

CURRICULUM VITAE
KENNETH ALLEN JOHNSON
Roger Williams Centennial Professor of Biochemistry

Institute for Cellular and Molecular Biology
Department of Chemistry & Biochemistry
2500 Speedway, A4800, MBB 3.122
University of Texas at Austin
Austin, Texas 78712

ACADEMIC TRAINING

University of Iowa	BS	1971	Chemistry, with highest honors and with highest distinction.
University of Wisconsin	Ph.D.	1975	Molecular Biology. Advisor: Dr. Gary Borisy Thesis Title: The Mechanism of Microtubule Assembly
University of Chicago	Postdoc		With Edwin W. Taylor

OCCUPATIONAL RECORD

1998 - present	Roger Williams Centennial Professor , Institute for Cellular and Molecular Biology, Dept. of Chemistry & Biochemistry, University of Texas at Austin, Austin, TX
1987-1998	Paul Berg Professor of Biochemistry Department of Biochemistry and Molecular Biology, The Pennsylvania State University, University Park, PA
1984-1987	Associate Professor , Department of Molecular and Cell Biology, The Pennsylvania State University, University Park, PA
1979-1984	Assistant Professor , Department of Biochemistry and Biophysics, The Pennsylvania State University, University Park, PA
1975-1979	Postdoctoral Fellow , Department of Biophysics and Theoretical Biology, The University of Chicago, Chicago, IL (with Dr. Edwin W. Taylor)

HONORS AND AWARDS

2007	Fellow of the American Association for the Advancement of Science
2000	Joseph Coleman Memorial Lecturer, Yale University, October 30, 2000
1998	Roger Williams Professorship, University of Texas at Austin
1989	Pfizer Award in Enzyme Chemistry, American Chemical Society
1987	Paul Berg Professorship, Pennsylvania State University
1987	Penn State Faculty Scholar Medal for Life and Medical Sciences
1983-1988	American Heart Association Established Investigatorship
1979	Muscular Dystrophy Association Postdoctoral Fellowship
1976-1979	National Institutes of Health Postdoctoral Fellowship
1971	Phi Beta Kappa
1971	Chemistry Faculty Undergraduate Scholar Award
1967-1971	Thomas Dooley Memorial Scholarship

COMMITTEES

National and International Committees

2001-2006	Member of Editorial Board of the Journal of Biological Chemistry
1996-2004	External reviewer for DFG Priority Program on Molecular Motors (Germany)
1998	Ad Hoc member of AIDS Study Section, National Institutes of Health
1997	Program Chair, Biological Division of American Chemical Society
1996	Chair, Gordon Conference on Biopolymers
1989-1998	Brookhaven STEM/NIH Advisory Committee
1992	Chair, Gordon Conference on Enzymes, Coenzymes & Metabolic Pathways
1987-1988	American Heart Association Grant Review Panel
1986-1991	Member of Cell Biology Study Section, National Institutes of Health
1986	Review Panel for the New Jersey Dept. of Higher Education
1985-1988	Monitoring Editor for the Journal of Cell Biology
1983	Organizing committee for the Cytoplasmic Matrix Conference
1983	Ad Hoc member of Cell Biology Study Section, NIH

University Committees

2007-2010	Member, Advisory Board of Institute for Cellular & Molecular Biology
2006-2008	Department of Chemistry and Biochemistry Promotion and Tenure Committee
2006-2008	College Science Promotion and Tenure Committee
2005	College Committee for MGM Department research space assignment
2004	Chair, College Review of Organized Research Units
2004	Chair, Review of Waggoner Alcohol Addiction Center
1999-2004	Institute for Cell & Molecular Biology Advisory Committee
1999-2003	Coordinator for Biochemistry Division of Chemistry & Biochemistry Dept.
2002	Chair, Chemistry & Biochemistry Search Committee
2001	Chair, Chemistry & Biochemistry Search Committee
1999	Chair, Chemistry & Biochemistry Search Committee
1996	College of Science Promotion and Tenure Committee
1994-1996	Departmental Promotion and Tenure Committee
1994-1998	Endowed Faculty Search Committee
1993-1996	Faculty Search Committee, Chairman
1992	Endowed Faculty Position Search Committee, Chairman
1991	Faculty Search Committee
1990	Graduate Student Search Committee, Chairman
1989	College of Science Promotion and Tenure Committee
1988-1989	Departmental Nominations Committee, Chairman
1987-1989	Departmental Headship Search Committee, Chairman
1987-1989	College of Science Dean Search Committee
1987	Departmental Graduate Candidacy, Chairman

1987 Departmental Promotion and Tenure Committee, Chairman
 1986 Biochemistry Program Graduate Candidacy, Chairman
 1985-1986 Graduate Student Admissions
 1985-1986 Faculty Search Committee
 1980-1983 Graduate Student Admissions

