

Cynthia Wolberger

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Education

A.B. <i>cum laude</i> in Physics, Cornell University, Ithaca, NY	June 1979
Ph.D. in Biophysics, Harvard University, Cambridge, MA	October 1987
Postdoctoral fellow, University of California, San Francisco	1987 – 1989
Postdoctoral fellow, Johns Hopkins University School of Medicine	1989 – 1991

Positions Held

Associate Investigator Howard Hughes Medical Institute Johns Hopkins University School of Medicine, Baltimore, MD	Nov. 1997 - present
Associate Professor Department of Biophysics and Biophysical Chemistry Johns Hopkins University School of Medicine, Baltimore, MD	Jul. 1997 - present
Assistant Investigator Howard Hughes Medical Institute Johns Hopkins University School of Medicine, Baltimore, MD	Apr. 1994 - Nov. 1997
Assistant Professor Department of Biophysics and Biophysical Chemistry Johns Hopkins University School of Medicine, Baltimore, MD	Aug. 1991 - Jun. 1997
Postdoctoral Fellow (mentor: Carl Pabo) Department of Molecular Biology and Genetics Johns Hopkins University School of Medicine, Baltimore, MD	Apr. 1989 - Jun. 1991
Postdoctoral fellow (mentor: Robert Stroud) Department of Biochemistry and Biophysics University of California School of Medicine, San Francisco, CA	Nov. 1987 - Mar. 1989
Graduate student Department of Biochemistry and Molecular Biology Harvard University, Cambridge, MA Thesis advisors: Stephen C. Harrison and Mark Ptashne	Sept. 1980 - Oct. 1987
Guest scientist Max Planck Institute for Solid State Physics	Aug. 1979 - Aug. 1980

Stuttgart, Germany

Publications

1. **C. Wolberger** and S.C. Harrison (1987) "X-ray diffraction studies of a 434 Cro-DNA complex", *J. Mol. Biol.* **196**, 951-954
2. **C. Wolberger** (1987) "The structure of a 434 Cro-DNA complex," Ph.D. Thesis, Harvard University, Cambridge, Mass.
3. S.C. Harrison, J.E. Anderson, G.B. Koudelka, A. Mondragon, S. Subbiah, R.P. Wharton, **C. Wolberger** and M. Ptashne (1988), "Recognition of DNA sequences by the repressor of bacteriophage 434", *Biophysical Chemistry* **29**, 31-37
4. **C. Wolberger**, Y. Dong, M. Ptashne and S.C. Harrison (1988), "The structure of a 434 Cro-DNA complex", *Nature* **335**, 789-795
5. A. Mondragon, **C. Wolberger** and S.C. Harrison (1989), "The structure of phage 434 Cro protein at 2.35 Å resolution", *J. Mol. Biol.* **205**, 179-188
6. **C. Wolberger**, C.O. Pabo, A.K. Vershon and A.D. Johnson (1991), "Crystallization and preliminary X-ray diffraction studies of a MAT α 2-DNA complex," *J. Mol. Biol.* **217**, 11-13
7. **C. Wolberger**, A.K. Vershon, B. Liu, A.D. Johnson and C.O. Pabo (1991), "Crystal structure of a MAT α 2 homeodomain-operator complex suggests a general model for homeodomain-DNA interactions," *Cell* **67**, 517-528
8. **C. Wolberger** (1993) "Transcription factor structure and DNA binding," *Curr. Opin. Struct. Biol.* **3**, 3-10
9. **C. Wolberger** (1993) "Structure and DNA Binding of the Yeast MAT α 2 Homeodomain." *Cold Spring Harbor Symp. Quant. Biol.* **58**, 159-166
10. **C. Wolberger** (1994) "b/HLH Without the Zip," *Nature Structural Biology* **1**, 413-416
11. T. Li, M. Stark, A.D. Johnson, and **C. Wolberger** (1995) "Crystallization and preliminary X-ray diffraction studies of an a1/ α 2/DNA ternary complex," *PROTEINS:Structure, Function, Genetics* **21**, 161-164
12. T. Li, M.R. Stark, A.D. Johnson, and **C. Wolberger** (1995) "Structure of the MAT a1/MAT α 2 homeodomain heterodimer bound to DNA," *Science* **270**, 262-269
13. Y. Jin, J. Mead, T. Li, **C. Wolberger**, and A.K. Vershon (1995) "Altered DNA recognition and bending by insertions in the α 2 tail of the yeast a1/ α 2 homeodomain heterodimer," *Science* **270**, 290-293
14. **C. Wolberger** (1996) " Homeodomain Interactions," *Curr. Opin. Struct. Biol.* **6**, 62-68
15. S. Soisson, B. MacDougall-Shackleton, R. Schleif, and **C. Wolberger** (1997) "Structural basis for ligand-regulated oligomerization of AraC," *Science* **276**, 421-425
16. S. Soisson, B. MacDougall-Shackleton, R. Schleif, and **C. Wolberger** (1997) "The 1.6 Å crystal structure of the AraC sugar-binding and dimerization domain complexed with D-fucose: Structural basis for carbohydrate specificity," *J. Mol. Biol.* **273**, 226-237
17. A. Batchelor, D. Piper, F. Charles de la Brousse, S.L. McKnight, and **C. Wolberger** (1998), "The structure of GABP α/β : An ETS domain - ankyrin repeat heterodimer bound to DNA,"

