CURRICULUM VITAE

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Education

July, l980	N.I.H. Postdoctoral Research Associate Purdue University Research Director: Professor Heinz G. Floss
January, l978	University of California, San Francisco Research Director: Professor John C. Craig Ph.D. Degree in Pharmaceutical Chemistry Degree Conferred July 25, l978 Title of Dissertation: Study of Deuterium Isotope Effects in Metabolic *C*-Hydroxylation
September, l970- April, l972	Georgia Institute of Technology Atlanta, Georgia Took graduate course work in organic and inorganic chemistry
June, l971	Georgia State University Atlanta, Georgia Research Director: Professor David W. Boykin M. S. Degree in Organic Chemistry Title of Thesis: Part I, Synthesis of Potential Antimalarials; Part II, Steric Effects on the Carbonyl Stretching Frequency of Styryl Alkyl Ketones
June, l968	Jacksonville State University Jacksonville, Alabama B.S. Degree in Chemistry and Math
June, l965	Honor graduate of Saks High School Anniston, Alabama

Experiences

2008-Present	Frederick F. Blicke Collegiate Professor of Medicinal Chemistry
2004-2012	Professor and Chair, Medicinal Chemistry Director, Interdepartmental Program in Medicinal Chemistry Professor of Chemistry University of Michigan Ann Arbor, Michigan
2000-2004	Professor and Associate Chairman, Medicinal Chemistry Professor of Chemistry University of Michigan Ann Arbor, Michigan
1998-Present	Professor of Medicinal Chemistry University of Michigan Ann Arbor, Michigan
1986-1998	Associate Professor of Medicinal Chemistry and Pharmacognosy University of Michigan Ann Arbor, Michigan
1980-1986	Assistant Professor of Medicinal Chemistry and Pharmacognosy University of Michigan Ann Arbor, Michigan
1978-1980	National Institutes of Health Postdoctoral Fellow Purdue University West Lafayette, Indiana
1978	Postdoctoral Research Associate Purdue University West Lafayette, Indiana
1977-1978	Eli Lilly Research Fellow University of California San Francisco, California
1974-l977	National Institutes of Health Trainee University of California San Francisco, California
1974-1976	Teaching Assistant University of California San Francisco, California
1972	Research Assistant Georgia Institute of Technology Atlanta, Georgia

1970-1972	Teaching Assistant Georgia Institute of Technology Atlanta, Georgia
1968-1970	Research Assistant Georgia State University Atlanta, Georgia
1969	Teaching Assistant Georgia State University Atlanta, Georgia
1967-1968	Teaching Assistant Jacksonville State University Jacksonville, Alabama

Recent Awards and Honors

TEACHER OF THE YEAR AWARD - College of Pharmacy - 2000-2001

UNIVERSITY OF MICHIGAN FACULTY RECOGNITION AWARD - University of Michigan 2001-2002

Elected Fellow American Associate for the Advancement of Science Section on Chemistry 2007

Elected Member-at-Large of the Section on Chemistry American Associate for the Advancement of Science 2008

University and College-wide Institutional Initiatives

Creator the University of Michigan College of Pharmacy Medicinal Chemistry Core Synthesis Laboratory (http://sitemaker.umich.edu/mccsl/home)

Co-Creator the University of Michigan Center for Drug Discovery (web site under construction)

Member of the executive advisory board of the Life Sciences Institute Center for Chemical Genomics (CCG) (http://www.lsi.umich.edu/facultyresearch/centers/chemicalgenomics)

Member of the executive advisory board of the Biomedical Research Core Facilities (http://www.brcf.med.umich.edu)

PI of the Pharmacological Sciences Training Program (http://sitemaker.umich.edu/pharmacology.training/pstp)

Co-PI of the NSF REU Site in the College of Pharmacy at the University of Michigan: Interdisciplinary Research Experiences for Undergraduates (REU)
Program in the Structure and Function of Proteins (http://pharmacy.umich.edu/reu/overview)

Member of the executive committee of the newly created Interdepartmental Program in Chemical-Biology (http://www.chembio.umich.edu)

Accomplishments as Chair of Medicinal Chemistry (www.umich.edu/~pharmacy/MedChem)

Increase enrollment from 10 to 42 student in three years with an increase in overall G.R.E. and G.P.A. scores for the new students each successive year

Hired four new assistant Professors, one female, one African American male, one Russian male and one Ohio male.

Appointed Professor David Sherman as the first Hans Vahlteich Chair in Medicinal Chemistry

Instituted departmental procedures to both strengthen the overall quality of the education experience while shortening Ph.D. degree to five years by instituting yearly goals/measures

Initiated a new Chem-informatics sub-disciple into Medicinal Chemistry

Professional Societies

American Chemical Society
Sigma Xi
Rho Chi
America
American Association for the Advancement of Science
American Society of Pharmacognosy
International Isotope Society

Grants

Presentations

Gordon Conference on Enzymes, Coenzymes and Metabolic Pathways, Meriden, New Hampshire, July, 1979, poster.

Gordon Conference on Drug Metabolism, Plymouth, New Hampshire, July, 1979, poster.

American Society of Pharmacognosy International Symposium on Recent Advances in Antibiotics and Alkaloids, West Lafayette, Indiana, July, 1979, poster.

American Society of Pharmacognosy International Symposium on Recent Advances in Antibiotics and Alkaloids, West Lafayette, Indiana, July, 1979, podium.

American Chemical Society, National Meeting, Washington, D.C., September, 1979, poster.

Interviewed on National Public Radio Program, "All Things Considered," February 24, 1982, Stereochemistry of Sugars and Enzymes Stereospecificity.

Gordon Research Conference, Chemistry and Physics of Isotopes, Ventura, California, February, 1981, podium.

Fourth International Meeting on Transmethylation, Lake of the Ozarks, Missouri, October, 1981, Podium. Chaired one evening session.

American Society of Pharmacognosy Twenty-Third Annual Meeting, Pittsburgh, Pennsylvania, August, 1982, poster.

Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways, Meriden, New Hampshire, July, 1983, poster.

American Society of Pharmacognosy Twenty-Fourth Annual Meeting, University, Mississippi, July, 1983, poster.

American Society of Pharmacognosy Twenty-Fifth Annual Meeting, Austin, Texas, August, 1984, podium.

The University of California, San Francisco, School of Pharmacy, December 6,1984, podium.

American Society of Pharmacognosy Twenty-Seventh Annual Meeting, Ann Arbor, Michigan, July, 1984, Two posters.

The Ninth American Peptide Symposium, Toronto, Canada, June, 1985, poster.

Seventeenth Workshop on Organic Synthesis and Natural Products Chemistry, Squam Lake, N. H., July 1986. One of 18 organic and natural product chemists in the nation selected to attend.

The College of Pharmacy, University of Toledo, November, 1986.

Tenth American Peptide Symposium, Washington University in St. Louis, Mo., May, 1987. Two posters.

The Department of Chemistry, The University of Alberta, Edmonton, Alberta, May, 1987.

American Society of Pharmacognosy Twenty-Eighth Annual Meeting, University of Rhode Island in Kingston, Rhode Island, July, 1987, Two posters.

Eleventh Enzyme Mechanism Conference, St. Petersburg Beach, FL., January, 1989, Poster.

IXth Midwest Enzyme Chemistry Conference, Northwestern University, October 14, 1989, Two posters and podium presentation by Marletta on joint project.

The Department of Chemistry, University of Akron, Akron, Ohio, May 2, 1990.

Xth Midwest Enzyme Chemistry Conference, Loyola University Lakeshore Campus, Chicago, IL, October 13, 1990, poster.

Third US Central Regional Meeting of the International Isotope Society, October 18-19, 1991, Indianapolis, Indiana, poster.

Thirty-First Annual Medicinal Chemistry Symposium, June 4-6, 1990, Amherst Campus, SUNY at Buffalo, Buffalo, NY. poster.