CONSULTING ACTIVITIES

2008-2011 Consultant, Roche Palo Alto
 2007-2011 Member of Scientific Advisory Board of Pacific Biosciences
 2007 Fish & Richardson – Expert witness for patent lawsuit of reverse transcriptase.
 2005-2009 Consultant for Pacific Biosciences
 2005 Drinkler Biddle & Reath – expert witness on lawsuit relating to the toxicity of AZT in treating AIDS.
 2004 Fish & Richardson – expert witness on patent infringement lawsuit involving use of polymerases in PCR
 1987-present President, KinTek Corporation, State College, PA
 2003-2004 Consultant for Applied Biosystems Group, Applied Corp
 1994-2001 Consultant for Applied Biosystems Division, Perkin Elmer Corporation, Foster City, CA
 1999-2001 Consultant for Schering-Plough
 1996-1997 Expert witness for patent law for Finnegan, Henderson, Farabow, Garrett & Dunner, Washington, DC
 1987-1990 Consultant for Monsanto Agricultural Co., St. Louis, MO

PATENT APPLICATIONS

2007	Portable, temperature and chemically inducible expression vector for high cell density expression of heterologous genes in E. coli.
2004	<ol style="list-style-type: none"> 1. “Use of the human mitochondrial DNA polymerase for single molecule DNA sequencing” 2. “Use of dye-linked chain terminators for single molecule DNA sequencing” 3. “A unique reverse transcriptase capable of longer and more accurate cDNA transcripts” 4. “Site specifically labeled DNA polymerase to measure nucleotide binding and incorporation”
1990	Exonuclease deficient mutant of T7 DNA polymerase.

RESEARCH INTERESTS

Research in the Johnson Lab is supported by three NIH research grants focused on three different areas. The projects are linked by the common thread of using transient kinetic methods to examine enzyme reaction pathways and to relate our functional analysis to structure.

Elementary steps in DNA replication. In these studies we use a model DNA polymerase from T7 bacteriophage which replicates DNA with high speed and fidelity, but is small enough to enable rigorous structure/function analysis. In recent work using a fluorescently labeled enzyme we discovered a new paradigm for DNA polymerase selectivity in which the substrate dissociation rate is a critical parameter. A correct nucleotide induces a rapid conformational change that organizes active site residues to promote catalysis. Following the conformational change, the substrate is committed to continue the forward reaction because the substrate release rate is so slow; therefore, the rate the chemistry step does not contribute to k_{cat}/K_m . In contrast, a mismatched nucleotide induces a different conformational state in which active site residues appear to be disorganized while the rate of substrate release is fast, promoting dissociation rather than incorporation. Thus, the conformational change acts as a molecular switch to distinguish correct from incorrect substrates.

HIV Reverse Transcriptase mechanism, fidelity, inhibition and drug resistance. In previous work we have established the elementary steps leading to correct nucleotide incorporation by HIV reverse transcriptase and have quantified the changes in individual kinetic constants occurring during misincorporation. In addition, we have determined the mechanism of action of a class of nonnucleoside inhibitors and characterized changes leading to resistance against these agents. In current work, we are continuing to explore the mechanisms of multiple drug resistance and examine the phenomenon of reciprocal drug resistance where, for example, resistance to AZT and ddI appears to be mutually exclusive in some instances. A better understanding of these phenomena at the structural and mechanistic level could lead to the development of better combination therapies in the treatment of AIDS.

Mitochondrial DNA Polymerase mechanism, fidelity and inhibition by nucleoside analogs. Several studies point to the likely role of the mitochondrial DNA polymerase in the toxicity of nucleoside analogs used in the treatment of viral infections such as hepatitis and AIDS. We have established that the toxicity of nucleoside analogs is correlated with their incorporation into mitochondrial DNA by the mitochondrial polymerase, spanning six orders of magnitude. Recently we have succeeded in obtaining a crystal structure of this large and complex enzyme in collaboration with Dr. Whitney Yin. This opens the way for more detailed structure/function studies.

Microtubule-Dependent Motor ATPase Mechanism and Force Production. We have established the pathway of ATP hydrolysis by kinesin, a motor protein involved in fast axonal transport. The protein is a dimer and shows an alternating site ATPase mechanism that is coupled to the movement of the kinesin along the surface of the microtubule. In current work we are examining the kinetic and structural basis for this alternating site activity in order to establish the mechanism of force production. The work serves as an important model for understanding energy transduction in general, and for exploring the family of kinesin-like ATPases that are responsible for a wide range of microtubule-dependent movements in all eukaryotic cells.

