

Seth M. Cohen, Ph.D.

Department of Chemistry and Biochemistry
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0358
Phone (858) 822-5596
Fax (858) 822-5598
scohen@ucsd.edu

EDUCATION

1999-2001 N.I.H. Postdoctoral Fellowship, M.I.T., PI: Stephen J. Lippard
1994-1998 Ph.D., University of California, Berkeley, PI: Kenneth N. Raymond
1990-1994 B.S. Chemistry, Stanford University, PI: Robert M. Waymouth
1990-1994 B.A. Political Science, Stanford University

RESEARCH

- 2001-present Assistant Professor, University of California, San Diego*
Developed new approaches to the inhibition of metalloproteinases, specifically matrix metalloproteinases (MMPs) and anthrax lethal factor (LF). Devised new dipyrinato-based metalloligands for the synthesis of functional metal-organic frameworks (MOFs). Examined the mechanism of metal-activated DNA binding in the Mn(II)-dependent metalloregulatory protein MntR.
- 1999-2001 Postdoctoral Fellow, Massachusetts Institute of Technology*
Investigated the reactivity of the anticancer drug cisplatin (cis-diamminedichloroplatinum(II)) with telomere DNA. Studied the interaction of several DNA-binding proteins (TATA-binding protein, high-mobility group proteins) with cisplatin-damaged DNA.
- 1994-1998 Graduate Student Researcher, University of California, Berkeley*
Designed new ligands for Gd(III) as potential magnetic resonance imaging (MRI) contrast agents. Synthesized multidentate ligands tailored for attachment to dendrimers and other macromolecular structures. Prepared novel cryptands for use as fluorescent labels in diagnostic assays. Synthesized tripodal ligands as models for siderophores involved in bacterial iron transport.
- 1992-1994 Undergraduate Student Researcher, Stanford University*
Synthesized and derivatized organic polymers to enhance their chemical and physical properties. Investigated modification of polymers with masked functionalities.

- 1992 *Summer Student Researcher, California Institute of Technology*
Studied the coordination chemistry of the blue copper protein azurin. Used site-directed mutagenesis to change the amino acid residues ligated to the Cu(II) ion (PI: Prof. Jack H. Richards).
- 1991 *Summer Student Researcher, Jet Propulsion Laboratories*
Searched for previously unidentified asteroids as part of the Planet-Crossing Asteroid Survey (PCAS). Observed asteroids in near-Earth orbits using the 12" Schmidt Telescope at Mt. Palomar Observatory. Discovered new objects and determined their orbits for classification and cataloguing (PI: Dr. Eleanor Helin).

AWARDS AND AFFILIATIONS

Awards: NSF CAREER Award (2006-2010), Research Corporation Cottrell Scholar Award (2004), Hellman Faculty Fellow (2002), Hellman Faculty-Scholar Award (2001-2005), NIH Postdoctoral Fellowship (1999-2001), Stanford-Bing Undergraduate Research Fellowship (1993), Caltech Student Undergraduate Research Fellowship (1992)

Affiliations: American Chemical Society, Sigma Xi, Society for Bioinorganic Chemistry, UCSD/Moores Cancer Center, Chair/Vice-Chair Graduate Research Seminar Gordon Conference (2001, 2000)

TEACHING

University of California, San Diego: Director of the UCSD-DEA (Drug Enforcement Administration) Internship Program, Bioinorganic Chemistry (undergraduate/graduate recitation), Honors General and Forensic Chemistry (undergraduate recitation), Freshman Seminar: Crime Scene Investigations (undergraduate seminar), Freshman Seminar: Archaeological Chemistry (undergraduate seminar)

University of California, Berkeley: Physical Organic Chemistry (graduate recitation), Introductory Organic Chemistry (undergraduate recitation and laboratory), Advanced Inorganic Chemistry (undergraduate recitation)

Stanford University: Advanced Organic Chemistry (undergraduate recitation and laboratory)

