Robert J. Hondal

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CURRICULUM VITAE

EDUCATION

1989-1991	B.S. Chemistry, University of Pittsburgh, Pittsburgh, PA.
1991-1997	Ph. D., Chemistry, The Ohio State University, Columbus, OH.

MILITARY SERVICE

•U.S. Army Reserves 1988-1992

POST-DOCTORAL APPOINTMENTS

Oct. 1997- Oct .1998	Post-Doctoral Fellow, Vanderbilt University
Jan. 1999- June 2002	NIH Post-Doctoral Fellow, University of Wisconsin (1 F32 GM20180-01)

CURRENT APPOINTMENT

Aug 1 2002 to June 30, 2008	Asst. Professor of Biochemistry, University of Vermont, Burlington, VT.
July 1, 2008 to June 30, 2020	Assoc. Professor of Biochemistry, University of Vermont, Burlington, VT.
July 1, 2010 to June 30, 2020	Assoc. Professor of Chemistry, University of Vermont, Burlington, VT.
July 1, 2020 to present	Professor of Biochemistry, University of Vermont, Burlington, VT

HONORS AND AWARDS

•The Paul D. Boyer Memorial Award for Post-Doctoral Fellows (2001). This was a new award given by a Biochemistry Department faculty committee at the University of Wisconsin in 2001. This award is given on an annual basis to the post-doctoral fellow in the department determined to be the "most outstanding" post-doctoral scientist.

•The 2009 Journal of Peptide Science Best Publication Award

•2010-2011 nominee for the UVM Graduate Student Senate Excellence in Teaching Award

•2015 nominee for the Kroepsch-Maurice Excellence in Teaching Award

•2017 Office of Undergraduate Research Student Mentoring Award

•2018 nominee for the Kroepsch-Maurice Excellence in Teaching Award

PROFESSIONAL ORGANIZATIONS

•American Chemical Society

•Society for Redox Biology and Medicine

OTHER PROFESSIONAL ACTIVITIES:

•Member, Cell Signaling and Environmental Pathology Training Program (2004 to 2014)

•Member, M.D./Ph.D. training program (2008 to 2010)

•Member, Hemostasis and Thrombosis Training Program (2003 to 2018)

•Member, UVM Graduate College (2004 to present).

•Member, UVM Cellular, Molecular, and Biomedical Graduate Program (2012 to present)

RESEARCH

PEER-REVIEWED PUBLICATIONS

66) Hondal RJ. (2023) What is the redox potential of ergothioneine? *Antioxid. Redox. Signal*. Published Online:13 Jan 2023 https://doi.org/10.1089/ars.2022.0192

65) Hondal RJ. (2022) Flux versus poise: Measuring the dynamic cellular activity of the thioredoxin system with a redox probe. *Redox Biol. 54*, 102376. *doi: 10.1016*

64) Ste.Marie EJ, **Hondal RJ**. (2022) Application of alpha-methyl selenocysteine as a tool for the study of selenoproteins. *Methods Enzymol. 662*, 297-329. doi: 10.1016/bs.mie.2021.10.016

63) Jenny KA, Mose G, Haupt DJ, & **Hondal RJ**. (2022) Oxidized forms of ergothioneine are substrates for mammalian thioredoxin reductase. *Antioxidants 11*, 185. **PMCID:** PMC8868364

62) Colon R, Wheater M, Joyce EJ, Ste Marie EJ, **Hondal RJ**, & Rein KS. (2021) The marine neurotoxin brevetoxin (PbTx-2) inhibits *Karenia brevis* and mammalian thioredoxin reductases by targeting different residues. *J Nat Prod. 84*, 2961-2970.

61) Jenny KA, Ruggles EL, Liptak MD, Masterson DS & **Hondal RJ**. (2021) Ergothioneine in a peptide: Substitution of histidine with 2-thiohistidine in bioactive peptides. *J. Pept. Sci.* e3339. **PMCID:** PMC8443123

60) Remington J, Liao C, Sharafi M, Ste.Marie E, Ferrell J, **Hondal RJ**, Wargo M, Schneebeli S & Li, J. (2020) On the aggregation state of synergistic antimicrobial peptides. *J. Phys. Chem. Lett. 11,* 9501-9506.

59) Ste.Marie E, Wehrle RJ, Haupt DJ, Wood NB, van der Vliet A, Previs MJ, Masterson DS & **Hondal RJ**. (2020) Can selenoenzymes resist electrophilic modification? Evidence from thioredoxin reductase and a mutant containing alpha-methylselenocysteine. *Biochemistry 59,* 3300-3315. **PMCID:** PMC7509987

58) Ste.Marie E, & **Hondal RJ**. (2020) 2,2´-Dipyridyl diselenide: A chemoselective tool for cysteine deprotection and disulfide bond formation. *J. Pept. Sci. 26,* e3236. **PMCID:** PMC7509986

57) Day BJ, Bratcher PE, Chandler, J, Kilgore M, Min E, LiPuma JJ, **Hondal RJ**, & Nichols DP. (2020) The thiocyanate analog selenocyanate is a more potent antimicrobial pro-drug that also is selectively detoxified by the host. *Free Radic. Biol. Med. 146,* 324-332. **PMCID:** PMC6951815.

56) Jenny KA, Ste.Marie EJ, Mose G, Ruggles EL, & **Hondal RJ**. (2019) Facile removal of 4-methoxybenzyl protecting group from selenocysteine. *J. Pept. Sci. 25, e3209*. **PMCID:** PMC6851407

55) Wehrle RJ, Ste.Marie E, **Hondal RJ**, & Masterson DS. (2019) Synthesis of alpha-methyl selenocysteine and its utilization as a glutathione peroxidase mimic. *J. Pept. Sci. 25,* e3173. **PMCID:** PMC6785838.

54) Alim I, Caulfield JT, Chen Y, Swarup V, Geschwind DH, Ivanova E, Seravalli J, Ai Y, Sansing LH, **Hondal RJ,** Ste. Marie E, Cave JW, Sagdullaev BT, Karuppagounder SS, & Ratan RR. (2019) Selenium induces an adaptive transcriptional response to inhibit ferroptosis and improve recovery after brain hemorrhage. *Cell 177,* 1262-1279.

53) Barber DR, & **Hondal RJ** (2019) Gain of function conferred by selenocysteine: Catalytic enhancement of one-electron transfer reactions by thioredoxin reductase. *Protein Sci. 28,* 79-89. **PMCID:** PMC6295889.