CURRENT RESEARCH GRANT SUPPORT

2 R01 GM044613-18A1 (Johnson)

4/08/2008 to 1/31/2012

NIH/NIGMS

Mechanism of mitochondrial DNA replication

This project is to investigate the mechanism of DNA replication catalyzed by the human mitochondrial DNA polymerase and to investigate its role in the toxicity of nucleoside analogs used to treat HIV infections.

F-1604 (Johnson)

6/01/2008 to 5/31/2011

The Welch Foundation

HIV reverse transcriptase inhibitors and the treatment of AIDS

This grant provides seed money to develop new methods to examine the kinetic, structural and thermodynamic basis for nucleotide selectivity by HIV reverse transcriptase.

2 R01 GM084741-01A1 (Johnson)

08/15/2009 to 07/31/2013

NIH/NIGMS

Nucleotide selectivity and drug resistance by HIV reverse transcriptase

This project is to examine the role of enzyme structural changes in nucleotide selectivity during DNA polymerization catalyzed by HIV reverse transcriptase and to better understand the evolution of resistance to nucleoside analogs used to treat HIV infections.

1 R01 GM071404-01A1 (Johnson)

4/01/2005 to 3/31/2009

NIH/NIGMS

Elementary steps in DNA polymerization

This project is to investigate the mechanisms responsible for DNA polymerase fidelity using the T7 DNA as a model, high fidelity polymerase. Kinetic analysis using fluorescently labeled protein and extensive mutagenesis will probe the role of protein conformational changes in nucleotide selectivity. *This grant is currently continuing on a no-cost extension.*

TEACHING

COURSE NO.	TITLE	YEARS TAUGHT	TOTAL STUDENTS
Biochem 41	Introductory Biochemistry	1	92
Biochem 401	General Biochemistry	4	901
Biochem 425	Introductory Physical Biochemistry	3	227
Biochem 451	Senior Seminar	2	49
Biochem 503	Biochemical Problems	2	40
Biochem 525	Proteins and Enzymes	15	420
Biochem 496	Independent Study	17	38
Biochem 600	Graduate Research	17	55
Chemistry 394	Chemistry of Enzymes	11	242

Annual Kinetics Workshop:

For the past 7 years I have taught a 4-day intensive workshop on modern enzyme kinetics. This workshop is attended by 40-50 professors, graduate students and industrial research scientists (in approximately equal proportions) from the US and Europe.

Software development:

At my own expense, I have hired programmers and worked closely with them to write a computer program for fitting kinetic data based upon computer simulation. Based upon numerical integration of rate equations, the program allows data to be fit directly to a model, bypassing the simplifying assumptions required for mathematical modeling. A professional version of the software is offered for sale to support the programming effort. A free student version is also available at <http://www.kintek-corp.com/kinetic-explorer>.

