N. Reynolds, B.M. Bennett, K. Jhamandas, R. Boegman and G.R.J. Thatcher, *Neuroprotection in a rat model of focal cerebral ischemia by a novel family of nitrate esters*, Soc. Neurosci. 25 (1999) 584.
127. Ferguson, C.G. and Thatcher, G.R. (1999) *Catalysis and acceleration of acyl transfer by aminocyclodextrins: a biomimetic system of use in enzyme modeling and drug design*. Org Lett, **1**, 829-32.
128. Thatcher, G.R.J., Weldon, H. (1998) *NO problem for nitroglycerin: organic nitrate chemistry and therapy*. Chem. Soc. Rev., **27**, 331-337.
129. Ferguson, C.G. and Thatcher, G.R.J. (1998) *A simple synthesis of phosphonofornamides*. Synlett, 1325-1326.
130. Artz, J.D. and Thatcher, G.R. (1998) *NO release from NO donors and nitrovasodilators: comparisons between oxyhemoglobin and potentiometric assays*. Chem Res Toxicol, **11**, 1393-7.
131. Borrajo, A.M.P., Gal, J.-F., Maria, P.-C., Decouzon, M., Ripley, D.C., Buncel, E. and Thatcher, G.R.J. (1997) *Gas-Phase Cation Basicities for Sulfuryl Species from Calculation and Experiment*. J Org Chem, **62**, 9203-9209.
132. Vizitiu, D., Walkinshaw, C.S. and Thatcher, G.R.J. (1997) *Synthesis of mono-facially functionalized cyclodextrins bearing amino pendent groups*. J. Org. Chem., **62**, 8760-8766.

133. McCracken, P.G., Bolton, J.L. and Thatcher, G.R.J. (1997) *Covalent Modification of Proteins and Peptides by the Quinone Methide from 2-tert-Butyl-4,6-dimethylphenol: Selectivity and Reactivity with Respect to Competitive Hydration*. J Org Chem, **62**, 1820-1825.
134. Borrajo, A.M.P., Gorin, B.I., Dostaler, S.M., Riopelle, R.J. and Thatcher, G.R.J. (1997) *Derivatized cyclodextrins as peptidomimetics: influence on neurite growth*. Bioorg Med Chem Lett, **7**, 1185-1190.
135. Gorin, B.I., Ferguson, C.G. and Thatcher, G.R.J. (1997) *A novel esterification procedure applied to synthesis of biologically active esters of Foscarnet*. Tetrahedron Letters, **38**, 2791-2794.
136. Cameron, D.R. and Thatcher, G.R.J. (1996) *Mechanisms of Reaction of Sulfate Esters: A Molecular Orbital Study of Associative Sulfuryl Group Transfer, Intramolecular Migration, and Pseudorotation*. J Org Chem, **61**, 5986-5997.
137. Gorin, B.D., Riopelle, R.J. and Thatcher, G.R.J. (1996) *Efficient perfacial derivatization of cyclodextrins at the primary face*. Tetrahedron Lett, 4647-4650.
138. Vaino, A.R., Chan, S.S., Szarek, W.A. and Thatcher, G.R. (1996) *An experimental reexamination of the reverse anomeric effect in N-glycosylimidazoles*. J Org Chem, **61**, 4514-4515.
139. Yang, K., Artz, J.D., Lock, J., Sanchez, C., Bennett, B.M., Fraser, A.B. and Thatcher, G.R.J. (1996) *Synthesis of novel organic nitrate esters: guanylate cyclase activation and tissue relaxation*. J Chem Soc Perkin Trans 1, 1073-1075.
140. Kriste, A.G., Vizitiu, D. and Thatcher, G.R.J. (1996) *A metallomicelle enzyme model for phospholipase C catalysis and inhibition*. Chem. Commun., 913-914.
141. Vizitiu, D., Kriste, A.G., Campbell, A.S. and Thatcher, G.R. (1996) *Inhibition of phosphatidylinositol-specific phospholipase C: studies on synthetic substrates, inhibitors and a synthetic enzyme*. J Mol Recognit, **9**, 197-209.
142. Artz, J.D., Yang, K., Lock, J., Sanchez, C., Bennett, B.M. and Thatcher, G.R.J. (1996) *Reactivity of thionitrate esters: putative intermediates in nitrovasodilator activity*. Chem. Commun., 927-928.
143. Thatcher, G.R.J. and Cameron, D.R. (1996) *Influence of strain on hydrolysis of five-membered sulfate and phosphate esters*. J Chem Soc, Perkin Trans 2, 767-769.
144. Williams, V.E., Lemieux, R.P. and Thatcher, G.R.J. (1996) *Substituent effects on the stability of arene-arene complexes: an AM1 study of the conformational equilibria of cis-1,3-diphenylcyclohexanes*. J Org Chem, **61**, 1927-33.
145. Pregel, M.J., Dunn, E.J., Nagelkerke, R., Thatcher, G.R.J. and Buncl, E. (1995) *Alkali-metal ion catalysis and inhibition in nucleophilic displacement reactions of phosphorus-, sulfur- and carbon-based esters*. Chem Soc Rev, **24**, 449-55.
146. Nagelkerke, R., Pregel, M.J., Dunn, E.J., Thatcher, G.R.J. and Buncl, E. (1995) *Catalysis and inhibition by alkali metal ions in nucleophilic substitution at phosphorus and sulfur centers*. Org React (Tartu), **29**, 11-18.
147. Cameron, D.R., Borrajo, A.M.P., Bennett, B.M. and Thatcher, G.R.J. (1995) *Organic nitrates, thionitrates, peroxyxynitrites, and nitric oxide: a molecular orbital study of the $RXNO_2 \rightleftharpoons RXONO$ ($X=O,S$) rearrangement, a reaction of potential biological significance*. Can J Chem, **73**, 1627-1638.
148. Chan, S.S.C., Szarek, W.A. and Thatcher, G.R.J. (1995) *The reverse anomeric effect in N-pyranosylimidazolides: a molecular orbital study*. J Chem Soc, Perkin Trans 2, 45-60.
149. Palmer, D.R.J., Buncl, E. and Thatcher, G.R.J. (1994) *Re-evaluation of cyclodextrin as a model of chymotrypsin: acceleration and inhibition of tertiary anilide hydrolysis*. J. Org. Chem., **59**, 5286-91.