52) Payne NC, Barber DR, Ruggles EL, & **Hondal RJ** (2019) Can dimedone be used to study selenoproteins? An investigation into the reactivity of dimedone towards oxidized forms of selenocysteine. *Protein Sci. 28,* 41-55. **PMCID:** PMC6295895

51) Tuladhar A, **Hondal RJ,** Colon R, Hernandez EL, & Rein KS. (2019) Effectors of thioredoxin reductase: I Brevetoxins and manumycin A. *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology 217,* 76-86. **PMCID:** PMC7485175

50) Ste.Marie E, & **Hondal RJ**. (2018) Reduction of cysteine-*S*-protecting groups by triisopropylsilane. *J. Pept. Sci. 24, e3130.* **PMCID:** PMC6773273.

49) Maroney MJ, and **Hondal RJ** (2018) Selenium versus sulfur: reversibility of chemical reactions and resistance to permanent oxidation in proteins and nucleic acids. *Free Radic. Biol. Med. 127,* 228-237. **PMCID:** PMC6158117

48) O'Keefe JP, Dustin CM, Barber DR, Snider GW, & **Hondal RJ** (2018) A "seleno-effect" differentiates the roles of redox active cysteine residues in *Plasmodium falciparum* thioredoxin reductase. *Biochemistry 57,* 1767-1778. **PMCID:** PMC5866731

47) Fredericks GJ, Hoffmann FW, **Hondal RJ,** Rozovsky S, Urschitz J, & Hoffmann PR. (2017) Selenoprotein K increases efficiency of DHHC6 catalyzed palmitoylation by stabilizing the acyl-DHHC6 intermediate. *Antioxidants 7*, E4. **PMCID:** PMC5789314

46) Payne NC, Geissler A, Button A, Sasuclark AR, Schroll AL, Ruggles EL, Gladyshev VN & **Hondal RJ**. (2017) Comparison of the redox chemistry of sulfur and selenium-containing analogs of uracil. *Free Radic. Biol. Med.* 104, 249-261. **PMCID:** PMC5328918

45) Gladyshev VN, Arnér ES, Berry MJ, Brigelius-Flohé R, Bruford EA, Burk RF, Carlson, BA Castellano S, Chavatte L, Conrad M, Copeland PR, Diamond AM, Driscoll DM, Ferreiro A, Flohé L, Green FR, Guigó R, Handy DE, Hatfield DL, Hesketh J, Hoffmann PR, Holmgren A, **Hondal RJ**, Howard MT, Huang K, Kim H-Y, Ick Young Köhrle KJ, Krol A, Kryukov GV, Lee BJ, Lee BC, Lei XG, Liu Q, Lescure A, Lobanov AL, Loscalzo J, Maiorino M, Mariotti M, K. Prabhu KS, Rayman MP, Rozovsky S, Salinas G, Schomburg L, Schweizer U, Simonovic M, Sunde RA, Tsuji PA, Tweedie S, Ursini F, & Zhang Y. (2016) Selenoprotein gene nomenclature. *J. Biol. Chem*. *291,* 24036-24040. **PMCID:** PMC5104929

44) Ste.Marie E, Ruggles EL & **Hondal RJ**. (2016) Removal of the 5-nitro-2-pyridine-sulfenyl protecting group from selenocysteine and cysteine by ascorbolysis. *J. Pept. Sci. 22*, 571-576. **PMCID:** PMC5098394

43) Reich HJ & **Hondal RJ**. (2016) Why Nature chose selenium. *ACS Chem. Biol. 11*, 821-841.

42) Ruggles EL, Deker PB, & **Hondal RJ.** (2014) Conformational analysis of oxidized peptide fragments of the C-terminal redox center in thioredoxin reductases by NMR spectroscopy. *J. Pept. Sci. 20*, 349-360. **PMCID:** PMC4000577

41) Lothrop AP, Snider GW, Ruggles EL, Patel AS, Lees WJ, & **Hondal RJ.** (2014) Selenium as an electron acceptor during the catalytic mechanism of thioredoxin reductase, *Biochemistry 53*, 654-663. https://doi.org/10.1021/bi400658g **PMCID:** PMC3957198

40) Snider GW, Dustin CM, Ruggles EL, & **Hondal RJ**. (2014) A mechanistic investigation of the C-terminal redox motif of thioredoxin reductase from *Plasmodium falciparum. Biochemistry 53*, 601-609. **PMCID:** PMC3957191

39) Lothrop AP, Snider GW, Ruggles EL, & **Hondal RJ**. (2014) Why is mammalian thioredoxin reductase-1 so dependent upon the use of selenium? *Biochemistry 53*, 554-564. **PMCID:** PMC3957196

38) Cunniff B, Snider GW, Fredette N, Stumpff J, **Hondal RJ** & Heintz N. (2014) Resolution of oxidative stress by thioredoxin reductase: cysteine versus selenocysteine. *Redox Biology 2*, 475-484. **PMCID:** PMC3949094

37) Lothrop AP, Snider GW, Flemer S. Jr., Ruggles EL, Davidson RS, Lamb A, & **Hondal RJ.** (2014) Compensating for the absence of selenocysteine in high M_r thioredoxin reductases: The electrophilic activation hypothesis, *Biochemistry 53*, 664-674. **PMCID:** PMC3931472

36) Cunniff B, Snider GW, Fredette N, **Hondal RJ** & Heintz N. (2013) A direct and continuous assay for the determination of thioredoxin reductase activity in cell lysates. *Anal Biochem 443,* 34-40. **PMCID:** PMC3839276

35) Snider GW, Ruggles EL, Khan N, & **Hondal RJ**. (2013) Selenocysteine confers resistance to inactivation by oxidation in thioredoxin reductase: Comparison of selenium and sulfur enzymes. *Biochemistry 52*, 5472-5481. **PMCID:** PMC3760785

34) Chandler JD, Nichols DP, Nick JA, **Hondal RJ**, & Day, BJ. (2013) Selective metabolism of hypothiocyanous acid by mammalian thioredoxin reductase promotes lung innate immunity and antioxidant defense. *J. Biol. Chem.288*, 18421-18428. **PMCID:** PMC3689984

33) Randall MJ, Spiess PC, Hristova M, **Hondal RJ**, & van der Vliet, A. (2013) Acrolein-induced activation of mitogen-activated protein kinase signaling is mediated by alkylation of thioredoxin reductase and thioredoxin 1. *Redox Biology 1*, 265-275. **PMCID:** PMC3757691

32) Hondal RJ, Marino SM, & Gladyshev, VN. (2013) Selenocysteine in thiol-disulfide-like exchange reactions. *Antioxid Redox Signal 18*, 1675-1689. **PMCID:** PMC3613276

31) Schroll AL, **Hondal RJ**, & Flemer S. Jr (2012) The use of 2,2' dithiobis(5-nitropyridine) (DTNP) for deprotection and diselenide formation in protected selenocysteine-containing peptides. *J. Pept. Sci. 18*, 155-162. **PMCID:** PMC3437994