SEMINARS PRESENTED

1. Princeton University, Department of Biology. "The Mechanism of ATP Hydrolysis by Actomyosin." May 23, 1979
2. University of Guelph, Department of Chemistry. Two seminars: "Thermodynamics of Microtubule Assembly" and "The Pathway of GTP Hydrolysis During Microtubule Assembly." Dec. 1, 1980
3. Friday Harbor Washington, International Meeting on The Mechanism and Control of Ciliary Movement. "Transient-State Kinetic Analysis of the Dynein ATPase." Sept. 10, 1981
4. Worcester Foundation for Experimental Biology, Shrewsbury, MA. "The Structure of Dynein ATPase and the Mechanism of Force Production for Microtubule Sliding." Feb. 17, 1982
5. Yale University, New Haven, CT, Department of Biology. "The Structure of the Dynein ATPase and the Mechanism of Force Production for Microtubule Sliding." Feb. 19, 1982
6. University of Pennsylvania, Philadelphia, PA, Department of Biochemistry and Biophysics. "Kinetic and Structural Analysis of the Dynein ATPase." May 25, 1982
7. International Conference on Cilia and Flagella, Siena, Italy. "Structural and Mass Analysis of Dynein by Scanning Transmission Electron Microscopy." July 12, 1982
8. Max Planck Institute for Medical Research, Heidelberg, West Germany, Department of Biophysics. "Structural and Kinetic Analysis of Dynein-microtubule Complex." July 16, 1982
9. Woods Hole Marine Biological Laboratory, Woods Hole, MA. "Structural and Kinetic Analysis of Dynein." Aug. 10, 1982
10. Carnegie-Mellon University, Pittsburgh, PA. Department of Biological Sciences. "Kinetic and Structural Analysis of the Dynein-Microtubule Complex." Sept. 29, 1982
11. California Institute of Technology, Pasadena, CA, Division of Biology. "Structure and Kinetics of the Dynein ATPase." Feb. 18, 1983
12. Brandeis University, Waltham, MA. Department of Biochemistry. "Biochemistry of Dynein-microtubule Interaction." Mar. 2, 1983
13. National Institutes of Health, NIHLB, Bethesda, MD. "Structure and Kinetics of the Dynein ATPase." Sept 19, 1983
14. NICHD Testis Workshop Symposium, National Institutes of Health, Bethesda, MD. "Scanning Transmission Electron Microscopy of Dynein Arms." Invited symposium lecture. Oct. 16, 1983
15. Cytoplasmic Matrix Conference, Fogarty International Center, Bethesda, MD. "Mechanisms of Force Production for Intracellular Movements." Invited symposium lecture. Oct. 19, 1983
16. Temple University School of Medicine. "Structure and Function of Dynein, the Motor for Ciliary Movement." Mar. 21, 1984
17. Woods Hole Marine Biological Laboratory, Woods Hole, MA. "Structure of Dynein and the Mechanism of the Microtubule-Dynein ATPase." June 28, 1984
18. American Chemical Society Meeting, Philadelphia, PA. Organizer and speaker at symposium on "Protein-Macromolecule Interactions." "Structure and ATPase Mechanism of Dynein and its Role in Microtubule-Dependent Movements." Aug. 27, 1984
19. U. S.-Japan Cooperative Science Program on Fundamental Problems of Movement of Cilia, Eukaryotic Flagella and Related Systems, Hakone, Japan. "Dynein Structure and the Pathway of the Microtubule-Dynein ATPase." Sept. 7, 1984
20. Hershey Medical Center, Pennsylvania State University, Hershey, PA, Dept. of Biological Chemistry. "Structure and Mechanism of the Dynein ATPase and its Interaction with Microtubules." Sept. 24, 1984
21. Northwestern University Medical School, Dept. of Cell Biology and Anatomy, Chicago, IL. "Structure of Dynein and the Mechanism of Interaction with Microtubules." Oct. 22, 1984
22. International Chemical Congress of Pacific Basin Societies, Honolulu, HI. "Microtubule-Dynein Interactions and the Pathway of ATP Hydrolysis." Dec. 19, 1984
23. University of Pittsburgh, School of Medicine, Dept. of Biochemistry, Pittsburgh, PA. "Structure of Dynein and the Pathway of the Microtubule-Dynein ATPase." Mar. 21, 1985
24. DESY, Max-Planck-Gesellschaft, Colloquium in "Molekulare Strukturbiologie," Hamburg, West Germany. "Structure and Function of the Dynein ATPase." May 13, 1985

25. Yamada Conference on "Energy Transduction in ATPases." Kobe, Japan. "Dynein Structure and the Pathway of the Microtubule-Dynein ATPase." May 27, 1985
26. Gordon Conference on Enzymes, Coenzymes and Metabolic Pathways, Kimball Union Academy. "Dynein Structure and the Pathway of the Microtubule-Dynein ATPase." July 12, 1985
27. Princeton University, Dept. of Chemistry, Princeton, NJ. "Structure and Mechanism of the Dynein ATPase." Aug 13, 1985
28. American Society for Cell Biology Meeting, Subgroup meeting on Dynein, organized and presented paper, Atlanta, GA. Nov 17, 1985
29. Brandeis University, Dept. of Biochemistry, Waltham, MA. "Structure and Mechanism of the Dynein ATPase." Dec 4, 1985
30. SUNY-Buffalo, Cell Motility Minisymposium, Buffalo, NY. "Structure of Dynein and the Mechanism of Force Production for Microtubule-Dependent Movements." Feb 17, 1986
31. Johns Hopkins University School of Medicine, Dept. of Anatomy & Cell Biology, Baltimore, MD. "Structure of Dynein and the Mechanism of Force Production for Microtubule-Dependent Movements." Mar 4, 1986
32. University of Utah, Department of Biochemistry, Salt Lake City, Utah. "Structure and Mechanism of the Microtubule-Dynein ATPase." Mar 11, 1986
33. Harvard University, Dept. of Biology, Cambridge, MA. "Structure and mechanism of the Microtubule-Dynein ATPase." Mar 19, 1986
34. British Society for Cell Biology Meeting, Norwich, England. "Dynein and Related Proteins in Cell Motility." BSCB Symposium. Apr 8, 1986
35. State University of New York, Cellular and Developmental Biology, Stony Brook, NY. "Structure and Mechanism of the Dynein ATPase." May 23, 1986
36. Gordon Research Conference, Tilton, NH. "Mechanism of the Microtubule-Activated, Dynein ATPase." July 24, 1986
37. University of Colorado, Dept. of Molecular, Cellular and Developmental Biology, Boulder, CO. Two seminars: "Structure and Mechanism of the Microtubule-Dynein ATPase" and "Elementary steps in the DNA Polymerase I Reaction Pathway." Sept. 25, 1986
38. Monsanto Agricultural Co., St. Louis, MO. "Transient Kinetic Analysis of Enzyme Reaction Mechanisms: Implication for Inhibitor Design." Oct. 17, 1986
39. Scripps Clinic and Research Foundation, Dept. of Cellular and Developmental Immunology, La Jolla, CA. "Structure and Pathway of the Microtubule-Dynein ATPase." March 4, 1987
40. American Society of Biological Chemists, Annual Meeting, Philadelphia, PA. Invited Symposium Talk: "Dynein." June 8, 1987
41. Electron Microscope Society of America Annual Meeting, Baltimore, MD. Invited Symposium Talk: "Scanning Transmission EM of Dynein ATPases." August 7, 1987
42. Texas A & M, Dept. of Biochemistry and Biophysics, College Station, TX. "Elementary Steps in the DNA Polymerase I Reaction Pathway." November 11, 1987
43. University of Maryland, Department of Chemistry & Biochemistry, College Park, MD. "EPSP Synthase: Enzymatic Pathway and Mechanism of Action of the Herbicide, Glyphosate." March 1, 1988.
44. Gordon Research Conference on Cellular and Molecular Biology of the Plant and Fungal Cytoskeleton, Proctor Academy, Andover, NH. "Structure and Pathway of the Microtubule-Activated Dynein ATPase." August 11, 1988
45. International Conference on Force Production and Microtubule-Coupled Cell Movement, Stowe, VT. "Dynein Structure and Function." August 23, 1988
46. Bioscience Advisory Committee Meeting on Macromolecular Structure and Drug Design, Johnson and Johnson Conference Center, New Brunswick, NJ. "Alteration of Protein Structure and Effect on Biological Activity." October 12, 1988
47. Brandeis University, Department of Biochemistry, Waltham, MA. "EPSP Synthase: Enzymatic Pathway and Mechanism of Action of the Herbicide, Glyphosate." October 26, 1988
48. Penn State, Hershey Medical Center, Cell Biology Program, Hershey, PA. "Structure and Mechanism of the Dynein ATPase." March 15, 1989

