CURRICULUM VITAE

**Judith Pollock Klinman**

Department of Chemistry & Molecular and Cell Biology 1498 Olympus Drive

University of California, Berkeley Berkeley, CA 94708

Berkeley, CA 94720-3220

Ph: (510) 642-2668 Fax: (510) 642-8369 Date of Birth: April 17, 1941

E-mail: klinman@berkeley.edu Place of Birth: Philadelphia, PA

**EDUCATION**

University of Pennsylvania (Chemistry), Philadelphia, PA A.B. 1962

University of Pennsylvania (Physical Organic Chemistry) Ph.D. 1966

 Thesis Advisor: Dr. Edward R. Thornton

 Thesis Title: A Kinetic Study of the Hydrolysis and Imidazole-Catalyzed Hydrolysis of Substituted Benzoyl Imidazole in Light and Heavy Water

**LABORATORY APPOINTMENTS**

Postdoctoral Fellow, Weizmann Institute of Science, Rehovoth, Israel 1966-1967

Affiliated with Dept. of Chemistry, University College, London, England 1967-1968

Postdoctoral Associate, The Institute for Cancer Research, Philadelphia 1968-1970

Research Associate, The Institute for Cancer Research, Philadelphia, PA 1970-1972

Assistant Member, The Institute for Cancer Research, Philadelphia, PA 1972-1977

Associate Member, The Institute for Cancer Research, Philadelphia, PA 1977-1978

Assistant Professor of Biophysics, University of Pennsylvania,

 Philadelphia, PA 1974-1978

Associate Professor of Chemistry, University of California, Berkeley, CA 1978-1982

Professor of Chemistry, University of California, Berkeley 1982-present

Professor of Molecular & Cell Biology, University of California, Berkeley 1993-present

Chair, Department of Chemistry 2000-2003

Hildebrand Distinguished Professor, University of California, Berkeley 2002-2003

Chancellor’s Professor, University of California, Berkeley 1996-1999, 2009-2012

Professor of the Graduate School 2010-present

**PROFESSIONAL SOCIETIES**

American Chemical Society 1964-present

Sigma Xi 1966-present

American Society of Biochemistry and Molecular Biology 1972-present

Protein Society 1996-present

Biophysical Society 1996-present

**FELLOWSHIPS AND AWARDS**

Edgar Fahs Smith Scholar 1960-1962

National Science Foundation, Summer Predoctoral Fellow 1964

National Institutes of Health, Predoctoral Fellow 1964-1966

Weizmann Institute of Science, Postdoctoral Fellow 1966-1967

Guggenheim Fellow 1988-1989

Miller Professorship, University of California, Berkeley 1992, 2003-2004

Merit Award, National Institutes of Health 1991-2001

American Academy of Arts and Sciences, elected 1993

Repligen Award, American Chemical Society 1994

National Academy of Sciences, elected 1994

Fellow of the Japanese Ministry of Science 1996

Honorary Ph.D. at the University of Uppsala, Sweden 2000

# American Philosophical Society, elected 2001

David S. Sigman Lectureship Award, University of California, Los Angeles 2003

Remsen Award, Maryland Section of the American Chemical Society 2005

Honorary Ph.D. at the University of Pennsylvania 2006

Merck Award, American Society of Biochemistry and Molecular Biology 2007

Fellow, American Association for the Advancement of Science, elected 2007

Fellow of the Royal Society of Chemistry 2009

Fellow of the American Chemical Society 2011

I. Scott Medal in Biological Chemistry, Texas A&M University 2012

National Medal of Science 2014

Mildred Cohn Award in Biological Chemistry 2015

Willard Gibbs Medal in Chemistry 2017

Penn Chemistry Distinguished Alumni Award, University of Pennsylvania 2018

**NAMED AND PLENARY LECTURESHIPS**

Philips Lecturer, Haverford College, PA 1990

Dow Lectureship, University of Indiana, Bloomington, IN 1994

Mildred Cohn Lectureship, University of Pennsylvania, PA 1994

Alexander Cruickshank Lecturer, Gordon Research Conference 1995

Plenary Lecturer, American Society of Biochemistry and Molecular Biology 1995, 2003

Plenary Lecturer, Protein Society 1995

Rosetta Briegel Barton Lecturer, University of Oklahoma 1998

Merck Lecturer, Rutgers University, NJ 1998

Marker Lecturer, Penn State University, PA 1998

Bigeleisen Lecturer, Stony Brook, NY 1999

Plenary Lecturer, ICBIC, Minneapolis, MN 1999

Lucy Pickett Lecturer, Mount Holyoke, NH 1999

Reilly Lecturer, University of Notre Dame, IN 2000

Distinguished Lecturer in Macromolecular and Cellular Structure and Chemistry,

 Scripps Institute, San Diego, CA 2000

Research Frontiers in Chemistry, University of Iowa 2001

British Biophysical Society Lecturer, Leeds University, UK 2002

Intl Conference on B6 and Quinones, Plenary Lecturer, Southampton, UK 2002

James D. and Julia P. Morrison Lecturer, Carleton College 2002

Intl Conference on Physical Org. Chemistry, Plenary Lecturer, San Diego 2002

Gunning Lecturer, University of Alberta, Edmonton 2003

Women Leaders in the Biosciences Lectureship, UCSF 2004

R. Gaurth Hansen Lectureship, Utah State University 2005

Keynote Lecturer, Symposium on Astrobiology, McQuarrie Univ., Sydney 2005

Richard L. Schowen Lecturer in Bioorganic Chemistry 2005

Chem. Comm. Lecturer of the Royal Society, Pacifichem, Honolulu, HI 2005

Boehringer Ingelheim Research Lecturer, University of British Columbia 2007

Keynote Lecturer (Inauguration of a new Max Planck program on Quantum Dynamics) 2007

University Lecturer, Juniata College, PA 2008

Plenary Speaker, Trends in Enzymology, St. Malo, France 2008

Frontiers in Chemistry, Texas A&M 2009

Distinguished Women in Science, Stanford University 2009

Closing Lecturer, European Symposium of the Protein Society, Zurich 2009

Lecturer, WINS Distinguished Lecture in Chemistry and Biochemistry,

 University of Texas, Austin 2009

Closing Lecturer, Methods in Protein Structure Analysis, Sweden 2010

Ross Lecturer, Dartmouth 2011

TY Shen Lecturer, Massachusetts Institute of Technology 2011

Isotopes 2011 Plenary Lecturer, Provence, France 2011

Australian Society for Biophysics, Plenary Lecturer 2011

Li Ka Shing Lecturer, China 2012

DeLuca Lecturer, University of California, San Diego 2013

Fritz London Lecturer, Duke University 2013

Peter Yates Lecturer, University of Toronto 2013

Danforth Lecturer, Grinnell College 2013

Women in Science Lecturer, Boston University 2016

Chilton Lecturer, University of Texas, Southwestern 2017

William W. Wells Endowed Lecturer, Michigan State University 2018

William Lloyd Evans Lecturer, Ohio State University 2018

# INVITED TALKS AT CONFERENCES AND SYMPOSIA (other than Named or Plenary)

Gordon Research Conference on Enzymes, Co-enzymes and Metabolic Pathways 1973, 1978, 1981, 1984, 1988, 1991, 1994, 1998, 2000, 2004, 2010

Steenbock Symposia:

 Isotope Effects in Enzymology 1976

 Enzyme Mechanisms 1998, 2003

Gordon Research Conference on Physics and Chemistry of Isotopes 1976, 1979, 1988,1992, 1998, 2002, 2008, 2010, 2014

Minnesota Section of the American Chemical Society 1979

Gordon Research Conference on Metals in Biology 1982, 1997, 2005, 2013, 2017

Gordon Research Conference on Protein Derived Cofactors 1990, 1992, 1995, 1997, 1999, 2004, 2006, 2008, 2010, 2012

Gordon Research Conference on Electron Donor-Acceptor Interactions 2012, 2018

American Society of Biochemistry and Molecular Biology:

 Symposium on Isotope Effects 1982

 Symposium on Enzyme Mechanism 1988

 Symposium on Novel Cofactors 1990

 Symposium on Enzyme Mechanism 1997

 Symposium to honor Irwin Rose 2006

 Symposium on Protein Dynamics 2007

 Post-Translational Modification Conference 2008

American Chemical Society:

 Symposium on Transition States 1982

 Symposium on Hydrogen Transfer 1990, 1995, 2000, 2005

 Symposium on Tunneling 1993, 2006

 Repligen Symposium 1994, 2006, 2017

 Pfizer Symposium 2001

 Symposium on Oxygen Activation 2007

 Symposium on Novel Enzymatic Cofactors and Function (Chair) 2009

 Symposium on 20 Years of Tunneling Pathways 2011

 Presidential Symposium on Catalysis 2012

 Symposium in Honor of Brian Hoffman (Alfred Bader Award) 2012

 Symposium on Computational Chemical Dynamics 2015

 Symposium on Protein Dynamics 2016

 Symposium on Oxygen Activation 2016

 Symposium on the Many Colors of Copper 2017

 Memorial Symposium Honoring Justine Roth 2017

Canadian Institute of Chemistry, Symposium on Metals in Biology 1983

International Chemical Congress of Pacific Basin Societies, HI 1984

Conference on Copper Proteins, Italy 1985, 1990, 1996

Fourth International Symposium on Oxidases, Portland, OR 1987

Structural Biology Symposium, Berkeley, California 1988

International Conference on Amine Oxidases, Italy 1988

International Conference on Amine Oxidases, Finland 1999

First International Congress on Quinoproteins, Netherlands 1988

Winter Enzyme Mechanism Conference 1989, 1997, 2003, 2007, 2019

International Symposium on Biological Oxidation Systems, Bangalore, India 1989

International Symposium on Oxygenases and Active O2, Kyoto, Japan 1990

Second International Congress on Quinoproteins, Japan 1991

Symposium on Copper Coordination Chemistry, Baltimore, MD 1992

Protein Society Meeting:

 Symposium on New Cofactors 1992

 Symposium on Protein Dynamics 2000

Fifth Glaxo-UNC "Frontiers in Chemistry & Medicine" Symposium, NC 1993

Fourth European Symposium on Organic Reactivity, Newcastle, UK 1993

Ninth Harden Discussion Meeting, "Biological Electron & Proton Transfer,” UK 1994

Second International Symposium on Vitamins and Biofactors, San Diego, CA 1995

International Conference on C-1 Microorganisms, San Diego, CA 1995

Tables Rondes Roussel UCLAF, Paris, France 1995

International Workshop on New Trends in Biocatalysis Research, Japan 1996

International Meeting on Hydrogen Transfer, Germany 1997

Biophysical Society:

 Symposium on Enzyme Mechanism 1998

 Symposium on Protein Dynamics 2006

 Symposium to Honor Mo Cleland 2014

Earl and Theresa Stadtman Symposium, Philadelphia, PA 2000

Johnson Foundation Discussions, “40 Years of Tunneling in Biology,” Philadelphia, PA 2001

2001 An Isotope Odyssey Series, Zakopane, Poland 2001

Panel Member, ACS Committee on Science-Special Session: “Diversity in the Top 50

 Universities: The Challenge to Lead” 2001

29th Reaction Mechanisms Conference, Ohio State University 2002

Meeting of IUPAC and Canadian Chemical Society 2003

Taiwan Bioinorganic Symposium 2003

Reaction Mechanisms VII, University College Dublin 2004

The Research Triangle Park Biochemistry & Enzymology Club 2nd Symp. 2004

Gordon Research Conference on Bio-Organic Chemistry 2005

Symposium on Enzyme Dynamics, Ohio State University 2005

Royal Society Discussion Meeting on Hydrogen Tunneling, London 2005

Chemical Challenges for the 21st Century, Sydney 2005

Agouron Institute Meeting on “O2”, Santa Fe, NM 2006

Sanken Workshop on Nano-Bioscience, Berkeley 2007

Isotopes 2007, Spain 2007

QAMTS, Houston 2007

Protein Dynamics Workshop, New York 2008

Quantum Technology in Biological Systems, Singapore 2009

Frontiers in Chemical Biology, Bangalore, India 2009

Solvay Conference on Chemistry, Brussels, Belgium 2010, 2013, 2016

EMBO: Catalytic Mechanisms by Biological Systems, Netherlands 2012

FEBS, St. Petersburg, Russia 2013

CECAM Workshop, Paris 2014

EMBO Conference on Enzymology, Manchester 2014

Steenbock Symposium to honor WW Cleland, Madison, WI 2014

Symposium to honor Izaak Maurits Kolthoff, Minneapolis, MN 2014

Buergenstock Conference, Switzerland 2016

QAMTS, Madison, WI 2017

Isotopes 2017, Switzerland 2017

NSF Quantum Biology and Quantum Processes in Biology Workshop, Tyson’s Corner, VA 2018

Stauffer Symposium, University of Southern California 2019

Frontiers in Chemical Biology, Scripps Florida (delayed due to Covid-19) 2020

Nobel Symposium on Metals in Biomolecules (delayed due to Covid-19) 2020

**EDITORIAL AND ADVISORY BOARDS**

National Institutes of Health

 Ad Hoc Biochemistry & Physical Biochemistry Study Sections 1977-1984

 Ad Hoc Enzymology Study Section 2008

 Reviewer of the Pioneer Awards 2009

 Reviewer for Special Study Section 2010, 2011

 Reviewer for MIRA grants for Young Investigators 2016

*Journal of Biological Chemistry,* Editorial Board 1979-1984

American Chemical Society Monograph Series, Editorial Board 1980-1982

Mid-Winter Enzyme Mechanisms Conference

 Seventh Conference, Organizing Committee 1981

 Eighth Conference, Organizer 1983

American Chemical Society, Biological Chemistry Division

 Executive Council 1982-1985

 Chair, Nominating Committee 1986-1987

 Program Chair 1992

American Society of Biochemists and Molecular Biologists

 Membership Committee 1984-1986

 Nominating Committee 1986

 Public Affairs Committee 1987-1993

 Symposium Chair, Novel Cofactors 1989

 Program Committee 1995

 President-Elect 1997-1998

 President 1998-1999

 Past President 1999-2000

 Nominating Committee 2008-2010

 Committee on Status of Women 2011, 2015-2017

 Awards Committee 2015-present

National Institutes of Health, Physical Biochemistry Study Section 1984-1988

International Union of Biochemistry, Interest Group on Kinetics

 and Mechanisms of Enzymes and Metabolic Networks 1984

Gordon Conference on Enzymes, Coenzymes & Metabolic Pathways, Co-Chair 1989

*European Journal of Biochemistry,* Editorial Board 1991-1995

Sterling Winthrop Pharmaceuticals, Board of Scientific Advisors 1990-1994

*Biofactors,* Editorial Board 1991-1998

Fibromed, Board of Scientific Advisors 1992-1994

Advisory Board of the National Tritium Lab 1992-1995

*Biochemistry,* Editorial Board 1993-present

Gordon Conference on Isotopes in Biology and Chemistry

 Assistant Chair 1994

 Chair 1996

Council of the Gordon Research Conferences 1994-1997

*Annual Review of Biochemistry,* Editorial Board 1995-2000

Advisory Board of the National Stable Isotopes Lab 1997-2000

Accounts of Chemical Research, Editorial Board 1995-1998

Current Opinions in Chemical Biology, Editorial Board 1997-present

Protein Society, Program Co-Chair 1998

Gordon Conference on Quinones and Redox Active Amino Acids, Asst. Chair 1999

Roche Diagnostics, Scientific Advisory Board 1999-2001

Mesilla Conference on Tunneling and Dynamics in Proteins, Co-Chair 2000

Chemical Record, Editorial Board 2000-present

Gordon Conference on Protein Derived Cofactors, Radicals & Quinones, Chair 2002

Advisory Board Member, Advances in Physical Organic Chemistry 2003-present

Editorial Board, Chemistry and Biodiversity 2004-present

Advisory Board for Program on Enzyme Dynamics, Albert Einstein Med. College 2005-2010