Local ACS Bioorganic Symposium, University of Michigan, October, 1990, Ann Arbor, Michigan, poster.

Warner-Lambert/Parke-Davis, August 7, 1991, Ann Arbor, MI. "Preliminary Studies on the Enzyme 3-Deoxy-D-*Manno*-Octulosonate (KDO) 8-Phosphate Synthase: A Unique Chemotherapeutic Target" podium.

XIth Midwest Enzyme Chemistry Conference, October 12, 1991, University of Illinois at Chicago, Chicago, IL, "Mechanistic Studies on the Enzyme 3-Deoxyoctulosonate 8-Phosphate Synthase" poster.

1991 Midwest Pharmacy Meeting, October 25-26, 1991, Merrillville, IN. "Pharmacognosy and Natural Products in the Pharmacy Graduate Program" podium.

Enzyme Discussion Group, May 6, 1992, Ann Arbor, MI. "Preliminary Studies on the Enzyme 3-

Deoxy-D-*Manno*-Octulosonate (KDO) 8-Phosphate Synthase: A Unique Chemotherapeutic Target" podium.

XIIth Midwest Enzyme Chemistry Conference, October 10, 1992, University of Illinois at Chicago, Chicago, IL

"Mechanistic Studies on the Enzyme 3-Deoxyoctulosonate 8-Phosphate Synthase" poster.

"Overexpression, Purification and Initial Kinetic Studies of 3-Deoxy-D-*manno*-2-octulosonate 8-Phosphate Synthase" poster.

Fifth Annual Molecular Biophysics Poster Session, October 14, 1992, Michigan League, U of MI, Ann Arbor, MI.

"Mechanistic Studies on the Enzyme 3-Deoxyoctulosonate 8-Phosphate Synthase" poster.

"Overexpression, Purification and Initial Kinetic Studies of 3-Deoxy-D-*manno*-2-octulosonate 8-Phosphate Synthase" poster.

Department of Chemistry/Biochemistry, December 6,7,8, 1992, University of Waterloo, Waterloo, Ontario, Canada, "Mechanism of S-Adenosyl-L-Methionine Hydrolase" podium

13th Enzyme Mechanisms Conference, January 6-10, 1993, Key Largo Resort, Florida, "Overexpression, Purification and Initial Mechanistic Studies of 3-Deoxy-D-*manno*-2-octulosonate 8-Phosphate Synthase" poster.

International Isotope Society, Sixth US Central Regional Meeting, May 13-14, 1993, Weber's Inn, Ann Arbor, MI.

"Stereochemistry of 3-Deoxy-D-*manno*-2-octulosonate 8-Phosphate Synthase" poster.

"Initial Stereochemical Studies of Phosphoenolpyruvate: uridine-5'-diphospho-*N*-acetyl-2-amino-2-deoxyglucose-3-enolpyruvyl transferase" poster.

Gordon Research Conference in Medicinal Chemistry, August 1-6, 1993, Colby-Sawyer North, London, N.H.,

"Overexpression, Purification and Initial Mechanistic Studies of Phosphoenol–pyruvate: uridine-5'-diphospho-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

"Mechanistic Studies on the Enzyme 3-Deoxy-D-*manno*-2-octulosonate 8-Phosphate Synthase" poster.

206th ACS National Meeting, August 22-27, 1993, Chicago, IL,

"Stereochemical Studies of Phosphoenolpyruvate: uridine-5'-diphospho-N-acetylglucosamine enolpyruvyl transferase" poster

"Overexpression, Purification and Initial Characterization of PEP:UDP-N-acetylglucosamine enolpyruvyl transferase" poster

XIIIth Midwest Enzyme Chemistry Conference, October 9, 1993, Loyola University of Chicago Lake Shore Campus, Chicago, IL,

"Stereochemical Studies of Phosphoenolpyruvate: uridine-5'-diphospho-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

"Overexpression, Purification and Identification of the Reactive Cysteines of PEP: UDP-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

Sixth Annual Molecular Biophysics Poster Session, October 14, 1993, Michigan League, U of MI, Ann Arbor, MI.

"Stereochemical Studies of Phosphoenolpyruvate: uridine-5'-diphospho-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

"Overexpression, Purification and Identification of the Reactive Cysteines of PEP: UDP-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

Protein Structure and Design Symposium, December 11, 1993, Rackham Amphitheater, University of Michigan, Ann Arbor, "Mechanistic Studies of Phosphoenol Pyruvate-Utilizing Enzymes: A New Generation of Antibiotics" podium.

Joint Meeting of the ACS Central and Great Lakes, June 1-3, 1994, University of Michigan, Ann Arbor, UDP-*N*-acetylglucosamine Enolpyruvyl Transferase Catalyzes The Unusual Transformation of PEP to 3-Phosphoglyceric Acid" poster.

Gordon Research Conference in Enzymes, Coenzymes and Metabolic Pathways, July 17-22, 1994, Kimball Union Academy, Meriden, N.H., "Mechanistic Studies of Phosphoenolpyruvate: Uridine-5'-Diphospho-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

Seventh Annual Molecular Biophysics Poster Session, October 12, 1993, Michigan League, U of MI, Ann Arbor, MI.,

"Overexpression, Purification and Initial Studies of the Ethylene-Forming Enzyme" poster.

"Mechanistic Studies of UDP-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

"Overexpression, Purification and Initial Kinetic Studies of UDP-*N*-acetylenolpyruvyl glucosamine Reductase" poster.

XIVth Midwest Enzyme Chemistry Conference, October 15, 1993, Northwestern University, Evanston, IL,

"Overexpression, Purification and Initial Studies of the Ethylene-Forming Enzyme" poster.

"Mechanistic Studies of UDP-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

"Overexpression, Purification and Initial Kinetic Studies of UDP-*N*-acetylenolpyruvylglucosamine Reductase" poster.

American Chemical Society, Great Lakes/Central Regional Meeting, June 1-3, 1994, Ann Arbor, MI, "UDP-*N*-acetylglucosamine Enolpyruyl Transferase Catalyzes the Unusual Transformation of PEP to 3-Phosphoglyceric Acid, poster.

Gordon Research Conference in Enzymes, Coenzymes and Metabolic Pathways, July 15-22, 1994, Kimball Union Academy, Meriden, N.H., "Mechanistic Studies of Phosphoenolpyruvate: Uridine-5'-diphospho-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

XIVth Midwest Enzyme Chemistry Conference, October 15, 1994, Northwestern University, Evanston, IL,

"Overexpression, Purification and Initial Kinetic Studies of UDP-*N*-acetylenolpyruvylglucosamine Reductase" poster.

"Overexpression, Purification and Initial Studies of Ethylene-Forming Enzyme" poster.

"Mechanistic Studies of UDP-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

Eigthth Annual Molecular Biophysics Fall Poster Session, October 12, 1994, Michigan League, U of Michigan, Ann Arbor, MI.,

"Overexpression, Purification and Initial Kinetic Studies of UDP-*N*-acetylenolpyruvylglucosamine Reductase" poster.

"Overexpression, Purification and Initial Studies of Ethylene-Forming Enzyme" poster.

"Mechanistic Studies of UDP-*N*-acetylglucosamine Enolpyruvyl Transferase" poster.

AACP Meeting "Permeation of Buprenorphine and its 3-Alkyl-Ester Prodrugs through Human Skin." Audra L. Stinchcomb, Hirofumi Imoto, Ronald W. Woodard and G. L. Flynn poster.

XVth Midwest Enzyme Chemistry Conference, October 14, 1995, University of Illinois at Chicago, Chicago, IL

"Essential Cysteines in KDO 8-P Synthase from E. coli: Analysis by Chemical Modification and Site-directed Mutagensis" poster.

"Overexpression of S-Adenosylmethionine Hydrolase" poster.