FUNDING

Current: NIH R01 Grant (\$1,900,000; 2006-2010), NSF CAREER Award (\$563,500 including supplement; 2006-2010), ACS-PRF AC-Grant (\$88,000 including supplement; 2005-2007), Research Corporation Cottrell Scholar Award (\$75,000; 2004), American Heart Association Grant (\$260,000; 2004-2007)

Prior: UCSD/Moores Cancer Center Grant (\$40,000; 2004), ACS-PRF G-Grant (\$35,000; 2003), UCSD Academic Senate Grant (\$17,200; 2003, 2005), American Cancer Society IRG (\$20,000; 2002), Hellman Faculty Fellow (\$20,000; 2002), Hellman Faculty-Scholar Award (\$125,000; 2001-2005),

PUBLICATIONS

Independent Publications (DOI codes for the WWW provided)

55. Misha V. Golynskiy, Sheng Li, Virgil Woods Jr., and Seth M. Cohen, "Conformational Studies of the Manganese Transport Regulator (MntR) from *Bacillus subtilis* using Deuterium Exchange Mass Spectrometry" *J. Biol. Inorg. Chem.* 2007, in press.
DOI: N/a

54. Sara R. Halper, Jay R. Stork, and Seth M. Cohen, "Preparation and Characterization of Asymmetric β -Alkoxy Dipyrin Ligands and their Metal Complexes" *Dalton Trans.* 2007, in press.
DOI: 10.1039/b615801c

53. Seth M. Cohen, "New Approaches for Medicinal Applications of Bioinorganic Chemistry" *Curr. Opin. Chem. Biol.* 2007, in press (invited contribution).
DOI: 10.1016/j.cbpa.2007.01.012

52. Faith E. Jacobsen, Jana A. Lewis, Katie J. Heroux, and Seth M. Cohen, "Characterization and Evaluation of Pyrone and Tropolone Chelators for use in Metalloprotein Inhibitors" *Inorg. Chim. Acta* 2007, 360, 264-272 (invited contribution).
DOI: 10.1016/j.ica.2006.07.044

51. Faith E. Jacobsen, Jana A. Lewis, and Seth M. Cohen, "The Design of Inhibitors for Medicinally Relevant Metalloproteins" *ChemMedChem* 2007, 2, 152-171 (invited contribution).
DOI: 10.1002/cmdc.200600204

50. Misha V. Golynskiy, William A. Gunderson, Michael P. Hendrich, and Seth M. Cohen, "Metal Binding Studies and EPR Spectroscopy of the Manganese Transport Regulator MntR" *Biochemistry* 2006, 45, 15359-15372.
DOI: 10.1021/bi0607406

49. Van S. Thoi, Jay R. Stork, Douglas Magde, and Seth M. Cohen, "Luminescent Dipyrinato Complexes of Trivalent Group 13 Metal Ions" *Inorg. Chem.* 2006, 45, 10688-10697.
DOI: 10.1021/ic061581h

48. Sara R. Halper, Loi Do, Jay R. Stork, and Seth M. Cohen, "Topological

Control in Heterometallic Metal-Organic Frameworks by Anion Templating and Metalloligand Design" *J. Am. Chem. Soc.* 2006, 128, 15255-15268.
DOI: 10.1021/ja0645483

47. Faith E. Jacobsen, Robert M. Breece, William K. Myers, David L. Tierney, and Seth M. Cohen, "Model Complexes of Cobalt-Substituted Matrix Metalloproteinases: Tools for Inhibitor Design" *Inorg. Chem.* 2006, ASAP contents.
DOI: 10.1021/ic060901u

46. Faith E. Jacobsen, Jana A. Lewis, Katie J. Heroux, and Seth M. Cohen, "Characterization and Evaluation of Pyrone and Tropolone Chelators for use in Metalloprotein Inhibitors" *Inorg. Chim. Acta* 2006, in press (invited contribution).
DOI: 10.1016/j.ica.2006.07.044