Organizing Committee of Agouron Institute Conference on O2 2006

Blue Ribbon Committee Member (to evaluate US/Israel Binational Science Prog.) 2007-2008

Faculty of 1000, Section Head in Biocatalysis 2012-present

Retrotope, Scientific Consultant 2012-2013

Bioelectronic, Scientific Board 2016-2019

**UNIVERSITY SERVICE (selected from 1992):**

Member of the Chancellor’s Advisory Committee on Biology 1992-1995

Environmental Health and Safety Committee, College of Chemistry 1992, 1993

Member of the Planning Committee, Department of Chemistry 1994, 1995, 1997-1999

 2010-2011

Member of the Executive Committee, Interdepartmental NIH Training Grant

 in Molecular Biophysics 1996-2001

Chair, Search Committee for a Structural Biologist in the Department of

 Molecular and Cell Biology 1996

Member, Divisional Council of the Academic Senate 1997, 1998

Member, Chancellor’s Committee on the Status of Women 1999

Member, Stanley Hall Replacement Committee 1999

Member, Chancellor’s Task Force on the Recruitment of Women and

 Underrepresented Faculty 2000

Chair, Department of Chemistry 2000-2003

Member of Two-Person Committee to Evaluate University Child Care Services 2006

Chair, Graduate Life Committee 2008-2011

Recruitment Committee for Junior Faculty in Chemistry 2008

Committee to select QB3 Director for Berkeley Campus 2009

Member, Dept. of Chemistry Planning Committee 2011-2019

Faculty Awards Committee 2015-2019

**CURRENT FUNDING:**

NIH Grant Number: R35 GM118117

Looking in New Directions for Origins and Cryptic Mechanisms of Enzyme Catalysis

04/01/2016-03/31/2021

Role: PI

**REFEREED PUBLICATIONS:**

1. Klinman, J.P. and Thornton, E.R. Solvolysis Mechanisms: A Kinetic Study of the Hydrolysis and Imidazole-Catalyzed Hydrolysis of *p*-methyl, *p*-chloro, and *p*-nitro Benzoyl Imidazole in H2O and *p*-nitro Benzoyl Imidazole in D2O. *J. Am. Chem. Soc*. **99**, 4390-4394 (1968).
2. Klinman, J.P. and Samuel, D. Oxygen-18 Studies to Determine the Position of Bond Cleavage of Acetyl Phosphate in the Presence of Divalent Metal Ions. *Biochemistry* **10**, 2126-2130 (1971).
3. Klinman, J.P. and Rose, I.A. Purification and Kinetic Properties of Aconitase Isomerse from *Pseudomonas pudita*. *Biochemistry* **10**, 2253-2259 (1971).
4. Klinman, J.P. and Rose, I.A. Mechanism of Aconitase Isomerase Reaction. *Biochemistry* **10**, 2259-2266 (1971).
5. Klinman, J.P. and Rose, I.A. Stereochemistry of the Interconversion of Citrate and Acetate Catalyzed by Citrate Synthase, Adenosine Triphosphate Citrate Lyase, and Citrate Lyase. *Biochemistry* **10**, 2267-2272 (1971).
6. Klinman, J.P. The Mechanism of Enzyme Catalyzed NADH Dependent Reduction: Substituent and Isotope Effects in the Yeast Alcohol Dehydrogenase Reaction. *J. Biol. Chem*. **247**, 7977-7987 (1972).
7. Schray, K. and Klinman, J.P. The Magnitude of Enzyme Transition State Analog Binding Constants. *Biochem. Biophys. Res. Commun*. **57**, 641-648 (1974).
8. Klinman, J.P. Acid-base Catalysis in the Yeast Alcohol Dehydrogenase Reaction. *J. Biol. Chem.* **250**, 2569-2573 (1975).
9. Klinman, J.P. The Interaction of an Epoxide with Yeast Alcohol Dehydrogenase: Evidence for Binding and the Modification of Two Active Center Cysteines by Styrene Oxide. *Biochemistry* **14**, 2568-2574 (1975).
10. Klinman, J.P. Isotope Effects and Structure-Reactivity Correlations in the Yeast Alcohol Dehydrogenase Reaction: A Study of the Enzyme Catalyzed Oxidation of Aromatic Alcohols. *Biochemistry* **15**, 2018-2026 (1976).
11. Klinman, J.P. and Welsh, K.M. The Zn Content of Yeast Alcohol Dehydrogenase. *Biochem. Biophys. Res. Commun*. 70, 878-884 (1976).
12. Klinman, J.P., Welsh, K.M. and Hogue-Angeletti, R. Epoxide Inhibition of Alcohol Dehydrogenases. Identification of Modified Cysteines in Yeast Alcohol Dehydrogenase and Demonstration of Reversible and Irreversible Inhibition of Liver Alcohol Dehydrogenase by Styrene Oxide. *Biochemistry* **16**, 5521-5527 (1977).
13. Klinman, J.P. Kinetic Isotope Effects in Enzymology. *Adv. Enzymol. Relat. Areas Mol. Biol*. **46**, 415-494 (1978).
14. Battersby, A.R., Staunton, J., Klinman, J.P. and Summers, M.C. Stereochemistry of Oxidation of Benzylamine by the Amine Oxidase from Beef Plasma. *FEBS Lett*. **99**, 297 (1979).
15. Summers, M.C., Markovic, R. and Klinman, J.P. Stereochemistry and Kinetic Isotope Effects in the Bovine Plasma Amine Oxidase Catalyzed Oxidation of Dopamine. *Biochemistry* **10**, 1969 (1979).
16. Welsh, K.M., Creighton, D.J. and Klinman, J.P. Transition State Structure in the Yeast Alcohol Dehydrogenase Reaction: The Magnitude of Solvent and a-Secondary Hydrogen Isotope Effects. *Biochemistry* **19**, 2005-2016 (1980).
17. Klinman, J.P., Humphries, H. and Voet, J.G. Deduction of Kinetic Mechanism in Multisubstrate Enzyme Reactions from Tritium Isotope Effects: Application to Dopamine -Hydroxylase. *J. Biol. Chem.* **255**, 11643 (1980).
18. Klinman, J.P. Probes of Mechanism and Transition State Structure in the Alcohol Dehydrogenase Reaction. *CRC Crit. Rev. Biochem*. **10**, 39 (1981).
19. Allen, R. and Klinman, J.P. Stereochemistry and Kinetic Isotope Effects in the Decarboxylation of *S*-Adenosylmethionine Decarboxylase. *J. Biol. Chem.* **256**, 3233 (1981).
20. Klinman, J.P. and Krueger, M. Dopamine b-Hydroxylase: Activity and Inhibition in the Presence of -substituted Phenethylamines. *Biochemistry* **21**, 67 (1982).
21. Miller, S.M. and Klinman, J.P. Deduction of Kinetic Mechanism from Hydrogen Isotope Effects: Dopamine -Hydroxylase, A Case History. *Methods Enzymol.* **87**, Part C, 711 (1982).
22. Miller, S.M. and Klinman, J.P. The Magnitude of Intrinsic Isotope Effects in the Dopamine -Monooxygenase Reaction. *Biochemistry* **22**, 3091 (1983).
23. Ahn, N. and Klinman, J.P. Mechanism of Modulation of Dopamine -Monooxygenase by pH and Fumarate, as Deduced from Initial Rate and Primary Deuterium Isotope Effect Studies. *Biochemistry* **22**, 3096-3106 (1983).
24. Palcic, M. and Klinman, J.P. Isotopic Probes Yield Microscopic Constants: Separation of Binding Energy from Catalytic Efficiency in the Bovine Plasma Amine Oxidase Reaction. *Biochemistry* **22**, 5957-5966(1983).
25. Klinman, J.P., Brenner, M., Krueger, M. and Edmondson, D. Evidence for Two Copper Atoms per Subunit in Dopamine -Monooxygenase. *J. Biol. Chem.* **259**, 3399 (1984).
26. Mangold, J.B. and Klinman, J.P. Mechanism-based Inactivation of Dopamine -Monooxygenase by -Chlorophenethylamine. *J. Biol. Chem.* **259**, 7772 (1984).
27. Klinman, J.P. and Matthews, R.S. Calculation of Substrate Dissociation Constants from Steady-State Isotope Effects in Enzyme-Catalyzed Reactions. *J. Am. Chem. Soc*, **107**, 1058-1060 (1985).
28. Miller, S. and Klinman, J.P. Secondary Isotope Effects and Structure Reactivity Correlations in the Dopamine -Monooxygenase Reaction: Evidence for a Chemical Mechanism. *Biochemistry* **24**, 2114 (1985).
29. Farnum, M.F., Palcic, M. and Klinman, J.P. The pH Dependence of Deuterium Isotope Effects and Tritium Exchange in the Bovine Plasma Amine Oxidase Reaction: A Role for Single Base Catalysis in Amine Oxidation and Imine Exchange. *Biochemistry* **25**, 1898 (1986).
30. Farnum, M.F. and Klinman, J.P. Stereochemical Probes of the Mechanism of Bovine Plasma Amine Oxidase: Evidence for Mirror Image Processing and a Syn-Cleavage of Hydrogens from C-1 and C-2 of Dopamine. *Biochemistry* **25**, 6028 (1986).
31. Bossard, M.J. and Klinman, J.P. Mechanism Based Inhibition of Dopamine -Monooxygenase by Aldehydes and Amides. *J. Biol. Chem.* **261**, 16421 (1986).
32. Ahn, N.G. and Klinman, J.P. Activation of Dopamine -Monooxygenase by External and Internal Electron Donors in Resealed Chromaffin Granule Ghosts. *J. Biol. Chem*. **262**, 1485 (1987).
33. Hartmann, C. and Klinman, J.P. Reductive Trapping of Substrate to Bovine Plasma Amine Oxidase. *J. Biol. Chem*. **262**, 962 (1987).
34. Stewart, L. and Klinman, J.P. Characterization of Alternate Reductant Binding and Electron Transfer in the Dopamine -Monooxygenase Reaction. *Biochemistry* **26**, 5302 (1987).
35. Stewart, L.C and Klinman, J.P. Dopamine -Hydroxylase of Chromaffin Granules: Structure and Function. *Annu. Rev. Biochem.* **57**, 551-592 (1988).
36. Hartmann, C. and Klinman, J.P. Pyrroloquinoline Quinone: A New Cofactor in Eukaryotic Enzymes. *Biofactors* **1**, 41 (1988).
37. Stewart, L.C. and Klinman, J.P. Membranous Dopamine -Hydroxylase is Not Anchored by Phosphatidylinositol. *J. Biol. Chem*. **263**, 12183 (1988).
38. Klinman, J.P., Hartmann, C. and Janes, S.M. Mechanism of Reaction of the Copper Amine Oxidases. *Pharm. Res. Commun.* **20**, 35 (1988).
39. Brenner, M., Murray, C.J. and Klinman, J.P. Rapid Freeze and Chemical Quench Studies of Dopamine -Monooxygenase: Comparison of Pre-Steady State and Steady State Parameters. *Biochemistry* **28**, 4656 (1989).
40. Brenner, M. and Klinman, J.P. Correlation of Copper Valency with Product Formation in Single Turnovers of Dopamine b-Monooxygenase. *Biochemistry* **28**, 4664 (1989).
41. Cha, Y., Murray, C. and Klinman, J.P. Hydrogen Tunneling in Enzyme Reactions. *Science* **243**, 1325-1330 (1989).
42. Grant, K. L. and Klinman, J. P. Evidence that Both Protium and Deuterium Undergo Significant Tunneling in the Reaction Catalyzed by Bovine Serum Amine Oxidase. *Biochemistry* **28**, 6597- 6605(1989).
43. Klinman, J. P. Quantum Mechanical Effects in Enzyme Catalyzed Hydrogen Transfer Reactions. *Trends Biochem. Sci.*, **14**, 368 (1989).
44. Ahn, N. G., Klinman, J. P. Nature of Rate Limiting Steps in a Compartmentalized Enzyme System: Quantification of Dopamine Transport and Hydroxylation Rates in Resealed Chromaffin Granule Ghosts. *J. Biol. Chem.* **264**, 12259 (1989).
45. Taljanidisz, J., Stewart, L., Smith. A.J., and Klinman, J.P. Structure of Bovine Adrenal Dopamine -Monooxygenase, as Deduced from cDNA and Protein Sequencing: Evidence that the Membrane Bound Form of Enzyme is Anchored by an Uncleaved Signal Peptide. *Biochemistry* **28**, 10054 (1989).
46. Bossard, M. J. and Klinman, J. P. Use of Isotope Effects to Characterize Intermediates in Mechanism-Based Inactivation of Dopamine -Monooxygenase by -Chlorophenethylamine. *J. Biol. Chem.* **265**, 5640 (1990).
47. Hartmann, C. and Klinman, J. P. Reductive Trapping of Substrate to Methylamine Oxidase from *Arthrobacter P1*. *FEBS Lett.* **261**, 441 (1990).
48. Janes, S.M., Mu, D., Wemmer, D., Smith, A., Kaur, S., Maltby, D., Burlingame, A.L. and Klinman, J.P. A New Redox Cofactor in Eukaryotic Enzymes: Identification of 6-Hydroxydopa at the Active Site of Bovine Serum Amine Oxidase. *Science* **248**, 981-987 (1990).
49. Janes, S.M. and Klinman, J.P. An Investigation of Bovine Serum Amine Oxidase Active Site Stoichiometry: Evidence for an Aminotransferase Mechanism Involving Two Carbonyl Cofactors per Enzyme Dimer. *Biochemistry* **30**, 4599-4605 (1991).
50. Hartmann, C. and Klinman, J.P. Structure Function Studies of Substrate Oxidation by Bovine Serum Amine Oxidase: Relationship to Cofactor Structure and the Hydrogen Transfer Mechanism. *Biochemistry* **30**, 4605 - 4611 (1991).
51. Brown, D.E., McGuirl, M.A., Dooley, D.M., Janes, S.M., Mu, D. and Klinman, J.P. The Organic Functional Group in Copper-Containing Amine Oxidases: Resonance Raman Spectra Are Consistent with the Presence of Topa Quinone (6-Hydroxydopa Quinone) in the Active Site. *J. Biol. Chem*. **266**, 4049 (1991).
52. Huyghe, B.G. and Klinman, J.P. Activity of Membranous Dopamine -Monooxygenase Within Chromaffin Granule Ghosts: Interaction with Ascorbate. *J. Biol. Chem.* **266**, 11544-11550 (1991).