"Overexpression, Purification and Initial Studies of Ethylene-Forming Enzyme" poster.

211th National American Chemical Society Meeting, March 23-28, 1996, New Orleans, LA., "Essential

Cysteines in KDO 8-P Synthase from *E.coli*: Analysis by Chemical Modification and Site-directed Mutagenesis" poster.

XVIth Midwest Enzyme Chemistry Conference, October 12, 1996, University of Chicago, Chicago, Chicago, IL

"Futher Studies of KDO 8-P Synthase: 3-Bromopyruvate Inactivation Studies and Further Site-directed Mutagensis" poster.

"Overexpression of S-Adenosylmethionine Hydrolase" poster.

"Identification of the Active Site Residues of ACC Oxidase involved in Metal Binding" poster.

15th Winter Enzyme Mechanism Conference, January 4-8, 1997, Naples, FA. "Identification of the Active Site Residues of ACC Oxidase Involved in Metal Binding."

XVIIth Midwest Enzyme Chemistry Conference, October 18, 1997, Loyola University of Chicago, Chicago, IL,

E) and (*Z*)-2-Phosphoenolbutyrate are Pseudosubstrates for KDO 8-P Synthase, Matthew R. Birck, Trudy Wilson and Ronald W. Woodard. poster

Are Histidines Essential for the Catalytic Activity of 3-Deoxy-D-*Manno*-Octulosonic Acid 8-Phosphate Synthase?, Galina Ya. Sheflyan, Grace Chen, Trudy L. Wilson and Ronald W. Woodard. poster.

Initial Characterization of ACC Oxidase, David L. Howe and Ronald W. Woodard. poster.

The 20th Steenbock Symposium on Enzymatic Mechanisms, May 28-31, 1998, University of Wisconsin-Madison,

Uridine-5'-Diphospho-*N*-Acetylgalactosamine Is A Substrate For Enolpyruvyl Transferase And It's Product Is A Substrate For Ep-Reductase Matthew R. Birck, Galina Ya. Sheflyan and Ronald W. Woodard. poster.

Enzymatic Synthesis Of 3-Deoxy-D-*Manno*-Octulosonate 8-Phosphate By 3-Deoxy-D-*Arabino*-Heptulosonate 7-Phosphate Synthase (Phe) David L. Howe, Galina Ya. Sheflyan, Trudy Wilson and Ronald W. Woodard. poster.

Identification Of Active Site Histidine Residues Of 3-Deoxy-D-*Manno*-Octulosonic Acid 8-Phosphate Synthase Galina Ya. Sheflyan, Grace Chen, Henry Duewel and Ronald W. Woodard. poster.

3-Deoxy-D-Arabino-Heptulosonate-7-Phosphate Synthase From *Escherichia Coli*: Importance Of Cysteine-61 And Histidine-64 For The Catalysis Appavu K. Sundaram, Galina Ya. Sheflyan, and Ronald W. Woodard. poster.

XVIIIth Midwest Enzyme Chemistry Conference, October 3, 1998, Northwestern University, Evanston,

IL,

Tandem Expression of an Oligomeric Enzyme: Probing The Role of Histidine-202 In KDO 8-P Synthase, Galina YA. Sheflyan and Ronald W. Woodard. poster.

Investigation of the Role of Histidine Residues in 3-Deoxy-D-*arabino*-heptulosonate 7-Phosphate Synthase, David L. Howe, Henry Duewel, and Ronald W. Woodard. poster.

Overexpression, Purification and Characterization of a Thermostable 3-Deoxy-D-*manno*-Octulosonic Acid 8-Phosphate Synthase from *Aquifex Aeolicus,* Henry S. Duewel, Galina Y. Sheflyan, Dana Randall and Ronald W. Woodard. poster.

Homology Studies Between *E.Coli* KDO 8-P Synthase and DAH 7-P Synthase-Chorismate Mutase from *B. Subtilis* by Site-Directed Mutagenesis**,** Appavu K. Sundaram, Galina Y. Sheflyan, Edgar S. Diaz-Cruz, Jeffery D. Kittendorf and Ronald W. Woodard. poster.

Stereochemistry of murA C115D with 3-Methyl Phospho*enol*pyruvate, Matthew R. Birck and Ronald W. Woodard. poster.

Mechanistic Studies of Phosphoenol Pyruvate-Utilizing Enzymes: Targets for a New Generation of Antibiotics? The Biochemistry-Chemistry Department, Indiana University March 26-27, 1998. Invited Speaker.

Mechanistic Studies of Phosphoenol Pyruvate-Utilizing Enzymes: Targets for a New Generation of Antibiotics? The Medicinal Chemistry Department, Wayne State University, April 8, 1998. Invited Speaker.

Mechanistic Studies of Phosphoenol Pyruvate-Utilizing Enzymes: Targets for a New Generation of Antibiotics? Interdepartmental Program in Medicinal Chemistry, University of Michigan, April 23, 1998. Invited Speaker.

Mechanistic Studies of Phosphoenol Pyruvate-Utilizing Enzymes: Targets for a New Generation of Antibiotics? The Chemistry Department, University of Alberta, June 21-23, 1998. Invited Speaker and external examiner for Ph.D. degree.

Gordon Research Conference in Enzymes, Coenzymes and Metabolic Pathways, July 12-17, 1998, Kimball Union Academy, Meriden, N.H., "Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase" poster.

16th Winter Enzyme Mechanism Conference, January 6-10, 1999, Silverado Country Club and Resort, Napa, CA., "Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase" poster.

XIIth KDO Meeting, February 4-7, 1999, Research Center Borstel, Hamburg, Germany, "Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase" podium.

XIXth Midwest Enzyme Chemistry Conference, October 2, 1999, University of Illinois at Chicago, Chicago, IL:

Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase, Ronald W. Woodard. podium.

Investigation of the Role of Histidine Residues in 3-Deoxy-D-*arabino*-heptulosonate 7-Phosphate Synthase, David L. Howe, Henry Duewel, and Ronald W. Woodard. poster.

Isolation and Characterization of KDO-8-P Synthase from a Mutant Strain of *Salmonella typhimurium,* William P. Taylor, Galina Y. Sheflyan and Ronald W. Woodard. poster.

Probing the Stereochemistry of the *E. coli* 3-Deoxy-D-*arabino*-heptulosonate 7-Phosphate Synthase (Phenylalanine-sensitive) Catalyzed Synthesis of DAH 7-P and KDO 8-P Analogs**,** Appavu K. Sundaram, and Ronald W. Woodard. poster.

Overexpression and Characterization of the 3-Deoxy-D-*Manno*-Octulosonic Acid 8-Phosphate Synthase from *Helicobacter pylori* J99, Matthew R. Birck and Ronald W. Woodard. poster.

XIIIth KDO Meeting, January 26-February 3, 2000, Research Center Borstel, Hamburg, Germany, "Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase" podium.

Valparaiso University, Valparaiso, IN., February 21, 2000 "PEP-Utilizing Enzymes: Potential Antibacterial Targets - Medicinal Chemistry at the University of Michigan."

219th American Chemical Society Spring Meeting, March 26-30, 2000, San Francisco, CA. "Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase", poster.

College of Wooster, Wooster, Ohio, April 3-4, 2000, "PEP-Utilizing Enzymes: Potential Antibacterial Targets - Medicinal Chemistry at the University of Michigan."