49. Institute for Cancer Research, Philadelphia, PA. "Mechanism of DNA Polymerase I." March 16, 1989
50. American Chemical Society Meeting, Dallas, TX, Pfizer Award Address. "Solving Enzyme Mechanisms by Transient Kinetics." April 11, 1989
51. Symposium in Molecular Biology, DNA-Protein Interactions, Pennsylvania State University, University Park, PA. "Pathway and Fidelity of DNA Polymerization." July 27, 1989
52. Department of Biochemistry, St. Louis University, St. Louis, MO. "Pathway and Fidelity of DNA Polymerase." Sept. 6, 1989
53. Pfizer Chemical Co., Groton, CN. "EPSP Synthase Mechanism: Implications for Inhibitor Design." Oct. 10, 1989
54. Fogarty International Center Symposium on "Kinetic Approaches to the Study of Physiological Functions, National Institutes of Health, Bethesda, MD. "DNA Polymerase: Kinetic Mechanism and Fidelity." Oct. 18, 1989
55. Department of Chemistry, University of Maryland, Baltimore, MD "Mechanism and Fidelity of DNA Replication." Feb. 13, 1990
56. Gordon Conference on Enzymes, Coenzymes and Metabolic Pathways, Meriden, NH. "Substrate Channeling: Facts and Misinterpretations." July 5, 1990
57. Gordon Research Conference on Mutagenesis. Plymouth State College, Plymouth, NH. "Mechanistic Basis of DNA Polymerase Fidelity." July 11, 1990
58. Department of Biochemistry, Duke University Medical School, Durham, NC. "Mechanistic Basis for DNA Polymerase Fidelity." Oct 5, 1990
59. Department of Microbiology, New Jersey School of Medicine, Newark, NJ. "Mechanistic Basis for DNA Polymerase Fidelity." Oct 23, 1990
60. Department of Chemistry, Wayne State University, Detroit, MI. "Mechanistic Basis for DNA Polymerase Fidelity." Oct 29, 1990
61. Department of Biochemistry, Johns Hopkins School of Public Health, Baltimore, MD. "Mechanistic Basis for DNA Polymerase Fidelity." Dec. 10, 1990
62. Department of Pharmacology, Yale University Medical School, New Haven, CT. "Mechanistic Basis for DNA Polymerase Fidelity." Dec. 18, 1990
63. Department of Chemistry and Biochemistry, University of Delaware, Newark, DE. "Mechanistic Basis for DNA Polymerase Fidelity." Sept. 6, 1991
64. Department of Chemistry, Cornell University, Ithaca, NY. "Kinetic and Thermodynamic Basis for DNA Polymerase Fidelity." Sept. 25, 1991
65. Royal Society, London, England "Kinetic and Thermodynamic Basis for DNA Polymerase Fidelity." Oct. 25, 1991
66. Department of Biochemistry, University of Minnesota, Minneapolis, MN. "Kinetic and Thermodynamic Basis for DNA Polymerase Fidelity." Jan 8, 1992
67. National Institutes of Health, Bethesda, MD. "Mechanism and Inhibition of HIV Reverse Transcriptase." April 7, 1992
68. Boeringer-Ingelheim, Danbury, CT. "Mechanism and Inhibition of HIV Reverse Transcriptase." Oct. 6, 1992
69. Center for Advanced Research in Biotechnology, University of Maryland, Rockville, MD. "Mechanism and Inhibition of HIV Reverse Transcriptase." Oct. 26, 1992
70. Japanese Biophysical Society Meeting, Osaka, Japan. "Conformational Coupling in DNA Replication." Nov. 6, 1992
71. Bristol-Myers-Squibb Pharmaceutical, Princeton, NJ. "Mechanism and Inhibition of HIV Reverse Transcriptase." Dec. 10, 1992
72. Parke-Davis Pharmaceutical, Ann Arbor, MI. "Mechanism and Inhibition of HIV Reverse Transcriptase." Jan 18, 1993
73. University of Michigan, Dept. of Biochemistry, Ann Arbor, MI. "Mechanism and Inhibition of HIV Reverse Transcriptase." Jan 19, 1993 (Annual graduate student invited speaker).
74. Washington University, Dept. of Biochemistry and Molecular Biophysics, St. Louis, MO. "Mechanism and Inhibition of HIV Reverse Transcriptase." Feb. 3, 1993