53. Stewart, L.C. and Klinman, J.P. Cooperativity in the Dopamine -Monooxygenase Reaction: Evidence for Ascorbate Regulation of Enzyme Activity. *J. Biol. Chem.* **266**, 11537-11543 (1991).
54. Klinman, J.P., Dooley, D., Duine, J.A., Knowles, P., Mondovi, B. and Villafranca, J.J. Status of the Cofactor Identity in Copper Oxidative Enzymes. *FEBS Lett.* **282**, 1-7 (1991).
55. Kim, S.C. and Klinman, J.P. Mechanism of Inhibition of Dopamine -Monooxygenase by Quinol- and Phenol-Derivatives, as Determined by Solvent and Substrate Deuterium Isotope Effects. *Biochemistry* **30**, 8138-8144 (1991).
56. Klinman, J.P. Surprises Among Quinoproteins. *Curr. Opin Struct. Biol.* **1**, 968-972 (1991).
57. Sanders-Loehr, J., Backes, G., Kahlow, M.A., Davidson, V.L., Duine, J.A. and Klinman, J.P. Identification of Quinone Cofactors in Proteins by Resonance Raman Spectroscopy. *J. Inorg. Biochem.* **43**, 194 (1991).
58. Grant, K.L. and Klinman, J.P. Exponential Relationships among Multiple Hydrogen Isotope Effects as Probes of Hydrogen Tunneling. *Bioorganic Chem.* **20**, 1-7 (1992).
59. Mu, D., Janes, S.M., Smith, A.J., Brown, D.E., Dooley, D.M. and Klinman, J. P. Codon Identification for 6-Hydroxydopa at the Active Site of the Amine Oxidase from the Yeast *Hansenula polymorpha.* *J. Biol. Chem.* **267**, 7979-7982 (1992).
60. Rucker, J., Cha, Y., Jonsson, T., Grant, K.L. and Klinman, J.P. The Role of Internal Thermodynamics in Determining Hydrogen Tunneling in Enzyme Catalyzed Hydrogen Transfer Reactions. *Biochemistry*, **31**, 11489-11499 (1992).
61. Janes, S.M., Palcic, M.M., Scaman, C.H., Smith, A.J., Brown, D.E., Dooley, D.M., Mure, M. and Klinman, J.P. Identification of Topa Quinone and Its Consensus Sequence in Copper Amine Oxidases. *Biochemistry*, **31**, 12147-12154 (1992).
62. Hartmann, C., Brzovic, P. and Klinman, J. P. Spectroscopic Detection of Chemical Intermediates in the Reaction of *para*-Substituted Benzylamines with Bovine Serum Amine Oxidase. *Biochemistry*, **31**, 2234-2241 (1993).
63. Mure, M. and Klinman, J.P. Synthesis and Spectroscopic Characterization of Model Compounds for the Active Site Cofactor in Copper Amine Oxidase. *J. Am. Chem. Soc.* **115**, 7117-7127 (1993).
64. Bahnson, B. J., Park, D.-H., Kim, K., Plapp, B. V. and Klinman, Judith P. Unmasking of Hydrogen Tunneling in the Horse Liver Alcohol Dehydrogenase Reaction by Site Directed Mutagenesis. *Biochemistry* **31**, 5503-5507 (1993).
65. Tian, G. and Klinman, J. P. Discrimination between O-16 and O-18 in Oxygen binding to the Reversible Oxygen Carrier, Hemoglobin, Myoglobin, Hemerythrin and Hemocyanin: A New Probe for Oxygen Binding and Reductive Activation By Proteins. *J. Am. Chem. Soc*. **115**, 8891-8897 (1993).
66. Klinman, J.P. and Mu, D. Quinoenzymes in Biology. *Annu. Rev. Biochem.* **63**, 299-344 (1994).
67. Tian, G., Berry, J. A., and Klinman, J. P. Oxygen-18 Kinetic Isotope Effects in the Dopamine -Monooxygenase Reaction: Evidence for a New Chemical Mechanism in Non-Heme, Metallo-Monooxygenases. *Biochemistry* **33**, 226-234 (1994).
68. Mu, D., Medzihradsky, K.F., Adams, G. W., Mayer, P., Hines, W.M., Burlingame, A. L., Smith, A. J., Cai, D., and Klinman J.P. Primary Structures for Mammalian Intracellular and Serum Copper Amine Oxidases. *J. Biol. Chem.* **269**, 9926-9932 (1994).
69. Glickman, M.H., Wiseman, J. S. and Klinman, J. P. Extremely Large Isotope Effects in the Soybean Lipoxygenase-Linoleic Acid Reaction. *J. Am. Chem. Soc.* **116**, 793-794 (1994).
70. Cai, D. and Klinman, J.P. Copper Amine Oxidase: Heterologous Expression, Purification and Characterization of an Active Enzyme in *Saccharomyces cerevisiae*. *Biochemistry* **33**, 7647-7653 (1994).
71. Cai, D. and Klinman, J.P. Evidence for a Self-catalytic Mechanism of 2,4,5-Trihydroxyphenylalanine Quinone Biogenesis in Yeast Copper Amine Oxidase. *J. Biol. Chem.* **269**, 32039-32042 (1994).
72. Jonsson, T., Edmondson, D.E. and Klinman, J.P. Hydrogen Tunneling in the Flavoenzyme Monoamine Oxidase B. *Biochemistry* **33**, 14871-14878 (1994).
73. Bahnson, B. and Klinman, J.P. Hydrogen Tunneling in Enzyme Catalysis. *Methods Enzymol.* **249**, 374-398 (1995).
74. Moënne-Loccoz, P., Nakamura, N., Steinebach, V.; Duine, J.A.; Mure, M.; Klinman, J.P.; and Sanders-Loehr, J. Characterization of the Topa Quinone Cofactor in Amine Oxidase from *Escherichia coli* by Resonance Raman Spectroscopy. *Biochemistry* **34**, 7020 (1995).
75. Janes, S.M. and Klinman, J.P. "Isolation of 2,4,5-Trihydroxyphenylalanine Quinone (Topa Quinone) from Copper Amine Oxidases" in *Methods in Enzymology: Redox-Active Amino Acids in Biology,* Vol. 258 (J.P. Klinman, ed) Academic Press (1995), pp. 20-34.
76. Mure, M. and Klinman, J.P. "Model Studies of Topa Quinone" in *Methods Enzymol: Redox-Active Amino Acids in Biology,* Vol. 258 (J.P. Klinman, ed) Academic Press (1995), pp. 39-52.
77. Mu, D. and Klinman, J.P. “Cloning of Mammalian Topa Quinone-Containing Enzymes" in *Methods in Enzymology: Redox-Active Amino Acids in Biology,* Vol. 258 (J.P. Klinman, ed) Academic Press (1995), pp. 114-122.
78. Mure, M. and Klinman, J.P. Model Studies of Topaquinone-Dependent Amine Oxidases. I. Oxidation of Benzylamine by Topaquinone Analogs. *J. Am. Chem. Soc.* **117**, 8698-8706 (1995).
79. Mure, M. and Klinman, J.P. Model Studies of Topaquinone-Dependent Amine Oxidases. II. Characterization of Reaction Intermediates and Mechanism. *J. Am. Chem. Soc.* **117**, 8707-8718 (1995).
80. Glickman, M.H. and Klinman, J. P. Nature of Rate-Limiting Steps in the Soybean Lipoxygenase-1 Reaction. *Biochemistry* **34**, 14077-14092 (1995).
81. Plastino, J. and Klinman, J.P. Limited Proteolysis of *H. polymorpha* Yeast Amine Oxidase: Isolation of a C-Terminal Fragment Containing Copper and Quino-Cofactor. *FEBS Lett.* **371**, 276-278 (1995).
82. Glickman, M.H. and Klinman, J. P. Lipoxygenase Reaction Mechanism: Demonstration that Hydrogen Abstraction from Substrate Precedes Dioxygen Binding during Catalytic Turnover. *Biochemistry* **35**,12882-12892 (1996).
83. Klinman, J. P. Mechanisms Whereby Mononuclear Copper Proteins Functionalize Organic Substrates. *Chem. Rev,* **96**, 2541-2561 (1996).
84. Jonsson, T., Glickman, M., Sun, S., and Klinman, J. P. Experimental Evidence for Extensive Tunneling of Hydrogen in the Lipoxygenase Reaction Implications for Enzyme Catalysis. *J. Am. Chem. Soc.* **118**, 10319-10320 (1996).
85. Wang, S. X., Mure, M., Medzihradszky, K. F., Burlingame, A. L., Brown, D. E., Dooley, D. M., Smith, A. J., Kagan, H. M. and Klinman, J. P. A Crosslinked Cofactor in Lysyl Oxidase: Redox Function for Amino Acid Side Chains. *Science* **273**, 1078-1084 (1996).
86. Klinman, J.P. New Quinocofactors in Eukaryotes. Minireview. *J. Biol. Chem.* **271**, 27189-27192 (1996).
87. Dove, J.E., Smith, A.J., Brown, D.E., Dooley, D.M. and Klinman, J.P. Identification of the Quinone Cofactor in a Lysyl Oxidase from *Pichia pastoris*. *FEBS Lett.* **398**, 231-234 (1996).
88. Kohen, A., Jonsson, T. and Klinman, J.P. Effects of Protein Glycosylation on Catalysis: Changes in Hydrogen Tunneling and Enthalpy of Activation in the Glucose Oxidase Reaction. *Biochemistry* **36**, 2603-2611 (1997).
89. Cai, D., Williams, N.K. and Klinman, J.P. Effects of Metal on 2,4,5-Trihydroxyphenylalanine (Topa) Quinone Biogenesis in the *Hansenula polymorpha* Copper Amine Oxidase. *J. Biol. Chem.* **272**, 19277-19281 (1997).
90. Li, R., Chen, L., Cai, D., Klinman, J.P. and Mathews, F.S. Crystallographic Study of Yeast Amine Oxidase. *Acta Cryst.* D**53**, 364-370 (1997).
91. Cai, D., Dove, J., Nakamura, N., Sanders-Loehr, J. and Klinman, J.P. Mechanism-Based Inactivation of a Yeast Methylamine Oxidase Mutant: Implications for the Functional Role of the Consensus Sequence Surrounding Topa Quinone. *Biochemistry* **36**, 11472-11478 (1997).
92. Nakamura, N., Moënne-Loccoz, P., Tanizawa, K., Mure, M., Suzuki, S., Klinman, J.P. and Sanders-Loehr, J. Topaquinone-Dependent Amine Oxidases: Identification of Reaction Intermediates by Raman Spectroscopy. *Biochemistry* **36**, 11479-11486 (1997).
93. Bahnson, B.J., Colby, T.D., Chin, J.K., Goldstein, B.M., and Klinman, J.P. A Link between Protein Structure and Enzyme Catalyzed Hydrogen Tunneling. *Proc. Natl. Acad. Sci.* *USA* **94**, 12797-12802 (1997).
94. Glickman, M., Cliff, S., Thiemens, M. and Klinman, J.P. Comparative Study of 17O and 18O Isotope Effects as a Probe for Dioxygen Activation: Application to the Soybean Lipoxygenase Reaction. *J. Am. Chem. Soc.* **119**,11357-11361 (1997).
95. Wang, S.X., Nakamura, N., Mure, M., Klinman, J.P. and Sanders-Loehr, J. Characterization of the Native Lysine Tyrosylquinone Cofactor in Lysyl Oxidase by Raman Spectroscopy. *J. Biol. Chem.* **272**, 28841-28844 (1997).
96. Kohen, A. and Klinman, J.P. Enzyme Catalysis: Beyond Classical Paradigms. *Accts. Chem. Res.* **31**, 397-404 (1998).
97. Francisco, W.A., Tian, G., Fitzpatrick, P.F. and Klinman, J.P. Oxygen-18 Kinetic Isotope Effect Studies of the Tyrosine Hydroxylase Reaction: Evidence of Rate Limiting Oxygen Activation. *J. Am. Chem. Soc.* **120**, 4057-4062 (1998).
98. Francisco, W.A., Merkler, D.J., Blackburn, N.J. and Klinman, J.P. Kinetic Mechanism and Intrinsic Isotope Effects for the Peptidylglycine -Amidating Enzyme Reaction. *Biochemistry* **37**, 8244-8252 (1998).
99. Li, R., Klinman, J. P., and Mathews, F.S. Copper Amine Oxidase from *Hansenula polymorpha*: The Crystal Structure Determined at 2.4 Å Resolution Reveals the Active Conformation. *Structure* **6**, 293-307 (1998).
100. Colby, T. D., Bahnson, B. J., Chin, J. K., Klinman, J. P., and Goldstein, B. M. Active Site Modifications in a Double Mutant of Liver Alcohol Dehydrogenase: Structural Studies of Two Enzyme-ligand Complexes. *Biochemistry* **37**, 9295-9304 (1998).
101. Su, Q. and Klinman, J. P. Probing the Mechanism of Proton Coupled Electron Transfer to Dioxygen: The Oxidative Half Reaction of Bovine Serum Amine Oxidase, *Biochemistry*, **37**, 12513-12525 (1998).
102. Rucker, J. and Klinman, J. P. Computational Study of Tunneling and Coupled Motion in Alcohol Dehydrogenase-Catalyzed Reactions: Implications for Measured Hydrogen and Carbon Isotope Effects.  *J. Am. Chem. Soc.* **121**, 1997-2006 (1999).
103. Schwartz, B., Green, E. L., Sanders-Loehr, J. and Klinman, J. P. The Relationship Between Conserved Consensus Site Residues and the Productive Conformation for TPQ Cofactor in a Copper-Containing Amino Oxidase from Yeast. *Biochemistry* **37**, 16591-16600 (1998).
104. Hevel, J., Mills, S. and Klinman, J. P. Mutation of a Strictly Conserved Active Site Residue Alters Substrate Specificity and Cofactor Biogenesis in a Copper Amine Oxidase. *Biochemistry* **38**, 3683-3693 (1999).
105. Plastino, J., Green, E. L., Sanders-Loehr, J. and Klinman, J. P. An Unexpected Role for the Active Site Base in Cofactor Orientation and Flexibility in the Copper Amine Oxidase from *Hansenula polymorpha*. *Biochemistry* **38**, 8204-8216 (1999).
106. Kohen, A., Cannio, R., Bartolucci, S. and Klinman, J. P. Enzyme Dynamics and Hydrogen Tunneling in a Thermophilic Alcohol Dehydrogenase. *Nature* **399**, 496-499 (1999).
107. Kohen, A. and Klinman, J. P. Hydrogen Tunneling in Biology in *Chemistry and Biology*, (Stuart L. Schreiber and K.C. Nicolaou, eds), Elsevier Science, Ltd., London, U.K. (1999) **6**, R191-R198.
108. Su, Q. and Klinman, J. P. Nature of Oxygen Activation in Glucose Oxidase from *Aspergillus niger*: The Importance of Electrostatic Stabilization in Superoxide Formation. *Biochemistry* **38**, 8572-8581 (1999).
