
BIOGRAPHICAL SKETCH

NAME Mueller, David Michael	POSITION TITLE Professor of Biochemistry and Molecular Biology		
eRA COMMONS USER NAME muellerd			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
The University of Michigan, Ann Arbor	B.S.	1976	Chemistry
Wayne Sate University, Detroit, MI, Detroit	Ph.D.	1981	Biochemistry
The University of Chicago, Chicago, IL	Post-doct	1981-1986	Molecular Biology

A. Personal statement

My educational background is broad. My undergraduate studies gave me a strong basis in math and chemistry. In graduate school, I worked with C.P. Lee, who had just come from a faculty position at the Johnson Research Foundation at the University of Pennsylvania and was a leader in her field, and with her I used biochemical and biophysical methods in the study of mitochondrial bioenergetics. My post-doctoral studies with Murray Rabinowitz were exclusively on gene expression studies with heavy utilization of yeast genetics and molecular biology. Over the last 25 years my laboratory has continually investigated genetic, cellular, biochemical, biophysical, and more recently, X-ray crystallographic studies on the mitochondrial ATP synthase. We have expertise in a broad area of research and continually expand on our expertise. Careful inspection of the list of publications will reveal studies that are entirely genetic, biochemical, cellular, or crystallographic. The entry into crystallography has been noticeable as we have been successful in the solving the structure of the yeast F_1 -ATPase, a major accomplishment as many established laboratories have tried to crystallize the F_1 from yeast of other species, without success. John Walker was awarded the Nobel Prize in Chemistry for solving the first complete structure of the bovine F_1 and we continue close discussions with him and Dr. Andrew Leslie. My lab has completed the structure of 5 mutant structures of the yeast F_1 and an apo form of the enzyme. We have solved the crystal structure of yeast c-ring at pH 8.3, 6.1, 5.5, and at 5.5 modified with the inhibitor, DCCD from 2.0-2.5Å resolution. Most recently, we have solved the structure of oligomycin bound to the yeast c-ring at 1.9Å. Our expertise on the ATP synthase, in yeast genetics, molecular biology, and crystallography are unique and critical for the success in this project.

B. Positions and honors

Positions

August 2000 to Sept. 2001, Visiting Professor, Medical Research Council, Dunn Human Nutrition, Unit, Cambridge, U.K.

July 1999 to present, Professor, Department of Biochemistry and Molec. Biology, The Chicago Medical School, North Chicago, IL

1990 to July 1999, Associate Professor, Department of Biochemistry and Molec. Biology, The Chicago Medical School, North Chicago, IL.

1986 to 1990, Assistant Professor, Department of Biochemistry and Molec. Biology, The Chicago Medical School, North Chicago, IL.

1984-1986, Research Associate, Department of Medicine, The University of Chicago, Chicago, IL

1981-1984, Postdoctoral Fellow, Department of Medicine, The University of Chicago, Chicago, IL.

1977-1980, Research Assistant, Department of Biochemistry, Wayne State University, Detroit, MI.

1977, Teaching Assistant, Department of Chemistry, Wayne State University, Detroit, MI.

Honors

1981-1984	NIH Training Grant
1989-present	Member of Genetic Society
1990-present	Member of the American Society For Biochemistry and Molecular Biology
1990	Board of Trustees Research Award, The Chicago Medical School
1998-2002	Editorial Board, <i>The Journal of Biological Chemistry</i>
1999	Scientific Review Board for the American Heart Association

2000 NIH, Fogarty Senior International Fellowship
 2005-present Reviewer for Argonne National Laboratory, APS, General User Program.
 2005 Ad Hoc Reviewer for NHBLI Program Project Study Section
 2005 Ad Hoc Reviewer for BBM Study Section
 2006 Ad Hoc Reviewer for GCMB Study Section
 2007 Ad Hoc Reviewer for BBM Study Section
 2007 Ad Hoc Reviewer for GCMB Study Section
 2009 Ad Hoc Reviewer for BBM Study Section
 2009 Ad Hoc Reviewer for BCMB Integrated Review Group
 2010, 2011 Ad Hoc Reviewer for NHBLI Program Project Study Section
 2009, 2013 Guest Editor, PNAS
 Current Recent *Ad hoc* reviewer for Science, Nature, *Biochemistry*, *PNAS*, *EMBO J.*, *Eukary. Cell*, *BBA, J.*, *Bioenerg. Biomemb.*, *JBC*, *Structure*, *Human Genetics*, *Biochemical J.*, *Molec. Biol. and Evolution*

Recent Invited Talks.

2010 FASEB summer meeting on "Transport ATPases", Snowmass Co.
 2010 European Bioenergetic Conference, Warsaw, Poland, (turned down).
 2011 Gordon Research Conference on "Bioenergetics", Andover, N.H.
 2012 FASEB summer meeting on "Transport ATPases", Snowmass Co.
 2013 Gordon Research Conference on "Bioenergetics", Andover, N.H.
 2014 FASEB summer meeting on "Transport ATPases", Barga, Italy.