75. National Institutes of Health, Bethesda, MD. "HIV Reverse Transcriptase Mechanism and Inhibition." Feb. 19, 1993
76. Department of Chemistry, University of Rochester, Rochester, NY. Albert Noyes/Mobay Memorial Lectures I: "Detection of Enzyme Intermediates: Lessons from EPSP Synthase and Tryptophan Synthase." Feb. 22, 1993
77. Department of Chemistry, University of Rochester, Rochester, NY. Albert Noyes/Mobay Memorial Lectures II: "DNA Polymerase Fidelity and Error Correction." Feb 23, 1993
78. Department of Chemistry, University of Rochester, Rochester, NY. Albert Noyes/Mobay Memorial Lectures III: "HIV Reverse Transcriptase Mechanism and Inhibition." Feb. 24, 1993
79. International Conference on Perspectives in AIDS Research, Heidelberg, Germany. "HIV Reverse Transcriptase Mechanism and Inhibition." April 20, 1993
80. Department of Biochemistry, Ohio State University, Columbus, OH. "HIV Reverse Transcriptase Mechanism and Inhibition." May 18, 1993
81. Department of Biochemistry, Temple University, Philadelphia, PA. "HIV Reverse Transcriptase Mechanism and Inhibition." May 20, 1993
82. Steenbock Symposium on Protein-DNA Interactions, Department of Biochemistry, University of Wisconsin, Madison, WI. "HIV Reverse Transcriptase Mechanism and Inhibition." May 24, 1993
83. Department of Human Biological Chemistry and Genetics, University of Texas Medical Branch, Galveston, TX. "HIV Reverse Transcriptase Mechanism and Inhibition." Dec. 16, 1993
84. Biophysical Society Meeting, Invited Symposium Talk. "Mechanisms of DNA Polymerization." Feb. 16, 1994
85. Department of Chemistry and Biochemistry, University of Maryland-Baltimore County, Baltimore, MA. "Mechanisms of DNA Polymerization." March 21, 1994
86. Gordon Conference on Biopolymers, Newport, RI. "Energy Transduction Mechanisms." June 27, 1994
87. Rutgers University, Center for Advanced Biotechnology and Medicine. "HIV Reverse Transcriptase Mechanism and Inhibition." July 16, 1994
88. Biophysical Discussions Meeting, Airlie, VA. "Kinesin ATPase Mechanism." October 22, 1994
89. Michigan State University, Department of Biochemistry, East Lansing, MI. "HIV Reverse Transcriptase Fidelity and the Mechanism of Inhibition by Non-nucleoside Inhibitors". December 5, 1994
90. Vanderbilt University, Nashville, KY. "Mechanism of HIV Reverse Transcriptase Inhibition by Non-nucleoside Inhibitors". December 9, 1994
91. Albert Einstein College of Medicine, Bronx, NY. "Mechanism of HIV Reverse Transcriptase and Mode of Inhibition by Non-nucleoside Inhibitors." December 20, 1994
92. Biophysical Society Meeting, San Francisco, CA. "The New Enzymology." February 12, 1994
93. National Institutes of Health, National Heart, Lung and Blood Institute, Bethesda, MD. "Pathway of Processive ATP Hydrolysis by Kinesin." March 27, 1995
94. University of North Carolina, Department of Biochemistry, Chapel Hill, NC. "Pathway of Processive ATP Hydrolysis by Kinesin". April 18, 1995
95. Fidelity Conference. Sponsored by National Institutes of Environmental Health Science, Wrightsville Beach, NC. "Mechanism of HIV Reverse Transcriptase and Mode of Inhibition by Non-nucleoside Inhibitors." September 12, 1995
96. Brandeis University, Department of Biochemistry, Waltham, MA. "Pathway of processive ATP hydrolysis by kinesin." December 6, 1995
96. University of Arizona, Department of Biochemistry, Tucson, AZ. "Mechanism and Inhibition of HIV Reverse Transcriptase." September 6, 1996
97. EMBO Workshop, Xanten, Germany, "Effects of RNA Secondary Structure on HIV Reverse Transcriptase." October 3, 1996
98. EMBO Workshop, Xanten, Germany, "Alternating Site Mechanism of Kinesin ATPase." October 4, 1996
99. Ohio State University, Columbus, OH. "Mechanism and Inhibition of HIV Reverse Trascriptase." February 17, 1997