150. Buckell, F., Hartry, J.D., Rajalingam, U., Bennett, B.M., Whitney, R.A. and Thatcher, G.R.J. (1994) *Hydrolysis of nitrite esters: Putative intermediates in the biotransformation of organic nitrates*. J. Chem. Soc. Perkin Trans. 2, 401-403.
151. Thatcher, G.R.J., Krol, E.S. and Cameron, D.R. (1994) *Stereoelectronic effects in pentacoordinate intermediates and acceleration of nucleophilic substitution at phosphorus*. J Chem Soc, Perkin Trans 2, 683-90.
152. Cameron, D.R. and Thatcher, G.R.J. (1993) *Stereoelectronic effects in pentaoxysulfuranes. Putative intermediates in sulfuryl-group transfer*. In Thatcher Gregory, R.J. (ed.), ACS Symposium Series, vol. 539, pp. 256-76.
153. Thatcher, G.R.J. (1993) *Anomeric and associated stereoelectronic effects. Scope and controversy*. In Thatcher Gregory, R.J. (ed.), ACS Symposium Series, vol. 539, pp. 6-25
154. Thatcher, G.R.J. and Campbell, A.S. (1993) *Phosphonates as mimics of phosphate biomolecules: ab initio calculations on tetrahedral ground states and pentacoordinate intermediates for phosphoryl transfer*. J Org Chem, **58**, 2272-81.
155. Krol, E.S. and Thatcher, G.R.J. (1993) *Hydrolysis of phosphonoformate triesters: rate acceleration of a millionfold in nucleophilic substitution at phosphorus*. J Chem Soc, Perkin Trans 2, 793-4.
156. Campbell, A.S. and Thatcher, G.R.J. (1992) *Tetравanadate is an inhibitor of phosphatidyl inositol-specific phospholipase C*. Bioorg Med Chem Lett, **2**, 655-8.
157. Thatcher, G.R.J., Cameron, D.R., Nagelkerke, R. and Schmitke, J. (1992) *Selective hydrogen bonding as a mechanism for differentiation of sulfate and phosphate at biomolecular receptor sites*. Chem Commun, 386-8.
158. Palmer, D.R.J., Buncel, E. and Thatcher, G.R.J. (1992) *The problem of selective derivatization of the secondary face of β -cyclodextrin in the synthesis of enzyme mimics*. Minutes Int. Symp. Cyclodextrins, 6th, 86-91.
159. Davis, J. M., Cameron, D. R., Kubanek, J. M., Mizuyabu, L., Thatcher, G. R. J. (1991) *Acceleration of sulfate ester hydrolysis in hydrophobic environments*. Tetrahedron Letters.32, 2205-6.
160. Krol, E. S., Davis, J. M., Thatcher, G. R. J. (1991) *Hydrolysis of Phosphonoformate Esters: Product Distribution and Reactivity Patterns*. J. Chem. Soc. Chem. Commun., 118-119.
161. Campbell, A. S., Thatcher, G. R. J. (1991) *Synthesis of an Analogue of D,L-Myo-Inositol-1,2-Cyclic Phosphate: Inhibition of Phosphatidylinositol-Specific Phospholipase C*. Tetrahedron Lett. ;32, 2207.
162. Thatcher, G.R.J. and Kluger, R. (1989) *Mechanism and catalysis of nucleophilic substitution in phosphate esters*. In Bethell, D. (ed.), Adv Phys Org Chem, vol. 25, pp. 99-265.
163. Lowe, G., Thatcher, G.R.J., Turner, J.C.G., Waller, A. and Watkin, D.J. (1988) *Stereoelectronic effects in sulfate diesters and sulfuric acid*. J Am Chem Soc, **110**, 8512-20.
164. Blackburn, G.M., Taylor, G.E., Tattershall, R.H., Thatcher, G.R.J. and McLennan, A. (1987) *Phosphonate analogs of biological phosphates*. Bioactive Molecules. In: Bruzik, K. S., Stec, W. J., editors. *Biophosphates and Their Analogues - Synthesis, Structure, Metabolism and Activity*. Amsterdam: Elsevier; 1987.
165. Blackburn, G.M., Taylor, G.E., Thatcher, G.R.J., Prescott, M. and McLennan, A.G. (1987) *Synthesis and resistance to enzymic hydrolysis of stereochemically-defined phosphonate and thiophosphate analogs of P1,P4-bis(5'-adenosyl) tetrphosphate*. Nucl Acid Res, **15**, 6991-7004

166. Blackburn, G.M., Thatcher, G.R.J., Hosseini, M.W. and Lehn, J.M. (1987) *Evidence for a protophosphatase catalyzed cleavage of adenosine triphosphate by a dissociative-type mechanism within a receptor-substrate complex*. Tetrahedron Lett, **28**, 2779-82.
167. Gregory R.J. Thatcher, and Ronald Kluger, " *Nucleophilic substitution and pseudorotation at phosphorus* ". Can. J. Chem. (1987).
168. Thatcher, G.R.J., Poirier, R. and Kluger, R. (1986) *Enzymic carboxyl transfer from N-carboxybiotin. A molecular orbital evaluation of conformational effects in promoting reactivity*. J Am Chem Soc, **108**, 2699-704.
169. Kluger, R. and Thatcher, G.R.J. (1986) *Exocyclic cleavage in the alkaline hydrolysis of methyl ethylene phosphate: pseudorotation of a pentavalent intermediate or reaction via a hexavalent intermediate?* J Org Chem, **51**, 207-12.
170. Kluger, R. and Thatcher, G.R.J. (1985) *Exocyclic cleavage in the alkaline hydrolysis of methyl ethylene phosphate. Evidence against the significance of stereoelectronic acceleration in reactions of cyclic phosphates*. J Am Chem Soc, **107**, 6006-11.

PATENTS

A. More Recently Published (2016-19)

0. Thatcher, G. R.; Xiong, R.; Zhao, J.; Tonetti, D. A. Pyridinone-based epigenetic modifiers and uses thereof. WO2019109057A1: 2019.
1. Thatcher, G. R.; Xiong, R.; Zhao, J.; Tonetti, D. A. Benzothiophene-Based Selective Estrogen Receptor Downregulators. US Patent 10,377,735: 2019.
2. Thatcher, G. R.; Xiong, R.; Lu, Y.; Zhao, J.; Tonetti, D. A. Benzothiophene-Based Selective Mixed Estrogen Receptor Downregulators. US Patent 10,703,747: 2020.
3. Thatcher, G. R.; Siklos, M.; Xiong, R. Compositions and Methods for Treating Estrogen-Related Medical Disorders. US Patent 10,464,930: 2019.
4. Strum, J. C.; Thatcher, G. R.; Xiong, R.; Zhao, J.; Tonetti, D. A. Combination Therapy for Treatment of Cancer. In US Patent App. 16/460,502: 2019.
5. DiMagno, S.; Thatcher, G. R.; Tonetti, D.; Xiong, R.; Hu, B. Radiotracers for Imaging ER-Positive Breast Cancer. In US Patent App. 16/254,017: 2019.
6. Thatcher, G. R.; Schiefer, I. T.; Arancio, O.; Fa, M. Cysteine Protease Inhibitors and Uses Thereof. In US Patent 10,647,709: 2020.
7. Thatcher, G. R.; Xiong, R.; Zhao, J.; Tonetti, D. A. Benzothiophene-Based Selective Estrogen Receptor Downregulators. US Patent 10,118,910: 2018.
8. Thatcher, G. R.; Tonetti, D.; Molloy, M. E.; Michalsen, B.; Qin, Z. Compositions and Methods for Treating Estrogen-Related Medical Disorders. US Patent 9,895,348: 2018.
9. Thatcher, G. R.; Siklos, M.; Xiong, R. Compositions and Methods for Treating Estrogen-Related Medical Disorders. US Patent 10,160,752: 2018.
10. Thatcher, G. R.; Xiong, R.; Zhao, J.; Tonetti, D. A. Benzothiophene-Based Selective Estrogen Receptor Downregulator Compounds. In US Patent App. 15/375,049: 2017.
11. Thatcher, G. R.; Qin, Z.; Luo, J. Compounds and Methods for Treating Brain Disorders. EP2566856B1: 2017.
12. Thatcher, G. R.; Tonetti, D.; Molloy, M. E.; Michalsen, B.; Qin, Z. Compositions and Methods for Treating Estrogen-Related Medical Disorders. US Patent 9,475,791: 2016.

13. Thatcher, G. R.; Schiefer, I. T.; Arancio, O.; Fa, M. Cysteine Protease Inhibitors and Uses Thereof. US Patent 9,403,843: 2016.