Enzymes, Coenzymes, and Metabolic Pathways Gordon Conference, July 16-21, 2000, Kimball Union Academy, Meriden, N.H., *Aquifex aeolicus* KDO 8-Phosphate Synthase: A New Class of KDO 8-P Synthase or Evolutionary Anomaly? Poster

Ohio State University, Columbus, OH, September 26, 2000, "Mechanistic Comparisons of KDO 8-P Synthase and DAH 7-P Synthase"

XXth Midwest Enzyme Chemistry Conference, September 23, 2000, University of Chicago, Chicago, IL:

Aquifex aeolicus KDO 8-Phosphate Synthase: A New Class of KDO 8-P Synthase Or Evolutionary Anomaly? Matthew R. Birck, Henry S. Duewel, David L. Howe, and Ronald W. Woodard

Investigation of the Substrate Specificity of *E. Coli* 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase. David L. Howe and Ronald W. Woodard

Identification of a Slow- Tight-Binding Inhibitor of 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase. Matthew R. Birck, Todd Holler, and Ronald W. Woodard

Substrate Specificity and Stereochemistry of 3-Deoxy-D-*manno*-octulosonate 8-Phosphate Synthase And 3-Deoxy-D-*arabino*-heptulosonate 7-Phosphate Synthase from *Neisseria gonorrhoeae*. Appavu K. Sundaram, Galina Ya. Sheflyan, William P. Taylor, and Ronald W. Woodard

2000 International Chemical Congress of Pacific Basin Societies, December 14-19, 2000, Honolulu, HA. *Aquifex aeolicus* KDO 8-Phosphate Synthase: A New Class of KDO 8-P Synthase or Evolutionary Anomaly? Matthew R. Birck, Henry S. Duewel, David L. Howe, and Ronald W. Woodard. Podium and session chairman.

17th Enzyme Mechanisms Conference, January 3-6, 2001, Marco Island, FA. *Aquifex aeolicus* KDO 8-Phosphate Synthase: A New Class of KDO 8-P Synthase or Evolutionary Anomaly? Matthew R. Birck, Henry S. Duewel, David L. Howe, and Ronald W. Woodard. Poster.

Invited Seminar Division of Carbohydrate Chemistry, 222nd National ACS meeting in Chicago, August 26, 2001.

University of Toledo, December 13, 2001, KDO 8-P and DAH 7-P Synthase: Potential New Targets for Drug Design and Development?

University of Kentucky, January 12-14, 2002, KDO 8-P and DAH 7-P Synthase: Potential New Targets for Drug Design and Development?

1st Annual Carbohydrate Workshop 2002 Research Center Borstel/University Rostock, Borstel, Germany, March 1-2, 2002, Is R5P Really a Substrate for KDO 8-P Synthase?

U of MI Chemistry and Biophysics, January 25, 2002, KDO 8-P and DAH 7-P Synthase: Potential New Targets for Drug Design and Development?

XXIth Midwest Enzyme Chemistry Conference, September 23, 2001, University of Chicago, Chicago, IL: Four posters.

XXIIth Midwest Enzyme Chemistry Conference, September 28, 2002, Northwestern University, Evanston, IL:

> *Thermotoga maritima* 3-Deoxy-D-*arabino*-heptulosonate 7-phosphate Synthase: The Ancestral Eubacterial DAHP Synthase? Ji Wu, David L. Howe, and Ronald W. Woodard
>
> Overexpression, Purification and Properties of Shikimate Kinase I (aroK) from *Aquifex aeolicus*. Hao Fang and Ronald W. Woodard
>
> The Overexpression of 3-Deoxy-D-*arabino*-heptulosonate 7-phosphate Synthase from the Hyperthermophile *Aeropyrum pernix*. Lily Zhou and Ronald W. Woodard
>
> D-Arabinose 5-Phosphate Isomerase (API) from *E. coli*. Tim Meredith and Ronald W. Woodard

18th Enzyme Mechanisms Conference, January 4-7, 2003, Galveston Island, TX. *Thermotoga maritima* 3-Deoxy-D-*arabino*-heptulosonate 7-phosphate Synthase: The Ancestral Eubacterial DAHP Synthase? Ji Wu, David L. Howe, and Ronald W. Woodard. Poster.

XXIIIth Midwest Enzyme Chemistry Conference, October 4, 2003, University of Illinois at Chicago, Chicago, IL:

> 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Phosphatase from the Hyperthermophilic Bacterium *Aquifex aeolicus.* Parag Aggarwal and Ronald W. Woodard

Conversion of *Aquifex aeolicus* 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase, A Metalloenzyme into a Nonmetalloenzyme. JingJing Li, Jing Wu, Angela Fleishhacker and Ronald W. Woodard

Functional and Biochemical Characterization of a Recombinant *Arabidopsis thaliana* 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase. Jing Wu, Mayur Patel, Appavu Sundaram and Ronald W. Woodard

Mutation Studies of C61 in the Phe-Sensitive DAHP Synthase from *E. coli*. Lily Zhou and Ronald W. Woodard

D-Arabinose 5-Phosphate Isomerase (API) from *E. coli*. Tim Meredith and Ronald W. Woodard

Central Ohio Undergraduate Research Symposium Invited Lecturer. Muskingum College, November 1, 2003 "Modern Methods for Drug Discovery"

XXIVth Midwest Enzyme Chemistry Conference, October 9, 2004, University of Chicago, Chicago, IL:

Interconversion Between Metallo and Nonmetalloenzyme 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase. JingJing Li, Jing Wu, Angela Fleishhacker and Ronald W. Woodard

Expression of S-Adenosyl-L-Methionine (SAM) Hydrolysis by Protein Splicing. Li Yi and Ronald W. Woodard

Comparison of *A. pernix* and Truncated *T. maritima* DAHP Synthase. Lily Zhou and Ronald W. Woodard

D-Arabinose 5-Phosphate Isomerase (API) from *E. coli*. Tim Meredith and Ronald W. Woodard

Invited Lecturer. Georgia State University Third Annual Biotech Symposium, June 9-10, 2005 "Identification of Potential New Targets for Drug Design and Development?"

Invited Lecturer. University of Youngstown, November 4, 2005 "KDO 8-P and DAH 7-P Synthase: Potential New Targets for Drug Design and Development?"

Invited Lecturer. Siena Heights College, November 16, 2005 "KDO 8-P and DAH 7-P Synthase: Potential New Targets for Drug Design and Development?"

XXVth Midwest Enzyme Chemistry Conference, October 8, 2005, Loyola University, Chicago, IL:

Studies on the Mechanism of S-Adenosyl-L-Methionine (SAM) Hydrolysis. Li Yi and Ronald W. Woodard

Mechanistic Studies of 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase, Metal Binding and Substrate Specificity. JingJing Li, Jing Wu and Ronald W. Woodard

Regulated and Non-Regulated DAHP Synthase from *Thermoanaerobacter tengcongensis*. Lily Zhou and Ronald W. Woodard

Life Without KDO: Redefining the Requisite LPS Structure in *E. coli*. Tim Meredith, Parag Aggarwal, Uwe Mamat, Buko Lindner and Ronald W. Woodard

XXVIth Midwest Enzyme Chemistry Conference, September 30, 2006, Northwestern University, Evanston, IL:

Studies on the Mechanism of S-Adenosyl-L-Methionine (SAM) Hydrolysis. Li Yi and Ronald W. Woodard

Studying the Mechanism of 3-Deoxy-D-*manno*-octulosonic acid 8-Phosphate Synthase in Substrate Specificity. JingJing Li, Jing Wu and Ronald W. Woodard

Regulated and Unregulated DAHP Synthases from *T. tengcongensis*. Lily Zhou and Ronald W. Woodard

Redefining the Requisite LPS Structure in *E. coli*. Tim Meredith, Parag Aggarwal, Uwe Mamat, Buko Lindner and Ronald W. Woodard

Invited Lecturer. 20th Enzyme Mechanism Conference, January 3-6, 2007, St Petersburg Beach, FA, Redefining the Requisite LPS Structure in *E. coli.*

Invited Lecturer. University of Missouri Kansas City, School of Biological Sciences, February 28-March 2, 2007, Redefining the Requisite LPS Structure in *E. coli.*