45. Jana A. Lewis, John Mongan, J. Andrew McCammon, and Seth M. Cohen, "Evaluation and Binding Mode Prediction of Thiopyrone-Based Inhibitors of Anthrax Lethal Factor" *ChemMedChem* 2006, 1, 694-697.
DOI: 10.1002/cmdc/200600102

44. Faith E. Jacobsen, Jana A. Lewis, and Seth M. Cohen, "A New Role for Old Ligands: Discerning Chelators for Zinc Metalloproteinases" *J. Am. Chem. Soc.* 2006, 128, 3156-3157.
DOI: 10.1021/ja057957s

43. David T. Puerta, Mauro Botta, Christoph J. Jocher, Eric J. Werner, Stefano Avedano, Kenneth N. Raymond, and Seth M. Cohen, "Tris(pyrone) Chelates of Gd(III) as High Solubility MRI-CA" *J. Am. Chem. Soc.* 2006, 128, 2222-2223.
DOI: 10.1021/ja057954f

42. David T. Puerta, Michael O. Griffin, Jana A. Lewis, Diego Romero-Perez, Ricardo Garcia, Francisco J. Villarreal, and Seth M. Cohen, "Heterocyclic Zinc-Binding Groups for Use in Next Generation Matrix Metalloproteinase Inhibitors: Potency, Toxicity, and Reactivity" *J. Biol. Inorg. Chem.* 2006, 11, 131-138.
DOI: 10.1007/s00775-005-0053-x

41. Daniel Brayton, Faith E. Jacobsen, Seth M. Cohen, and Patrick J. Farmer, "A Novel Heterocyclic Atom Exchange Reaction with Lawesson's Reagent: One-pot Synthesis of Dithiomaltol" *Chem. Commun.* 2006, 206-208.
DOI: 10.1039/b511966a

40. Ba L. Tran and Seth M. Cohen, "Flavothionato Metal Complexes: Implications for the Use of Hydroxyflavothiones as Green Pesticides" *Chem. Commun.* 2006, 203-205.

DOI: 10.1039/b512185j

39. David T. Puerta, John Mongan, Ba L. Tran, J. Andrew McCammon, and Seth M. Cohen, "Potent, Selective Pyrone-Based Inhibitors of Stromelysin-1" *J. Am. Chem. Soc.* 2005, 127, 14148-14149.
DOI: 10.1021/ja054558o

38. Drew L. Murphy, Mitchell R. Malachowski, Charles F. Campana, and Seth M. Cohen, "A Chiral, Heterometallic Metal-Organic Framework Derived from a Tris(Chelate) Coordination Complex" *Chem. Commun.* 2005, 5506-5508.
DOI: 10.1039/b510915a

37. Hongshan He, David T. Puerta, Seth M. Cohen, and Kenton R. Rodgers, "A Structural and Spectroscopic Study of Reactions between Chelating Zinc-Binding Groups and Mimics of the MMP and ADAM Catalytic Sites: The Coordination Chemistry of Metalloprotease Inhibition" *Inorg. Chem.* 2005, 44, 7431-7442.
DOI: 10.1021/ic050723p

36. Jana A. Lewis, Ba L. Tran, David T. Puerta, Evan M. Rumberger, David N. Hendrickson, and Seth M. Cohen, "Synthesis, Structure, and Spectroscopy of New Thiopyrone and Hydroxypyridinethione Transition Metal Complexes" *Dalton Trans.* 2005, 2588-2596 (featured cover article).
DOI: 10.1039/b505034k

35. Sara R. Halper and Seth M. Cohen, "Self-Assembly of Heteroleptic [Cu(dipyrrinato)(hfacac)] Complexes Directed by Fluorine-Fluorine Interactions" *Inorg. Chem.* 2005, 44, 4139-4141.
DOI: 10.1021/ic0504442

34. Misha V. Golynskiy, Talib C. Davis, John D. Helmann, Seth M. Cohen, "Metal-Induced Structural Organization and Stabilization of the Metalloregulatory Protein MntR" *Biochemistry* 2005, 44, 3380-3389.
DOI: 10.1021/bi0480741