Older Issued Patents

1. Nitrate Esters and Their Use for Neurological Conditions. U.S. Patent No. 6,916,835. Issue date, Jul 12, 2005. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, R.J. Boegman, K. Jhamandas.
2. Nitrate Esters and Their Use for Neurological Conditions. U.S. Patent No. 6,677,734. Issue date, Jan 13, 2004. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, R.J. Boegman, K. Jhamandas.
3. Nitrate Esters and Their Use for Neurological Conditions, U.S. Patent No. 6,365,579. Issue date, April 2, 2002. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
4. Phosphono-Carboxylate Compounds for Treating Amyloidosis, U.S. Patent No. 6,440,952. Issue date, Aug 27, 2002. Gregory R.J. Thatcher, Boris I. Gorine, Walter Szarek, G Kong.
5. Nitrate Esters and Their Use for Neurological Conditions, U.S. Patent No. 6,310,052, Issue date, Oct. 30, 2001. U.S. Continuation in part of U.S. Patent No. 5,883,122 (Serial No. 09/267,379). G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman
6. Nitrate Esters and Their Use for Neurological Conditions. U.S. Patent No. 5,883,122. Issue date, March 16, 1999. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
7. Nerve Process Growth modulators, Kimberley E. Dow, Boris I. Gorine, Richard J. Riopelle and Gregory R.J. Thatcher, , US Patent 5,834,446 (Nov. 1998).
8. Nitrate esters and method of making. U.S. Patent No. 5,807,847. Issue date, September 15, 1998. G.R.J. Thatcher, B.M. Bennett.
9. Nitrate Esters and Their Use for Neurological Conditions, European Patent No. 0915842, Issue Date: April 28, 2004. Filed: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
10. Methods and Compositions for Mitigating Pain Using Nitrate Esters. European Patent No. 1518553A2. Filed: December 27, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas.
11. Methods and Compositions for Mitigating Pain Using Nitrate Esters. European Patent No. 1246625. Issue Date: December 1, 2004. Filed: December 27, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas.
12. Methods and Compositions for Mitigating Pain Using Nitrate Esters. Australian Patent No. 782489 Issue Date: December 1, 2004. Filed: December 27, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas.
13. Nitrate Esters and Their Use for Neurological Conditions, Australian Patent No. 783036, Issue Date: January 5, 2006, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
14. Nitrate Esters and Their Use for Neurological Conditions. Canadian Patent No. 2255824 Issue date: Jan 24 2006. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.

15. Nitrate Esters and Their Use for Neurological Conditions, Australian Patent No. 725046 (National Phase of PCT/CA97/00372), Issue Date: January 25, 2001, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman
16. Use and compositions of nitrate esters for providing sedation, Hong Kong Patent No.1050144A1. Issue date, June 8, 2005. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas.
17. Nitrate Esters and Their Use for Neurological Conditions, Mexican Patent No. 1009246A. Issue date, April 2, 2002. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
18. Nitrate Esters and Their Use for Neurological Conditions, Korean Patent No. 061234445. Issue date, Nov 30, 2005. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, R.J. Boegman, K. Jhamandas.
19. Nitrate Esters and Their Use for Neurological Conditions, Korean Patent No. 0016354A. Issue date, April 2, 2002. G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, R.J. Boegman, K. Jhamandas.

B. Patent applications (early incomplete list)

20. Venton, D.L., Klein, W.L., Thatcher, G.R.J., Chang, L., Liu, R., Wang, Z. and Holterman, M. (2005) Preparation of per-6-amino-substituted-deoxy-cyclodextrins to treat Alzheimer's diseases. (The Board of Trustees of the University of Illinois, USA; Northwestern University). Application: WO, pp. 54 pp.
21. Thatcher, G.R.J., Bennett, B.M., Reynolds, J.N., Boegman, R.J. and Jhamandas, K. (2005) Preparation of nitrate esters having a b- or g-sufur atom for protection of cells/tissues from oxidative damage. (USA). Application: US, pp. 83 pp , Cont -in-part of U S Ser No 147,808.
22. Methods and Compositions for Mitigating Pain Using Nitrate Esters. Canadian Patent Application No. 23941844 Issue date: G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas.
23. Gregory R.J. Thatcher, Boris I. Gorine, Brian Pring, *Novel Compounds*, WO 98/25938 (June, 1998).
24. Gregory R.J. Thatcher, Boris I. Gorine, Walter Szarek, G Kong, *Phosphono-Carboxylate Compounds for Treating Amyloidosis*, WO 99/08685 (Feb. 1999).
25. Kimberley E. Dow, Boris I. Gorine, Richard J. Riopelle and Gregory R.J. Thatcher, *Nerve Process Growth modulators*, WO 97/49735 (Dec. 1997)
26. Gregory R.J. Thatcher, Boris I. Gorine, Walter Szarek, G Kong, *Phosphono-Carboxylate Compounds for Treating Amyloidosis*, EP 1014EP 1014994A1 (July, 2000).
27. Nitrate Esters and Their Use for Neurological Conditions. International patent application #PCT/CA97/00372, International Filing Date: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
28. Nitrate Esters and Their Use for Neurological Conditions. Japanese Patent Application No. Hei 10500039 (National Phase of PCT/CA97/00372), Filed: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
29. Nitrate Esters and Their Use for Neurological Conditions, Korean Patent Application No. 709928/1998 (National Phase of PCT/CA97/00372), Filed: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.

30. Nitrate Esters and Their Use for Neurological Conditions, Mexican Patent Application No. 9810182 (National Phase of PCT/CA97/00372), Filed: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
31. Nitrate Esters and Their Use for Neurological Conditions Brazilian Patent Application No. PI 9709635-0 (National Phase of PCT/CA97/00372), Filed: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
32. Nitrate Esters and Their Use for Neurological Conditions, Canadian Patent Application No. 2,255,824 (National Phase of PCT/CA97/00372), Filed: May 30, 1997, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
33. Nitrate Esters and Their Use for Neurological Conditions. International Patent Application No. PCT/CA00/00280, International Filing Date: March 15, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
34. Nitrate Esters and Their Use for Neurological Conditions. Australian Patent Application No.32673/00 (National Phase of PCT/CA00/00280), Filed: March 15, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
35. Nitrate Esters and Their Use for Neurological Conditions. Canadian Patent Application No. 2,364,493 (National Phase of PCT/CA00/00280), Filed: March 15, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
36. Nitrate Esters and Their Use for Neurological Conditions. European Patent Application No. 00910456.3 (National Phase of PCT/CA00/00280), Filed: March 15, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
37. Nitrate Esters and Their Use for Neurological Conditions. Japanese Patent Application No. 2000-604832 (National Phase of PCT/CA00/00280), Filed: March 15, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
38. Nitrate Esters and Their Use for Neurological Conditions. Mexican Patent Application No. 2001/009246 (National Phase of PCT/CA00/00280), Filed: March 15, 2000, G. R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
39. Nitrate Esters and Their Use for Neurological Conditions. Israeli Patent Application No. 145367, Filed: March 15, 2000, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.
40. Methods and Compositions for Mitigating Pain. US Application Serial No. 09/473,713, Filed: December 29, 1999, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas
41. Nitrate Esters and Their Use for Mitigating Cellular Damage. US Application Serial No. 10/943,263, Filed: Sept 17, 2004, G.R.J. Thatcher, B.M. Bennett, J.N. Reynolds, K. Jhamandas, R.J. Boegman.