109. Stewart, L. and Klinman, J.P. Kinetic Parameters for Dimeric and Tetrameric Forms of Dopamine b-Monooxygenase and their Relationship to Non-Michaelis Menten Behavior. *FEBS Lett.* **454**, 229-232 (1999).
110. Rickert, K. and Klinman, J.P. The Nature of Hydrogen Transfer in Soybean Lipoxygenase-1: Separation of Primary and Secondary Isotope Effects. *Biochemistry* **38**, 12218-12228 (1999).
111. Williams, N. and Klinman J. P. Whence Topa? Models for the Biogenesis of Topa Quinone in Copper Amine Oxidases. *J. Mol. Cat. B* **8**, 95-101 (2000).
112. Chin, J. and Klinman, J.P. Probes of a Role for Remote Binding Interactions on Hydrogen Tunneling in the Horse Liver Alcohol Dehydrogenase Reaction. *Biochemistry* **39**, 1278-1284 (2000).
113. Dove, J., Schwartz, B., Williams, N. and Klinman, J.P. Investigation of Spectroscopic Intermediates during Copper-Binding and TPQ Formation in Wild-Type and Active-Site Mutants of a Copper-Containing Amine Oxidase from Yeast. *Biochemistry* **39**, 3690-3698 (2000).
114. Schwartz, B., Dove, J. and Klinman, J.P. Kinetic Analysis of Oxygen Utilization During Cofactor Biogenesis in a Copper-Containing Amine Oxidase from Yeast. *Biochemistry* **39**, 3699-3707 (2000).
115. Mills, S., and Klinman, J.P. Evidence Against Reduction of Cu2+ to Cu+ during Dioxygen Activation in a Copper Amine Oxidase from Yeast. *J. Am. Chem. Soc*. **122**, 9897-9904 (2000).
116. Melville, C., Green, E., Sanders-Loehr, J., and Klinman, J.P. Reassessment of the Active Site Quino-Cofactor Proposed to Occur in the *Aspergillus niger* Amine Oxidase AO-I from the Properties of Model Compounds. *Biochemistry* **39**, 7589-7594 (2000).
117. Chen, Z., Schwartz, B., Williams, N.K., Li, R., Klinman, J.P., and Mathews, S. Crystal Structure at 2.5 Å Resolution of Zinc-substituted Copper Amine Oxidase of *Hansenula polymorpha* Expressed in *Escherichia coli*. *Biochemistry* **39**, 9709-9717 (2000).
118. Kohen, A. and Klinman, J.P. Protein Flexibility Correlates With Degree of Hydrogen Tunneling in Thermophilic and Mesophilic Alcohol Dehydrogenase. *J. Am. Chem. Soc.* **122**, 10738-10739 (2000).
119. Klinman, J.P. Life As Aerobes: Are There Simple Rules for Activation of Dioxygen by Enzymes? *J. Biol. Inorg. Chem*. **6**, 1-13 (2001).
120. Tsai, S. and Klinman, J.P. Probes of Hydrogen Tunneling with Horse Liver Alcohol Dehydrogenase at Subzero Temperatures. *Biochemistry* **40**, 2303-2311 (2001).
121. Schwartz, B., Olgin, A., and Klinman, J.P. The Role of Copper in Topa Quinone Biogenesis and Catalysis, as Probed by Azide Inhibition of a Copper Amine Oxidase from Yeast. *Biochemistry* **40**, 2954-2963 (2001).
122. Stahl, S.S.. Francisco, W.A., Merkx, M., Klinman, J.P. and Lippard, S.J. Oxygen Kinetic Isotope Effects in Soluble Methane Monooxygenase. *J. Biol. Chem.* **276**, 4549-4553 (2001).
123. Knapp, M. J., Seebeck, F.P. and Klinman, J.P. Steric Control of Oxygenation Regiochemistry in Soybean Lipoxygenase-1. *J. Am. Chem. Soc*. **123**, 2931-2932 (2001).
124. Thrower, J. S. and Klinman, J. P. Steady-State Kinetics of Substrate Binding and Iron Release in Tomato ACC Oxidase. *Biochemistry* **40**, 9717-9724 (2001).
125. Tang, C. and Klinman, J.P. The Catalytic Function of Bovine Lysyl Oxidase in the Absence of Copper. *J. Biol. Chem.* **276**, 30575-30578 (2001).
126. Dove, J. and Klinman, J.P. Trihydroxyphenylalanine Quinone (TPQ) from Copper Amine Oxidases and Lysyl Tyrosylquinone (LTQ) from Lysyl Oxidase *in Advances in Protein Chemistry: Novel Cofactors*, (J. Dove and J.P. Klinman, eds) Academic Press, California (2001), pp. 141-174.
127. Klinman, J.P. How Many Ways to Craft a Cofactor*? A Commentary: Proc. Natl. Acad. Sci.* **98**, 14766-14768 (2001).
128. Green, E.L., Nakamura, N., Dooley, D.M., Klinman, J.P. and Sanders-Loehr, J. Rates of Oxygen and Hydrogen Exchange as Indicators of TPQ Cofactor Orientation in Amine Oxidases. *Biochemistry* **41**, 687-696 (2002).
129. Knapp, M. J., Rickert, K. and Klinman, J. P. Temperature-Dependent Isotope Effects in Soybean Lipoxygenase-1: Correlating Hydrogen Tunneling with Protein Dynamics. *J. Am. Chem. Soc*. **124**, 3865-3874 (2002).
130. Seymour, S.L. and Klinman, J.P. Comparison of Rates and Kinetic Isotope Effects Using PEG Modified Variants and Glycoforms of Glucose Oxidases: The Relationship of Modification of the Protein Envelope to C-H Activation and Tunneling. *Biochemistry* **41**, 8747-8758 (2002)*.*
131. Francisco, W.A., Knapp, M.J., Blackburn, N.J., and Klinman, J.P. Hydrogen Tunneling in Peptidylglycine Alpha-Hydroxylating Monooxygenase. *J. Am. Chem. Soc*. **124**, 8194-8195 (2002).
132. Knapp, M.J. and Klinman, J.P. Environmentally Coupled Hydrogen Tunneling: Linking Catalysis to Dynamics. *Eur. J. Biochem.* **269**, 3113-3121 (2002).
133. Mure, M., Mills, S.A., and Klinman, J.P. Catalytic Mechanism of the Topa Quinone Containing Copper Amine Oxidase. *Biochemistry* **41**, 9269-9278 (2002).
134. Mills, S.A., Goto, Y., Su, Q., Plastino, J., and Klinman, J.P. Mechanistic Comparison of the Cobalt-Substituted and Wild-Type Copper Amine Oxidase from *Hansenula polymorpha*. *Biochemistry* **41**, 10577-10584 (2002).
135. Goto, Y. and Klinman, J.P. Binding of Dioxygen to Non-Metal Sites in Proteins: Exploration of the Importance of Binding Site Size vs. Hydrophobicity in the Copper Amine Oxidase from *Hansenula polymorpha*. *Biochemistry* **41**, 13637-13640 (2002).
136. Roth, J.P. and Klinman, J.P. Catalysis of Electron Transfer during the Activation of O2 by the Flavoprotein Glucose Oxidase. *Proc. Natl. Acad. Sci. U.S.A*. **100**, 62-67 (2003).
137. Francisco, W.A., Blackburn, N.J. and Klinman, J.P. Oxygen and Hydrogen Isotope Effects in an Active Site Tyrosine to Phenylalanine Mutant of Peptidylglycine -Hydroxylating Monooxygenase: Mechanistic Implications. *Biochemistry* **42**, 1813-1819 (2003).
138. Klinman, J. P. The Multi-functional Topa-quinone Copper Amine Oxidase. BBA-Proteins and Proteomics Special Issue*: “VitaminB6, PQQ, Carbonyl Catalysis and Quinoproteins.* **1647**, 131-137 (2003).
139. Tsai, S.C. and Klinman, J.P. DeNovo Design and Utilization of Photolabile Caged Substrates as Probes of Hydrogen Tunneling with Horse Liver Alcohol Dehydrogenase at Sub-Zero Temperatures. *Bioorg. Chem.* **31**, 170-188 (2003).
140. Klinman, J.P. Dynamic Barriers and Tunneling: New Views of Hydrogen Transfer in Enzyme Reactions. *Pure Appl. Chem.* **75**, 601-608 (2003).
141. Mure, M., Wang, S.X., and Klinman, J.P. Synthesis and Characterization of Model Compounds of the Lysine Tyrosyl Oxidase (LTQ) Cofactor of Lysyl Oxidase. *J. Am. Chem. Soc*. **125**, 6113-6125 (2003).
142. Knapp, M.J. and Klinman, J.P. Kinetic Studies of Oxygen Reactivity in Soybean Lipoxygenase-1. *Biochemistry* **42**, 11466-11475(2003).
143. Evans, J.P., Ahn, K., and Klinman, J.P. Evidence that Dioxygen and Substrate Activation are Tightly Coupled in DM: Implications for Reactive Oxygen Species. *J. Biol. Chem*. **278**, 49691-49698 (2003).
144. Purdy, M.M., Koo, L.S., Ortiz de Montellano, P.R., and Klinman, J.P. Steady State Kinetic Investigation of Cytochrome P450cam: Interaction with Redox Partners and Reaction with Molecular Oxygen. *Biochemistry* **43**, 271-281 (2004).
145. Ceccarelli, C., Liang, Z.X., Strickler, M., Prehna, G., Goldstein, B.M., Klinman, J.P., Bahnson, B.J. Crystal Structure and Amide H/D Exchange of Binary Complexes of Alcohol Dehydrogenase from *B. stearothermophilus*: Insights to Thermostability and Cofactor Binding. *Biochemistry* **43**, 5266-5277 (2004).
146. Dubois, J., and Klinman, J.P. Methods for Characterizing TPQ-Containing Proteins in *Methods in Enzymology*, v 378 (H. Sies, ed) Academic Press, California (2004), pp. 17-31.
147. Magnusson, O.T., Toyama, H., Saeki, H., Schwarzenbacher, R., and Klinman, J.P. The Structure of Biosynthetic Intermediate of Pyrroloquinoline Quinone (PQQ) and Elucidation of the Final Step of PQQ Biosynthesis. *J. Am. Chem. Soc.* **126**, 5342-5343 (2004).
148. Magnusson, O.T., Toyama, H., Saeki, M., Rojas, A., Reed, J.C., Liddington, R.C., Klinman, J.P. and Schwarzenbacher, R. Quinone Biogenesis: Structure and Mechanism of PqqC, the Final Catalyst in the Production of Pyrroloquinoline Quinone. *Proc. Natl. Acad. Sci. USA* **101**, 7913-7918 (2004).
149. Liang, Z.-X., Lee, T., Resing, K.A., Ahn, N.G., and Klinman, J.P. Thermal-Activated Protein Mobility and its Correlation with Catalysis in Thermophilic Alcohol Dehydrogenase. *Proc. Natl. Acad. Sci. USA* **101**, 9556-9561 (2004).
150. Liang, Z.-X., Tsigos, I., Bouriotis, V., and Klinman, J.P. Impact of Protein Flexibility on Hydride Transfer Parameters in Thermophilic and Psychrophilic Alcohol Dehydrogenases. *J. Am*. *Chem. Soc*. **126**, 9500-9501 (2004).
151. Francisco, W.A., Wille, G., Smith, A.J., Merkler, D.J., and Klinman, J.P. Investigation of the Pathway for Inter-Copper Electron Transfer in Peptidylglycine -Amidating Monooxygenase. *J. Am. Chem. Soc*. **126**, 13168-13169 (2004).
152. Liang, Z.-X., Tsigos, I., Lee, T., Bouriotis, V. Resing, K.A., Ahn, N.G., and Klinman, J.P. Evidence for Increased Local Flexibility in Psychrophilic Alcohol Dehydrogenase Relative to its Thermophilic Homolog. *Biochemistry* **43**, 14676-14683 (2004).
153. Roth, J.P., Wincek, R., Nodet, G., Edmondson, D.E., McIntire, W.S., and Klinman, J.P. Oxygen Isotope Effects on Electron Transfer to O2 Probed Using Chemically Modified Flavins Bound to Glucose Oxidase. *J. Am. Chem. Soc*. **126**, 15120-15131 (2004).
154. Liang, Z-X., and Klinman, J.P. Structural Bases of Hydrogen Tunneling in Enzymes: Progress and Puzzles. *Curr. Opin. Struct. Biol*., Volume 14, Issue 6. (A. Mattevi and K. Anderson, eds). Elsevier, U.K. (2004), pp. 648-655.
155. Dubois, J.L. and Klinman, J.P. Mechanism of Post-Translational Quinone Formation in Copper Amine Oxidases and Its Relationship to the Catalytic Turnover. Special Issue of *Arch. Biochem. Biophys.* **433**, 255-265 (2005).
156. Limburg, J., Mure, M. and Klinman, J.P. Cloning and Characterization of Histamine Dehydrogenase (NSHADH) from *Nocardioides simplex*. *Arch. Biochem. Biophys.*, **436**, 8-22 (2005).
157. DuBois, J.L. and Klinman, J.P. Nature of O2 Reactivity Leading to Topa Quinone in the Copper Amine Oxidase from *Hansenula polymorpha* and its Relationship to Catalytic Turnover. *Biochemistry* **44**, 11381-11388 (2005).
158. Kim, H.S., Damo, S. M., Lee, S.-Y., Wemmer, D.E. and Klinman, J.P. Structure and Hydride Transfer Mechanism of a Moderate Thermophilic Dihydrofolate Reductase from *Bacillus stearothermophilus* and Comparison to its Mesophilic and Hyperthermophilic Homologs. *Biochemistry* **44**, 11428-11439 (2005).
159. Samuels, N.M. and Klinman, J.P. 2,4,5-Trihydroxyphenylalanine Quinone Biogenesis in the Copper Amine Oxidase from *Hansenula polymorpha* with the Alternate Metal, Nickel. *Biochemistry* **44**, 14308-14317 (2005).
160. Meyer, M. and Klinman, J.P. Modeling Temperature Dependent Kinetic Isotope Effects for Hydrogen Transfer in a Series of Soybean Lipoxygenase Mutants: The Effect of Anharmonicity Upon Transfer Distance. *Chem. Phys*. **319**, 283-296 (2005).
161. Klinman, J. P. The Copper Enzyme Family of Dopamine -Monooxygenase and Peptidylglycine--Hydroxylating Monooxygenase: Resolving the Chemical Pathway for Substrate Hydroxylation. Solicited minireview for *J. Biol. Chem*. **281**, 3013-3016 (2006).
162. DuBois, J. L. and Klinman, J.P. Role of a Strictly Conserved Active Site Tyrosine in Cofactor Genesis in the Copper Amine Oxidase from *Hansenula polymorpha*. *Biochemistry* **45**, 3178-3188 (2006).