33. Sara R. Halper and Seth M. Cohen, "Heterometallic Metal-Organic Frameworks Based on Tris(dipyrrinato) Coordination Complexes" *Inorg. Chem.* 2005, 44, 486-488.
DOI: 10.1021/ic048289z

32. Jana A. Lewis and Seth M. Cohen, "Addressing Lead Toxicity: Complexation of Lead(II) with Thiopyrone and Hydroxypyridinethione O,S Mixed Chelators" *Inorg. Chem.* 2004, 43, 6534-6536.
DOI: 10.1021/ic0493696

31. Loi Do, Sara R. Halper, and Seth M. Cohen, "Helical Coordination Polymers and Cyclic Dimers Formed From Heteroleptic Thioether-

Dipyrrinato Copper(II) Complexes" Chem. Commun. 2004, 2662-2663.
DOI: 10.1039/b411991f

30. David T. Puerta, Jana A. Lewis, and Seth M. Cohen, "New Beginnings for Matrix Metalloproteinase Inhibitors: Identification of High Affinity Zinc-Binding Groups" J. Am. Chem. Soc. 2004, 126, 8388-8389.
DOI: 10.1021/ja0485513

29. David T. Puerta and Seth M. Cohen, "A Bioinorganic Perspective on Matrix Metalloproteinase Inhibition" Curr. Top. Med. Chem. 2004, 4, 1551-1573 (invited review).

28. Sara R. Halper and Seth M. Cohen, "Self-Assembly of Two Distinct Supramolecular Motifs in a Single Crystalline Framework" Angew. Chem. Intl. Ed. 2004, 43, 2385-2388.
DOI: 10.1002/anie.200353520

27. Faith E. Jacobsen and Seth M. Cohen, "Using Model Complexes to Augment and Advance Metalloproteinase Inhibitor Design" Inorg. Chem. 2004, 43, 3038-3047 (featured cover article).
DOI: 10.1021/ic035388o

26. Sara R. Halper, Mitchell R. Malachowski, Heather M. Delaney, and Seth M. Cohen, "Heteroleptic Copper Dipyrrromethene Complexes: Synthesis, Structure, and Coordination Polymers" Inorg. Chem. 2004, 43, 1242-1249.
DOI: 10.1021/ic0352295

25. Jana A. Lewis, David T. Puerta, and Seth M. Cohen, "Metal Complexes of the trans-influencing Ligand Thiomaltol" Inorg. Chem. 2003, 42, 7455-7459.
DOI: 10.1021/ic0347135

24. Scot A. Lieser, Talib C. Davis, John D. Helmann, Seth M. Cohen, "DNA-Binding and Oligomerization Studies of the Manganese(II) Metalloregulatory Protein MntR from *B. subtilis*" Biochemistry 2003, 42, 12634-12642.
DOI: 10.1021/bi0350248

23. Sara R. Halper and Seth M. Cohen, "Synthesis, Structure, and Spectroscopy of Phenylacetylene Rods Incorporating Meso-Substituted Dipyrrin Ligands" Chem. Eur. J. 2003, 9, 4661-4669.
DOI : 10.1002/chem.200305041

22. David T. Puerta, Julie R. Schames, Richard H. Henchman, J. Andrew McCammon, and Seth M. Cohen, "From Model Complexes to Metalloprotein Inhibition: A Synergistic Approach to Structure-Based Drug Discovery" Angew. Chem. Intl. Ed. 2003, 42, 3772-3774.

DOI: 10.1002/anie.200351433

21. David T. Puerta and Seth M. Cohen, "Synthesis and structure of the hexameric, dodecanuclear metallamacrocycle [(5,3-methylphenylpyrazole)₂Zn₂(OCH₂CH₂S)]₆" Chem. Commun. 2003, 1278-1279.