30) Schroll AL, **Hondal RJ**, & Flemer S. Jr (2012) 2,2' Dithiobis(5-nitropyridine) (DTNP) as an effective and gentle deprotectant for common cysteine protecting groups. *J. Pept. Sci. 18*, 1-9. **PMCID:** PMC3289972

29) Spiess PC, Deng B, Matthews DE, **Hondal RJ,** van der Vliet A (2011) Proteomic profiling of acrolein adducts in human lung epithelial cells. *J. Proteomics 74,* 2380-2394. **PMCID:** PMC3196826

28) Hondal RJ, & Ruggles EL (2011) Differing views of the role of selenium in thioredoxin reductase. *Amino Acids 41*, 73-89. **PMCID:** PMC2935959

27) Snider G, Grout L, Ruggles EL, & **Hondal RJ** (2010) Methaneseleninic acid is a substrate for truncated thioredoxin reductase: Implications for the catalytic mechanism and redox signaling. *Biochemistry 49,* 10329-10338. **PMCID:** PMC3018153

26) Lothrop, AP, Ruggles, EL, & **Hondal RJ**. (2009) No selenium required: Reactions catalyzed by mammalian thioredoxin reductase that are independent of a selenocysteine residue. *Biochemistry.48*, 6213–6223. **PMCID:** PMC2754045

25) Hondal, RJ (2009) Using chemical approaches to study selenoproteins – focus on thioredoxin reductases. *Biochim. Biophys. Acta 1790*, 1501-1512. **PMCID:** PMC2818346

24) Ruggles EL, Deker PB, & **Hondal RJ**. (2009) Synthesis, redox properties, and conformational analysis of vicinal disulfide ring mimics. *Tetrahedron 65*, 1257-1267. **PMCID:** PMC3653589

23) Lacey BM, Flemer SJ, Eckenroth BE, & **Hondal RJ** (2008) Selenium in thioredoxin reductase: A mechanistic perspective. *Biochemistry 47*, 12810-12821. **PMCID:** PMC3682215

22) Ruggles EL, Flemer SJ, & **Hondal RJ** (2008) A viable synthesis of *N*-methyl cysteine. *Biopolymers 90*, 61-68. **PMCID:** PMC3691851

21) Flemer SJ, Lacey BM & **Hondal RJ** (2008) Synthesis of peptide substrates for mammalian thioredoxin reductase. *J. Pept. Sci. 14*, 637-47. **PMCID:** PMC3690199

20) Eckenroth BE, Lacey BM, Lothrop AP, Harris KM, & **Hondal RJ** (2007) Investigation of the C-terminal redox center of high M_r thioredoxin reductases by protein engineering and semisynthesis. *Biochemistry 46*, 9472-9483. **PMCID:** PMC3682222

19) Eckenroth BE, Rould MA, **Hondal RJ**, & Everse SJ (2007) Structural and biochemical studies reveal differences in the catalytic mechanisms of mammalian and *Drosophila melanogaster* thioredoxin reductases. *Biochemistry 46*, 4694-4705. **PMCID:** PMC3687216

18) Harris KM, Flemer S & **Hondal RJ**. (2007) Studies on deprotection of cysteine and selenocysteine side chain protecting groups. *J. Pept. Sci 13*, 81-93. **PMCID:** PMC3689433

17) Eckenroth BE, Harris K, Turanov AA, Gladyshev VN, Raines RT, & **Hondal, RJ.** (2006) Semisynthesis and characterization of mammalian thioredoxin reductase. *Biochemistry 45*, 5158-5170. **PMCID:** PMC2570056

16) Ruggles EL, & **Hondal RJ**. (2006) Synthesis and properties of disulfide-bond containing eight-membered rings. *Tet. Lett. 47*, 4281-4284. **PMCID:** PMC3698869

15) Lacey BM, & **Hondal RJ**. (2006) Characterization of mitochondrial thioredoxin reductase from *C. elegans*. *Biochem. Biophys. Res. Commun. 346*, 629-636. **PMCID:** PMC3687220

14) Hondal RJ. (2005) Incorporation of selenocysteine into proteins using peptide ligation. *Protein and Peptide Letters 12*, 757-764. **PMCID:** PMC3683319

13) Nilsson BL, **Hondal RJ**, Soellner MB, & Raines RT. (2003) Protein assembly by orthogonal chemical ligation methods. *J. Am Chem. Soc. 125,* 5268-5269.

12) Hondal RJ, & Raines RT. (2002) Semisynthesis of proteins containing selenocysteine. *Methods Enzymol*. *347,* 70-83.

11) Kubiak RJ, Yue X, **Hondal RJ**, Mihai C, Tsai M.-D., & Bruzik K.S.(2001) Involvement of the Arg-Asp-His Catalytic Triad in Enzymatic Cleavage of the Phosphodiester Bond. *Biochemistry 40,* 5422-5432.

10) Hondal RJ, Nilsson BL, & Raines RT, (2001) Selenocysteine in native chemical ligation and expressed protein ligation. *J. Am Chem. Soc. 123,* 5140-5141.

9) Hondal RJ, Ma, S Caprioli RM, Hill KE, & Burk RF. (2001) Heparin-binding histidine and lysine residues of rat selenoprotein P. *J. Biol. Chem*. *276,* 15823-15831.

8) Hondal RJ, Motley AK, Hill KE, & Burk RF. (1999) Failure of selenomethionine residues in albumin and immunoglobulin G to protect against peroxynitrite. *Arch. Biochem. Biophys*. *371,* 29-34.

7) Kubiak RJ, **Hondal RJ**, Yue X, Tsai M.-D., & Bruzik KS. (1999) Identification of a novel catalytic triad with dual functions in enzymatic cleavage of the P-O Bond. *J. Am. Chem. Soc*. *121,* 488-489.

6) Hondal RJ, Zhao Z, Kravchuk AV, Liao H, Riddle SR, Bruzik KS, & Tsai M.-D. (1998) Mechanism of phosphatidylinositol-specific phospholipase C: A unified view of the mechanism of catalysis" *Biochemistry 37,* 4568-4580.

5) Hondal RJ, Riddle SR, Kravchuk AV, Zhao Z, Liao H, Bruzik KS, & Tsai M.-D. (1997) Phosphatidylinositol phospholipase C: Kinetic and stereochemical evidence for an interaction between arginine-69 and the phosphate group of phosphatidylinositol. *Biochemistry 36,* 6633-6642.

4) Hondal RJ, Bruzik KS, Zhao Z, & Tsai M.-D. (1997) Mechanism of Phosphatidylinositol-Phospholipase C. 2. Reversal of a Thio Effect by Site-Directed Mutagenesis. *J. Am. Chem. Soc. 119,* 5477-5478.