RESEARCH & FUNDING

RESEARCH

Research Support (since 2003):

- 1R01 AG067771-01 (Thatcher) 09/01/20 - 08/31/23
National Institute of Health/NIA
"Novel allosteric activation of nicotinamide rescue"
New treatment for Alzheimer's disease and comorbid diseases such as Type 2 diabetes are desperately needed. Completion of this proposal will move us closer to a small molecule therapeutic.
- UL1 TR002003 (Memelstein/Tobacman, MPI) 08/15/16 - 05/31/20
National Institutes of Health/NCATS
"Clinical and Translational Science Award"
(Thatcher, Co-I: Core 7: UICentre for the Discovery of Small Molecule Therapeutic Agents)
The University of Illinois at Chicago (UIC) Center for Clinical and Translational Science (CCTS) seeks to catalyze translational research, locally and nationally, as part of a national network to improve individual and population health. Core 7: Aim 1. Create and support multidisciplinary collaborations that transform basic science projects into drug discovery initiatives.
Role: Core Leader and Co-Investigator
- R33 AI127635 (Williams/Thatcher/Petukhov, MPI) 12/01/16 - 11/30/21
Rush University (NIH flow-thru/NIAD)
"Identification of preclinical drug candidates for the treatment of schistosomiasis"
Drs. Petukhov & Thatcher will be responsible for: Aim 3: Design and synthesize novel inhibitors of TGR: A. Iterative structure and ligand-based computer-aided design; B. Medicinal chemistry: optimize for potency, stability, and oral bioavailability; C. Structural biology: X-ray crystallography; and chemoproteomics using photoreactive probes. Aim 4: B. Metabolic stability in plasma and mouse and human liver microsomes. Aim 5: Determine plasma concentration after IP and PO administration (samples to be provided by Dr. Williams).
- R01 AG057008 (Thatcher/LaDu, MPI) 09/01/17 - 05/31/21
National Institutes of Health/NCI
"Estrogen therapy and APOE4 risk in Alzheimer's tested in female EFAD mice"
The goal is to determine the ability of ET and alt-ET to counteract the negative interaction of sex with APOE4 in the novel preclinical EFAD mouse model (expressing human APOE +FAD mutations), establishing both the preferred timing and APOE isoform selectivity of safe alt-ET for therapy or prophylaxis of AD.
- NA (Brady/Thatcher, MPI) 08/01/18 - 07/31/20
Rainwater Charitable Foundation (Tau Consortium)
"Targeting Pathological Tau Signaling Through Tau N-Terminal PAD"
The proposed studies will address three specific aims: 1) Identify a small molecule probe that binds to PAD and inhibits the interaction of PAD with TNT; 2) Development of a phenotypic assay to assist optimization of PAD ligands as therapeutic agents; and 3) Identify a small molecule probe as a radiotracer for PAD-tau.
- NA (Thatcher, PI) 01/01/19 - 12/31/19
Chicago Biomedical Consortium
"A Novel BET Inhibitor for Breast Cancer Combination Therapy"
This proposal will obtain crucial preclinical efficacy data on the YF-2-23 combination in xenograft models of metastatic ER+ breast cancer, resistant to endocrine therapy and CDK4/6 inhibitors.
- 1R01 CA188017-01A1 (Thatcher) 04/01/15 - 03/31/19 1.62 academic
National Institute of Health, NCI \$383,185 0.45 summer
Partial Agonist at Estrogen Receptor Alpha for Breast Cancer Therapy
Pharmacological partial agonists and allosteric modulators of estrogen receptor function will be developed as novel therapeutics with widespread use in women's health and beyond and immediate potential benefit in breast cancer.
- UH2 NS100127 (LaDu, PI) 09/30/16 - 07/31/19 (Thatcher only in Y1 & 2)

National Institutes of Health/NINDS

“Aged EFAD mice as a model for the effects of APOE and sex on AD pathology”

Using a novel preclinical transgenic mouse model, this proposal will address the interactive effects of aging, APOE genotype and sex on AD progression, establishing the foundation testing mechanistic-based therapeutic interventions.

Role: Co-Investigator

5R01 CA102590-08 (Thatcher)

07/01/03 - 07/31/17

0.90 academic

National Cancer Institute, NIH

\$145,319

0.25 summer

Biointeractions of Antiestrogens with Nitric Oxide

This proposal is targeted at understanding specific points of intersection in NO and (anti)estrogen actions that increase knowledge on NO and NOS status in cancer, and provide a mechanistic basis for future design of safe, non-carcinogenic SERMs for HRT and beyond.

R56 NS083527 (Loeb)

08/01/15 - 07/31/17

National Institutes of Health/NINDS

“MAPK Signaling in Neocortical Epilepsy”

This project addresses major gaps in our ability to care for patients with epilepsy both by developing a better understanding of epileptic discharge and seizures in the human brain and in a new animal model.

Role: Co-Investigator

R41 AI126971 (Rong, PI; Thatcher, UIC PI)

08/01/16 - 07/31/18

Chicago BioSolutions (NIH flow-thru/NIAID)

“4-(Aminomethyl) benzamides as novel anti-Ebola agents”

This application defines a plan to develop potent, small molecule inhibitors, which block entry of EBOV and MARV. Entry of EBOV and MARV into the hosts is mediated by a single viral glycoprotein (GP).

R41 AI127031 (Rong, PI; Thatcher, UIC PI)

06/01/16 - 05/31/18

Chicago BioSolutions (NIH flow-thru/NIAID)

“4-Aminopiperidines as novel anti-influenza agents”

The overall goal of this research is to address a critical need by developing *small molecule inhibitors of influenza viral infections*, which we believe can be used prophylactically or acutely when symptoms of disease are present.

R42AG044024 (Thatcher, PI)

09/30/16 - 05/31/18

Revivo Therapeutics Inc. (NIH flow-thru/NIA)

“Nomethiazoles Harnessing GABA and NO mimetic activity for Alzheimer's therapy”

Objective: Phase 2 proposal will de-risk and select one drug candidate for future full IND-enabling studies.

NA (Tonetti/Thatcher, MPI)

06/01/17 - 5/31/18

G1 Therapeutics Inc.

“Discovery of New Partners for Combination Therapy with G1T48”

Goals: Design and optimize combination therapeutics with G1T48 in metastatic ER+ breast cancer, and for potential use in combination with G1T38. Test new G1T48 combinations in tamoxifen-resistant cell lines.

NA (Tonetti)

03/01/16 - 02/28/17

Chicago Biomedical Consortium

“Selective inhibition of tamoxifen-resistant breast cancer cell growth by single agents and in combination”

To identify new chemotypes and novel mechanisms of adjuvant treatments for treatment resistant (TR) ER+ breast cancer by comparing TR (MCF7:5C) with parent wild type (WT: MCF-7:ws8) cell lines.

Role: Co-Investigator

NA (LaDu)

03/01/16 - 02/28/17

Chicago Biomedical Consortium

“Screening for a Tissue-specific ABCA1 agonists to target lipidation of apoE4 in the CNS as an effective and related therapy for Alzheimer’s disease”

Identifying tissue-specific agonists increasing ABCA1 expression in CCF-astrocytoma cells and primary glia without inducing detrimental SREBP-1c activation in hepatocytes and HepG2-cells.

Role: Co-Investigator.

5R01 CA079870-14 (Bolton)	01/08/99 - 05/31/15	0.27 academic
National Institute of Health, NCI	\$144,858 (NCE)	

Carcinogenic metabolites formed from antiestrogens

The goals of this project are to study the bioactivation mechanisms of antiestrogens to reactive intermediates to determine potential mechanisms of carcinogenesis.

1R41 AG044024-01A1 (Thatcher)	07/01/13 - 12/31/14 (NCE)	0.95 academic
National Institute of Health (STTR)	\$83,702 (UIC total)	0.26 summer

Nomethiazoles Harnessing GABA and NO mimetic activity for Alzheimer's therapy

Preliminary data show that nomethiazoles reverse cognitive deficits, slow A β accumulation, and provide a positive biomarker profile in AD transgenic mouse models: four nomethiazoles have been identified as promising leads for AD therapy. Selection of the preferred drug candidate and a back-up compound for development is the major objective of this STTR phase I study.