163. Takahashi, K. and Klinman, J.P. Relationship of Stopped Flow to Steady State Parameters in the Dimeric Copper Amine Oxidase from *Hansenula polymorpha* and the Role of Zinc Inhibiting Activity at Alternate Copper-containing Subunits. *Biochemistry* **45**, 4683-4694 (2006).
164. Klinman, J.P. Linking Protein Structure and Dynamics to Catalysis: The Role of Hydrogen Tunneling. *Phil. Trans. R. Soc. B* 361, 1323-1331 (2006).
165. Samuels, N.M. and Klinman, J.P. Investigation of Cu(I)-Dependent 2,4,5-Trihydroxyphenylalanine Quinone (TPQ) Biogenesis in *Hansenula polymorpha* Amine Oxidase. *J. Biol. Chem* **281**, 21114-21118 (2006).
166. Nagel, Z. and Klinman, J.P. Tunneling and Dynamics in Enzymatic Hydride Transfer. Solicited Review. *Chem. Rev.* **106**, 3095-3118 (2006).
167. Klinman, J.P. The Role of Tunneling in Enzyme Catalysis of C-H Activation in *Biochim. Biophys. Acta Bioenergetics* Special Issue, Proton Transfer Reactions in Biological Systems, **1757,** 981-987 (2006).
168. Thrower, J., Mirica, L.M., McCusker, K.P. and Klinman, J.P. Mechanistic Investigations of 1-Aminocyclopropane 1-Carboxylic Acid Oxidase with Alternate Cyclic and Acyclic Substrates. *Biochemistry*, **45**, 13108-13117 (2006).
169. Ghattas, W., Hess, C.R., Iacazio, G., Klinman, J.P. and Reglier, M. Pathway for the Stereo-Controlled *Z* and *E* Production of ,-difluorine-substituted Phenyl Butenoates. *J. Org. Chem*. **71**, 8618-8621 (2006).
170. Evans, J.P., Blackburn, N.J. and Klinman, J.P. The Catalytic Role of the Copper Ligand H172 of Peptidylglycine -Hydroxylating Monooxygenase: A Kinetic Study of H172A Mutant. *Biochemistry* **45**, 15419-15429 (2006).
171. Purdy, M.M., Koo, L.S., Ortiz de Montellano, P.R. and Klinman, J.P. Mechanism of O2 Activation by Cytochrome P450cam Studied by Isotope Effects and Transient State Kinetics. *Biochemistry* **45**, 15793-15806 (2006).
172. Klinman, J.P. How Do Enzymes Activate Oxygen Without Inactivating Themselves? *Acc. Chem. Res*, **40**, 325-333 (2007).
173. Magnusson, O.T., RoseFigura, J.M., Toyama, H., Schwarzenbacher, R. and Klinman, J.P. Pyrroloquinoline Quinone Biogenesis: Characterization of PqqC and its H84N and H84A Active Site Variants. *Biochemistry* **46**, 7174-7186 (2007).
174. Johnson, B.J., Cohen, J., Welford, R.W., Pearson, A.R., Schulten, K., Klinman, J.P., Wilmot, C.M. Exploring Molecular Oxygen Pathways in *Hansenula polymorpha* Copper-Containing Amine Oxidase. *J. Biol. Chem*. **282**, 17767-17776 (2007).
175. Welford, R. D. W., Lam, A., Mirica, L.M., Klinman, J.P. Partial Conversion of *Hansenula polymorpha* Amine Oxidase into a ‘Plant’ Amine Oxidase: Implications for Copper Chemistry and Mechanism. *Biochemistry* **46**,10817-10827 (2007).
176. Meyer, M.P., Tomchick, D.R., Klinman, J.P. Enzyme Structure and Dynamics Affect Hydrogen Tunneling: The Impact of a Remote Side Chain (I553) in Soybean Lipoxygenase-1. *Proc. Natl. Acad. Sci. USA* **105**, 1146-1151 (2008).
177. Hess, C.R., McGuirl, M.M., Klinman, J.P. Mechanism of the Insect Enzyme, Tyramine--Monooxygenase, Reveals Differences with the Mammalian Enzyme, Dopamine -Monooxygenase. *J. Biol. Chem*. **283**, 3042-3049 (2008).
178. Mirica, L.M., Klinman, J.P. The Nature of O2 Activation by the Ethylene-Forming Enzyme ACC Oxidase. *Proc. Natl. Acad. Sci. USA* **105**, 1814-1819 (2008).
179. Meyer, M., Klinman, J.P. Synthesis of Linoleic Acids Combinatorially-Labeled at the Vinylic Positions as Substrates for Soybean Lipoxygenase-1 Isotope Effect Studies. *Tet. Letts*., **49**, 3600-3603 (2008).
180. Mirica L.M., McCusker, K.P., Munos, J.W., Liu, H-w., Klinman, J.P. 18O Kinetic Isotope Effects in Non-Heme Iron Enzymes: Probing the Nature of Fe/O2 Intermediates*. J. Am. Chem. Soc*. **130**, 8122-8123 (2008).
181. Hess, C.R., Wu, Z., Klinman, J.P. Hydroxylase Activity of Met471Cys Tyramine -Monooxygenase. *J. Am. Chem. Soc*. **130**, 11939-11944 (2008).
182. Sharma, S.C., Klinman, J.P. Experimental Evidence for Hydrogen Tunneling when Arrhenius Prefactor (AH/AD) is Unity. *J. Am. Chem. Soc*. **130**, 17632-17633 (2008).
183. McCusker, K.P., Klinman, J.P. Facile Synthesis of 1,1[2H2]-2-methylaminoethane-1-Sulfonic Acid as a Substrate for Taurine -Ketoglutarate Dioxygenase (TauD). *Tet. Letts*. **50**, 611-613 (2009).
184. Klinman, J.P. An Integrated Model for Enzyme Catalysis Emerges from Studies of Hydrogen Tunneling. *Chem. Phys. Letts*, *- Frontiers* **471**, 179-193 (2009).
185. Humphreys, K.J., Mirica, L.M., Wang, Y., Klinman, J.P. Galactose Oxidase as a Model for Reactivity at a Copper Superoxide Center. *J. Am. Chem. Soc*. **131**, 4657-4663 (2009).
186. Nagel, Z.D., Klinman, J.P. A 21st Century Revisionist’s View at a Turning Point in Enzymology. *Nature Chem. Biol*., **5**, 543-550 (2009).
187. Wecksler, S.R., Stoll, S., Tran, H., Magnusson, O.T., Wu, S-P.; King, D., Britt, R.D., Klinman, J.P. Pyrroloquinoline Quinone Biogenesis: Demonstration that PqqE from *Klebsiella pneumoniae* is a Radical SAM enzyme. *Biochemistry* **48**, 10151-10161 (2009).
188. McCusker, K.P. and Klinman, J.P. Modular Behavior of TauD Provides Insight into the Origin of Specificity in Alpha-ketoglutarate-Dependent Non-Heme Iron Oxygenases. *Proc. Natl. Acad. Sci. USA* **106**, 19791-19795 (2009).
189. Chang, C.M., Klema, V.J., Johnson, B.J., Mure, M., Klinman, J.P., Wilmot, C.M. Kinetic and Structural Analysis of Substrate Specificity in Two Copper Amine Oxidases from *Hansenula* *polymorpha*. *Biochemistry* **49**, 2540-2550 (2010).
190. McCusker, K.P., Klinman, J.P. An Active Site Phenylalanine Directs Substrate Binding and C-H Cleavage in the alpha-Ketoglutarate-Dependent Dioxygenase TauD. *J. Am. Chem. Soc.* **132**,5114-5120 (2010).
191. Oyeyemi, O.A., Sours, K.M., Lee, T., Resing, K.A., Ahn, N.G., Klinman, J.P. Temperature Dependence of Protein Motions in a Thermophilic Dihydrofolate Reductase and its Relationship to Catalytic Efficiency. *Proc. Natl. Acad. Sci. USA* **107**, 10074-10079 (2010).
192. Klinman, J.P. A New Model for the Origin of Kinetic Hydrogen Isotope Effects. Symposium In Print on Tunneling, *J. Phys. Org. Chem*. 23, 606-612 (2010).
193. Puehringer S., RoseFigura, J., Metlitzky, M., Toyama, H., Klinman, J.P., Schwarzenbacher, R. Structural Studies of Mutant Forms of the PQQ-Forming Enzyme PqqC in the Presence of Product and Substrate. *Proteins: Structure, Function and Bioinformatics* **78**, 2554-2562 (2010).
194. Chen, Z., Datta, S., DuBois, J.L., Klinman, J.P., Mathews, F.S. Mutation of a Strictly Conserved, Active Site Tyrosine in the Copper Amine Oxidase Leads to Uncontrolled Oxygenase Activity. *Biochemistry* **49**, 7393-7402 (2010).
195. Wecksler, S.R., Stoll, S., Iavarone, A.T., Imsand, E.M., Tran, H., Britt, D.R., Klinman, J.P. Interaction of PqqE and PqqD in the Pyrroloquinoline Quinone (PQQ) Biosynthetic Pathway Links PqqD to the Radical SAM Superfamily. *Chem. Commun*. **46**, 7031-7033 (2010).
196. Hess, C.R., Klinman, J.P., Blackburn, N.J. The Copper Centers of Tyramine-beta-Monooxygenase and Its Catalytic Site Methionine Variants. An X-Ray Absorption Study. *J. Biol. Inorg. Chem.* **15**, 1195-1207 (2010).
197. Nagel, Z.D., Klinman, J.P. Tunneling and Dynamics in Enzymatic Hydride Transfer. Solicited review update from 2006. *Chem. Rev*. **110**, PR41-PR67 (2010).
198. Meyer, M.P. and Klinman, J.P. Investigating Inner Sphere Reorganization via Secondary Kinetic Isotope Effects in the C–H Cleavage Reaction Catalyzed by Soybean Lipoxygenase: Tunneling in the Substrate Backbone as well as the Transferred Hydrogen. *J. Am. Chem. Soc*. **133**, 430-439 (2011).
199. RoseFigura, J.M., Puehringer, S., Schwarzenbacher, R., Toyama, H., Klinman, J.P. Characterization of a Protein-Generated O2-Binding Pocket in PqqC, a Cofactorless Oxidase Catalyzing the Final Step in PQQ Production. *Biochemistry* **50**, 1556-1566 (2011).
200. Nagel, Z.D., Dong, M., Bahnson, B.J., Klinman, J.P. Impaired Protein Conformational Landscapes as Revealed in Anomalous Arrhenius Prefactors. *Proc. Natl. Acad. Sci. USA* **108**, 10520-10525 (2011).
201. Oyeyemi, O.A., Sours, K.M., Lee, T., Kohen, A., Resing, K.A., Ahn, N.G., Klinman, J.P. Comparative Hydrogen-Deuterium Exchange for a Mesophilic vs Thermophilic Dihydrofolate Reductase at 25 degrees C: Identification of a Single Active Site Region with Enhanced Flexibility in the MesophilicProtein. *Biochemistry*, **50**, 8251-8260 (2011).
202. Zhang, J., Klinman, J.P. Enzymatic Methyl Transfer: Role of An Active Site Residue in Generating Active Site Compaction that Correlates with Catalytic Efficiency. *J. Am. Chem. Soc*.**133**, 17134-17137 (2011).
203. Shen, S.H., Wertz, D.L., Klinman, J.P. Implication for Functions of the Ectopic Adipocyte Copper Amine Oxidase (AOC3) from Purified Enzyme and Cell-Based Kinetic Studies. *PlosOne* **7** (1), e29270 (2012).
204. Shen, Y.-Q., Bonnot, F., Imsand, E.I., RoseFigura, J.M., Sjolander, K., Klinman, J.P. Distribution and Properties of the Genes Encoding the Biogenesis of the Bacterial Growth Factor, PQQ. *Biochemistry* **51**, 2265-2275 (2012).
205. Klema, V.J., Johnson, B.J., Klinman, J.P., Wilmot, C.M. The Precursor Form of *Hansenula polymorpha* Copper Amine Oxidase-1 in Complex with Cu(I) and Co(II). *Acta Cryst. F.*, **68**, 501-510 (2012).
206. Nagel, Z.D., Meadows, C.W., Dong, M., Bahnson, B.J., Klinman, J.P. Active Site Hydrophobic Residues Impact Hydrogen Tunneling Differently in a Thermophilic Alcohol Dehydrogenase at Optimal vs. Non-Optimal Temperatures. *Biochemistry* **51**, 4147-4156 (2012).
207. Osborne, R.L., Zhu, Hui, Iavarone, A.T., Hess, C.R., Klinman, J.P. Inactivation of Met471Cys Tyramine -Monooxygenase Results from Site-Specific Cysteic Acid Formation. *Biochemistry* **51**, 7488-7495 (2012).
208. Arnison PG, et al. Ribosomally Synthesized and Post-translationally Modified Peptide Natural Products: Overview and Recommendations for a Universal Nomenclature. *Nat. Prod. Rep*. **30**, 108-160 (2013).
209. Osborne, R.L., Zhu, Hui, Iavarone, A.T., Blackburn, N.J., Klinman, J.P. Interdomain Long-Range Electron Transfer Becomes Rate-Limiting in Y216A Variant of Tyramine -Monooxygenase*. Biochemistry* **52**, 1179-1191 (2013).
210. Klinman, J.P. Importance of Protein Dynamics During Enzymatic C–H Bond Cleavage. *Biochemistry* (Current Topics), **52**, 2068-2077 (2013).
211. Klema, V.J., Solheid, C.J., Klinman, J.P., Wilmot, C.M. Structural Analysis of Aliphatic vs. Aromatic Substrate Specificity in a Copper Amine Oxidase from *Hansenula polymorpha*. *Biochemistry* **52**, 2291-2301 (2013).
212. Klinman, J.P., Kohen, A. Hydrogen Tunneling Links Protein Dynamics to Enzyme Catalysis. *Annu. Rev. Biochem*. **82**, 471-496 (2013).
213. Nagel, Z.D., Cun, S., Klinman, J.P. Identification of a Long-Range Protein Network that Modulates Active Site Dynamics in Extremophilic Alcohol Dehydrogenases. *J. Biol. Chem*. **288**, 14087-14097 (2013).
214. Johnson, B.J., Yukl, E.T., Klema, V.J., Klinman, J.P., Wilmot, C.M. Structural Snapshots from the Oxidative Half-Reaction of a Copper Amine Oxidase: Implications for O2 Activation. *J. Biol. Chem*. **288**, 28409-28417 (2013).
215. Bonnot, F., Iavarone, A.T., Klinman, J.P. Multistep, Eight-Electron Oxidation Catalyzed by the Cofactorless Oxidase, PqqC: Identification of Chemical Intermediates and their Dependence on Molecular Oxygen. *Biochemistry,* **52**, 4667-4675 (2013).
216. Klinman, J.P. The Power of Integrating Kinetic Isotope Effects into the Formalism of the Michaelis-Menten Equation. *FEBS J*. **281**, 489-497 (2014).