3) Hondal RJ, Zhao Z, Riddle SR, Kravchuk AV, Liao H, Bruzik KS, & Tsai. M.-D. (1997) Phosphatidylinositol-specific Phospholipase C. 3. Elucidation of the catalytic mechanism and comparison with ribonuclease A. *J. Am. Chem. Soc. 119,* 9933-9934.

2) Werneburg BG, Ahn J, Zhong X, **Hondal RJ**, Kraynov VS, & Tsai M.-D. (1996) DNA Polymerase β: Pre-Steady-State Kinetic Analysis and Roles of Arginine-283 in Catalysis and Fidelity. *Biochemistry 35,* 7041-50.

1) Hondal RJ & Ulsh RC. (1992) Studies on the Coprophageal Behavior of the Domestic Rabbit Using Adiabatic Calorimetry. *J. Penn. Acad. Sci. 66,* 107-110.

Conference Proceedings:

1) Harris KM & **Hondal RJ.** Deprotection of the *p*-methoxybenzyl group of selenocysteine by neighboring group participation. *Understanding Biology Using Peptides: Proceedings of the 19th American Peptide Symposium* (Sylvie E. Blondelle, Ed.). American Peptide Society, 2006. Produced by Springer, New York, pgs 91-92.

2) Flemer S & **Hondal RJ.** An efficient on-resin protocol for on-resin, vicinal disulfide formation: Applications to thioredoxin reductase (2009) *Adv. Exp. Med. Biol. 611*, 93-94.

3) Schroll A & **Hondal RJ.** Further development of new deprotection chemistry for cysteine and selenocysteine side chain protecting groups (2009) *Adv. Exp. Med. Biol. 611*, 135-136.

4) Flemer S, Schroll A, & **Hondal RJ** DTNP as a gentle and effective method of deprotection for side-chain protectants on commercially available Cys and Sec SPPS derivatives. *Building Bridges:* The *Proceedings of the 22nd American Peptide Symposium* (Michal Lebl, Ed.). American Peptide Society, 2011. Produced by Prompt Scientific Publishing, San Diego, CA, pgs 24-25.

Book Chapters:

1) Ruggles EL, Snider GW, & **Hondal RJ** (2012) Chemical basis for the use of selenocysteine. In Selenium: Its Molecular Biology and Role in Human Health. 3rd ed, D.L. Hatfield, M.J. Berry, V.N. Gladyshev, Eds. Pgs 73-83. Springer, New York.

2) Hondal RJ, Zhao Z, Kravchuk AV, Liao H, Riddle SR, Bruzik KS, & Tsai, M.-D. (1998) The Mechanism of Phosphatidylinositol-Specific Phospholipase C Revealed by Protein Engineering and Thio-PI Analogs. *In Phosphoinositides: Chemistry, Biochemistry and Biomedical Applications*, K. S. Bruzik, Ed. *ACS Symp. Ser. 718,* 109-120.

Newsletters:

1) Hondal RJ, and Schaeffer C. (1995) Preparation of competent cells using transformation and storage solution, *Epicentre Forum 2,* 5.

Patents:

1) *Direct assay of thioredoxin reductase activity* (2014) US 20150050682 A1, **Robert J. Hondal**, Nicholas H. Heintz, Brian Cunniff, Nicholas Fredette, Gregg W. Snider.

2) *Selenocystine Derivatives, Alpha-Methylselenocysteine, Alpha-Methylselenocysteine Derivatives, and Methods of Making and Using Same* (2015) Provisional Patent# 62/110,943, **Robert J. Hondal**, Erik L Ruggles.

3) Substitution of histidine with 2-thiohistidine in bioactive peptides. WO WO2022226360A1 **Robert J. Hondal**,

INVITED LECTURES

•**Hondal, RJ**. *Cheating on Selenium. Gordon Research Conference: Thiol-Based Redox Regulation & Signaling.* July 9-15, 2022, Barcelona, Spain.

•**Hondal, RJ**. *The Chemical Advantage of Selenium in Enzymes and RNA.* University of New Hampshire, Durham, NH. November 5th, 2019.

•**Hondal, RJ**. *Everything I learned about thiol/disulfide exchange, I learned from selenium (and Ron)* Massachusetts Institute of Technology, Cambridge, MA. RTR-60 Symposium. July 27th, 2019.

•**Hondal, RJ**. *Selenium in enzymes and tRNA: Is there a common chemical connection?* Yale University, New Haven, CT. November 16th, 2017.

•**Hondal, RJ**. *Why Nature uses Selenium in Enzymes and tRNA.* Florida International University, Miami, Florida. October 20th, 2017.

•**Hondal, RJ**. *Selenium in enzymes and RNA: Is there a common chemical connection?* SUNY Albany, Albany, NY. September 12th, 2017.

•**Hondal, RJ**. *Selenium confers resistance to oxidative inactivation: Enzymes, model compounds, and molecular mechanisms.* 10th International Peroxidase Meeting, August 29th – 31st, 2017. Breckenridge, Colorado.

•**Hondal, RJ**. *Selenium versus sulfur: reversibility of chemical reactions and resistance to permanent oxidation in proteins and nucleic acid.* Se2017, The 11th International Symposium on Selenium in Biology and Medicine. Stockholm, Sweden. August 13-17, 2017.

•**Hondal, RJ**. *Selenium in proteins and RNA: A chemical and biological rationale*. Northeast Regional Meeting of the American Chemical Society, Binghamton, NY, October 5-8, 2016.

•**Hondal, RJ**. *Why Nature Chose Selenium.* University of Southern Mississippi, Hattiesburg, MS. March 11th, 2016.

•**Hondal, RJ**. *Why Nature Chose Selenium.* St. Michael's College, Colchester, VT. April 15th, 2016.

•**Hondal, RJ**. *The Essential Poison: Connecting the Chemistry of Selenium with Biology.* 2014 American Association for the Advancement of Science Annual Meeting, Nexus of Cell Signaling and Drug Discovery: Oxygen, Phosphorus, Sulfur, and Nitrogen, February 15th, 2014.

•**Hondal, RJ**. *The Selenium Paradox: The Chemical Basis for the Use of Selenocysteine in Enzymes.* Stonehill College, Easton, MA, November 22nd, 2013.

•**Hondal, RJ**. *The Selenium Paradox: The Chemical Basis for the Use of Selenocysteine in Enzymes.* SUNY-Potsdam, March 5th, 2013.

•**Hondal, RJ**. *The Selenium Paradox: The Chemical Basis for the Use of Selenocysteine in Enzymes.* Florida International University, October 5th, 2012.

•**Hondal, RJ**. *The Selenium Paradox: The Chemical Basis for the Use of Selenocysteine in Enzymes.* Gordon Research Conference – Enzymes, Coenzymes, and Metabolic Pathways. Waterville Valley Resort, July 15-20, 2012.