Invited Lecturer. University of Arkansas, Department of Chemistry, March 12-14, 2007, Redefining the Requisite LPS Structure in *E. coli.*

XXVIIth Midwest Enzyme Chemistry Conference, September 29, 2007, University of Illinois at Chicago, College of Pharmacy, Chicago, IL:

Invited Lecturer. University of Michigan, The Center for Chemical Genomics Colloquium Series, March 21, 2008, Redefining the Requisite Lipopolysaccharide (LPS) Structure in *E. coli.*

XXVIIIth Midwest Enzyme Chemistry Conference, October 4, 2008, University of Chicago, Chicago, IL:

Characterization of a Bifunctional Enzyme in 3-Deoxy-D-manno-octulosonate Biosynthetic Pathway. Li Yi and Ronald W. Woodard (poster 15)

Redefining the Requisite Lipopolysaccharide (LPS) Structure in *E. coli* Life Sciences Institute – Center Chemical Genomics

Characterization of a Bifunctional Enzyme in 3-Deoxy-D-manno-octulosonate Biosynthetic Pathway National American Chemical Society 3-Deoxy-D-manno-Octulosonate 8-Phosphate Phosphatase Annual ASBM conference in Anaheim (California)

XXIXth Midwest Enzyme Chemistry Conference, October 10, 2009, Loyola University-Lake Shore Campus, Chicago, IL:

HTS assay development of the KDO pathway. Paul Keller and Ronald W. Woodard (poster 51)

Site-directed mutagenesis studies of D-arabinose 5-phosphate isomerase based on structural homology modeling analysis. (poster 53)

Regulation of *Escherichia coli* 3-deoxy-D-arabino-heptulosonate-7-phosphate synthase isozymes studied by using single-gene knockout strains. Andrew Groves, Pan-Fen Wang, and Ronald W. Woodard (poster 55)

Insights into the Function of the a-Helical Tail of *Haemophilus influenzae* 3-Deoxy-D-manno-Octulosonate 8-Phosphate Phosphatase. Anna Hanuszkiewicz, Laurence M. Briski and Ronald W. Woodard (poster 93)

XXXth Midwest Enzyme Chemistry Conference, October 16, 2010, Northwestern University, Evanston, IL:

Bioorganic Synthesis of Fluorescent Tagged CMP-KDN9N Analogues for the Inhibition of CMP-KDO-Synthetase. Melvin Velasquez, Pan-Fen Wang, Ronald Woodard

HTS assay developments for KdsD/A/C Antibiotics and Resistance: Challenges and Solutions, Keystone Symposia, Santa Fe, NM 02/16/2010 Podium

HTS assay developments in the KDO pathway Antibiotics and Resistance: Challenges and Solutions, Keystone Symposia, Santa Fe, NM 02/16/2010 Poster

LPS-Less *Escherichia coli*, a New Paradigm. College of Pharmacy, University of Iowa, February 8-10, 2010.

2011 - XXXIth Midwest Enzyme Chemistry Conference Missing

2012
Single Amino Acid Substitutions in either YhjD or MsbA Confer Viability to 3-Deoxy-D-*manno*-oct-2-ulosonic Acid (Kdo)-Depleted *Escherichia coli* Uwe Mamat, Timothy C. Meredith, Parag Aggarwal,[3] Annika Kühl, Paul Kirchhoff, Buko Lindner, Anna Hanuszkiewicz, Jennifer Sun, Otto Holst, and Ronald W. Woodard, University of Lubig, 26 International Carbohydrate Symposium, Madrid, Spain July 22, 2012

NMR Studies on Substrate Specificity of Arabinose 5-phosphate Isomerase
L. Gabrielli, S. Merlo, C. Airoldi, L. Cipolla, P. Sperandeo, A. Polissi, F. Nicotra, T. P. Holler, and R. W. Woodard, 26 International Carbohydrate Symposium, Madrid, Spain July 22, 2012

A Gram-Positive D-arabinose 5-phosphate isomerase?, Department of Medicinal and Biological Chemistry, University of Toledo 3/21/2012,

A Gram-Positive D-arabinose 5-phosphate isomerase ?
Victoria A. Assimon, Pan-Fen Wang, Alejandra Yep, Tod Holler, and Ronald W. Woodard*

Keystone Meeting on Chemical Biology and Novel Tools in Pharmacology, Santa Fe, NM

A Gram-Positive D-arabinose 5-phosphate isomerase?
David L. Cech, Pan-Fen Wang, Victoria A. Assimon, Jeffrey M. Schaub, Christopher J. Holt, Tod P. Holler, and Ronald W. Woodard MECC U of I Chicago, Oct 12-13, 2012

Mechanistic Probing of PD404182 by Targeting *Acinetobacter baumannii* KdsA. Christopher J. Holt, Trevor Wood, and Ronald Woodard. Pharmacological Sciences Training Program Symposium, University of Michigan, Ann Arbor, MI, March 15, 2013.

A Gram-Positive D-arabinose 5-phosphate isomerase?
David L. Cech, Pan-Fen Wang, Victoria A. Assimon, Jeffrey M. Schaub, Christopher J. Holt, Tod P. Holler, and Ronald W. Woodard Pharmacological Sciences Training Program Symposium, University of Michigan, Ann Arbor, MI, March 15, 2013

D-arabinose 5-phosphate isomerase in Strange Places, Jiangnan University, Food sciences April 15, 2013.

Expression and purification of Gluconate-6-Phosphatase Dehydrogenase, Lactate dehydrogenase, and Inorganic Pyrophosphatase from Aska collection. Marquis Douglas, Pan Fen Wang, David Cech, Chris Holt, Tod P. Holler, and Ronald Woodard. IREU Closing Symposium, Ann Arbor, MI, August 9th, 2012.

Synthesis of 3-Deoxy-D-*manno*-octulosonic Acid for Use in Substrate Displacement Assay for Kdo Transferase. Andreea Temelie, Pan Fen Wang, Christopher Holt, Ronald W. Woodard. UROP Spring Research Symposium, Ann Arbor, MI, April 24th, 2013.

Grants

Internal:

Rackham Faculty Research; "Investigation of the Mechanism of ACC Synthase." January, 1981, $10,000.

Biomedical Research Support Grant; "Investigation of the Mechanism of ACC Synthase and ACC Deaminase." May, 1982, $3,000.

Upjohn Research Endowment Fund; "Biosynthesis of UDP-N-Acetylmuramic Acid." July, 1984, $15,000.

Program in Protein Structure and Design, Woodard, R. W. and Mosberg, H. I., Co-principle Investigators; "Incorporation of Stereoselective Deuterated Amino Acids into Conformationally Restricted Peptides to Aid Conformational Elucidation." January, 1987, $10,000.00 one year.

Upjohn Research Endowment Fund; "Mechanism of UDP-GlcNAc-Enol Pyruvate Transferase." July, 1989, $25,000.

Office of The Vice President of Research; "Biosynthesis of 2-Aminobutanoic Acid Derivatives." July, 1989, $7,500.

Rackham Faculty Research; "Biosynthesis of UDP-N-Acetyl Muramic Acid, Mechanism of the UDP-GlcNAc-Enol Pyruvate Reductase." January 1990, $10,000.00.

Phoenix Memorial Research; "Biosynthesis of UDP-N-Acetyl Muramic Acid, Synthesis of Radiolabelled PEP Analogues." January 1990, $3,000

Vahlteich Research Award Fund; "Mechanism of KDO 8-Phosphate Synthase." July, 1992, $25,000.

Upjohn Research Endowment Fund; "Mechanism of SAM Hydrolyase." September, 1995, $25,000.

College of Pharmacy-Office of Instructional Technology Development, "Introduction of Computer-Aided Learning into Medicinal Chemistry 411" $6,800.00.

National:

Research Corporation; "The Stereochemistry of 1-Aminocyclopropane-1-carboxylate Synthase." June, 1981, $9,000.