1R21 AG044682-01A1 (Thatcher & LaDu)	07/01/14 - 06/30/19	0.45 academic
National Institute of Health, NIA	\$150,000	0.13 summer

Potential ApoE Isoform-Specific Detrimental Effects of RXR Agonists in Alzheimer’s Therapy Studied in a Mouse Model

The goal of this proposal is to develop an in vitro assay for future drug development of RXR/LXR agonists by comparison with biomarkers and outcome with in vivo data in a mouse model of Alzheimer’s.

1UH2HL123610-01 (Prabhakar)	09/22/14 - 06/30/16	0.90 academic
University of Chicago (NIH flow-thru)	\$493,644 (UIC DC)	

Therapeutic Targeting of Carotid Body Chemoreflex for Sleep Disordered Breathing
(UIC PIs: Thatcher & Petukhov)

UIC will perform all HTS to identify novel inhibitors of cystathione-lyase. De novo structure-based design using combined *in silico* (CAMD) and structural (NMR, X-ray crystallography) will be performed in parallel. In addition, we will perform mechanism-based design from L-PAG as a lead compound.

STTR (Malik) (Thatcher, Co-I)	12/01/14 - 11/30/16	0.18 academic
Cell Biologics Inc. (NIH flow-thru)	\$75,480	(no salary request)

CXCL1 based cardiomyocyte protective therapies

The long term goal is to produce and test an effective and safe drug for the treatment of cardiovascular disease based on the therapeutic efficacy of the chemokine CXCL1.

STTR (Malik) (Thatcher, Co-I)	12/01/14 - 11/30/16	0.18 academic
Cell Biologics Inc. (NIH flow-thru)	\$75,480	(no salary request)

Cblb-based drugs to interrupt the pathogenesis of multiple organ dysfunction syndrome

The long term goal is to produce and test an effective and safe drug for the treatment of MODS based on the therapeutic efficacy of the protein Cblb.

OTM Proof of Concept Award	Tonetti/Thatcher PI	01/07/13-06/30/14
	\$50,000	

Mechanism of action of TTC-352 for the treatment of endocrine-resistant breast cancer

1U54 TR001354-01 (Mermelstein)	09/01/15 - 08/31/17	0.90 academic
National Institute of Health	\$3,298,592	0.25 summer

Clinical and Translational Science Award (U54)

The UIC CCTS proposes to be a robust and highly contributory hub in the national CTSA program that both advances and applies clinical translational research in a timely manner and expands and diversifies the clinical translational workforce.

U01 AG031294 Thatcher PI 07/01/08 – 06/30/12

NIH/NIA \$388,995

Harnessing GABA and NO mimetic activity for Alzheimer's therapy

The aim of this project is to design and synthesize novel NO chimera therapeutics that incorporate GABA_A potentiator and NO/cGMP activator activity to provide neuroprotection and restored cognitive function.

R01 CA130037 Bolton PI 08/31/07 – 05/31/12

NIH/NCI \$190,000

Role of Electrophilic/Redox Active Quinoids in Estrogen Carcinogenesis

The specific aims of this project are to determine the role of quinoids and the estrogen receptor in the carcinogenic effects of equine estrogens.

Role: co-investigator

R01 CA102590 Thatcher PI 01/15/05 – 12/31/09

NIH/NCI \$200,000

Biointeractions of Antiestrogens with Nitric Oxide

R01 CA121107 Thatcher PI 04/01/08 – 05/31/13

NIH/NCI \$250,000

Nitric Oxide Chimera Drugs for Colon Cancer Chemoprevention

The object of this project is to use the mouse AOM model of CRC to assess *in vivo* the potency, efficacy and mechanism of the lead NO chimera, GT 094, and subsequently, to assist optimized NO Chimera drug candidates.

R01 CA122914 Tonetti PI 09/01/07 – 08/31/12

NIH/NCI \$481,945

PKC Alpha as a Marker for Logical Therapeutic Approaches to Breast Cancer

The object of this project is to address three potential approaches to the treatment of breast cancer based on protein kinase C alpha (PKC α) as a biomarker to guide therapeutic choice.

U01 AG028713 Arancio PI 03/01/08 – 02/29/12

NIH/NIA \$133,443

Calpain Inhibitors Against Alzheimer's Disease

The aim of this project is to design and synthesize novel calpain inhibitors and then test their efficacy in *in vitro* assays, primary neuronal cultures, and an *in vivo* model of Alzheimer's Disease.

HHSN261200433012C (Thatcher) 01/28/11 – 09/29/11

Fisher BioServices (NIH flow-thru) \$123,574

Chemopreventive ASA Derivatives that Generate a Quinone

The goal of this project is to synthesize and deliver a series of chemopreventative ASA derivatives along with data on their *in vitro* cytotoxicity, bioactivation, enzyme induction, and anti-inflammatory activities.

R21 AT002299-02 Thatcher (PI) 09/30/05 – 09/29/08

NIH/NCCAM/NIMH

Botanicals for the Treatment of Depression

The object of this project is to study and compare the potential antidepressant effects on botanicals and an NO mimetic treatment in the amygdala of female rats

R21 AG027425-01 Thatcher (PI)

04/16/06 – 01/31/09

NIH/NIA

Nitric oxide mimetic NSAIDs for treatment of Alzheimer's Disease

The goal is to develop novel nitrates as anti-inflammatory anti-amyloidogenic therapeutics for AD, that provide cognition enhancement and neuroprotection.

Institute for Study of Aging Thatcher (PI)

03/01/06-02/28/07

Institute for Study of Aging - Elan Pharma

Generation and optimization of NO memetics for Alzheimer's Disease

The objective of this project is to generate and optimize new chemical entities (NCEs) in this novel pharmaceutical class, using iterative design and synthesis, and the use of sophisticated behavioral animal model that is able to reliably test visual recognition memory in rats.

Role: PI

1U19 AI056575-05

Johnson (PI)

08/15/03-01/31/08

NIH/NIAID

Novel therapeutics for *Bacillus anthracis* (Program title); Structure based design of novel *B. anthracis* therapeutic agents (Project title).

This is a project in a cooperative program grant that is aimed at developing novel therapeutic compounds to treat *Bacillus anthracis* infections via structure-based design approaches.

Role: Co-Investigator (Direction of FTE in drug design & synthesis)

Institute for Study of Aging Thatcher (PI)

06.04 – 07.05

Co-investigators: Reynolds, Bennett (Queen's)

"Generation and optimization of S-nitrate lead compounds for the treatment of Alzheimer's Disease"

TEACHING

Courses

Queen's University

Undergrad: Organic Chemistry (introductory full year; 120 – 320 students)

Physical Organic Chemistry (3rd year)Theoretical Organic Chemistry (3rd year)Computational Chemistry (3rd year)Bioorganic Chemistry (3rd or 4th year)Medicinal Chemistry (4th year)Advanced Organic Chemistry (4th year)

Thesis Research Project Director

Graduate: Medicinal Chemistry; Biomimetic Chemistry; Physical Organic Chemistry;

Bioorganic Chemistry; Advanced Topics in Organic, Bioorganic, and Medicinal Chemistry; Pharmacology & Toxicology

UIC;

GEMS 505 - Essential Technologies and Approaches in Translational Research: Drug Discovery

Pharm D: Fundamentals of Drug Action I. Introduction to basic concepts of drug chemistry and biological targets. Chemistry of simple biomolecules, redox chemistry, stereochemistry.