Science **279**, 1037-1041

18. **C. Wolberger** (1998) "Combinatorial Transcription Factors," *Curr. Opin. Genet. Dev.* **8**, 552-559
19. T. Li, Y. Jin, A.K. Vershon, and **C. Wolberger** (1998), "Crystal structure of the MAT α 1/MAT α 2 homeodomain heterodimer in complex with DNA containing an A-tract," *Nucleic Acids Research* **26**, 5707-5718
20. D. Piper, A. Batchelor, M. Cleary, and **C. Wolberger** (1999), "Structure of a HoxB1-Pbx1 heterodimer bound to DNA: Role of the hexapeptide and a fourth homeodomain helix in combinatorial interactions," *Cell* **96**, 587-597
21. **C. Wolberger** (1999) "Multiprotein-DNA Complexes in Transcriptional Regulation," *Annu. Rev. Biophys. Biomol. Struct.* **28**, 29-56
22. C. Jabet, R. Gitti, M. Summers, and **C. Wolberger** (1999), "NMR studies of the Pbx1 TALE homeodomain protein free in solution and bound to DNA : Proposal for a mechanism of HoxB1-Pbx1-DNA complex assembly," *J. Mol. Biol.* **291**, 521-530
23. A.H. Batchelor, D. Piper and **C. Wolberger** (2000), "Crystallization of protein-nucleic acid complexes," in *Encyclopedia of Life Sciences*, Macmillan Ltd., London
24. C. Jabet, E. R. Sprague, A.P. VanDemark and **C. Wolberger** (2000), "Characterization of the N-terminal domain of the yeast transcriptional repressor Tup1: Proposal for an association model of the Ssn6/Tup1 repressor complex," *J. Biol. Chem.* **275**, 9011-9018
25. **C. Wolberger** and R.L. Campbell (2000), "New perch for the winged helix," *Nature Structural Biology* **7**, 261-262
26. I. Celic, J. S. Smith, C.B. Brachmann, M. A. Kenna, S. Muhammad, J. Avalos, J. C. Escalante-Semerena, C. Grubmeyer, **C. Wolberger** and J. D. Boeke (2000), "A phylogenetically conserved NAD-dependent protein deacetylase activity in the Sir2p protein family," *Proc. Natl. Acad. Sci. USA* **97**, 6658-6663
27. E. R. Sprague, M. Redd, A.D. Johnson and **C. Wolberger** (2000), "Structure of Tup1, a yeast transcriptional co-repressor," *EMBO J.* **19**, 3016 – 3027
28. N. LaRonde – LeBlanc and **C. Wolberger** (2000) "Characterization of the Oligomeric States of AraC," *Biochemistry*, in press

Grant History

American Cancer Society Research Development Award

Title: Transcription Complex Structure: Crystallization of an α 2/MCM1/DNA Complex