American Chemical Society, Petroleum Research Type G; "The Stereochemistry of ACC Deaminase." April, 1982, $10,000.

National Institutes of Health; "^{1}H-NMR for the University of Michigan, College of Pharmacy." September, 1983, $112,250.

National Institutes of Health; "Stereochemistry of ACC Synthase and ACC Deaminase." GM 30097; "Feb, 1982 - Jan, 1985, $162,590.

National Institutes of Health; "Biosynthesis of Azetidine-2-Carboxylic Acid" GM 36184: "July, 1986 - June, 1989, $259,139.

National Institutes of Health; "Conformation-Selectivity Relations of Opioid Peptides," ADAMHA, DA 03910, H.I. Mosberg, P.I., Ronald W. Woodard, Co-Investigator, April, 1989 - March, 1992, $394,330.

National Institutes of Health; "A Novel Pathway of Arginine Metabolism in Macrophages," CA 50414, M. A. Marletta, P.I., Ronald W. Woodard, Co-Investigator, July, 1989 - June, 1992, $320,264.

Herman Frasch Foundation, "Mechanistic Studies of 1-Aminocyclopropane-1-carboxylic Acid Synthase: Catalysis and Inactivation" Ronald W. Woodard, P.I. $17,000 first year, $85,000 for five year total cost. July 1, 1992-97.

National Institutes of Health; "Transdermal Buprenorphine to Suppress Narcotic Addiction" DA075750, G. L. Flynn, P.I., Ronald W. Woodard, Co-Investigator, July, 1992 - June, 1995, $443, 929.

National Institutes of Health; "Mechanism of UDP-GlcNAc-EP Transferase" GM 42544, funded as a Shannon Award, $100,000.00 for two years, $80,000 direct, September, 1992 - Mar, 1995.

National Institutes of Health; "Mechanism of KDO 8-P Synthase" GM 53069, Ronald W. Woodard, P.I., 07/1/96 - 06/30/00, $173,571.00 direct / 1st year, $658,663.00 total direct.

National Institutes of Health; "Mechanism of KDO 8-P and DAH 7-P Synthase" GM 53069, Ronald W. Woodard, P.I., 07/1/01 - 06/30/05, $250,00.00 direct / 1st year, $1,000,000.00 total direct.

National Institutes of Health; "Mechanism of KDO 8-P and DAH 7-P Synthase" GM 53069-09-A1, Ronald W. Woodard, P.I., 01/1/08 - 12/31/12, $250,00.00 direct / 1st year, $1,250,000.00 total direct-Declined

National Institutes of Health; "Mechanism of A 5-P Isomerase" AI 061531-01, Ronald W. Woodard, P.I., 01/01/05 - 12/31/11, $250,000 direct / 1st year, $1,250,000.00 total direct - FUNDED.

National Institutes of Health; "Mining the kds Pathway – New Source of Antibacterial Targets" RFA-RM-06-004, Ronald W. Woodard, P.I., 6/15/06 - 6/14/06, $125,000 direct / total direct, Pending.

National Institutes of Health; “Pharmacological Sciences Training Program” T32 GM007767-29 Ronald W. Woodard (P.I.), 07/01/06-06/30/10, total direct funding $4,362,480. Pending

National Institutes of Health; "Mining the LPS Pathway – Identifying New Antibacterial Targets" PO1 under construction, Ronald W. Woodard P.I. and 4 other faculty at Michigan and Canada as Co-P.I.s, 1,250,000.00 first year funding.

Publications

l. Woodard, R. W., D. W. Boykin, Jr., *Chem. Commun.*, 628-629 (l970), "Steric Effects on the Carbonyl Stretching Frequencies of Alkyl Styryl Ketones."

2. Das, B. P., R. W. Woodard, L. K. Whisenant, W. F. Winecoff, III, and D. W. Boykin, Jr., *J. Med. Chem.*, **13**, 979-981 (1970), "Synthesis of Some Substituted 10-Amino-10,11-dihydro-5*H* -dibenz[b,f]azepines."

3. Woodard, R. W., K. Baldzer, and D. W. Boykin, Jr., *J. Med. Chem.*, **14**, 1131-1132 (1971), "Synthesis of Some 5-Substituted 10,11 Dihydrodibenz[b,f]azepines."

4. Das, B. P., J. A. Campbell, F. B. Samples, R. A. Wallace, L. K. Whisenant, R. W. Woodard, and D. W. Boykin, Jr., *J. Med. Chem.*, **15**, 370-373 (1972), "Naphthothiophenes. 1. α-(alkylaminomethyl)-4-napthol[2,1-b]thiophenemethanols as Antimalarials."

5. Gellert, E., R. Rudzats, J. Cymerman Craig, S. K. Roy, and R. W. Woodard, *Aust. J. Chem.*, **31**, 2095-2097 (1978), "The Absolute Configuration of Cryptopleurine and Tylocrebrine."

6. Woodard, R. W., J. Cymerman Craig and Jan G. Bruhn, *Acta. Chem. Scand.*, **B32**, 619-620 (1978), "The Absolute Configuration of the Cactus Alkaloid (-)-Calipamine."

7. Woodard, R. W. and J. Cymerman Craig, *J. Labelled Compounds,* **XVI**, 321-33 (1979), "The Synthesis of Non-Exchangeable Deuterated Internal Standards for Imipramine and its Metabolites."

8. Nichols, D. E., R. W. Woodard, B. A. Hathaway, M. T. Lowy, and G. K. W. Yim, *J. Med. Chem.,* **22**, 458-460 (1979), "Resolution and Absolute Configuration of *trans* -2-(2,5-dimethoxy-4-methylphenyl)cyclopropyl amine, A Potent Hallucinogen Analogue."

9. Woodard, R. W., L. Mascaro, Jr., R. Hörhammer, S. Eisenstein, and H. G. Floss, *J. Am. Chem. Soc.*, **102**, 6314-6318 (1980), "Stereochemistry of Indolmycin Biosynthesis. Steric Course of *C*- and *N* -Methylation Reactions."

10. Woodard, R. W., M. -D. Tsai, H. G. Floss, P. A. Crooks, and J. K. Coward, *J. Biol. Chem.*, **255**, 9124-9127 (1980), "Stereochemical Course of the Transmethylation Catalyzed by Catechol *O*-Methyltransferase."

11. Woodard, R. W., J. Weaver, H. G. Floss, *Arch. Biochem. Biophys.*, **207**, 51-54 (1981), "Stereochemical Course of the Methylation of the Polygalacturonic Acid Carboxyl Groups of Pectin."

12. Ramalingam, Kondareddiar and Ronald W. Woodard, *J. Org. Chem.*, **49** 1291-1293 (1984), "An Improved Synthesis of *S* -Adenosylhomocysteine and Related Compounds."

13. Khani-Oskouee, S., J. P. Jones and Ronald W. Woodard, *Biochem. Biophys. Res. Commun.*, **121**, 181-187 (1984), "Stereochemical Course of the Biosynthesis of 1-Aminocyclopropane-1-Carboxylic Acid. I. Role of the Asymmetric Sulfonium Pole and the α-Amino Acid Center."

14. Asano, Y., Ronald W. Woodard, D. Houck and H. G. Floss, *Arch. Biochem. Biophys.*, **231**, 253-

256 (1984), "Stereochemical Course of the Transmethylation Catalyzed by Histamine *N*-methyltransferase."

15. Moore, Richard E, A. J. Blackman, C. E. Cheuk, J. S. Mynderse, G. K. Matsumoto, J. Clardy, Ronald W. Woodard, and J. C. Craig, *J. Org. Chem.*, **49**, 2484-2489 (1984), "Absolute Stereochemistries of the Aplysiatoxins and Oscillatoxin A."