Biology of nucleic acids, proteins, and membranes.

Principles of Drug Action and Therapeutics V. Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics and toxicology in the areas of drug abuse, cerebrovascular diseases, parkinson's and epilepsy.

PHAR422. Fundamentals of Drug Action. 4 hours. Comprehensive course in chemical mechanisms of drug action. Drug discovery.

PHAR 504. Pathophysiology, Drug Action, and Therapeutics (PDAT) 4: Immunology/Respiratory. 4 hours. Covers basic biology of the immune system and its functions, common disorders of the immune system, chemistry and pharmacology of drugs used to treat immune disorders, and the therapeutic interventions for those disorders.

Graduate: Organic Medicinal Chemistry I. Organic reactions in terms of their mechanisms and utility in the field of medicinal chemistry, particularly in the synthesis of medicinal agents.

Principles of Medicinal Chemistry. Concerns basic chemical and physical principles necessary for an understanding of drug action. These principles are applied in the design and discovery of medicinal agents.

Organic Medicinal Chemistry II. Heterocyclic chemistry foundation for bio-organic mechanisms of enzyme reactions. Enzymes involved in biosynthesis and metabolism, particularly those that are targets for drug action or involved in drug metabolism.

TRAINING

Graduate Students - Present

1	Jesse Gordon-Blake (UIC)	PhD	09/17-	<i>Topic: NAMPT Activators in Alzheimer's Disease</i>
2	Carlo Rosales (UIC)	PhD	08/16-	<i>Topic: Targeting ER with Novel Small Molecules</i>
3	Raghad Nowar (UIC)	PhD	01/20-	<i>Topic: Viral Entry Inhibitors</i>
4	Megan Lahan	PhD	01/21-	<i>Topic: Design of non-lipogenic ABCA1 inducers</i>
5	Isabella Krider	PhD	01/21-	<i>Topic: Positive allosteric modulation of Nicotinamide phosphoribosyltransferase (NAMPT)</i>

Graduated

1	Cutler Lewandowski	MD/PhD	2021	<i>ABCA1 Inducers for AD and T2D</i>
2	Rachel Knopp	PhD	2020	<i>Targeting the Calpain-Cathepsin Hypothesis in Brain Endothelial Cells for AD Therapy; postdoc Univ. of Washington</i>
3	Ammar Justiniya	PhD	2020	<i>Design and synthesis of cysteine protease inhibitors; postdoc UIC</i>
4	Loru Delgado-Rivera	PhD	2019	<i>Cystathionase, Hydrogen Sulfide, and Hyrdopersulfides in Human Health</i>

5	Lauren Gutgesell	PhD	2019	<i>Examining the Estrogen Receptor as a Targetable Vulnerability in All Stages of Breast Cancer;</i> Research Scientist, Genentech Inc., SF
6	Yunlong Lu	PhD	2019	<i>Novel Treatment for ER+ Treatment Resistant Breast Cancer</i>
7	Sue Lee	PhD	2018	<i>Mild Traumatic Brain Injury and Early Onset Dementia Mouse Models and Disease Modifying Therapies;</i> Clinical Safety Analyst, Abbvie Inc
8	Emily Thayer	PhD	2017	<i>Chemical Probe Design & Development for Assessing Protein Modification and Cross-Linking;</i> Research Scientist, Acceleron Pharma, Boston
9	Rui Xiong	PhD	2016	<i>Novel Strategy for Treating Estrogen Receptor Positive Advanced Breast Cancer;</i> Med Chem Team Leader UICentre
10	Hitisha Patel	PhD	2016	<i>Partial Agonists at ER for Resistant Metastatic Breast Cancer;</i> Senior Scientist, Radius Pharma
11	Ronak Ghandi	PhD	2016	<i>Soluble Guanylate Cyclase Modulators and Inhibitors for Neurological Disorders;</i> Director, CSL Behring
12	Shuai Wang	PhD	2016	transferred to Bolton as major supervisor
13	Marton Siklos	PhD	2015	<i>Covalent Enzyme Inhibitors in Drug Design;</i> postdoc UCSF; Senior Chemist Austrian Acad of Sciences
14	Madhubani Hemachandra	Ph.D.	2013	<i>Prevention of Estrogen Carcinogenesis by Botanicals, SERMs and NO/cGMP Pathway Modulators</i>
15	Brad Michalson	PhD	2013	<i>Synthesis and Bioactivation of Selective Estrogen Receptor Modulators (SERMs)</i>
16	Ren VandeVrede	MD/PhD	2012	<i>Discovery & Development of New Alzheimer's Therapeutics;</i> Clinical Fellow at Massachusetts General
17	Ehsan Tavassoli	MSc	2012	<i>Nomethiazoles: PK/PD Study of a Novel Class of Alzheimer's Disease Therapeutics</i>
18	Schieffer, Isaac	PhD	2012	<i>Synthesis, Optimization, and Evaluation of Thiophilic Peptidomimetics as Novel AD Therapies;</i> Assistant Professor, Dept of Medicinal and Biological Chemistry, University of Toledo
19	Pei-Yi Lu	MSc	2012	<i>Methodology Development for the Study of Estrogen Carcinogenesis;</i> Clinical Research Associate at Orient Pharma Co., Ltd, Taiwan
20	Kastrati, Irida	Ph.D.	2009	<i>Mechanisms of estrogen carcinogenesis in human breast epithelial cells;</i> Assistant Professor, Dept of Cancer Biology, Loyola University
21	Abdul-Hay, Samer	PhD	2009	<i>Exploring the use of hybrid organic nitrates for the treatment of Alzheimer's disease</i>
22	Gherezghiher, T.	PhD	2011	<i>Bioactivation Studies of Novel SERMs, LY2066948 and Lasofoxifene, to Reactive Quinoids using LC-MS/MS</i>
23	Dunlap, Tarcisha	Ph.D.	2010	<i>Chemopreventive activity of nitric oxide-donating aspirin for colorectal cancer</i>
24	Yu, Bolan	Ph.D.	2010	<i>Chemoprevention by benzothiophene SERMs;</i> Assistant Prof. Inst. of Obstetrics and Gynecology