DOI: 10.1039/b300453h

20. David T. Puerta and Seth M. Cohen, "Examination of Novel Zinc-Binding Groups for Use in Matrix Metalloproteinase Inhibitors" Inorg. Chem. 2003, 42, 3423-3430.

DOI: 10.1021/ic026029g

19. David T. Puerta and Seth M. Cohen, "Elucidating Drug-Metalloprotein Interactions with Tris(pyrazolyl)borate Model Complexes" Inorg. Chem. 2002, 41, 5075-5082.

DOI: 10.1021/ic0204272

18. Seth M. Cohen and Sara R. Halper, "Dipyrromethene Complexes of Iron" Inorg. Chim. Acta 2002, 341, 12-16 (invited contribution).

17. David T. Puerta and Seth M. Cohen, "[Tp^{Me,Ph}]₂Zn₂(H₃O₂)]ClO₄: A New H₃O₂ Species Relevant to Zinc Proteinases" Inorg. Chim. Acta 2002, 337, 459-462 (invited contribution).

Graduate and Postdoctoral Publications

16. Stéphane Petoud, Seth M. Cohen, Jean-Claude Bünzli, and Kenneth N. Raymond, "Stable, High Quantum Yield Lanthanide Luminescence Agents: Multidentate 2-Hydroisophthalamide Complexes of Sm³⁺, Eu³⁺, Tb³⁺, Dy³⁺ in Aqueous Solution" J. Am. Chem. Soc. 2003, 125, 13324-13325.
DOI: 10.1021/ja0379363

15. Carmen M. Barnés, Stéphane Petoud, Seth M. Cohen, and Kenneth N. Raymond, "Iron Uptake in Horse Spleen Ferritin Probed by the Kinetically Inert Inhibitor, [Cr(TREN)(H₂O)(OH)]²⁺, and a New Luminescent Tb(III) Reagent" J. Biol. Inorg. Chem. 2003, 8, 195-205.

DOI: 10.1007/s00775-002-0409-4

14. Adam P. Silverman, Weiming Bu, Seth M. Cohen, and Stephen J. Lippard, "Effects of Spectator Ligands on the Specific Recognition of Intrastrand Platinum-DNA Cross-links by High Mobility Group Box and TATA-Binding Proteins" J. Biol. Chem. 2002, 276, 38774-38780.

DOI: 10.1074/jbc.M206979200

13. Min Wei, Seth M. Cohen, Adam P. Silverman, and Stephen J. Lippard, "Effects of Spectator Ligands on the Specific Recognition of Intrastrand Platinum-DNA Cross-links by High Mobility Group Box and TATA-Binding Proteins" J. Biol. Chem. 2001, 276, 38774-38780.

12. Seth M. Cohen and Stephen J. Lippard, "Cisplatin: From DNA Damage to Cancer Chemotherapy" *Prog. Nucleic Acid Res. Mol. Biol.* 2001, 67, 93-130.

11. Sharad P. Hajela, Adam R. Johnson, Jide Xu, Christopher J. Sunderland, Seth M. Cohen, Dana L. Caulder, and Kenneth N. Raymond, "Synthesis of Homochiral Tris(2-alkyl-2-aminoethyl)amine Derivatives from Chiral α -Amino Aldehydes and Their Application in the Synthesis of Water Soluble Chelators" *Inorg. Chem.* 2001, 40, 3208-3216.
DOI: 10.1021/ic001021x

10. Seth M. Cohen, Stéphane Petoud, and Kenneth N. Raymond, "Synthesis and Metal Binding Properties of Salicylate, Catecholate, and Hydroxypyridinonate Functionalized Dendrimers" *Chem. Eur. J.* 2000, 7, 272-279.