16. Ramalingam, Kondareddiar and Ronald W. Woodard, *J. Labelled Compounds*, **XXI**, *6*, 563-568 (1984), "Synthesis of L-[4,4-$^2H_2$] and D,L-[3,3,4,4-$^2H_4$]methionine."

17. Ramalingam, Kondareddiar, Douglas Kalvin and Ronald W. Woodard, *J. Labelled Compounds*, **XXI**, *9*, 833-841 (1984), "Synthesis of Deuterium Labelled 1-Aminocyclopropane-1-Carboxylic acid."

18. Kalvin, Douglas M. and Ronald W. Woodard, *Tetrahedron*, **40**, 3387-3392 (1984), "Preparation of 1-Deuterioaldehydes Via the Use of Diisobutylaluminum Deuteride (DIBAL-D).

19. Kalvin, Douglas, Kondareddiar Ramalingam and Ronald W. Woodard, *Synthetic Communications*, **15**, *4*, 267-272 (1985), "A Facile Procedure for the Preparation of Alicyclic α-Amino Acids."

20. Ramalingam, Kondareddiar and Ronald W. Woodard, *Tetrahedron Lett.*, **26**, *9*, 1135-1136 (1985), "A Convenient Synthesis of *S*-(5'-deoxy-5'-adenosyl)-(±)-2-methylhomocysteine."

21. Kalvin, Douglas M. and Ronald W. Woodard, *J. Org. Chem.*, **50**, 2259-2263 (1985), "Synthesis of D,L-4*R* -[4-^{2}H] and D,L-4*S* -[4-^{2}H]Homoserine lactones."

22. Ramalingam, Kondareddiar and Ronald W. Woodard, *Carbohydrate Research*, **142**, 123-126 (1985), "Synthesis of *S*-N^6,N^6-Dimethyladenosyl-L-Methionine."

23. Woodard, Ronald W., *J. Org. Chem.*, **50**, 4796-4799 (1985), "Stereochemistry of Cyclic Dipeptides. Assignment of the Pro-chiral Methylenes of 1-Aminocyclopropane-1-carboxylic Acid."

24. Ramalingam, Kondareddiar, Kang-man Lee, Ronald W. Woodard, A.B. Bleeker and Hans Kende, *Proceedings of the National Academy of Science USA*, **82**, 7820-7825 (1985), "Stereochemical Course of the δ-Replacement Process Catalyzed by the Pyridoxal-Phosphate-Dependent Enzyme 1-Aminocyclopropane-1-carboxylic Acid Synthase."

25. Subramanian, Pullachipatti and Ronald W. Woodard, *Synthetic Communications*, **16**, 337-342 (1986), "An Asymmetric Strecker Synthesis of (*R*)-(+)-2-Methyl-3-Phenylalanine: An Efficient Preparation."

26. Subramanian, Pullachipatti and Ronald W. Woodard, *International Journal of Peptide and Protein Research*, **28**, 579-585 (1986), "Enantioselective Synthesis of (*R*)- and (*S*)-2-Methyl-[3,3,3-$^2H_3$]Alanine."

27. Subramanian, Pullachipatti, Kondareddiar Ramalingam, Sheila Norton and Ronald W. Woodard, *Spectroscopy Letters*, **19(9)**, 1059-1069 (1986), "The Proton NMR Assignment of 1-

Aminocyclo-propane-1-carboxylic Acid."

28. Ramalingam, Kondareddiar and Ronald W. Woodard, *J. Labelled Compounds and Radio-pharmaceuticals,* **XXIV, 4**, 369-376 (1987), "Synthesis and ^{1}H-NMR of Deuterium Labeled Homoserine Lactone Hydrochlorides."

29. Subramanian, Pullachipatti and Ronald W. Woodard, *J. Organic Chemistry,* **52**, 15-18 (1987), "Synthesis of (*R*)- and (*S*)-1-Amino-[2,2-$^{2}H_{2}$]cyclopropane-1-carboxylic Acids."

30. Khani-Oskouee, Shahrokh, Kondareddiar Ramalingam, Douglas Kalvin and Ronald W. Woodard, *Bioorganic Chemistry,* **15**, 92-99, (1987), "Alternate Substrates and Inhibitors of 1-Aminocyclopropane-1-carboxylic Acid Synthase."

31. Mosberg, Henry I., John R. Omnaas, Kondareddiar Ramalingam and Ronald W. Woodard, *J. of Labeled Compounds,* **XXIV, 10**, 1265-1271 (1987), "Synthesis of Deuterium Labelled Penicillamine and its Use for the Assignment of the ^{1}H-NMR Spectra of Two Cyclic Enkephalin Analogs."

32. Son, Jong-Keun, Kondareddiar Ramalingam and Ronald W. Woodard, *Synthesis*, 240-242 (1988), "A Facile Synthesis of (-)-L-Discadenine and its Deuterio Derivatives."

33. Ramalingam, Kondareddiar and Ronald W. Woodard, *J. Org. Chem.*, **53(9)**, 1900-1903 (1988), "Synthesis of Stereospecifically Deuterium-Labeled Homoserines and Homoserine Lactones."

34 Mosberg, Henry I., Ronald C. Haaseth, Kondareddiar Ramalingam, A. Mansour, H. Akil and Ronald W. Woodard, *International Journal of Peptide and Protein Research,* **32**, 1-8 (1988), "The Role of Steric Interactions in The Delta Receptor Selectivity of [D-Pen^{2}, D-Pen^{5}]Enkephalin."

35. Son, Jong-Keun, Douglas Kalvin and Ronald W. Woodard, *Tetrahedron Letter*, 29, 4045-4048 (1988), "Assignment of the Chemical Shift Values of *N*-Trityl-L-homoserine Lactone."

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37. Ramalingam, Kondareddiar, Palaniappagownder Nanjappan, Douglas M. Kalvin and Ronald W. Woodard, *Tetrahedron*, **44**, 5597-5604 (1988), "A Practical Large Scale Chemical Synthesis of Chiral Glycines."

38. Subramanian, Pullachipatti, Douglas Kalvin and Ronald W. Woodard, *J. Org. Chem.*, **54**, 270-276 (1989), "Synthesis of Optically Active Monodeuterated 1-Aminocyclopropane-1-Carboxylic Acid: The Total ^{1}H-NMR Assignment of cyclo[ACC-α-methyl-phe]."

39. Lee, Kang-Man, Kondareddiar Ramalingam and Ronald W. Woodard, *J. Org Chem.*, **54**, 3195-3198 (1989), "Large Scale Synthesis of 3(*R*)- and 3(*S*)-[3-^{2}H]Aspartic Acid Utilizing Immobilized *E. Coli* Cells."

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44. Pufahl, Robert A., Palaniappagownder Nanjappan, Ronald W. Woodard and Michael A. Marletta, *Biochemistry*, **31**, 6822-6828 (1992), "Mechanistic Probes of N-Hydroxylation of L-Arginine by the Inducible Nitric Oxide Synthase from Murine Macrophages."

45. Nanjappan, Palaniappagownder, Henry I. Mosberg, Kondareddiar Ramalingam and Ronald W. Woodard, *Journal of Synthetic Organic Chemistry*, 421-425 (1993), "Synthesis of (2*S*, 3*S*)-[4,4,4-$^2H_3$]- and (2*S*, 3*R*)-[4,4,4-$^2H_3$]Penicillamine."