C. Selected PUBLICATIONS:

Lai-Zhang, J., Xiao, Y., Mueller DM (1999) Epistatic interactions of deletion mutants in the genes encoding the F₁-ATPase in yeast *Saccharomyces cerevisiae*. *EMBO J.*: 18: 58-64. PMID: PMC1171102
 Xiao, Y., Metz, M. and Mueller, D.M. (2000) Partial uncoupling of the mitochondrial membrane by a heterozygous null mutation in the gene encoding the γ - or δ -subunit of the yeast mitochondrial ATPase *J. Biol. Chem.* 275: 6963-6968. PMID:10702258
 Velours, J., Vaillier, J., Paumard, P., Soubannier, V., Lai-Zhang, J., and Mueller, D.M., (2001) Bovine coupling factor 6, with just 14.5% shared identity, replaces subunit *h* in the yeast *Saccharomyces cerevisiae* ATP synthase. *J. Biol. Chem.*, 276:8602-8607. PMID:11083870
 Puri N, Lai-Zhang J, Meier S, Mueller DM., (2005) Expression of bovine F₁-ATPase with functional complementation in yeast *Saccharomyces cerevisiae*. *J. Biol. Chem.* 280:22418-22424. PMID:15817482
 Kabaleeswaran V, Puri N, Walker JE, Leslie AG, Mueller DM. (2006) Novel features of the rotary catalytic mechanism in the structure of the yeast F₁ ATPase. *EMBO J.*, 25, 5433-5442. PMID: PMC1636620
 Wang, Y., Singh, U., and Mueller, D.M. (2007) Mitochondrial Genome Integrity Mutations Uncouple the Yeast *Saccharomyces cerevisiae* ATP Synthase *J. Biol. Chem.* 282: 8228-8236. PMID:17244612
 Kabaleeswaran, V., Shen, H., Symersky, J., Walker, JE, Leslie, AGW, Mueller, D.M., (2009) Asymmetric structure of the yeast F₁ ATPase in the absence of bound nucleotides, *J. Biol Chem.* 284: 10546-10551. PMID: PMC2667741
 Shen, H., Walters, D.E., and Mueller, D.M. (2008) Introduction of The Chloroplast Redox Regulatory Region In the Yeast ATP Synthase Impairs Cytochrome Oxidase, *J. Biol. Chem.* 283: 32937-32943. PMID: PMC2583308
 Arsenieva, D., Symersky, J., Wang, Y., Pagadala, V., and Mueller, D.M. (2010) Crystal Structure of mutant forms of the yeast F₁ATPase reveal two modes of uncoupling. *J. Biol. Chem.* 285: 36561-36569. PMID: PMC2978584
 Little, M.A, Steel, B.C., Bai, F., Sowa, Y., Bilyard, T., Mueller, D.M., Berry, R.M.Jones, N.S (2011) Steps and bumps: precision extraction of discrete states of molecular machines, *Biophysical Journal*, 101(2):477-485. PMID: PMC3136774
 Pagadala, V., Vistain, L., Symersky, J., and Mueller, D.M. (2011) Characterization Of The Mitochondrial ATP Synthase From Yeast *Saccharomyces cerevisiae*, *J. Bioener. Biomemb.* 43, 333-347. PMID: in process
 Symersky, J., Pagadala, V., Osowski, D., Krah, A., Meier, T., Faraldo-Gómez, J., and Mueller, D.M., (2012) Structure of the c₁₀ Ring of the Yeast Mitochondrial ATP Synthase in the Open Conformation. *Nat. Struct. Molec. Biol.* 19: 485-491. PMID: PMC3343227
 Symersky, J., Osowski, D., Walters, D.E., and Mueller, D.M. (2012) Oligomycin frames a common drug-binding

site in the ATP synthase. PNAS USA, 109: 13961-13965. PMID: PMC3435195
Robinson, G.C., Bason, J.V., Montgomery, M.G., Fearnley, I.M., Mueller, D.M., Leslie, A.G.W., and Walker, J.E. The structure of F₁-ATPase from *Saccharomyces cerevisiae* inhibited by its regulatory protein IF₁. (2013) Open Biol. 3: 120164. PMID: PMC3603450
Lieber, D.S., Calvo, S.E., Slate, N.G., Liu, S.L., Hershman, S.G., Gold, N.B., Borowsky, M.L., Thorburn, D.R., Berry, G.T., Schmahmann, J.D., Mueller, D.M., Sims, K.B., Mootha, V.K., Targeted exome sequencing of suspected mitochondrial disorders. (2013) Neurology 80:1762-1770. PMID: in process.

D. Research Support

Ongoing research support

R01GM066223 (Mueller) 2007 – 2016
NIH/NIGMS

Structure and function of the yeast ATPase. The major goal of this project is to determine structure/function relationship of the mitochondrial ATP synthase. A combination of genetic, biochemical, biophysical and X-ray crystallographic studies are used to probe the molecular mechanism of the ATP synthase.

R21 HL094951 (Pi, Mueller, co-PI, Bradbury) 2009 - 2013 (no cost extension)
NIH/NHBLI

Functional expression of CFTR and other multidomain proteins. The major goal of this project is test a critical hypothesis on the relationship between translation rate and protein folding.