•**Hondal, RJ**. *Selenium: It's Chemistry and Biology Among the Elements of Life.* Hobart and William Smith Colleges, Department of Chemistry, March 7th, 2012.

•**Hondal, RJ**. *The Chemical and Biological Function of Selenium in Thioredoxin Reductase.* Brown University, Department of Molecular Pharmacology, Physiology & Biotechnology September 16th, 2011.

•**Hondal, RJ**. *The Chemical and Biological Function of Selenium in Enzymes.* University of Kansas, Department of Molecular Biosciences. January 24th, 2011.

•**Hondal, RJ**. *A Chemico-Biological Rationale for the Use of Selenocysteine.* The 9th International Symposium on Selenium in Biology and Medicine. Kyoto, Japan, May 31 - June 4, 2010.

•**Hondal, RJ**. *Differing Views of the Role of Selenium in Thioredoxin Reductase.* Cell Signaling/Environmental Seminar Series, University of Vermont. February 22nd, (2010).

Flemer S, Jr. Schroll A, **Hondal RJ** *New Orthogonal Se-Protection Protocol for Selenocysteine in Fmoc SPPS: Progress Toward Stepwise Diselenide Formation*. 36th Northeast Regional Meeting of the American Chemical Society, Hartford, CT, United States, October 7-10 (2009) AN: 2009:1216291

•**Hondal, RJ**. *Differing Views of the Role of Selenium in Thioredoxin Reductase*. Department of Chemistry, College of The Holy Cross, Worcester, MA October 16th, 2009.

•**Hondal, RJ**. *Selenium in Thioredoxin Reductase: A Mechanistic Perspective*. Department of Chemistry, University of Rochester, Rochester, NY. October 31st, 2008.

•**Hondal, RJ**. *Selenium vs. Sulfur in Enzymes: The Case of Thioredoxin Reductase.* College of Pharmacy, University of Wisconsin-Madison, Madison, WI. October 12th, 2007.

•**Hondal, RJ**. *LEGO Proteins: The Use of Protein Building Blocks to Study Protein Function*. State University of New York-Plattsburgh, Plattsburgh, NY. September 7th, 2007.

•Eckenroth BE & **Hondal RJ**. *Selenium vs. Sulfur Thioredoxin Reductases: A Conformation Switching Mechanism Explains Differences in the Catalytic Mechanisms. Gordon Research Conference – Enzymes, Coenzymes, and Metabolic Pathways.* University of New England, July 8-13, (2007).

•**Hondal, RJ**. *Selenium in Proteins: The Case of Thioredoxin Reductase.* Department of Chemistry, The Ohio State University, Columbus, OH. March 29th, 2007.

•**Hondal, RJ**. *Selenium vs. Sulfur Thioredoxin Reductases: Structure studies by X-ray crystallography and functional analysis using semisynthesis.* Department of Chemistry & Biochemistry, The Florida State University, Tallahassee, FL. January 30th, 2007.

•Flemer, SF, Harris, KM, & **Hondal RJ**. *A New Method for Deprotecting p-Methoxybenzyl and Acetamidomethyl Groups from Cysteine and Selenocysteine.* Northeast Regional Meeting of the American Chemical Society, Binghamton, NY, October 5-7, (2006)

•Eckenroth BE, & **Hondal RJ**. *Structure-Function Relationships of the Conserved GCUG Tetrapeptide Motif of Thioredoxin Reductase Investigated by Protein Semisynthesis.* The 8th International Symposium on Selenium in Biology and Medicine, Madison, WI. July 25-30, (2006).

•**Hondal, RJ**. *I. New orthogonal deprotection strategies for cysteine and selenocysteine. II. Semisynthetic selenoproteins.* Department of Biochemistry, University of Nebraska, Lincoln, NE. October 11, 2005.

•**Hondal, RJ**. *Inserting Selenocysteine into Proteins – Problems and Advances*. New England Biolabs, Beverly, MA. November 4th, 2005.

•**Hondal, RJ**. *Mechanism of thioredoxin reductase studied by semisynthesis.* Department of Chemistry and Biochemistry, Baylor University, Waco, TX. January 30th, 2004.

•**Hondal, RJ**. *The mechanism of thioredoxin reductase studied by semisynthesis.* Cell Signaling/Environmental Seminar Series, University of Vermont. February 9th, (2004).

•**Hondal, RJ**. *The mechanism of thioredoxin reductase studied by semisynthesis.* 8th International Congress on Amino Acids and Proteins. Rome, Italy. September 5 –9, (2003).

•**Hondal, RJ**. *Insertion of Non-natural Amino Acids into Proteins by Semi-synthesis: Structural and Functional Studies.* Department of Chemistry Seminar Series, University of Vermont. February 6th, (2003).

•**Hondal, RJ**. Nilsson, BL, & Raines, RT. *Selenocysteine in Native Chemical Ligation and Expressed Protein Ligation.* ACS National Meeting, Chicago, IL. August 26-30. (2001), AN2001:637020.

•**Hondal, RJ**. *Selenocysteine in Native Chemical Ligation and Expressed Protein Ligation.* FASEB Summer Research Conference: Trace Elements. Whitefish, MT. (2001)

•**Hondal, RJ**. *Semisynthesis of Proteins with Selenocysteine and Other Unusual Amino Acids.* Oregon Health Sciences University Portland, OR. (2001).

•Hill, KE, Ma, S., **Hondal, RJ**, & Burk, RF. *Physical and Chemical Characterization of Rat Selenoprotein P Isoforms*. Selenium 2000: 7th International Symposium On Selenium In Biology and Medicine. Venice, Italy. (2000).

•**Hondal, RJ**, Hill, KE, & Burk, RF. *Identification of Heparin-Binding Histidine and Lysine Residues by Chemical Modification*. Annual Meeting of the American Society for Experimental Biology. Washington D.C. July 17-21, (1999), Abstract #662.3, pg A875, *FASEB Abstracts*.

ABSTRACTS PRESENTED AS POSTERS

•Jenny KA, Chen-Zion J, Day B, Cunniff B, and Hondal RJ. A Szeto-Schiller peptide containing 2-thiohistidine has enhanced antioxidant activity in vitro. The Society for Redox Biology and Medicine's 29th Annual Conference (SfRBM 2022). November 16-19, 2022, Orlando, Fl.

•Jenny KA, Owens T, Masterson DS, and Hondal RJ. Ergothioneine and selenoneine in peptides and proteins. The 12th International Symposium on Selenium in Biology and Medicine. Feb 2022, Honolulu, HI.

•Joyce E, Wheater M, Colon R, Rein KS, and Hondal RJ. Karenia brevis possesses a selenium-containing thioredoxin reductase capable of reducing oxidized glutathione and is inhibited by brevetoxin. The 12th International Symposium on Selenium in Biology and Medicine. Feb 2022, Honolulu, HI.