25	Xiaokai He	inc.	44084	returned to China
26	Overk, Cassia	PhD	2008	Senior Res Associate in Alzheimer's at UCSD
27	Wang, Zhican	PhD	2009	Res Associate, University of Washington
28	Ashgodom, Rezene	MSc	2009	Pharmacist Washington DC
29	Abdelhamid, Ramy	PhD	2010	<i>Neuroprotective and procognitive activity of a family of benzothienopyridine SERMs</i> ; Postdoctoral Scholar at The University of Iowa Health Care
30	Peng, Kuan-Wei	PhD	2009	Postdoctoral Fellow at University of Kansas
31	Powell, Sharla	PhD	2009	<i>Topic: Mechanisms of CNS Action of Botanicals</i>
32	Kundu, Indraneel	inc	2008	Associate Chemist at Momentive, Albany
33	Tewolde, Tewolde	MSc	2010	<i>Topic: Modulation of activated glial cell responses</i>
34	Sinha, Vaishali	PhD	2010	Senior Scientist, Amgen Inc, USA
35	Hagos, Ghenet	PhD	01/04-	Sr. Research Associate, ImClone Systems, Eli Lilly
36	Kim, Hye-Yang	PhD	2009	Research Associate, Univ. of Pittsburgh
37	Liu, Ju	PhD	2005	Senior Scientist at Alnylam, Boston
38	Yu, Lining	MSc	2004	Senior Scientist, Pfizer Pharmaceuticals Inc
39	Liu, Hong	PhD	2005	Senior Scientist, Abbvie Inc.
40	Clarke, Jenny	MSc	2004	Freelance Science Writer; previously Editor Canadian Chemical News
41	Chichirau, Alex	Ph.D.	--	completed PhD at Carlton University Chemistry
42	Nicolescu, Adrian	Ph.D.	2004	Canada Heart & Stroke Foundation Fellowship
43	Morin, Kim	M.Sc.	2002	High School Teacher
44	Murray, Jill	M.Sc.	2001	PhD Univ of Oregon Chemistry; Postdoc BC Cancer Agency
45	Artz, Jennifer	Ph.D.	1999	Assistant Managing Editor, Canadian Journal Emergency Medicine (CJEM); previously University of Toronto, Structural Genomics Consortium
46	Borrajo, Alison	Ph.D.	2000	Manager, Business Development, Biofuels at Suncor Energy
47	Wang, Yu	Ph.D.	2000	<i>Synth. of Novel Metal Ligands as Metaloenzyme Models</i>
48	Galen, Elena	M.Sc.	2000	<i>Synthesis of novel peptide analogues</i>
49	Vizitiu, Dragos	Ph.D.	1998	Director, Gilead Sciences, Edmonton, Canada
50	Ferguson, Colin	Ph.D.	1999	Director of Applied Technology at Echelon Biosciences Inc., Salt Lake City
51	McCracken, Paul	Ph.D.	1997	Pharma management consulting
52	Sanchez, Cristina	M.Sc.	1996	- to PDF at NRC (Ottawa)
53	Ripley, Daphne	M.Sc.	1996	- to LLB studies at Windsor
54	Kriste, Angela	Ph.D.	1996	- returned to NZ
55	Artz, Jennifer	M.Sc.	1996	Org. Nitrates, Thionitrates & Nitrosothiols: Probes of the Mech. of Nitrovasodilators
56	Palmer, David	Ph.D.	1995	Prof. and Dept. Chair, Chemistry, University of Saskatchewan
57	Iverson, Suzanne	M.Sc.	1995	Principal Scientist, Toxicology, AstraZeneca, Gotheberg, Sweden

58	Cameron, Dale R.	Ph.D.	1994	Associate Director, Medicinal Chemistry at viDA Therapeutics Inc, Vancouver, BC
59	Krol, Ed	Ph.D.	1993	Professor University of Saskatchewan
60	Nagelkerke, Ruby	Ph.D.	1993	Professor, Chemistry, Centralia College, Washington, USA
61	Campbell, Stewart	Ph.D.	1992	CEO Axial Therapeutics
62	Davis, Jean	M.Sc.	1991	to Doctorate in Chemistry in France

- **Undergraduate Summer & Thesis Research** Over 40 undergrad. Students have completed thesis projects and summer research terms, of which a large number have proceeded to position in the chemical industry or grad. studies, eg. MIT, Berkeley, Duke, Oxford, etc.
- **Technicians & Research Specialists** Over 10 MS and PhD level research specialists

- **Postdoctoral Trainees**

1	Nina Quyen Ma	Senior Res Specialist	4/21-	<i>Bioanalytical Chemistry</i>
2	Arthur (Jeng-Yeng) Shaw	Researcher IV	12/20-	<i>Medicinal Chemistry</i>
3	Christopher Penton	Senior Res Specialist	9/20	<i>Cell-based bioassay design</i>
4	Martha Ackerman-Berrier	Senior Res Specialist	11/20-	<i>Biochemical assays and HTS</i>
5	Ganga Reddy Velma	PDF	01/21-	<i>Medicinal Chemistry</i>
6	Zhengnan Shen	PDF	11/18-	<i>Medicinal Chemistry</i>
8	Deyu Kong	PDF	6/19-6/20	<i>Medicinal Chemistry</i>
9	Yangfeng Li	PDF	9/17-8/20	<i>Medicinal Chemistry</i>

10	Oleksii Dubrovsky	Res. Specialist	2/18-8/20	<i>Bioassay Support</i>
11	Fei Huang	Res. Specialist	2/19-8/20	<i>Bioassay Support</i>
12	Laura Bloem	Research Associate Professor	4/16-	<i>Bioassay Development UICentre</i>
13	Manel BenAissa	Research Assistant Professor	4/15-	<i>CNS Drug Discovery UICentre</i>
14	Jason Hikock	RAP	09/13-3/19	<i>Assistant Director UICentre</i>
15	Yucting Wang	RAP	09/09-03/19	<i>Team Leader DMPK UICentre</i>
16	Luo Jia	RAP	9/6/2014	<i>Neuroprotection with small molecules</i>
17	Michael Hollas	PDF	02/18-03/20	<i>Chemical Biology UICentre</i>
18	Bhargava Karamudi	PDF	05/13-05/19	<i>UICentre Med Chem</i>
19	Jiong Zhao	PDF	09/13-9/20	<i>Cancer biology</i>
20	Vladislav Litosh	PDF/RAP	6/10/2012	<i>Synthesis</i>
21	Qin, Zhihui	PDF/RAP	10/4/2013	<i>Synthesis and metabolism</i>
22	Jaewoo Choi	PDF	8/10/2012	<i>Mass spec</i>
23	Rob Scism	PDF	1/11/2012	<i>Enzymology</i>
24	Sujeewa Piyankarage	PDF	1/10/2015	<i>Proteomics</i>
25	Subhasish Tapadar	PDF	4/8/2010	<i>Synthesis of calpain inhibitors</i>
26	Gihani Wijewickrama	PDF	9/7/2010	<i>Application of confocal fluorescence microscopy and protein tagging</i>
27	Meiling Lu	RAP	2/9/2009	<i>Breast cancer etiology</i>
28	Ke Shan	PDF	1/9/2009	<i>LC-MS analysis of DNA damage</i>
29	S. Anand	PDF	10/8/2010	<i>Synthesis of hybrid nitrates and COATags</i>
30	Huali Wang	PDF	10/6/2008	<i>Synthesis of novel drugs</i>
31	Tanvi Muni	PDF	08/09-08/10	<i>Cancer cell biology</i>

32	Esala Chandrasena	PDF	4/6/2009	<i>Mechanisms of toxicology</i>
33	Praneeth Edirisinghe	RAP	10/6/2009	<i>Modern applications of mass spec</i>
34	Hong, Sa Weon	PDF	09/05-08/06	<i>Mechanism of NO release from drugs</i>
35	Kuanqiang Gao	PDF	8/6/2008	<i>Synthesis of biodefense agents</i>
36	Li, Min	PDF.	06/05-06/06	<i>Synthesis of CNS drugs</i>
37	Dowers, Tammy	PDF	Bolton PI	<i>Bioactivation and bioactivity of novel SERMs</i>
38	Bidet, Olivier	PDF	10/04-10/05	<i>Synthesis of anti-infective fosmidomycin analogs</i>
39	Wang, Mark	PDF	01/04-08/07	<i>Synthesis of anti-infective GluRac inhibitors Cyclodextrin derivatization</i>
40	Fernandez, Patricia	PDF.	06/03-05/05	<i>Mech of NO release; synthesis of drugs</i>
41	Li, Qian	PDF.	05/03-05/05	<i>Mechanism of NO release from drugs</i> UAB Center for Free Radical Biology
42	Xu, Xudong	PDF.	08/03-03/04	<i>Bioactivation of SERMs to Quinoids</i>
43	Toader, Violeta	PDF	02/03-08/04	<i>Synthesis and analysis on bioactive nitrates</i> McGill University
44	Sergei Zavorin	PDF	01/03	<i>Synthesis of NO chimeras</i> Allied Signal staff scientist