217. Klinman, J.P., Bonnot, F. The Intrigues and Intricacies of the Biosynthetic Pathways for the Enzymatic Quinocofactors: PQQ, TTQ, CTQ, TPQ, and LTQ. *Chem. Rev*. ***114*** (8), 4343-4365 (2014).
218. Carr, C.A.M., Klinman, J.P. Hydrogen Tunneling in a Prokaryotic Lipoxygenase. *Biochemistry* **53**, 2212-2214 (2014).
219. Meadows, C.W., Ou, R., Klinman, J.P. Picosecond-resolved Fluorescent Probes at Functionally Distinct Tryptophans within a Thermophilic Alcohol Dehydrogenase: Relationship of Temperature-Dependent Changes in Fluorescence to Catalysis. *J. Phys. Chem. B*. **118**, 6049-6061, (2014).
220. Hu, S., Sharma, S.C., Scouras, A.D., Soudackov, A.V., Carr, C.A.M., Hammes-Schiffer, S., Alber, T., and Klinman, J.P., Extremely Elevated Room-Temperature Kinetic Isotope Effects Quantify the Critical Role of Barrier Width in Enzymatic C-H Activation. *J. Am. Chem. Soc.* **136**, 8157-60 (2014).
221. Klinman, J.P. and Kohen, A., Evolutionary Aspects of Enzyme Dynamics. *J. Biol. Chem.* **289**, 30205-30212 (2014).
222. Meadows, C.W., Tsang, J.E. and Klinman, J.P., Picosecond-Resolved Fluorescence Studies of Substrate and Cofactor-Binding Domain Mutants in a Thermophilic Alcohol Dehydrogenase Uncovers an Extended Network of Communication. *J. Am. Chem. Soc.* **136**, 14821−14833 (2014).
223. Klinman, J.P., Dynamically Achieved Active Site Precision in Enzyme Catalysis. *Accounts Chem. Research* **48**, 449-456 (2015).
224. Zhang, J. and Klinman, J.P. High-Performance Liquid Chromatography Separation of the (S,S)- and (R,S)- Forms of S-Adenosyl-l-Methionine. *Analytical Biochemistry* **476**, 81-83 (2015).
225. Zhu H., Sommerhalter, M., Nguy, A.K.L. and Klinman, J.P., Solvent and Temperature Probes of the Long Range Electron Transfer Step in Tyramine β-Monooxygenase: Demonstration of a Long Range Proton-Coupled Electron Transfer Mechanism. *J. Am. Chem.* **137**, 5720-5729 (2015)*.*
226. Latham, J.A., Iavarone, A. T., Barr, I., Juthani, P.V., and Klinman, J.P., PqqD is a Novel Peptide Chaperone that Forms a ternary Complex with the Radical S-adenosylmethionine Protein PqqE in the Pyrroloquinoline Quinone Biosynthetic Pathway. *J. Biol. Chem*. **290**, 12908-12918 (2015).
227. Zhang, J., Kulik, H.J., Martinez, T.J. and Klinman, J.P., Mediation of Donor-Acceptor Distance in an Enzymatic Methyl Transfer Reaction. *Proc. Natl. Acad. Sci*. *USA.* **112**, 7954-7959 (2015).
228. Zhu, H., Peck, S.C., Bonnot, F., van der Donk, W.A., and Klinman, J.P., Oxygen-18 Kinetic Isotope Effects of Non-Heme Iron Enzymes HEPD and MPnS Support Iron(III) Superoxide as the Hydrogen Abstraction Species. *J. Am. Chem. Soc*. **137**, 10448-10451 (2015).
229. Sharma, S. C. and Klinman, J.P., Kinetic Detection of Orthogonal Protein and Chemical Coordinates in Enzyme Catalysis: Double Mutants of Soybean Lipoxygenase. *Biochemistry* **54**, 5447-5456 (2015).
230. Meadows, C.W., Balakrishnan, G., Kier, B.L., Spiro, T.G. and Klinman, J.P., Temperature-Jump Fluorescence Provides Evidence for Fully Reversible Microsecond Dynamics in a Thermophilic Alcohol Dehydrogenase. *J. Am. Chem. Soc*. **137**, 10060-10063 (2015).
231. Collazo, L. and Klinman, J.P., Control of the Position of Oxygen Delivery in Soybean Lipoxygenase-1 by Amino Acid Side Chains within a Gas Migration Channel. *J. Biol. Chem*. **291**, 9052-9059 (2016).
232. Barr*,* I., Latham, J.A., Iavarone, A.T., Chantarojsiri, T., Hwang, J.D., and Klinman, J.P., Demonstration that the Radical S-Adenosylmethionine (SAM) Enzyme PqqE Catalyzes *de Novo* Carbon-Carbon Cross-Linking within a Peptide Substrate PqqA in the Presence of the Peptide Chaperone PqqD. *J. Biol. Chem*. **291**, 8877-8884 (2016).
233. Hu, S., Cattin-Ortola, J., Munos, J.W. and Klinman, J.P., Hydrostatic Pressure Studies Distinguish Global from Local Protein Motions in C-H Activation by Soybean Lipoxygenase-1. *Angewandte Chemie, Intl. Ed.*, **55**, 9361-9364 (2016).
234. Zhang, J. and Klinman, J.P., Convergent Mechanistic Features Between the Structurally Diverse N- and O-Methyltransferases: Glycine N-Methyltransferase and Catechol O-Methyltransferase. *J. Am. Chem. Soc*., **138**, 9158-9165 (2016).
235. Offenbacher, A.R., Zhu, H. and Klinman, J.P., Synthesis of Site-Specifically 13C Labeled Linoleic Acids. *Tet. Letts.*, **57**, 4537-4540 (2016).
236. Evans, R.L.III, Latham, J.A., Klinman, J.P., Wilmot, C.M., and Xia, Y., 1H, 13C, and 15N Resonance Assignments and Secondary Structure Information for *Methylobacterium extorquens* PqqD and the Complex of PqqD with PqqA. *Biolmol. NMR Assign*., **10**, 385-389 (2016).
237. Kulik, H.J., Zhang, J., Klinman, J.P., and Martinez, T.J., How Large Should the QM Region be in QM/MM Calculations? The Case of Catechol O-Methyltransferase. *J. Phys. Chem. B*., **120**, 11381-11394 (2016).
238. Horitani, M., Offenbacher, A.R., Carr, C.A.M., Yu, T., Hoeke, V., Cutsail, G.E.III, Hammes-Schiffer, S., Klinman, J.P. and Hoffman, B.M., 13C ENDOR Spectroscopy of Lipoxygenase−Substrate Complexes Reveals the Structural Basis for C−H Activation by Tunneling. *J. Am. Chem. Soc*., **139**, 1984-1997 (2017).
239. Hu, S., Soudackov, A., Hammes-Schiffer, S., and Klinman, J.P., Enhanced Rigidification within a Double Mutant of Soybean Lipoxygenase Provides Experimental Support for Vibronically Nonadiabatic Proton-Coupled Electron Transfer Models. *ACS Catal.,* **7**, 3569-3574 (2017).
240. Evans, R.L.III, Latham, J.A., Xia, Y., Klinman, J.P. and Wilmot, C.M., Nuclear Magnetic Resonance Structure and Binding Studies of PqqD, a Chaperone Required in the Biosynthesis of the Bacterial Dehydrogenase Cofactor Pyrroloquinoline Quinone. *Biochemistry,* **56**, 2735–2746 (2017).
241. Offenbacher, A.R., Hu, S., Poss, E.M., Carr, C.A.M., Scouras, A.D., Prigozhin, D., Iavarone, A.T., Palla, A., Alber, T., Fraser, J.S. and Klinman, J.P., Hydrogen−Deuterium Exchange of Lipoxygenase Uncovers a Relationship between Distal, Solvent Exposed Protein Motions and the Thermal Activation Barrier for Catalytic Proton-Coupled Electron Tunneling. *ACS Cent. Sci.*, **3**, 570-579 (2017).
242. Tu, X., Latham, J.A., Klema, V.J., Evans, R.L.III, Li, C., Klinman, J.P., Wilmot, C.M., Crystal Structures Reveal Metal-Binding Plasticity at the Metallo-β-Lactamase Active Site of PqqB from *Pseudomonas putida. J. Biol. Inorg. Chem.*, **22**,1089-1097 (2017).
243. Latham, J.A., Barr, I., Klinman, J.P., At the Confluence of Ribosomally Synthesized Peptide Modification and Radical *S*-Adenosylmethionine (SAM) Enzymology. *J. Biol. Chem*., **292**, 16397–16405 (2017).
244. Klinman, J.P., Offenbacher, A.R., and Hu, S. Origins of Enzyme Catalysis: Experimental Findings for C–H Activation, New Models, and Their Relevance to Prevailing Theoretical Constructs. *J. Am. Chem. Soc*., **139**, 18409–18427 (2017).
245. Offenbacher, A.R., Iavarone, A.T., and Klinman, J.P., Hydrogen-Deuterium Exchange Reveals Long-Range Dynamical Allostery in Soybean Lipoxygenase. *J. Biol. Chem*. **293**, 1138-1148 (2018).
246. Vaughn, M.B., Zhang, J., Spiro, T.G., Dyer, R.B. and Klinman, J.P. Activity-Related Microsecond Dynamics Revealed by Temperature-Jump Förster Resonance Energy Transfer Measurements on Thermophilic Alcohol Dehydrogenase. *J. Am. Chem. Soc.,* **140**, 900-903 (2018).
247. Barr, I., Stich, T.A., Gizzi, A., Grove, T., Bonanno, J.B., Latham, J.A., Chung, T., Wilmot, C.M., Britt, R.B., Almo, S.C., and Klinman, J.P. X-ray and EPR Characterization of the Auxiliary Fe-S Clusters in the Radical SAM Enzyme PqqE. *Biochemistry*, **57**, 1306–1315 (2018).
248. Zhu, W., Martins, A.M., and Klinman, J.P. Methods for Expression, Purification and Characterization of PqqE, a Radical SAM Enzyme in the PQQ Biosynthetic Pathway. *Methods Enzymol.,* **606**, 389-420 (2018).
249. Klinman, J.P. and Offenbacher, A.R. Understanding Biological Hydrogen Transfer Through the Lens of Temperature Dependent Kinetic Isotope Effects. *Acc. Chem. Res*., **51**, 1966-1974 (2018).
250. Hu, S., Offenbacher, A.R., Thompson, E.M., Gee, C.L., Wilcoxen, J., Carr, C.A.M., Prigozhin, D.M., Yang, V., Alber, T., Britt, R.D., Fraser, J.S., and Klinman, J.P. Biophysical Characterization of a Disabled Double Mutant of Soybean Lipoxygenase: The “Undoing” of Precise Substrate Positioning Relative to Metal Cofactor and an Identified Dynamical Network. *J. Am. Chem. Soc.,* **141**, 1555–1567 (2019).
251. Koehn, E.M., Latham, J.A., Armand, T., Evans, R.L.III, Tu, X., Wilmot, C.M., Iavarone, A.T., and Klinman, J.P. Discovery of Hydroxylase Activity for PqqB Provides a Missing Link in the Pyrroloquinoline Quinone Biosynthetic Pathway. *J. Am. Chem. Soc.* **141**, 4398-4405(2019).
252. Klinman, J.P. Moving Through Barriers in Science and Life. *Annu. Rev. Biochem*. **88**, 1-24 (2019).
253. Masson G.R., Burke J.E., Ahn N.G., Anand G.S., Borchers C., Brier S., Bou-Assaf G.M., Engen J.R., Englander S.W., Faber J., Garlish R., Griffin P.R., Gross M.L., Guttman M., Hamuro Y., Heck A.J.R., Houde D., Iacob R.E., Jørgensen T.J.D., Kaltashov I.A., Klinman J.P., Konermann L., Man P., Mayne L., Pascal B.D., Reichmann D., Skehel M., Snijder J., Strutzenberg T.S., Underbakke E.S., Wagner C., Wales T.E., Walters B.T., Weis D.D., Wilson D.J., Wintrode P.L., Zhang Z., Zheng J., Schriemer D.C., Rand K.D. Recommendations for Performing, Interpreting and Reporting Hydrogen Deuterium Exchange Mass Spectrometry (HDX-MS) Experiments. *Nat. Methods*. **16**, 595-602 (2019).
254. Martins, A.M., Latham, J.A., Martel, P.J., Barr, I., Iavarone, A.T., and Klinman, J.P. A
Two-Component Protease in *Methylorubrum extorquens* with High Activity Toward the Peptide Precursor of the Redox Cofactor Pyrroloquinoline Quinone. *J. Biol. Chem*. **294**, 15025-15036 (2019).
255. Masson, G.R., et al. Recommendations for Performing, Interpreting and Reporting Hydrogen Deuterium Exchange Mass Spectrometry (HDX-MS) Experiments. *Nat. Methods*. **16**, 595-602 (2019).
256. Zaragoza, J.P.T., Nguy, A., Minnetian, N., Deng, Z., Iavarone, A.T., Offenbacher, A.O., Klinman, J.P. Detecting and Characterizing the Kinetic Activation of Thermal Networks in Proteins: Thermal Transfer from a Distal, Solvent-Exposed Loop to the Active Site in Soybean Lipoxygenase. *J. Phys. Chem. B*. **123**, 8662-8674 (2019).
257. Hu, S., Offenbacher, A.R, Lu, E.D., and Klinman, J.P. Comparative kinetic isotope effects on first- and second-order rate constants of soybean lipoxygenase variants uncover a substrate-binding network. *J. Biol. Chem*. **294**, 18069-18076 (2019).
258. Tao, L., Zhu, W., Klinman, J.P., and Britt, R.D. Electron Paramagnetic Resonance Spectroscopic Identification of the Fe–S Clusters in the SPASM Domain-Containing Radical SAM Enzyme PqqE. *Biochemistry*. **58**, 5173-5187 (2019).
259. Offenbacher, A.R., Sharma, A., Doan, P.E., Klinman, J.P., and Hoffman, B.M. The Soybean Lipoxygenase–Substrate Complex: Correlation between the Properties of Tunneling-Ready States and ENDOR-Detected Structures of Ground States. *Biochemistry* **59**, 901-910 (2020).
260. Zhang J., Balsbaugh, J.L., Gao, S., Ahn, N.G., and Klinman, J.P. Hydrogen Deuterium Exchange Defines Catalytically Linked Regions of Protein Flexibility in the Catechol *O*-Methyltransferase Reaction. *Proc. Natl. Acad. Sci. USA.* **117**, 10797-10805 (2020).
261. Zhu, W., Walker, L.M., Tao, L, Iavarone, A.T., Wei, X., Britt, R.D., Elliot, S.J., Klinman, J.P. Structural Properties and Catalytic Implications of the SPASM Domain Iron-Sulfur Clusters in *Methylorubrum extorquens* PqqE, *J. Am. Chem. Soc*. **142**, 12620–12634 (2020).
262. Zhu, W., and Klinman, J.P. Biogenesis of the Peptide-Derived Redox Cofactor PQQ. *Curr. Opin. Chem. Biol*. **59,** 93-103 (2020).