•Saunders LA, Ste.Marie E, and Hondal RJ. New Resin for Covalent Chromatography and Redox Proteomics: Selenosepharose. The 12th International Symposium on Selenium in Biology and Medicine. Feb 2022, Honolulu, HI.

•Jenny KA, Mose G, and Hondal RJ. A new substrate for mammalian thioredoxin reductase: oxidized forms of ergothioneine. The 12th International Symposium on Selenium in Biology and Medicine. Feb 2022, Honolulu, HI.

•Ste.Marie EJ, Wehrle R, Masterson DS, & **Hondal RJ**. Utilization of alpha-methyl selenocysteine as a glutathione peroxidase mimic*. 26th American Peptide Society Symposium.* Monterey, CA. June 22-27, 2019.

•Ste.Marie EJ & **Hondal RJ**. Pyridyl diselenide: A chemoselective tool for peptide synthesis*. 26th American Peptide Society Symposium.* Monterey, CA. June 22-27, 2019.

•Wehrle R, **Hondal RJ, &** Masterson, DS. Synthesis of enantioenriched (R)-α-methylselenocysteine and its enantiomer*. 2017 Southeast Regional Meeting of the American Chemical Society.* Charlotte, NC. November 7-11, 2017.

•Payne NC, Barber DR, Ruggles EL, & **Hondal RJ.** The use of dimedone to study redox states of selenoproteins. *Se2017, The 11th International Symposium on Selenium in Biology and Medicine.* Stockholm, Sweden, August 13-17, 2017.

•St. Marie E, Ruggles EL, & **Hondal RJ.** Removal of benzyl groups from cysteine and selenocysteine using 2,2′-dithiobis-5-nitropyridine and ascorbolysis. *252nd American Chemical Society National Meeting & Exposition*. August 21-25, 2016, Philadelphia, PA.

•Payne NC, Geissler A, Button A, Sasuclark AR, Schroll AL, Ruggles EL, & **Hondal RJ**. Why are sulfur and selenium in RNA? Investigations into the redox chemistry of 2-thiouracil and 2-selenouracil derivatives. *Gordon Research Conference: Thiol-Based Redox Regulation & Signaling.* August 7-12, 2016, Stowe, VT.

•Chandler JD, **Hondal RJ,** & Day, BJ. Selective detoxification of hypthiocyanate by mammalian thioredoxin reductase, the missing link in lung innate immunity and antioxidant defense. *52nd Society of Toxicology Meeting*, March 10th – 14th, 2013. San Antonio, TX.

•**Hondal, RJ** The Selenium Paradox: The Chemical Basis for the Use of Selenocysteine in Enzymes*. Gordon Research Conference – Enzymes, Coenzymes, and Metabolic Pathways.* Waterville Valley Resort, NH. July 15-20, 2012.

•Flemer S, & **Hondal RJ**. DTNP as a gentle and effective method of deprotection for side-chain protectants on commercially available Cys and Sec SPPS derivatives. *22nd American Peptide Symposium – Building Bridges*. June 25th – June 30th, 2011. San Diego, CA.

•Lothrop AP, & **Hondal RJ.** The mechano-enzymatic function of selenocysteine in thioredoxin reductase. *22nd Enzyme Mechanisms Conference*, January 2nd – 6th, 2011, St. Pete Beach, Florida.

•Snider GW & **Hondal RJ**. A chemico-biological rationale for the use of selenocysteine in a redox active enzyme: focus on mammalian thioredoxin reductase. *22nd Enzyme Mechanisms Conference*, January 2nd – 6th, 2011, St. Pete Beach, Florida.

•Lothrop AP & **Hondal RJ**, How a Cys-Enzyme Can Compensate for the Lack of Sec. *The 9th International Symposium on Selenium in Biology and Medicine (Selenium 2010),* Kyoto, Japan, May 31 - June 4, 2010.

•Spiess PC, Deng B, **Hondal RJ**, Randall MJ, Matthews DE, & van der Vliet A. A proteomics method to detect acrolein adduction: effects on redox proteins in vitro. *58th meeting of The American Society for Mass Spectrometry*, Salt Lake City, Utah, May 23 – 27th, 2010.

•Spiess PC, Deng B, **Hondal RJ**, Randall MJ, Matthews DE, & van der Vliet A, Use of a proteomics method to detect acrolein adduction: effects on redox proteins in human airway epithelial cells. *16th Annual Meeting of the Society for Free Radical Biology and Medicine*, San Francisco, CA, November 18-22nd, 2009.

•**Hondal, RJ**. From Sulfur Substrates to Selenium in Enzymes. *40th Central Regional Meeting of the American Chemical Society*, Columbus, OH, United States, June 10-14 (2008), AN 2008:681404

•Ruggles, EL; **Hondal, RJ**. Conformational Analysis of N-Me Vicinal Disulfide Rings and Vicinal Diselenide Ring Reveal β-Turn Mimics. *37th Northeast Regional Meeting of the American Chemical Society,* Burlington, VT, United States, June 29-July 2 (2008) AN 2008:788351

•Lothrop, AP, **Hondal, RJ**. Effect of D-Cysteine Insertion on the Catalysis of Drosophila Melanogaster Thioredoxin Reductase. *37th Northeast Regional Meeting of the American Chemical Society*, Burlington, VT, United States, June 29-July 2 (2008), AN 2008:788407

•Flemer, S, **Hondal, RJ.** Native Chemical Ligation as An Important Tool in Protein Engineering. *37th Northeast Regional Meeting of the American Chemical Society,* Burlington, VT, United States*,* June 29-July 2 (2008), AN 2008:788522

•Schroll, A, **Hondal, RJ**, Advances In 1) the Development of New Deprotection Chemistry for Cysteine and Selenocysteine Side Chain Protecting Groups and 2) the Synthesis of a New Selenocysteine Derivative That Have Applications In Peptide Synthesis. *37th Northeast Regional Meeting of the American Chemical Society*, Burlington, VT, United States, June 29-July 2 (2008), AN 2008:788523

•**Hondal, RJ**, Fitzsimmons, CK, Comparison of Different Oxidation Methods for Forming Disulfide Bonds In Peptides. *37th Northeast Regional Meeting of the American Chemical Society*, Burlington, VT, United States, June 29-July 2 (2008), AN 2008:788526

•Ruggles EL, & **Hondal RJ**. Viable construction of *N*-methyl cysteine and its use in peptide synthesis. *234th Meeting of the American Chemical Society*. Boston, MA. Aug 19th – 23rd. (2007) AN2007: 884125

•Lacey BM, Flemer, S. & **Hondal RJ**. Contribution of ring strain to catalysis: Comparison of cyclic and acyclic forms of octapeptides as substrates for high M_r thioredoxin reductases. *234th Meeting of the American Chemical Society*. Boston, MA. Aug 19th – 23rd. (2007) AN2007: 878899

•Stevenson Flemer Jr. & **Hondal RJ**. An Efficient Protocol for On-Resin, Vicinal Disulfide Formation: Applications to Thioredoxin Reductase. *20th American Peptide Society Symposium: Peptides for Youth.* Montreal, Canada. June 26-30, (2007).