100. Biophysical Society Meeting, New Orleans, LA. "HIV Reverse Transcriptase: Mechanism of Reading through hairpins." March 2, 1997
101. Salk Institute, La Jolla, CA . "HIV Reverse Transcriptase Mechanism, Inhibition and Resistance." April 11, 1997
102. Department of Biochemistry & Molecular Biology, Hershey Medical Center, Hershey, PA. "HIV Reverse Transcriptase mechanism, inhibition and resistance." May 5, 1997.
103. Department of Biochemistry & Biophysics, University of North Carolina, Chapel Hill, NC. "HIV Reverse Transcriptase Mechanism, Inhibition and Resistance." June 23, 1997
104. Gordon Conference on Enzymes, Coenzymes and Metabolic Pathways, Meriden, NH. "Alternating Site Mechanism of the Kinesin ATPase." July 14, 1997
105. International Conference of Energy Transduction and Regulation, Bochum, Germany. "Alternating Site Mechanism of the Kinesin ATPase." October 6, 1997
106. Organon Teknika, Boxtel, Netherlands. "HIV Reverse Transcriptase Mechanism, Inhibition and Resistance." October 8, 1997
107. Max-Planck Institute, DESY, Hamburg, Germany. "Alternating Site Mechanism of the Kinesin ATPase." October 10, 1997
108. Department of Biochemistry, Stanford University, Stanford, CA "Alternating Site Mechanism of the Kinesin ATPase." November 5, 1997
109. Department of Biochemistry and Chemistry, UC Santa Barbara, Santa Barbara, CA. . "HIV Reverse Transcriptase Mechanism, Inhibition and Resistance." November 6, 1997
110. Biophysics Program, Cornell University, Ithaca, NY. "Alternating Site Mechanism of the Kinesin ATPase." November 12, 1997
111. Program in Cellular and Molecular Biodynamics, Rutgers University, Newark, NY. "Alternating Site Mechanism of the Kinesin ATPase." November 17, 1997
112. Molecular Biology Institute, University of Texas, Austin, TX "HIV Reverse Transcriptase: Mechanism, Inhibition and Resistance." December 15, 1997
113. Department of Chemistry, University of Texas, Austin, TX "The New Enzymology: Transient State Kinetic Analysis." March 10, 1998
114. Department of Biochemistry, Case Western Reserve University, School of Medicine, Cleveland, OH "HIV Reverse Transcriptase Pausing while Reading Through RNA Hairpins." April 15, 1998
115. AIDS Structural Biology Meeting, NIH, Bethesda, MD. "Mechanistic Studies on Reverse Transcriptase." June 10, 1998
116. Department of Chemistry, University of Delaware, Newark, DE. "HIV Reverse Transcriptase Mechanism." November 9, 1998
117. Department of Chemistry & Biochemistry, University of Maryland, College Park, MD. "HIV Reverse Transcriptase and RNA Secondary Structure" November 10, 1998
118. Center for Advanced Research in Biotechnology, Rockville, MD "Alternating Site Mechanism of the Kinesin ATPase." November 11, 1998
119. Molecular Motors Meeting, Heidelberg, Germany, "Mechanism of Force Production by Kinesin" November 27, 1999
120. Yale University, Department of Biochemistry and Molecular Biophysics, *Joseph Coleman Memorial Lecture*, "Mitochondrial DNA Polymerase Fidelity and the Toxicity of Nucleoside Analogs." October 30, 2000.
121. Eli Lilly Company, Indianapolis, Indiana. "Mitochondrial DNA Polymerase Fidelity and the Toxicity of Nucleoside Analogs." November 1, 2000
122. Dupont Pharmaceutical, "Mitochondrial DNA Polymerase Fidelity and the Toxicity of Nucleoside Analogs." July 11, 2001
123. Molecular Motors Colloquium, Cologne, Germany. "DNA polymerase mechanisms." October 3, 2001
124. University of Texas Medical Branch, Galveston, Tx. "Mitochondrial DNA Polymerase Fidelity and the Toxicity of Nucleoside Analogs." December 10, 2001
125. Rice University, Houston, TX "Role of the mitochondrial DNA polymerase in the toxicity of nucleoside analogs used to treat AIDS" January, 2002

