

Faculty Profile

 Search

■ Faculty Directory

Vahe Bandarian

Associate Professor

Email: vahe@email.arizona.edu

Building: BSW 540

Phone: 520-626-0389

Education and Appointments

- B.S. 1992, California State University, Los Angeles
- Ph. D. 1998, University of Wisconsin-Madison
- Postdoctoral Fellow 1999-2003, University of Michigan, Ann Arbor
- Assistant Professor 2003-2009, University of Arizona, Tucson
- Associate Professor 2009-Pres, University of Arizona, Tucson

Honors

- Burroughs Wellcome Career Award in Biomedical Sciences, 2002
- Pfizer Award in Enzyme Chemistry, 2010

Research Interests

- Biochemistry
- Chemical Biology
- Nucleic Acids and Genomes
- Protein and Membrane Biochemistry
- Structural Biology

Research Summary

Biosynthesis of secondary metabolites; mechanistic enzymology

We will utilize tools of chemistry and of biology to elucidate the biosynthetic pathways by which deazapurine-containing metabolites are produced. Deazapurines are widely distributed in nature and play diverse biological functions, such as cofactors in redox reactions and antimicrobial agents. The goals of the research in my laboratory will be to identify the enzymes that catalyze individual steps in the biosynthetic pathways leading to the deazapurine-containing metabolites and to probe the catalytic mechanisms of these enzymes.

Selected Publications

- Blackwell, A. E., Dodds, E. D., Bandarian, V., and Wysocki, V. H. (2011) Surface-induced dissociation revealing the quaternary substructure of a heterogeneous noncovalent protein complex. *Anal. Chem.*, *in press*.
- Miles, Z. D., McCarty, R. M., Molnar, G., and Bandarian, V. (2011) Discovery of oQ reductase reveals parallels between halorespiration and tRNA modification. *Proc. Nat. Acad. Sciences USA*, *in press*.
- McCarty, R. M., Somogyi, A., Lin, G., Jacobsen, N. E., and Bandarian, V. (2009) The deazapurine biosynthetic pathway revealed: *In vitro* enzymatic synthesis of preQ0 from guanosine 5'-triphosphate in four steps, *Biochemistry*, 48, 3847-3852. (*Accelerated publication*.)

Spitale, R. C., Torelli, A. T., Krucinska, J., Bandarian, V. and Wedekind, J. E. (2009) The structural basis for recognition in the preQ0 metabolite by an unusually small riboswitch aptamer domain. *J. Bio. Chem.*, 284, 11012-11016

- McCarty, R. M., Somogyi, A. and Bandarian, V. (2009) *Escherichia coli* QueD is a 6-carboxy-5,6,7,8-tetrahydropterin synthase. *Biochemistry*, 48, 2302-2303.
- Morrison, S. D., Roberts, S. A., Zegeer, A. B., Montfort, W. R., and Bandarian, V. (2008) A new use for a familiar fold: The X-ray crystal structure of GTP-bound GTP cyclohydrolase III from *Methanocaldococcus jannaschii* reveals a two metal ion catalytic mechanism. *Biochemistry*, 47, 230-242. (Designated "Hot Article")
- Spoonamore, J. E. and Bandarian, V. (2008) Understanding functional divergence in proteins by studying intragenomic homologs. *Biochemistry*, 47, 2592-2600.
- Bandarian, V. (2008) Delivery of tailor-made cobalamin to methylmalonyl-CoA mutase. *Nat. Chem. Bio.*, 4, 158-159.
- Spoonamore, J. E., Heroux, A., Roberts, S. A. and Bandarian, V. (2008) The X-ray crystal structure of a 6-pyruvoyltetrahydropterin synthase homolog from *Streptomyces coelicolor*. *Acta Cryst.*, 64, 875-879.
- McCarty, R. M. and Bandarian, V. (2008) Deciphering deazapurine biosynthesis pathway for pyrrolopyrimidine nucleosides toyocamycin and sangivamycin. *Chem. Biochem.*, 28, 790-798. (Also featured on the cover.)
- Quaranta D., McCarty, R., Bandarian, V., and Rensing, C. (2007) The copper-inducible cin operon encodes an unusual methionine-rich azurine like protein and a preQ0 reductase in *Pseudomonas putida* KT 2440. *J. Bacteriol.*, 189, 5361-5371.
- Spoonamore, J. E., Dahlgran, A. E., Bandarian, V. (2005) Three open reading frames with similar annotations but different functions: The reactions catalyzed by three GTP cyclohydrolase II homologs in *Streptomyces coelicolor*. *Biochemistry*, 45, 12144-12155. (Designated "Hot Article")
- Bandarian, V. and Matthews, R. G. (2003) Measurement of energetics of conformational change in the cobalamin-dependent methionine synthase. in *Methods in Enzymology*, in press.
- Bandarian, V., Pattridge, K. A., Lennon, B. W., Huddler, D. P., Matthews, R. G., and Ludwig, M. L. (2002) Domain alternation in B12-dependent methionine synthase: Switching to the activation conformation. *Nat. Struct. Mol. Biol.*, 9, 53-56.
- Bandarian, V. and Reed, G. H. (2002) Analysis of electron paramagnetic resonance spectrum of a radical intermediate in the coenzyme B12-dependent ethanolamine ammonia-lyase reaction with S-propanolamine. *Biochemistry*, 41, 8580-8588.
- LoBrutto, R., Bandarian, V., Magnusson, O. Th., Chen, X., Schramm, V.L., and Reed, G. H. (2001) 5'-Deoxyadenosine contacts the substrate radical intermediate in the active site of ethanolamine ammonia-lyase: 2H and 13C Electron nuclear double resonance studies. *Biochemistry*, 40, 9-14.
- Bandarian, V., and Matthews, R. G. (2001) Quantitation of rate enhancements attained by the binding of cobalamin to methionine synthase. *Biochemistry*, 40, 5056-5064.
- Miller, J., Bandarian, V., Reed, G. H., and Frey, P. A. (2001) Inhibition of lysine 2,3-aminomutase by the alternative substrate 4-thialysine and characterization of the 4-thialysyl radical intermediate. *Arch. Biochem. Biophys.*, 387, 281-287.
- Bandarian, V. and Reed, G. H. (2000) Kinetic isotope effects in the transient phases of the reaction catalyzed by ethanolamine ammonia-lyase. *Biochemistry*, 39, 12069-12075.
- Wu, W., Booker, S., Lieder, K. W., Bandarian, V., Reed, G. H. (2000) Lysine 2,3-aminomutase and trans-4,5-dehydrolysine: Characterization of an allylic analogue of a substrate-based radical in the catalytic mechanism. *Biochemistry*, 39, 9561-9570.
- Abend, A., Bandarian, V., Reed, G. H., and Frey, P. A. (2000) Identification of cis-ethanesemidione as the organic radical derived from glycolaldehyde in the suicide inactivation of dioldehydrase and of ethanolamine ammonia-lyase. *Biochemistry*, 39, 6250-6257.
- Chang, C-w. T., Johnson, D. A., Bandarian, V., Zhou, H., LoBrutto, R., Reed, G. H., and Liu, H.W. (2000) Characterization of a unique coenzyme B6 radical in the ascarylose biosynthetic pathway. *J. Amer. Chem. Soc.*, 122, 4239-4240.

■  Send this page by email

Department of Chemistry and Biochemistry at The University of Arizona
P.O. Box 210041, 1306 East University Blvd., Tucson, AZ 85721-0041
Phone: 520.621.6354 Fax: 520.621.8407

[UA NetID Login](#)

Copyright 2014 © Arizona Board of Regents