

## Curriculum Vitae

### I. PERSONAL

Name: Gregory W. Muth  
Address: Department of Chemistry  
St. Olaf College  
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### II. EDUCATION

Ph.D. Chemistry, The University of Montana, Missoula, MT (1999)

Thesis Title: *I. Synthesis, bio-conjugation, electronic and spectral properties of phenanthroline analogs. II. Phenanthroline cleavage of RNA*

B.A. Chemistry, Gustavus Adolphus College, St. Peter, MN (1992)

Areas of Special Interest and Expertise: RNA structure and function related to bacterial gene regulation, chemical synthesis of novel oligonucleotides, nucleic acid biophysics, medicinal chemistry, enzyme kinetics, site-directed mutagenesis, the scholarship of teaching and learning

### III. EMPLOYMENT & TEACHING EXPERIENCE

St. Olaf College 2002-2009 Assistant professor  
St. Olaf College 2009-present Associate professor

Courses taught:

Chemistry and the World (CHEM 111)  
Chemistry at Life's Beginnings (CHEM 120)  
Structural Chemistry and Equilibrium (CHEM 125)  
Synthesis Lab (CHEM 253, 254)  
Medicinal Chemistry in Jamaica; An International Perspective (CHEM 260) – mentee, 2008  
Experimental Biochemistry (CHEM 373)  
Biochemistry I (CHEM 379)  
Organic Analysis and Theory (CHEM 380)  
Biochemistry II (CHEM 385)

Yale University, American Cancer Society Postdoctoral Fellow, Department of Molecular Biophysics and Biochemistry, 1999-2002

Research Assistant, Department of Biopharmaceutics, Corning Pharmaceutical Services, Hazleton Laboratories, Madison, WI. (1992-1995)

#### IV. PROFESSIONAL ACTIVITY

##### Publications:

**Gregory W. Muth**, Wolf Merker, Suzi Hintz, Paul Nichol, Robert T. Batey, Jeffery J. Schweinefus "Thermodynamic Characterization of the C74U Mutant *B. subtilis* xpt-pbuX Guanine Riboswitch Metabolite Binding Pocket Using Differential Scanning Calorimetry," *In preparation*.

**Muth, G.W.** and Chihade, J.W. "A Streamlined Molecular Biology Module for Undergraduate Biochemistry Labs," *Biochemistry and Molecular Biology Education*, **36**, 3, 209-216, (2008).

Jeffrey J. Schweinefus, Chris A. Clark, Nathaniel J. Schaeffle, **Gregory W. Muth**, and Gary L. Miessler "Lysozyme Thermal Denaturation and Self-Interaction: Four Integrated Thermodynamic Experiments for the Physical Chemistry Laboratory," *J. Chem. Ed.*, **85**, 1, 117-120, (2008).

Schweinefus, Jeffrey; Kuprian, Mikhail; Lamma, John; Merker, Wolf; Dorn, Kristin; **Muth, Gregory** "Human Telomerase RNA Pseudoknot and Hairpin Thermal Stability with Glycine Betaine and Urea: Preferential Interactions with RNA Secondary and Tertiary Structures," *Biochemistry*, **46**, 31, 9068-9079, (2007).

Weinger, J.S.; Kitchen, D.; Scaringe, S.A.; Strobel, S.A.; **Muth G.W.** "Solid phase synthesis and binding affinity of peptidyl transferase transition state mimics containing 2'-OH at P-site position A76," *Nucleic Acids Research*, **32**, 4, 1502-1511, (2004).

Katunin, V.I.; **Muth, G.W.**; Strobel, S.A.; Wintermeyer, W.; Rodnina, M.V. "Important contribution to catalysis of peptide bond formation by a single ionizing group within the ribosome," *Molecular Cell*, **10**, 339-346, (2002).

Trautman, J.; Suarez, A.I.; Tongcharoensirikul, P.; **Muth, G.W.**; Thompson, C.M. "A facile route to substituted phosphorothionates using dimethyl phosphite," *Phos. Sulfur Silicon Relat. Elem.*, **177**, 471-477, (2002).

Strobel, S.A.; **Muth, G.W.**; Chen, L. "Exploring the mechanism of the peptidyl transferase reaction by chemical footprinting," *Cold Spring Harbor Symposia on Quantitative Biology: The Ribosome*, **66**, 109-117, (2001).

**Muth, G.W.**; Chen, L.; Kosek, A.B.; Strobel, S.A. "pH dependent conformational flexibility within the ribosomal peptidyl transferase center," *RNA*, **7**, 1403-1415, (2001).

**Muth, G.W.**; Hill, W.E. "Phenanthroline-Cu(II) cleavage as a probe of rRNA structure," *Methods*, **23**, 218-232, (2001).

**Muth, G.W.**; Ortoleva-Donnelly, L.; Strobel, S.A. "A single adenosine with a neutral pK<sub>a</sub> in the ribosomal peptidyl transferase center," *Science*, **289**, 947-950, (2000).