Dates: 1/1/92 - 12/31/92

Total direct costs: \$64,300

March of Dimes - Basil O'Connor Starter Scholar Award

Title: Studies of Transcription Complex Structures

Dates: 9/1/92 - 8/31/94

Total direct costs: \$81,819

David and Lucile Packard Fellowship in Science and Engineering

Title: none

Dates: 10/15/92 - 10/14/97

Total direct costs: \$450,000

American Cancer Society Junior Faculty Award

Title: Structural Studies of Combinatorial Control of Transcription in Yeast

Dates: 1/1-93 - 12/31/95

Total direct costs: \$90,500

Note: Returned on 4/15/94 because of initiation of Hughes funding

National Science Foundation Research Grant (MCB- 9304526)

Title: Structure of Homeodomain Gene Regulatory Complexes

Dates: 8/1/93 - 7/31/98

Total direct costs: \$342,015

National Science Foundation Research Grant (MCB- 9808412)

Title: Structure of Homeodomain Gene Regulatory Complexes

Dates: 8/1/98 - 7/31/02

Total direct costs: \$296,296

Howard Hughes Medical Institute

Position: Associate Investigator

Dates: 4/15/94 - present

Total direct costs: Budget negotiated annually

Teaching

Molecular Biology, Fall quarter. Lectures on DNA and DNA-protein interactions, core discussion group	1991 - present
Molecules and Cells, first year medical student curriculum, Fall quarter	
Lectures on DNA structure and protein-DNA interactions	1992 - present
Discussion group leader	1996 - present
Elements of Crystallography, Spring quarter (alternate years).	1994 - present
Topics in Macromolecular Structure and Function; course director	1995 - 1996

Mentoring

Graduate Students

Stephen Soisson (Ph.D. 5/97; Senior Research Biochemist, Merck Research Laboratories)

Elizabeth Reisinger (Ph.D. 5/99; Postdoc at Cal Tech)

Jun Aishima (Ph.D. anticipated 5/01)

Nicole LaRonde-LeBlanc

Andrew Vandemark

Ailong Ke

José Avalos

Postdoctoral Fellows

Thomas Li, National Chung Hsin University, Taichung, Taiwan

Adrian Batchelor, Walter and Eliza Hall Institute, Melbourne, Australia

Carole Jabet

Colin Garvie

Thesis committees

Don Jackson, student of Phil Beachy (BCMB). Ph.D. 1997

Mary-Elizabeth Harmon, student of Wade Gibson (Pharmacology). Ph.D. 1998

Tonya Hendrix, student of Peter Privalov (Biology, Homewood). Ph.D. 1998

Holly Berkovitz, student of Jeremy Berg (BCMB)

Alysa Zelman, student of Randy Reed (IPMB)

Roseanne Hoffman, student of Cecile Pickart (Biochemistry, Public Health) Ph.D. 2000
 Min Wu, student of Robert Schleif (Biology, Homewood)

Training grant participation

BCMB – Program in Biochemistry, Cellular, and Molecular Biology

- Graduate Admissions Committee 1991 – 1994
- Retreat organizer 1993 – 1994
- Steering Committee 1994 – 1997

IPMB – Intercampus Program in Molecular Biophysics

- Graduate Admissions Committee 1995 – present
- Admissions Director 1998 – present

Institutional Activities

Department of Medicine Search Committee 1994 - 1995
 Young Investigator's Day Awards Committee 1995 - present
 Moderator, Young Investigator's Day April 1998
 Medical School Council representative 1999 – present
 Year 2000 Leadership Development Program 2000 –2001

Professional Activities

Editorial Board, *Current Biology* 1995 – present
 Editorial Board, *Macromolecular Structures* 1996 – 1997
 Molecular Biophysics Advisory Panel, National Science Foundation 1996 – present
 Biophysical Society Awards Committee 2000 - 2003
 Review manuscripts for: *Science, Nature, Cell, Journal of Molecular Biology, Biochemistry, Journal of Biological Chemistry, Structure, Nature Structural Biology, Current Biology, Nucleic Acids Research, Genes and Development, PROTEINS, Protein Science, Molecular and Cellular Biology, PNAS*

Fellowships and Awards

Cornell Honorary Scholarship 1975 – 1979
 New York State Regents Scholarship 1975 – 1979
 Received B.A. *cum laude* in physics and with distinction in all subjects June 1979
 Damon Runyon - Walter Winchell Cancer Research Fund Fellow 1987 – 1990
 March of Dimes - Basil O'Connor Starter Scholar Award 1992 – 1994
 David and Lucile Packard Fellowship for Science and Engineering 1992 – 1997
 American Cancer Society Junior Faculty Award 1993 – 1994
 Appointed Howard Hughes Medical Institute investigator April 1994