9. Seth M. Cohen, Jide Xu, Emil Radkov, Kenneth N. Raymond, Mauro Botta, Alessandro Barge, and Silvo Aime, "Synthesis and Relaxation Properties of Mixed Gadolinium Hydroxypyridinonate MRI Contrast Agents" *Inorg. Chem.* 2000, 39, 5747-5756.
DOI: 10.1021/ic000563b

8. Judith N. Burstyn, Wendy J. Heiger-Bernays, Seth M. Cohen, and Stephen J. Lippard, "Formation of cis-Diamminedichloroplatinum(II) Cross-links on DNA is Flanking Sequence Independent" *Nucleic Acids Res.* 2000, 28, 4237-4243.

7. Seth M. Cohen, Yuji Mikata, Qing He, and Stephen J. Lippard, "HMG-Domain Protein Recognition of Cisplatin 1,2-Intrastrand d(GpG) Cross-links in Purine-Rich Sequence Contexts" *Biochemistry* 2000, 39, 11771-11776.
DOI: 10.1021/bi001352l

6. Seth M. Cohen, Brendon O'Sullivan, and Kenneth N. Raymond, "Mixed Hydroxypyridinonate Ligands as Iron Chelators" *Inorg. Chem.* 2000, 39, 4339-4346.
DOI: 10.1021/ic000239g

5. Seth M. Cohen and Kenneth N. Raymond, "Catecholate/Salicylate Heteropodands: Demonstration of a Catecholate to Salicylate Coordination Change" *Inorg. Chem.* 2000, 39, 3624-3631.
DOI: 10.1021/ic990608c

4. Seth M. Cohen, Elizabeth R. Jamieson, and Stephen J. Lippard, "Enhanced Binding of the TATA-Binding Protein to TATA Boxes Containing Flanking Cisplatin 1,2-Cross-links" *Biochemistry* 2000, 39, 8259-8265.
DOI: 10.1021/bi0004495

3. Seth M. Cohen, Stéphane Petoud, and Kenneth N. Raymond, "A Novel Salicylate-based Macrobicyclic with a 'Split Personality'" *Inorg. Chem.* 1999, 38, 4522-4529.
DOI: 10.1021/ic990411k

2. Seth M. Cohen, Michel Meyer, and Kenneth N. Raymond, "Enterobactin Protonation and Iron Release: Hexadentate Tris-Salicylate Ligands as Models for Triprotonated Ferric Enterobactin" *J. Am. Chem. Soc.* 1998, 120, 6277-6286.
DOI: 10.1021/ja973442s

1. Michel Meyer, Jason R. Telford, Seth M. Cohen, David White, Jide Xu, and Kenneth N. Raymond, "High Yield Synthesis of the Enterobactin Trilactone and Evaluation of Derivative Siderophore Analogs" *J. Am. Chem. Soc.* 1997, 119, 10093-10103.
DOI: 10.1021/ja970718n

PATENTS

6. David T. Puerta, Jana A. Lewis, and Seth M. Cohen, "Metalloprotein Inhibitors" provisional patent filed 2006 (Application No. SD2007-050).

5. Faith E. Jacobsen, Jana A. Lewis, and Seth M. Cohen, "Metalloprotein Inhibitors Containing Nitrogen Based Ligands" provisional patent filed 2006 (Application No. SD2006-069).

4. David T. Puerta and Seth M. Cohen, "Multidentate Pyrone-Derived Chelators for Medicinal Imaging and Chelation" PCT international application filed 2006 (Application No. SD2005-191).

3. David T. Puerta, Jana A. Lewis, and Seth M. Cohen, "Zinc Binding Groups for Metalloprotein Inhibitors" PCT national application filed 2006 (Application No. SD2004-102).

2. Kenneth N. Raymond, Stéphane Petoud, Seth M. Cohen, and Jide Xu, "Phthalamide-Lanthanide Complexes for Use as Water Soluble Luminescent Markers" issued Feb. 4, 2003 (Patent No. US 6,515,113 B2).

1. Kenneth N. Raymond, Stéphane Petoud, Seth M. Cohen, and Jide Xu, "Salicylamide-Lanthanide Complexes for Use as Water Soluble Luminescent Markers" issued June 18, 2002 (Patent No. US 6,406,297 B1).