- Muth, G.W.**; Hennelly, S.P.; Hill, W.E. "Using a targeted chemical nuclease to elucidate conformational changes in the *E. coli* 30S ribosomal subunit," *Biochemistry*, **39**, 4068-4074, (2000).
- Hill, W.E.; **Muth, G.W.**; Bullard, J.M.; Hennelly, S.P.; Yuan, J.; Grace, W.T.; Bucklin, D.J.; Van Waes, M.A.; Thompson, C.M. "Chemical cleavage as a probe of ribosome structure," in *The Ribosome: Structure, Function, Antibiotics and Cellular Interactions*; Garrett, R.A. ed., ASM Press, Washington D.C., pp. 257-269, (2000).
- Muth, G.W.**; Hennelly, S.P.; Hill, W.E. "Positions in the 30S ribosomal subunit proximal to the 790 loop as determined by phenanthroline cleavage," *RNA*, **5**, 856-864, (1999).
- Muth, G.W.**; Thompson, C.M.; Hill, W.E. "Cleavage of a 23S rRNA pseudoknot by phenanthroline-Cu(II)," *Nucleic Acids Res.*, **27**, 1906-1911, (1999).
- Rodriguez, O.P.; **Muth, G.W.**; Berkman, C.E.; Kim, K.; Thompson, C.M. "Inhibition of various cholinesterases with the enantiomers of malaoxon," *Bull. Environ. Contam. Toxicol.*, **58**, 171-176, (1997).
- Congdon, R.W.; **Muth, G.W.**; Splittgerber, A.G. "The binding interaction of coomassie blue with proteins," *Analytical Biochemistry*, **213**, 407-413, (1993).

Presentations:

*Thermodynamic characterization of the guanine riboswitch by differential scanning calorimetry*, ACS Midwest Regional Meeting, 2008

*Synthetic methodology to stabilize DNA structure*, ACS Midwest Regional Meeting, 2008

*A Research Style Biochemistry Lab: Collaborating on the Integration of Research and Teaching at Two Institution*, Midstates Consortium for Math and Science conference on interdisciplinary science education, St. Olaf College, 2007

*Design, isolation and characterization of mutant cystathionine-beta lyase*, 19th Biennial Conference on Chemical Education, Purdue University, 2006

*A comparison of thiamine regulatory regions from three bacterial species*, 10th annual meeting of the RNA society, Banff, Alberta, Canada, 2005

*The puzzling properties of peptidyl transferase*, Departmental Seminar, Carleton College, 2003

*pK<sub>a</sub> Measurement of a Universally Conserved Adenosine within the Ribosomal Active Site*, 66<sup>th</sup> Annual Symposium: The Ribosome, Cold Spring Harbor Laboratories, Cold Spring Harbor, New York, 2001.

*Cleavage of the 530 and 790 region of 16S rRNA with phenanthroline tethered to complementary DNA probes*, The Third Annual Meeting of the RNA Society, Madison, Wisconsin, 1998.

*Probing a Pseudoknot Structure in 23S rRNA with Phenanthroline*, Structural Aspects of Protein Synthesis, Tällberg, Sweden, 1997.

*A Novel Phenanthroline Compound Showing Unique Specificity in the Cleavage of RNA*. The Second Annual Meeting of the RNA Society, Banff, Canada, 1997.

Peer review:

W.W. Norton & Co., Biochemistry text review, 2008

Honors, awards and grants:

#### External Funding

Pending:

NIH AREA (Co-principal investigator) "Urea destabilization of nucleic acid secondary structures," submitted 2008

Successful:

NSF MRI "Acquisition of a molecular imaging system to continue faculty-student research in an interdisciplinary biomolecular science program," \$27,669; 2008

NSF CCLI (Co-principal investigator) "Threading Interdisciplinary Biological-Chemistry Experiments Throughout the Undergraduate Chemistry Curriculum using MALDI Mass Spectrometry," \$149,986; 2007

NSF CCLI (Co-principal investigator) "Employing Differential Scanning Calorimetry and Laser Light Scattering For a Thermodynamic-Rich Undergraduate Chemistry Curriculum", \$88,994; 2005

American Chemical Society, Petroleum Research Fund Type G Starter Grant, "Post-transcriptional Gene Regulation by mRNA-small Molecule Recognition", \$35,000; 2004

American Cancer Society Postdoctoral Research and Training Fellowship, 2000

National Service and Research Award (NIH), 2000

#### Internal Funding

Faculty Development Grant (Released Time), St. Olaf College, 2007

Faculty Development Research Award, St. Olaf College, 2003

## Awards and Honors

Center for Innovation in the Liberal Arts (CILA) Associate 2008-2009

Finalist for the First Decade Award, Gustavus Adolphus College, 2002

Anderson Fellowship, Yale University, 1999

Stanley R. Ames Scholarship, The University of Montana, 1999

Graduate School Scholarship, The University of Montana, 1997

Bertha Morton Scholarship, The University of Montana, 1997

## **V. SERVICE**

### Departmental

St. Olaf Chemistry Students advisor (2003-2008)

NMR liason (2006, 2007)

Seminar committee (2005, 2006, 2007)

Representative to Science Symposium committee (2006, 2007)

Tenure track search committee member, 2007, 2008

### College

Board of Student Media (2005-2007)

CEPC New course sub-committee (2007)

Curriculum Committee (2007 – present)

chair: continuing programs sub-committee

Health Professions Committee (2008-2009)

### Community

Board of Deacons, First United Church of Christ (2005-2007)

Northfield Soccer Association, Coach 2007

Northfield Area YMCA, Flag Football, Coach 2007