Queen's University

Dr Sergei Zavorin, Russia/Canada

Dr Violeta Toader, Romania/Canada

Dr Sergiu Coseriu, Romania

Dr. Adina Dumitrascu, Romania

Prof. Dan Scutaru, Dean of Science at Iasi Technical University, Romania

Dr Hazel Weldon, UK

Dr. Boris Gorin, Russia/Canada

Dr. Kexin Yang, Canada/China

Dr. Li Hu, China/Canada

Dr Umarani Rajalingam, India/Canada

LECTURES**Invited Lecture Presentations**

International Workshop "Chemistry & Biochemistry of Biocatalysis", Kyoto, Japan, 1993

CSC Annual Conference, Winnipeg, 1994;

CSC Annual Conference, Windsor, 1997;

CSC Annual Conference, Calgary, 2000;
CSC Annual Conference, Montreal, 2001;
ISSX Annual Conference, Providence RI, 2003;
ISOA Fifth Annual Investigator's Meeting, Teaneck, NJ, 2004;
Mesilla Workshop on NO Chemistry & Biology, Mesilla NM, 2004;
New Directions in Neuroprotection: Basic Mechanisms, Targets, and Treatment Strategies, NY, NY, 2004
Gordon Conference on Drug Metabolism, Plymouth NH, 2005;
6th International Conference on Alzheimer's Disease Drug Discovery, NY, NY, 2005;
Alzheimer's Association Research Roundtable: Cytoskeletal Modulators and Pleiotropic Strategies for Alzheimer Drug Discovery, Philadelphia, 2006;
Symposium on New Strategies for Modern Medicinal Chemistry, American Chemical Society, Great Lakes Regional Meeting, Milwaukee, 2006;
7th International Conference on Alzheimer's Disease Drug Discovery, New York, NY • October, 2006
NIH/NIA Alzheimer's Disease Translational Research Meeting, Washington DC, Sep 2007.
1st Int'l Conference on Nitric Oxide (NO) and Cancer, Paris, France, Nov., 2007
Gordon Conference on Nitric Oxide, La Ciocca, Italy, Mar., 2009
1st Int'l Workshop on Nitric Oxide (NO) in Cancer Therapy, Dijon, France, Sep., 2009
NIH/NIA Alzheimer's Disease Translational Research Meeting, Washington DC, 2009.
ACS Great Lakes Regional Meeting, Lincolnshire, 2009: New Frontiers in Medicinal Chemistry
ACS National Meeting Aug 2010, Division of Chemical Toxicology: Protein Adducts and Stress Response Pathways
Gordon Conference on Oxygen Radicals, Ventura, CA, Feb 2012
4th Chicago Organic Symposium April, 2012
CBC Tech Day 2012, Northwestern Univ.: Small Molecule Discovery in Academia
ACS National Meeting Apr 2013, Division of Medicinal Chemistry: Recent Advances in the Discovery of Drugs Acting on the NO Pathway
3rd Int'l Workshop on Nitric Oxide (NO) in Cancer Therapy, June 2013, Canada
11th Annual CBC Symposium 2013, Univ. of Chicago: Exploring Human Biology with Small Molecules
ACS National Meeting Aug 2016, Division of Medicinal Chemistry: The Renaissance of Endocrine Cancer Therapy
Gordon Conference on Nitric Oxide, Ventura February 2017: NO Memory is Good Memory
Eastman Chemicals, Tennessee, USA, 1993;
British Biotechnology Ltd., Oxford, UK;
Astra Arcus, Sodertalje, Sweden;
BioMega (Boehringer Ingelheim), Laval, Canada;
Amerchol, New Jersey, USA;
Dept. of Chemistry, McGill University;
Dept. of Chemistry, University of Toronto;
Steacie Institute, National Research Council, Ottawa
Protein Engineering Network of Centres of Excellence, Toronto;
Dept. of Biochemistry Queen's University;
Dept. of Chemistry, Simon Fraser University;
Dept. of Pharmacology & Toxicology, Queen's University;
Dept. de Chimie, Universite de Montreal;
Dept. of Chemistry, University of Guelph;
Dept. of Chemistry, U. of Western Ontario;
Dept. of Chemistry, York University, Ont.;
Dept. de Chimie, Universite Laval;
Dept. de Chimie, Universite de Sherbrooke;

Dept. of Chemistry, U. of New Brunswick;
Dept. of Chemistry, Dalhousie University;
Dept. of Chemistry, Mt Allison University;
Cancer Center; Dept. of Med Chem & Pharmacognosy; University of Illinois at Chicago
Center for Free Radical Biology, University of Alabama at Birmingham
Dept. of Pharmacology, UIC
Faculty of Pharmacy, University of Toronto
Dept. of Chemistry & Biochemistry, University of Maryland Baltimore County
University of the Sciences, Philadelphia
School of Pharmacy, University of Pisa, Italy
Dept. of Pharmacology; Psychiatric Inst. University of Illinois at Chicago
Peking University College of Pharmaceutical Sciences
Hua Qiao University, Xiamen and Quanzhou
Dept. of Chemistry, Marquette University
Dept. of Pathology, Peking University, Beijing
Institute Materia Medica, Peking Union University, Beijing
College of Pharmacy, University of Florida
Dept. of Medicine, Rush University Medical School
Dept. of Neuroscience, Rosalind Franklin University
Dept. of Molecular Pharmacology & Neuroscience, Loyola University

Contributed oral and poster presentations at conferences number 5-10 per year since 1989; therefore numbering well over one hundred.

Symposium Organization

The Anomeric Effect, 204th ACS National Meeting, Washington DC, 1992;
ACS Symposium Series 539, The Anomeric Effect & Associated Stereoelectronic Effects.(1993)
ed.G.R.J. Thatcher, ACS Washington.
NO Synthase Inhibitors, 5th Chemical Conference of North America, Cancun, Mexico, 1997;
Peptidomimetics, Annual Canadian Society of Chemistry Conference, Whistler, 1998;
Ontario-Quebec Mini-Symposium on Physical Organic Chemistry, Kingston, Ontario, 1990, 1996

UNIVERSITY SERVICE

Queen's University

University Senate; Senate Advisory Research Committee; Faculty International Exchange Committee;
Project Co-Leader Drug Design & Discovery Initiative at Queen's (3D-IQ);
Interim Executive & Steering Committee, Queen's Centre for Studies in Molecular Neuroscience;
Departmental: Staffing Comm.; Undergraduate Curriculum Comm. (Chair); Instructional Assignments
Committee (Chair); Long Range Planning Comm.; Seminar Program Organizer. Chair OGS Scholarships
Selection Comm.; Council of Faculty of Grad. Studies & Research;

University of Illinois at Chicago

College of Pharmacy Student Relations Committee. Ongoing: Member UIC Cancer Center; Chair, Technical
Resources Committee; Dept'l Strategic Planning Committee; Head's Advisory Committee; Dean's Research
Advisory Committee; Faculty Search Committees; University Conflict Review Committee; College
Executive Advisory Committee; College of Pharmacy Dean's Diversity Committee; Director Collaborative
Engagement in Novel Therapeutic Research & Enterprise; CCTS Core Director; Chair Vahlteich Awards
Committee; Health Technologies Incubator Advisory Committee; UILabs/UIC advisory committee; VCR
Visioning Committee.

Search committees: Multiple departmental hires including committee chair; Vice Chancellor Research; Director of Office of Technology Management.

Current: Vice Chancellor for Innovation advisory board.

Mentored faculty: Tom Gao; Terry Moore; Douglas Thomas