•Alayne L Schroll & **Hondal RJ**. Further Development of New Deprotection Chemistry for Cysteine and Selenocysteine Side Chain Protecting Groups. *20th American Peptide Society Symposium: Peptides for Youth.* Montreal, Canada. June 26-30, (2007).

•Ruggles EL, **Hondal RJ**, & Deker, PB. Synthesis and properties of cyclocystine subunits (CCS): Application to thioredoxin reductase and hepcidin. *233rd Meeting of the American Chemical Society*. Chicago, IL. Mar 25th – 29th. (2007) AN2007: 295763

•P. Bruce Deker & **Hondal RJ**. Conformational Switching at the C-terminus of Thioredoxin Reductase? *The 8th International Symposium on Selenium in Biology and Medicine*, Madison, WI. July 25-30, (2006).

•Eckenroth BE, Harris, KM, & **Hondal RJ**. Structure-Function Investigation of the C-terminal Redox-Active Tetrapeptide of Mammalian Thioredoxin Reductase by Semisynthesis. *Gordon Research Conference – Enzymes, Coenzymes, and Metabolic Pathways.* University of New England, July 16-21, (2006).

•Lacey, B. & **Hondal RJ**. Purification and Characterization of Mitochondrial Thioredoxin Reductase from *Caenorhabditis elegans*: A Non-Selenium Containing Enzyme. *Northeast Regional Meeting of the American Chemical Society,* Fairfield, CT. July 14-17, (2005), AN2005:663401.

•Eckenroth, BE, Everse, SJ, Adams, TE, & **Hondal, RJ**. Crystallization of mammalian thioredoxin reductase for structural studies using synthetic active site peptides. *FASEB Meeting*. April 2-6 (2005), San Diego, CA. Abstract #2600. *FASEB Abstracts.*

•Ruggles, EL, Deker, P.B., & **Hondal, RJ**. Synthesis and properties of disulfide-bond containing eight-membered rings. *230th Meeting of the American Chemical Society*. Washington, D.C. Aug. 28-Sep. 1, (2005), AN2005:74088.

•Harris, KM & **Hondal RJ.** Deprotection of the *p*-methoxybenzyl group of selenocysteine by neighboring group participation.19th *American Peptide Symposium*. San Diego, CA. (2005).

•**Hondal, RJ** The Functional Role of the C-Terminus of Mammalian Thioredoxin Reductase Investigated by Peptide Complementation. *Selenium Biochemistry 2003*. Bethesda, MD. September 17-19, (2003)

•**Hondal, RJ** The mechanism of thioredoxin reductase studied by semisynthesis. (2003) *Amino Acids 25*, 185.

•**Hondal, RJ**, Nilsson, BL, & Raines, RT. Incorporation of Unnatural Amino Acids into Ribonuclease A by Semisynthesis. *17th Enzyme Mechanism Conference*, Marco Island, FL. (2001).

•**Hondal, RJ**, Abel, RL, & Raines, RT. Stereochemical Consequences of Catalysis by Ribonuclease A: Non-natural Variants and Phosphorothioate Substrates*. ACS National Meeting*, Chicago, IL. Aug. 26-30, (2001), AN2001:637183.

•Abel, RL, **Hondal, RJ**, & Raines, RT. Active Site Variants of Ribonuclease A. *ACS National Meeting*, Chicago, IL. Aug. 26-30, (2001), AN2001:637192.

•**Hondal, RJ**, & Burk, R. F. Evidence for Thiol Redox States of Selenoprotein P. *Annual Meeting of the American Society for Experimental Biology*. San Francisco, CA. April 18-20, (1998), Abstract#3040, pg A523, *FASEB Abstracts*.

•**Hondal, RJ**, Kravchuk, AV, & Tsai, M.-D. Using Protein Engineering and Thio-PI Analogs to Probe the Mechanism of PI-PLC. *ACS National Meeting*, Las Vegas, Nevada. (1997), AN1997:485974.

•Liao, H., **Hondal, RJ**, & Tsai, M.-D. Site-directed mutagenesis studies of phosphoatidylinositol-specific phospholipase C: the substrate binding residues. *17th International Congress of Biochemistry and Molecular Biology. Annual Meeting of the American Society for Biochemistry and Molecular Biology.* San Francisco, CA. Aug. 24-29, (1997). Abstract #2628, pg A1307, *FASEB Abstracts.*

Ongoing Research Support

LCOM Internal Grant Program

Cunniff B and Hondal RJ, co-PIs 01/01/2023 – 12/31/2025 no salary

Improved version of Elamipretide with greatly enhanced antioxidant function $75,000

The goals of this project are to: (i) Synthesize antioxidant peptides that target the mitochondria. (ii) Test whether these peptides can be reduced by in vivo antioxidant systems. (iii) Test the hypothesis that these peptides protect the mitochondria from oxidative injury.

NIH-NHLBI (Day, BJ and Hondal RJ, co-PIs) 01/01/19 – 11/30/22 1.2 months

1 R01 HL141146-01A1 $1,604,808.00

Selenocyanate as a novel treatment of cystic fibrosis lung disease

The proposal has three specific aims: (i) Specific aim 1 will determine the chemical mechanism by which Sec-containing TrxR resists inactivation by HOSCN/HOSeCN oxidation and Cys-containing TrxR are inactivated by HOSCN/HOSeCN. (ii) Specific aim 2 will examine CFTR's and Sec-TrxR's role in the importance of $^{-}$SCN/HOSCN -mediated lung host defense against bacterial infection. (iii) Specific aim 3 is designed to examine $^{-}$SeCN as a potential therapy for treatment of lung inflammation and infection using wild type and CFTR KO and β-ENaC Tg mouse models.

American Heart Association: 2020 Collaborative Sciences Award

Bouchard BA, Hondal RJ (co-PIs) 07/01/20 – 06/30/23 no salary

20CSA35320087 $250,000

Development of appropriate, targeted therapies to prevent thrombosis by modulation of platelet FV/Va levels

The major goal of this project is to develop appropriate, targeted therapies to prevent thrombosis by modulation of platelet factor V/Va levels.