126. Mutagenesis Gordon Conference, Lewiston, Maine. "Role of the mitochondrial DNA polymerase in the toxicity of nucleoside analogs used to treat AIDS." July 29, 2002
127. International Conference on Electron Microscopy, Durban, South Africa. "Mechanism of Force Production by Kinesin" September 3, 2002
128. Ambion, Austin, TX. HIV Reverse Transcriptase kinetics of reading through RNA secondary structure. September 19, 2002
129. Applera Applied Biosystems, Forster City, CA. "Toxicity of nucleoside analogs used to treat AIDS" July 19, 2004
130. Molecular Motors Colloquium, Hannover, Germany. "Pathway of processive movement by kinesin." September 27, 2004
131. University of South Florida, Tampa, FL "Toxicity of nucleoside analogs used to treat AIDS and selectivity of the mitochondrial DNA polymerase" October 21, 2004
132. University of Florida, Gainesville, FL "Toxicity of nucleoside analogs used to treat AIDS and selectivity of the mitochondrial DNA polymerase" October 22, 2004
133. Max-Planck Institute, Dortmund, Germany "A new paradigm for enzyme selectivity: Unique conformational states during DNA replication." September 19, 2005
134. Molecular Motors Meeting, Hamburg, Germany. "New insights into the kinesin ATPase pathway using single molecule kinetics." September 23, 2005
135. Baylor University, Waco, TX. "Toxicity of nucleoside analogs used to treat AIDS." March 3, 2006
136. University of South Florida, Tampa, FL. "Alternating site ATPase Mechanism of the Kinesin Molecular Motor." March 24, 2006
137. Pacific Biosciences, Menlo Park, CA. "A new paradigm for DNA polymerase specificity." April 7, 2006
138. Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways, Biddeford, ME "A New Paradigm for Enzyme Specificity." July 20, 2006
139. Pacific Biosciences, Menlo Park, CA. "Kinetics of enzymatic oxygen scavenging." October 20, 2006
140. Enzyme Mechanisms Conference, St. Pete's Beach, FL. "Role of conformational changes in Enzyme Specificity." January 5, 2007
141. American Physical Society, Denver, CO. "Mechanism of force production by kinesin" March 8, 2007.
142. Johns Hopkins University, Dept of Biophysics, Baltimore, MD. "Dynamics of DNA polymerase selectivity and the role of the human mitochondrial DNA polymerase in the toxicity of nucleoside analogs used to treat AIDS. November 28, 2007
143. Texas Enzymes Conference, Austin, TX. "Simulation and fitting of kinetic data." January 12, 2008
144. Pacific Biosciences, Menlo Park, CA. "Unusual kinetics of incorporation of AZT and 8-oxodGTP." January 18, 2008
145. Roche Palo Alto, Palo Alto, CA. "Computer simulation and the unusual kinetics of incorporation of AZT and 8-oxodG by the human mitochondrial DNA polymerase. March 27, 2008.
146. Carleton University, Ottawa, Ontario, Canada. "Simulation and fitting of kinetic data." February 22, 2008.
147. University of Iowa, Department of Chemistry, Iowa City, IA. "DNA polymerase dynamics and the effectiveness versus toxicity of nucleoside analogs used to treat HIV infections." April 25, 2008.
148. *Newmark Award Lecture*, University of Kansas, Department of Molecular Biosciences, Lawrence, KS. "Role of the human mitochondrial DNA polymerase in the toxicity of nucleoside analogs used to treat HIV infections." October 13, 2008
149. Dept. of Biochemistry, University of Missouri, Columbia, MO "Effectiveness versus toxicity of nucleoside analogs used to treat HIV infections." February 20, 2009
150. International meeting on coiled-coils, Alpbach, Austria. "Kinesin structure and mechanism." September 10, 2009.
151. Dept. of Biochemistry, University of Texas San Antonio, San Antonio, TX "Effectiveness versus toxicity of nucleoside analogs used to treat HIV infections." September 25, 2009

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