Invited Talks

Laboratory of Molecular Biology, National Institutes of Health Apr. 1991
 Gordon Conference on Developmental Biology, Andover, N.H. June 1991
 Dept. of Microbiology and Molecular Genetics, University of Vermont, Burlington Feb. 1992
 National Institutes of Health Feb. 1992
 Structural Biology Seminar, University of California, Berkeley Apr. 1992

Biochemistry and Biophysics Colloquium, University of California, San Francisco	Apr. 1992
Junior Faculty - Student Seminar, Rockefeller University	June 1992
Gordon Conference on Nuclear Proteins, Gene regulation and Chromatin Structure, Tilton, N.H.	July 1992
Cold Spring Harbor 58th Symposium on Quantitative Biology	June 1993
Cold Spring Harbor meeting on Mechanisms in Eukaryotic Transcription	Sep. 1993
Boston Structural Biology Colloquium, Children's Hospital, Harvard School of Medicine	Jan. 1995
Department of Microbiology, New York University Medical Center.	Jan. 1995
Department of Biology, Brookhaven National Laboratory	Feb. 1995
Molecular Biophysics Seminar Series, Rutgers University	Feb. 1995
Department of Cell Biology and Anatomy, Johns Hopkins School of Medicine	Feb. 1995
Cold Spring Harbor meeting on Mechanisms in Eukaryotic Transcription	Aug. 1995
Department of Chemistry, University of Maryland, Baltimore County	Oct. 1995
Biophysics Seminar, Columbia University College of Physicians and Surgeons	Nov. 1995
Conference on Mathematics and Molecular Biology IV, Santa Fe, N.M.	Nov. 1995
Department of Chemistry and Biochemistry, University of Pennsylvania	Jan. 1996
Biophysics Seminar, Johns Hopkins University, Homewood Campus	Feb. 1996
Structural Biology Seminar, University of California, Berkeley	Feb. 1996
Biochemistry and Biophysics Colloquium, University of California, San Francisco	Feb. 1996
National Institutes of Health, Laboratory of Molecular Biology	May 1996
Dept. of Molecular Biology and Genetics, Johns Hopkins School of Medicine	June 1996
Colloquium speaker, ASBMB/ASIP/AAI Joint Meeting, New Orleans, LA	June 1996
FASEB meeting on Transcriptional Mechanisms, Snowmass, CO	Aug. 1996
Department of Molecular Biophysics and Biochemistry, Yale University	Oct. 1996
Department of Biology, California Institute of Technology	Nov. 1996
Arolla workshop: Expression, Maintenance, and Propagation of the Genome, Arolla, Switzerland	Aug. 1997
AACR Symposium on Transcription, Lake George, NY	Oct. 1997
Dept. of Biochemistry, University of Maryland School of Medicine	Feb. 1998
Dept. of Biochemistry, University of Texas Southwestern Medical Center	Feb. 1998
Department of Chemistry, University of Maryland, Baltimore County	May 1998
Biopolymers Gordon Conference, Newport, RI	June 1998
FASEB meeting on Transcriptional Mechanisms, Snowmass, CO	July 1998
CABM Symposium, Rutgers University	Oct. 1998
Robert A. Welch Foundation Conference, Houston, TX	Oct. 1998
Department of Chemistry and Biochemistry, University of Pennsylvania	Dec. 1998
Tsukuba Workshop on Nucleic Acid Structure and Interactions, Tsukuba, Japan	Jan. 1999
Department of Embryology, Carnegie Institute of Washington	Feb. 1999
Cold Spring Harbor meeting on Mechanisms of Eukaryotic Transcription	Sep. 1999
Department of Biochemistry, Oregon Health Sciences University	Mar. 2000
Department of Biochemistry, University of Maryland, College Park	Apr. 2000
Session Chair, American Crystallographic Association meeting, St. Paul, MN	Jul. 2000
Plenary lecture, European Life Sciences Organization Meeting, Geneva, Switzerland	Sep. 2000
Department of Biochemistry, Washington University, St. Louis, MO	Jan. 2001
Keystone Symposium on Transcriptional Regulation, Santa Fe, NM	Feb. 2001