Hydrostatic Pressure Studies Distinguish Global from Local Protein

Motions in C



H Activation by Soybean Lipoxygenase-1

**BOOKS/SPECIAL ISSUES EDITED**:

1. Klinman, J.P. Methods in Enzymology, Vol. 258. Redox-Active Amino Acids in Biology. Academic Press, San Diego, California. (1995).

2. Klinman, J.P. and Dove, J.E. Advances in Protein Chemistry, Vol. 58, Novel Cofactors. Academic Press, San Diego, California (2001).

3. Hynes, J.T., Klinman, J.P., Limbach, H.-H., Schowen, R.L. Hydrogen-Transfer Reactions, Vols. 1-4, Wiley-Verlag GmbH & Co. KGaA (2007).

4. Klinman, J.P. and Hammes-Schiffer, S. Special Issue on “Dynamics in Enzyme Catalysis” in Topics in Chemistry, Vol. 337. Springer-Verlag Berlin Heidelberg, Germany (2013).

5. Klinman, J.P. and Rosensweig, A. Editorial Overview: Catalysis and Regulation in Current Opinion in Structural Biology 35 (2015).

6. Hammes-Schiffer, S. and Klinman, J.P. Editorial Overview in Accounts of Chemical Research 48, 899 (2015).

**ESSAYS/BOOK CHAPTERS/NEWS & VIEWS**:

1. Klinman, J.P. The Yeast Alcohol Dehydrogenase Reaction: Substituent and Isotope Effects, in Alcohol and Aldehyde Metabolizing Systems, Vol. 1 (R.G. Thurman, T. Yonetani, J.R. Williamson and B. Chance, eds) Academic Press, New York (1974), p.81-90.

2. Klinman, J.P., Welsh, K.M. and Creighton, D.J. Solvent Isotope Effects in the Yeast Alcohol Dehydrogenase Reactions, in Alcohol and Aldehyde Metabolizing Systems, Vol. II (R.G. Thurman, T. Yonetani, J.R. Williamson and B. Chance, eds) Academic Press, New York (1977), pp. 53-62.

3. Klinman, J.P. Isotope Effects in Hydride Transfer Reactions, in Sixth Steenbock Symposium on Isotope Effects on Enzyme Catalyzed Reactions (W.W. Cleland, M.L. O'Leary and D.B. Northrop, eds) University Park Press (1977), pp. 176-208.

4. Klinman, J.P. Primary Hydrogen Isotope Effects, in Transition States of Biochemical Processes (R.L. Schowen and R. Gandour, eds) Plenum Press (1978), pp. 165-200.

5. Klinman, J.P. and Brenner, M. Role of Copper and Catalytic Mechanism in the Copper Monooxygenase, Dopamine -Hydroxylase. Fourth International Symposium on Oxidases and Related Redox Systems, (T.E. King, M. Morrison and H.A. Mason, eds), Alan R. Liss, N.Y. (1988).

6. Klinman, J. P., Hartmann, C. and Janes, S. M. Mechanistic Probes of Copper Amine Oxidases. 1st International Symposium on PQQ and Quinoproteins (J.A. Duine and J.A. Jongejan, eds) (1989), p. 297.

7. Klinman, J.P., Huyghe, B., Stewart, L., Taljanidisz, J. Structure Function Studies of Dopamine b-Hydroxylase. *1989 Proceedings of the International Symposium on Biological Oxidation Systems,* Bangalore, India, Vol. 1 (C.C. Reddy, G.A. Hamilton and K.M. Madyastha, eds) (1990), p. 329.

8. Klinman, J.P. Hydrogen Tunneling and Coupled Motion in Enzyme Reactions *in Isotope Effects in Enzyme Mechanisms*, Chap. 4 (P.F. Cook, ed) CRC Press (1991), p. 127.

9. Kim, S.C. and Klinman, J.P. The Nature of Substrate Activation in the Dopamine -Monooxygenase Reaction. *in* 'Yamada Conference XXVII: International Symposium on Oxygenases and Oxygen Activation' (S. Yamamoto, M. Nozaki and Y. Ishimura, eds) Yamada Science Foundation, Japan (1991), pp. 121-124.

10. Klinman, J.P., Berry, J., Tian, G. New Probes of O2 Binding and Activation: Applications to DbM. *in* 'Bioinorganic Chemistry of Copper' (K.D. Karlin and Z. Tyeklár, eds) Chapman and Hall (1993), pp. 151-163.

11. Klinman, J.P. Hydrogen Tunneling in Enzyme Reactions in *Organic Reactivity: Physical and Biological Aspects* (B.T. Golding, R.J. Griffin and H. Maskill eds) Royal Society of Chemistry, London (1995), pp. 38-58.

12. Jonsson, T., Edmondson, D. and Klinman, J. P. Experimental Probes of Hydrogen Tunneling in Bovine Liver Monoamine Oxidase B. Proceedings of the 11th International Symposium on Flavins and Flavoproteins, 1993. Walter de Gruyter, Berlin (1994), pp. 117-121.

13. Glickman, M.H. and Klinman, J.P. "Isotopic Probes of the Soybean Lipoxygenase-1 Mechanism" in *Lipoxygenase and Lipoxygenase Pathway Enzymes,* (G. Piazza, ed) AOCS Press, Champaign (1996), pp. 95-111.

14. Klinman, J.P., Cai, D. and Wang, S. Quinocofactors in Copper Amine Oxidases and Lysyl Oxidase in *Proceedings of the 8th International Symposium on Microbial Growth on C­1 Compounds* (M. Lidstrom and R. Tabita, eds) Kluwer Academic Publishers (1996), pp.167-174.

15. Wang, S.X., Klinman, J.P., Medzihradszky, K.F. and Burlingame, A.L. Isolation and Characterization of Active Site Peptides in Lysyl Oxidase. *Techniques in Protein Chem.*, Vol. 8, (D.R. Marshak, ed) Academic Press (1997), pp. 351-361.

16. Kohen, A., Jonsson, T. and Klinman, J.P. Effects of Enzyme Glycosylation on the Chemical Step of Catalysis as Proved by Hydrogen Tunneling and Enthalpy of Activation. *Techniques in Protein Chem.*, Vol. 8, (D.R. Marshak, ed.) Academic Press (1997), pp. 311-319.

17. Su, Q. and Klinman, J. P. Life as Aerobes: How Does Nature Control the Activation of Dioxygen? *1998 Steenbock Symposium on Enzymatic Mechanisms*, (P.A. Frey and D.B. Northrop, eds) Biomedical and Health Research, Washington, D.C. (1998) pp 20-31.

18. Wertz, D.L. and Klinman, J.P. Eukaryotic Copper Amine Oxidases in *The Handbook of Metalloproteins*, (A. Messerschmidt, R. Huber, T. Poulous and K. Wieghardt, eds) John Wiley & Sons, Ltd. Chichester (2001), pp. 1258-1271.

19. Schwartz, B. and Klinman, J.P. Mechanisms of Biosynthesis of Protein-Derived Redox Cofactors in *Vitamins and Hormones*, Vol. 61, 219-239. (T. Begley and V.L. Schramm, eds) Academic Press, California (2001), pp. 219-239

20. Klinman, J.P. “A Personal Journey in Science and Life”, an essay written for ChemWorld, monthly news magazine of The Korean Chemical Society, October 2001.

21. Schwartz, B. and Klinman, J. P. Quinone Cofactors. In: *Encyclopedia of Life Sciences*, Vol. 15. London: Nature Publishing Group (2002) pp. 742-748.

22. Klinman, J.P. “Hydrogen,” C&E News Special Issue on Periodic Table of Elements, September 2003, p. 30.

23. Roth, J.P. and Klinman, J.P. Kinetic Isotope Effects in *Encyclopedia of Biological Chemistry* Vol. 2 (W.J. Lennarz and M.D. Lane, eds) Elsevier, Oxford (2004), pp. 522-528.

24. Roth, J.P. and Klinman, J.P. Oxygen-18 Isotope Effects as a Probe of Enzymatic Activation of Molecular Oxygenin *Isotope Effects in Chemistry and Biology*, (A. Kohen and H. Limbach, eds) Taylor and Francis Inc., Boca Raton, FL (2006), pp. 645-669.

25. Klinman, J.P. “The Mafia and the Melting Pot,” in Reflections from the Frontiers: Explorations for the Future. Gordon Research Conferences, 1931-2006. Published in celebration of 75 years of Gordon Research Conferences. (A.A. Daemmrich, N.R. Gray and L. Shaper, Eds.) Picarri Press (2006), p. 77.

26. Rickert, K. and Klinman, J.P. Radical Generation-Lipoxygenase (Chapter XIII) in *Biological Inorganic Chemistry: Structure and Reactivity*, (I. Bertini, H. Gray, E.I. Stiefel, and J.S. Valentine, eds) University Science Books, Inc., Mill Valley, California (2006), pp 607-612.

27. Knapp, M.J., Meyer, M.P. and Klinman, J.P. Nuclear Tunneling in Condensed Phase: Hydrogen Transfer in Enzyme Reactions in “Hydrogen Transfer Reactions”, (R. Schowen and J.P. Klinman, eds) Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany (2007), Vol. 4, pp 1241-1284.

28. Klinman, J.P. Beyond Tunneling Corrections: Full Tunneling Modes for Enzymatic C-H Activation Reactions. In Quantum Tunneling in Enzyme Catalyzed Reactions (Biomolecular Series). R. Allemann and N. Scrutton, eds. Royal Society of Chemistry, Cambridge, UK, 2009, pp. 132-160.

29. Hess, C.R., Welford, R.D.W., Klinman, J.P. Chemistry of Oxygen Activating Enzymes, in *Wiley Encyclopedia of Chemical Biology*, Vol. 3, pp 529-540. John Wiley & Sons, Hoboken, NJ (2009).

30. Klinman, J.P. Control of Active-Site Compression, *Nature Chemistry* (News & Views) **2**, 907-909 (2010).

31. Klinman, J.P. The Widespread Occurrence of Enzymatic Hydrogen Tunneling and its Unique Properties Lead to a New Physical Model for the Origins of Enzyme Catalysis. *Procedia Chemistry* (22nd Solvay Conference on Chemistry, Brussels, October 2010), **3**, 291-305 (2011).

32. Klinman, J.P. “Thinking Like an Enzyme,” in Letters to a Young Scientist, (A. Ghosh, Ed.) Wiley & Sons, 2011.

33. Osborne, R.L., Klinman, J.P. Insights into the Proposed Copper Oxygen Intermediates that Regulate the Mechanism of Reactions Catalyzed by Dopamine -Monooxygenase, Peptidylglycine -Hydroxylating Monooxygenase, and Tyramine -Monooxygenase. In Copper-Oxygen Chemistry, Wiley Series on Reactive Intermediates in Chemistry and Biology, Wiley & Sons, Ltd. USA (Kenneth D. Karlin and Shinobu Itoh, Eds.) Vol 4, pp 1-22 (2011).

34. Lang, A., Klinman, J.P. Quinone Cofactors. In: eLS2013, John Wiley & Sons, Ltd. Chichester http://www.els.net/[DOI:10.1002/9780470015902.a000660.pub2] West Sussex, UK (2013).

35. Lang, A., Klinman, J.P. Copper Amine Oxidase. In “Encyclopedia of Metalloproteins”. (Uversky, V., Kretsinger, R.H., Permyakov, E.A., Eds.) Springer-Verlag, Berlin, Heidelberg (2013).

36. Klinman, J.P. “Looking in New Directions for the Origins of Enzymatic Rate Accelerations,” in New Chemistry and New Opportunities from the Expanding Protein Universe (Wuthrich, K., Wilson, I.A, Hilvert, D., Wolan, D.W., De Wit, A., Eds.) World Scientific, pp 64-69 (2014).

37. Klinman, J.P. “Irwin Rose (1926-2015)” in Proc. Natl. Acad. Sci. (USA) 112, 10568-10569 (2015).

38. Klinman, J.P. “Low Barrier Hydrogen Bonds: Getting Close, But Not Sharing…” in ACS Central Science 1, 115-116 (2015).

39. Klinman, J.P., Hu, S., Offenbacher, A.R. “How Close are We to Explaining Enzyme Catalysis?” in Catalysis in Chemistry and Biology: Proceedings of the 24th International Solvay Conference on Chemistry (Wüthrich, K., Grubbs, R.H., Visart de Bocarmé, T., De Wit, A. (Eds.) World Scientific, pp 309-314 (2018).

**NON-REFERREED PUBLICATIONS:**

1. Kulik, H.J., Zhang, J., Klinman, J.P., and Martinez, T.J., How Large Should the QM Region be in QM/MM Calculations? The Case of Catechol O-Methyltransferase. arXiv: 1505.05730 (2015).

2. Zhang, J. and Klinman, J.P., CH···O Interactions Are Not the Cause of Trends in Reactivity and Secondary Kinetic Isotope Effects for Enzymatic SN2 Methyl Transfer Reactions. bioRxiv: http://dx.doi.org/10.1101/071043 (2016).