TEACHING EXPERIENCE

BIOC 205 (1 hour)	Proteomics	Fall 2002
BIOC 351 (1.5 hours)	Protein semisynthesis	Fall 2002
BIOC 381 (14 hours)	Graduate Seminar (protein engineering)	Spring 2003
BIOC 207 (entire course)	Biochemistry Laboratory	Fall 2003
BIOC 207 (entire course)	Biochemistry Laboratory	Spring 2004
BIOC 207 (entire course)	Biochemistry Laboratory	Fall 2004
BIOC 351 (1.5 hours)	Peptide synthesis & sequencing	Fall 2004
BIOC 207 (entire course)	Biochemistry Laboratory	Spring 2005
BIOC 371 (4.5 hours)	NMR theory & applications	Spring 2005
BIOC 381 (14 hours)	Graduate Seminar (oxidative stress & cell signaling)	Spring 2005
BIOC 207 (entire course)	Biochemistry Laboratory	Fall 2005
BIOC 353 (15 hours)	Enzyme mechanism	Fall 2005
BIOC 207 (entire course)	Biochemistry Laboratory	Spring 2006
BIOC 381 (14 hours)	Graduate Seminar (translational control mechanisms)	Spring 2006
MMG 198 (3 credits)	Undergraduate Research	Spring 2006
BIOC 207 (entire course)	Biochemistry Laboratory	Fall 2006
BIOC 351 (12 hours)	Protein structure & function	Fall 2006
BIOC 191 (3 credits)	Undergraduate Research	Spring 2007
CHEM 291 (2 credits)	Undergraduate Research	Spring 2007
BIOC 371 (6 hours)	NMR theory & applications	Fall 2007
BIOC 353 (16.5 hours)	Enzyme mechanism	Spring 2008
BIOC 381 (14 hours)	Graduate Seminar (highly cited papers-JBC/Biochem)	Spring 2008
BIOC 192 (2 credits)	Undergraduate Research	Spring 2008
BIOC 381 (14 hours)	Graduate Seminar (protein *S*-nitrosylation)	Fall 2008
BIOC 191 (2 credits)	Undergraduate Research	Fall 2008
BIOC 351 (12 hours)	Protein structure & function	Spring 2009
BIOC 191 (2 credits)	Undergraduate Research	Spring 2009
BIOC 371 (10.5 hours)	NMR theory & applications Circular dichroism, mass spectrometry	Fall 2009
BIOC 191 (2 credits)	Undergraduate Research	Fall 2009
BIOC 353 (18 hours)	Enzyme mechanism	Spring 2010
BIOC 192 (1 credits)	Undergraduate Research	Spring 2010
CHEM 40	Introduction to Research	Spring 2010
BIOC 205 (entire course)	Biochemistry for majors	Fall 2010
MMG 199 (1 credit)	Undergraduate research	Fall 2010
BIOC 351 (21 hours)	Protein structure & function	Spring 2011
BIOC 192 (1 credit)	Undergraduate research	Spring 2011
BIOC 205 (entire course)	Biochemistry for majors	Fall 2011
BIOC 191 (3 credit)	Undergraduate research	Fall 2011
BIOC 353 (21 hours)	Enzyme mechanism	Spring 2012
BIOC 207 (3 comp labs)	Biochemistry Laboratory	Spring 2012

BIOC 192 (3 credit)	Undergraduate research	Spring 2012
BIOC 205 (entire course)	Biochemistry for majors	Fall 2012
BIOC 191 (7 credits)	Undergraduate research	Fall 2012
CHEM 291 (1 credit)	Undergraduate research	Fall 2012
PATH 305 (1.5 hours)	thioredoxin system lecture	Fall 2012
BIOC 192 (5 credit)	Undergraduate research	Spring 2013
PHRM 303 (3 credit)	Pharmacological Techniques	Spring 2013
BIOC 212 (1 hours)	Small group – Diabetes	Spring 2013
BIOC 284 (2 hours)	Small group – evaluation of student presentations	Spring 2013
BIOC 205 (entire course)	Biochemistry for majors	Fall 2013
BIOC 191 (11 credits)	Undergraduate research	Fall 2013
BIOC 351 (25.5 hours)	Protein structure & function	Spring 2014
BIOC 351 (3 hours)	small group discussion leader	Spring 2014
BIOC 212 (1 hour)	small group discussion leader	Spring 2014
PATH 395 (1 hour)	Readings in Pathology: Redox Biology	Spring 2014
HON 196B (2 credits)	Honors College Research	Spring 2014
BIOC 192 (7 credits)	Undergraduate research	Spring 2014
CHEM 040 (7 week lab rotation)	Introduction to Research	Spring 2014
BIOC 301 (31 hours)	Biochemistry I for grad students	Fall 2014
BIOC 191 (3 credits)	Undergraduate research	Fall 2014
HON 196B (2 credits)	Honors College Research	Fall 2014
BIOC 296B (42 hours)	Nutritional biochemistry	Spring 2015
BIOC 192 (4 credits)	Undergraduate research	Spring 2015
HON 196B (2 credits)	Honors College Research	Spring 2015
CHEM 292 (2 credits)	Undergraduate research	Spring 2015
HLTH 095 (2 hour panel)	Exploring Anat. & Phys.	Summer 2015
BIOC 195 (1.5 hours)	Preparation for Biochemistry	Summer 2015
BIOC 191 (2 credits)	Undergraduate research	Fall 2015
CHEM 292 (3 credits)	Undergraduate research	Fall 2015
BIOC 263 (42 hours)	Nutritional biochemistry	Spring 2016
BIOC 192 (6 credits)	Undergraduate research	Spring 2016
CHEM 291 (4 credits)	Undergraduate research	Fall 2016
HON 196B (4 credits)	honors thesis research	Fall 2016
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2017
BIOC 302 (43 hours)	Biochemistry II for grad students	Spring 2017
BIOC 191 (6 credits)	Undergraduate research	Fall 2017
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2018
BIOC 302 (43 hours)	Biochemistry II for grad students	Spring 2018
BIOC 192 (6 credits)	Undergraduate research	Spring 2018
BIOC 191	Undergraduate research	Fall 2018
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2019
BIOC 192 (6 credits)	Undergraduate research	Spring 2019
BIOC 191	Undergraduate research	Fall 2019
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2020

BIOC 192 (6 credits)	Undergraduate research	Spring 2020
BIOC 191 (6 credits)	Undergraduate research	Fall 2020
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2021
BIOC 192 (6 credits)	Undergraduate research	Spring 2021
BIOC 191 (6 credits)	Undergraduate research	Fall 2021
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2022
BIOC 192 (6 credits)	Undergraduate research	Spring 2022
BIOC 002 (15 hours)	Modern Perspective II	Spring 2022
BIOC 191 (6 credits)	Undergraduate research	Fall 2022
BIOC 263 (43 hours)	Nutritional biochemistry	Spring 2023
BIOC 192 (6 credits)	Undergraduate research	Spring 2023