**PATENTS:**

1. Klinman, J.P. and Thrower, J., Appl. No. 11/885,915: Method of Inhibiting Ethylene Production in Plants. U.S. Patent 8,247,352 issued August 21, 2012. (UC Case No. B04-05603).

**ABSTRACTS**:

1. Klinman, J.P. Substituent and Isotope Effects in the Yeast Alcohol Dehydrogenase Reaction. *Fed. Proc*. **31**, 1425 (1972).
2. Klinman, J.P. Alkylation of Two Active Center Cysteines of Yeast Alcohol Dehydrogenase by Styrene Oxide and Methyl-methanethiol Sulfonate. *Fed. Proc*. **34**, 2154 (1975).
3. Klinman, J.P., Walsh, K.M. A Reassessment of the Zn Content of Yeast Alcohol Dehydrogenase. 10th Int. Congress of Biochem., Hamburg, Germany (1976).
4. Klinman, J.P., Humphries, H., Voet, J. Studies of Fumarate Activation of Dopamine--Hydroxylase. *Fed. Proc*. **36**, 666 (1977).
5. Klinman, J.P., Markovic, R., Summers, M. Bovine Plasma Amine Oxidase (PAO) Catalyzed Oxidation of Dopamine. *Fed. Proc*. **37**, 1421 (1978).
6. Klinman, J.P. Inactivation of Dopamine -Hydroxylase from Chromaffin Vesicles of Bovine Adrenal Glands. 11th Int. Cong. Biochem., Toronto, Canada (1979).
7. Klinman, J.P. Kinetic Properties of Soluble *vs*. Membrane-bound Dopamine -Hydroxylase. *Fed. Proc*. **39**, 2035 (1980).
8. Klinman, J.P. Deduction of Enzyme Mechanism from Hydrogen Isotope Effects: Dopamine b-Hydroxylase, A Case History. *Fed. Proc*. **41**, 628 (1982).
9. Klinman, J.P., Palcic, M. Isotopic Probes of Plasma Amine Oxidase (PAO) – Separation of Binding Interactions and Catalytic Efficiency. *Am. Chem. S*. **184**: 195-Orgn (1982).
10. Mangold, J.B., Klinman, J.P. Mechanism of Suicide Inactivation of Dopamine -Hydroxylase by-Chlorophenethylamine. *Fed. Proc.* **41**, 743 (1982).
11. Brenner, M., Krueger, M., Klinman, J.P., Edmondson, D. A Role for Two Coppers Per Subunit in Dopamine b-Monooxygenase Catalysis. *Fed Proc*. **42**, 2059 (1983).
12. Bossard, M.J., Klinman, J.P. Mechanism-based inhibitors of Dopamine b-Hydroxylase: A Role for Intramolecular Redox Chemistry in Enzyme Inactivation. *Fed. Proc*. **44**, 1399 (1985).
13. Ahn, N.G., Klinman, J.P. Transport and Hydroxylation of Dopamine in Chromaffin Granule Ghosts. *Fed. Proc*. **44**, 1771 (1985).
14. Farnum, M.F., Klinman, J.P. Stereochemical Probes of the Mechanism of Bovine Plasma Amine Oxidase. *Fed. Proc*. **44**, 1055 (1985).
15. Murray, C., Klinman, J.P. An Active Site Titration of Dopamine -Hydroxylase. *Fed. Proc*. **44**, 1810 (1985).
16. Hartmann, C., Klinman, J.P. Plasma Amine Oxidase (PAO) Oxidizes Substrate by a Proton Activation Mechanism. *Fed. Proc*. **45**, 1537 (1986).
17. Brenner, M., Klinman, J.P. Correlation of Copper Valency with Tyramine Hydroxylation in the Dopamine -Monooxygenase Reaction. *Fed. Proc*. **46**, 2262 (1987).
18. Ahn, N.G., Klinman, J.P. A Kinetic Study of a Compartmentalized Enzyme: Dopamine-Hydroxylase in Chromaffin Granule Ghosts. *Fed*. *Proc*. **46**, 1973 (1987).
19. Klinman, J.P. Pyrroloquinoline Quinone: A New Cofactor in Eukaryotic Enzymes. *FASEB J.***2**,A1329 (1988)**.**
20. Huyghe, B.G., Klinman, J.P. Activation of Tyramine Turnover in Chromaffin Vesicle Ghosts by Internal and External Ascorbate. *J. Cell Biology* **107**, 115A (1988).
21. Stewart, L.C., Klinman, J.P. Non-Hyperbolic Kinetic Behavior in the Dopamine b-hydroxylase Reaction as a Function of Variable Ascorbate Concentration. *J. Cell. Biology* **107**, 186A (1988).
22. Klinman, J.P. Hydrogen Tunneling in Enzyme Reactions. *Am. Chem. S*. **199**: 203-Orgn Part 2 (1990).
23. Rucker, J., Cha, Y., Jonsson, T., Klinman, J.P. Role of Internal Thermodynamics in Determining the Extent of Hydrogen Tunneling for Enzyme Catalyzed Hydride and Proton Transfer Reactions. *Am. Chem. S*. **203**: 95-Biol (1992).
24. Tian, G.C., Berry, J., Klinman, J.P. Oxygen Activation in Dopamine -Hydroxylase. *Am. Chem. S.* **203**, 105-Biol (1992).
25. Klinman, J.P. The Role of Hydrogen Tunneling in Enzyme-Catalyzed Reactions. Am. Chem. S. **206**: 26-Phys Part 1 (1993).
26. Klinman, J.P. The Role of Hydrogen Tunneling in Enzyme-Catalyzed Reactions. *Am. Chem. S.* **208**: 8-Biol Part 2 (1994).
27. Klinman, J.P. Unusually Large and Complex Hydrogen Isotope Effects in the Lipoxygenase Reaction. *Am. Chem. S*. **210**, 325-Phys (1995).
28. Klinman, J.P. Quinoenzymes – A New Class of Biologic Redox Catalysts. *FASEB J*. **9**: A1455 (1995).
29. Klinman, J.P. Copper Oxidases and Their Cofactors. *Biofactors* **5**, (1995).
30. Chan, G., Hevel, J.M., Klinman, J.P. Developing a Model System for Studying Topa Quinone Biogenesis in Yeast Amine Oxidase. *Am. Chem. S*. **213**: 246-Ched Part 1 (1997).
31. Klinman, J.P. Studies of Biogenesis and Catalytic Mechanism in Quinoproteins. *FASEB J*. **11**, A871, 78 Suppl. S (1997).
32. Kohen A., Cannio, R., Bartolucci, S., Klinman, J.P. Thermophilic Dehydrogenase: Hydrogen Tunneling at High and Low Temperature. *FASEB J*. **11**, A1134, 1617 Suppl. S (1997).
33. Hevel, J.M., Mills, S.A., Klinman, J.P. A Key Residue in Yeast Copper Amine Oxidase Functions in Both Amine Oxidase Activity and Topa Quinone Biogenesis. *FASEB J.* **11**, A1321, 2712 Suppl S (1997).
34. Kohen, A., Cannio, R., Bartolucci, S., Klinman, J.P. Beyond the Classics: Hydrogen Tunneling in Enzyme Reaction. *Biophys. J*. **74**, A117 (1998).
35. Rickert, K., Klinman, J.P. The Nature of Hydrogen Transfer in Soybean Lipoxygenase-1. *FASEB J*. **13**, A1529 (1999).
36. Klinman, J.P. Life As Aerobes: Are There Simple Principles for Enzyme Catalysis of Dioxygen Activation? *J. Inorg. Biochem*. **74**, 4 (1999).
37. Green, E.L., Sanders-Loehr, J., Plastino, J., Klinman, J.P. Using Raman Spectroscopy to Characterize Reaction Pathways in Copper Amine Oxidases. *J. Inorg. Biohcem*. **74**, 1148 (1999).
38. Knapp, M.J., Klinman, J.P. Mechanistic Probes of the Oxidative Half-Reaction of Soybean Lipoxygenase-1. *J. Inorg. Biochem*. **74**, 193 (1999).
39. Mills, S.A., Klinman, J.P. Nonredox Role for Copper in a Copper Amine Oxidase from Yeast. *Am. Chem. S*. **219**: U125, 11-Biol Part 1 (2000).
40. Klinman, J.P., Dove, J.E., Williams, N.K., et al. Quinocofactor Biogenesis in the Copper Amine Oxidases: How Does a Single Active Site Perform Multiple Functions?  *Am. Chem. S*. **219**: U154, 174-Biol Part 1 (2000).
41. Goto, Y., Su, Q., Klinman, J.P. Mechanism of the Oxidative Half-Reaction in *Hansenula* *polymorpha* Amine Oxidase (HPAO): A Non-Metal Binding Site? *Am. Chem. S*. **219**: U126, 13-Biol Part 1 (2000).
42. Schwartz, B., Dove, J.E., Klinman, J.P. Mechanism of Topa Quinone Biogenesis. *Am. Chem. S.* **219**: U126 12-Biol Part 1 (2000).
43. Wertz, D., Klinman, J.P. Investigation of the Biological Function of Murine Membrane-Bound CAO. *FASEB J*. **14**, A1454 (2000).
44. Klinman, J.P. Tunneling in Enzyme Catalyzed Hydrogen Atom Transfer Reactions. *Am. Chem. S.* **220**: U163, 50-Phys Part 2 (2000).
45. Klinman, J. P. Mechanistic Enigmas: Dopamine -monooxygenase and Peptidylglycine -Amidating Enzyme. *Am. Chem. S*. **222**: U135, 122-Biol Part 1 (2001).
46. Thrower, J.S., Blalock, R., Klinman, J.P. Steady-State Kinetics of Substrate Binding and Iron Release in Tomato ACC Oxidase. *J. Inorg. Biochem*. **86**, 455 (2001).
47. Roth, J.P., Klinman, J.P. Oxygen Activation by Glucose Oxidase. *J. Inorg. Biochem*. **86**:408 (2001).
48. Klinman, J.P. Oxygen Reactivity in Enzymes: Problems and Solutions. *FASEB J*. **17**, A969, (2003).
49. Damo, S.M., Kim, H.S., Lee, S.Y., Oyeyemi, O., Klinman, J.P., Wemmer, D.E. Structure of a Thermophilic Dihydrofolate Reductase. *Am. Chem. S.* **226**:U166, 097-Biol Part 1 (2003)*.*
50. DuBois, J.L., Klinman, J.P. Cofactor Formation and Catalysis in the Dual-Functioning Copper Amine Oxidases. *FASEB J*. **18**, C275 Suppl. S, (2004).
51. Samuels, N., Klinman, J.P. Probing the Role of Copper in the Biogenesis of TPQ in Amine Oxidase by Metal Substitution. *Protein Science* **13**: 190, 424 Suppl. 1 (2004).
52. Klinman, J.P., Liang, Z.-X. Linking Protein Flexibility to Tunneling in Dehydrogenases. Am. Chem. Soc. **229**: U732-U732, 198 PHYS. Part 2 (2005).
53. Klinman, J.P. Hydrogen Tunneling in Enzymes: Linking the Role of Protein Dynamics to Catalysis. Am. Chem. Soc. **232**, 940-940 (2006).
54. Klinman, J.P. Linking Protein Dynamics to Function. *FASEB J*. **21**, A645, Apr. 2007.
55. Klinman, J.P. Quinoproteins and Cofactors: Expecting the Unexpected. *FASEB J*. **21**, A42, Apr 2007.
56. Klinman, J.P. Oxygen Reactivity in Quinocofactor Catalysis and Biogenesis. Am. Chem. S **234**, 39-CATL (2007).
57. Klinman, J.P. Protein and Peptide-Derived Cofactors: Exploring the Mechanisms for the Biogenesis of the Tyrosine-Derived Qunio-Cofactors, Trihydroxyphenylalanine Quinone (TPQ) and Pyrroloquinoline Quinone (PQQ). Am. Chem. S **238**, 852 (2009).
58. Klinman, J. P., Osborne, R.L., Hydrogen and Electron Transfer in the Copper Protein Family Comprised of Dopamine beta-Monooxygenase (DM), Tyramine beta-Monooxygenase (TM) and Peptidylglycine alpha-Hydroxylating Monooxygenase (PHM). Am. Chem. S. 241, 62-PHYS (2011).
59. Klinman, J.P., The Intrigues and Intricacies of Quino-Cofactor Biosynthesis. 38th Congress of FEBS, Saint Petersburg, Russia. Fed. Eur. Biochem. Soc. Vol. 280, 172 (2013).

61. Klinman, J.P., Moving Through Barriers: Unlocking the Mysteries of How Enzymes Really Work. FASEB J., 29, 100.1 (2015)

62. Klinman, J.P., Tunneling and the role of Barrier Width in Enzymatic C-H Activation. Symposium on Computational Chemical Dynamics, Am. Chem. Soc., Spring (2015).

63. Klinman, J.P., Changing Paradigms in Enzyme catalysis. Symposium on Protein Dynamics, Am. Chem. Soc., Spring (2016).

64. Zhu, H., Peck, S., Bonnot, F., van der Donk, w. and Klinman, J.P., Involvement of Metal-Superoxo Species in Iron and Copper C-H Activating Enzymes. Sympoisum on Alternate Oxygen Species in Biological Redox, Spring (2016).

65. Offenbacher, A., Hu, S. Nguy, A., Iavarone, A.T. and Klinman, J.P., Sifting through the Haystack to Find the Needle: Spatial Identification of a Structural Conduit for Transfer of Thermal Activation Energy in the Course of C-H Activation in Soybean Lipoxygenase. FASEB J. 30. 1086.1 (2016).

66. Offenbacher, A., Horitani, M., Carr, C., Yu, T., Hammes-Schiffer, S., Klinman, J.P. and Hoffman, B. Dynamic compaction is revealed from active site structure of soybean lipoxygenase enzyme-substrate complex, Am. Chem. Soc., Summer (2016).

67. Klinman, J.P., Pathway for production of the bacterial cofactor pyrroloquinoline quinone (PQQ): At the confluence of radical SAM (RS) enzymes and ribosomally synthesized and post-translationally modified peptides (RiPPs), Am. Chem. Soc., Summer (2017).

68. Klinman, J.P., Koehn, E., Latham, J.A., Evans, R.L.III, Tu, X., Sundaram, D.V., Wilmot, C.M., Is PqqB, a protein of unknown function within the PQQ biosynthetic pathway, a novel copper enzyme? Am. Chem. Soc., Summer (2017).

69. Klinman, J.P., Hu, S., Soudackov, A.V., Hammes-Schiffer, S., Enormous, temperature independent kinetic deuterium isotope effects in the proton-coupled electron transfer reaction catalyzed by soybean lipoxygenase, Am. Chem. Soc., Summer (2017).