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xx. Zhou, Lilly and Ronald W. Woodard, *Journal of Biological Chemistry*, "Characterization of the Two of 3-Deoxy-D-*arabino*-heptulosonate 7-phosphate Synthases from *Thermoanaerobacter tengcongensis.*" In preparation

xx. Fang, Hao and Ronald W. Woodard "Purification and properties of shikimate kinase (aro K) from *Aquifex aeolicus*." Manuscript in preparation

xx. Fang, Hao and Ronald W. Woodard "Purification and properties of EPSP Synthase (aro A) from *Aquifex aeolicus*." Manuscript in preparation

xx. Birck, Matthew R. and Ronald W. Woodard, *Journal of Medicinal Chemistry*, "*H. pylori* J99 3-deoxy-D-*manno*-octulosonic acid 8-P synthase: A mesophilic Class II KDO 8-P synthase" Manuscript in preparation.

xx. Birck, Matthew R., Galina Ya. Sheflyan and Ronald W. Woodard, *Journal of Organic Chemistry*, "UDP-GAL-NAc is a Substrate for UDP-N-Acetylglucosamine Enolpyruvoyl Transferase and the Product is a Substrate for UDP-N-Acetylglucosamine Enolpyruvate Reductase." Manuscript in preparation.

xx. Sheflyan, Galina Ya. and Ronald W. Woodard, *Biotechniques*, "Pitfalls in Site-Directed Mutagenesis Utilizing One-Step PCR and *Dpn*I." Manuscript in preparation.

xx. Dotson, Garry D., Rajesh K. Dua, Matthew Birck and Ronald W. Woodard, *Journal of Organic Chemistry*, "Alternate Substrate Studies of UDP-N-Acetylglucosamine Enolpyruvoyl Transferase." Manuscript in preparation.

PUBLISHED PROCEEDINGS

1. Floss, Heinz G., L. Mascaro, M. -D. Tsai, and R. W. Woodard, "Stereochemistry of Enzymatic Transmethylation," in *Transmethylation* , Usdin, Borchardt, Creveling, eds., Elsevier North Holland, Inc., 1979, pp. 135-141.

2. Floss, Heinz G., L. Mascaro and R. W. Woodard, "Stereochemistry of One-Carbon Transfer Reactions," in *Proceeding of the Sino-American Symposium on the Chemistry of Natural Products*, Yang, Yu, ed., Science Press, Beijing, China, 1982, pp 110-114.

3. Floss, H. G. and Ronald W. Woodard, "Further Stereochemical Studies on Methyl Transfer Reactions," in *Biochemistry of S-Adenosylmethionine and Related Compounds*, Usdin, Borchardt, Creveling, eds., MacMillan Press Ltd., 1982, pp 539-544.

4. Woodard, Ronald W., "1-Aminocyclopropane-1-carboxylic Acid Synthase, A Unique SAM-Utilizing Enzyme," in *Biochemistry of S-Adenosyl-methionine and Related Compounds*, Usdin, Borchardt, Creveling, eds., MacMillan Press Ltd., 1982, pp 621-625.

5. Floss, Heinz G., Ming-Daw Tsai and Ronald W. Woodard, "Stereochemistry of Biological Reactions at Proprochiral Centers," in *Topics in Stereochemistry*, **Vol 15**, Eliel, Wilen, Allinger, eds, John Wiley and Sons, 1984, pp. 253-321.

6. Subramanian, Pullachipatti and Ronald W. Woodard, *Proceedings of the Ninth American Peptide Symposium; Structure and Function*, 437-440 (1985) "Synthesis of (*R*)- and (*S*)-1-Amino-[2,2-$^{2}H_{2}$]cyclopropane-1-carboxylic Acids: A Double Violation of Schöllkopf's Rule."

7. Woodard, Ronald W., "^{17}O NMR as a Mechanistic Probe to Investigate Chemical and Biological Problems," in *^{17}O NMR Spectroscopy in Organic Chemistry*, Boykin, ed., CRC Press, 1991, pp. 115-140.

Professional Services

Papers Reviewed for:
Journal of the American Chemical Society
Journal of Organic Chemistry
Journal of Medicinal Chemistry
Biochemistry
Journal of Natural Products
Journal of Bacteriology
Journal of Bioorganic and Medicinal Chemistry Letters

Associate Editorships/Editorial Boards:
Bioorganic Chemistry
Future Medicinal Chemistry
Chemical Biology & Drug Design

Books Reviewed for:
Journal of the American Chemical Society
Journal of Medicinal Chemistry
Journal of Natural Products

Grants Reviewed for:
National Science Foundation
American Chemical Society - Herman Frasch Foundation
American Chemical Society - Petroleum Research Foundation
Department of Energy
United States-Israel Bi-national Science Foundation (BSF)
USDA's National Research Initiation Competitive Grants Program
Canadian National Government
ASP Junior Faculty Starter Grants
ASP Undergraduate Summer Fellowships
ASP Travel Grants
Member of the NIH Bioorganic and Natural Products Study Section, June 15, 1995, ad hoc.

Rackham Graduate School
Office of the Vice President of Research
Presidential Initiative Grant
Animal Use Reviews, see GARR committee
Comprehensive Cancer Committee

Teaching

Medicinal Chemistry 409, Biopharmaceutical Analysis (2001-present) Course Coordinator (2001-present)

Medicinal Chemistry 410, Principles of Medicinal Chemistry and Pharmacognosy (80-83), Team Taught.

Medicinal Chemistry 411, Principles of Medicinal Chemistry and Pharmacognosy (80-1999), Team Taught, Course Coordinator (83-1999).

Medicinal Chemistry 622, Research Techniques in Medicinal Chemistry (84-86), Team Taught.

Medicinal Chemistry 533, Survey of Medicinal Chemistry (Graduate) (80-Present), Team Taught, Course Coordinator (1999-2005).

Medicinal Chemistry 534, Modern Techniques in Drug Discovery and Development (Graduate) (2001-Present), Team Taught, Course Coordinator (2001-2005). Course Inventor.

Medicinal Chemistry 532, Survey of Medicinal Chemistry (Graduate) (93), Team Taught.

Medicinal Chemistry 573, Investigations in Medicinal Chemistry (Graduate) (82-Present).

Medicinal Chemistry 990/995, Dissertation Precandidacy/Candidacy Medicinal Chemistry (80-Present).

Pharmacognosy 412, Principles of Pharmacognosy (80-86, 99), Team Taught, Course Coordinator (1999).

Pharmacognosy 572, Investigations in Pharmacognosy (Graduate) (82-90).

Pharmacognosy 990/995, Dissertation Precandidacy/Candidacy Pharmacognosy (80-89).

Chemistry 611, (97), Team Taught.

Committees

National:

Member, Awards and Funds Committee American Society of Pharmacognosy (86-91)
Member, National Nominating Committee American Society of Pharmacognosy (84)
Member, Membership Committee, American Society of Pharmacognosy (1985-89)
Chairperson, Scientific Program Committee, American Society of Pharmacognosy, 1986 Meeting at the University of Michigan.
Member, Local Planning Committee, American Society of Pharmacognosy, 1986 Meeting at the University of Michigan.
Member, Planning Committee, International Isotope Society, U. S. Central Region (93).
Member, Planning Committee 9th Annual Symposium on Pharmacy Graduate Programs, Merriville, IN, (91).
Chairman, Scientific Program Committee, XIV Midwest Enzyme Chemistry Conference (Oct 15, 1994) at Northwestern University, Evanston, IL

Local:

Member: Medical School Technology Transfer and Patents (01-Present)
Member: Governing Board Biomedical Research Core Facilities

Member: Executive Committee of the College of Pharmacy (86-88)
Member: Executive Committee of the College of Pharmacy (01-03)
Member: Executive Committee of the College of Pharmacy as Departmental Chair (03-Present)
Member: Policy Review Committee of the College of Pharmacy as Departmental Chair (01-Present)
Member: Biomedical Research Council, U of M Medical School (89-92)
Member: Cancer Committee, U of M Medical School (94-97)
Member: Distinguished Visiting Faculty Program (82-83)
Member: Credit, Evaluation and Advanced Standing Committee (82-84)
Member: Graduate Affairs and Research Resources Committee (83- 89) Subcommittee: Animal use approval request
Member: The Committee Guiding the Training Grant in Pharmacological Sciences (83-94)
Member: Pharmaceutics Faculty Search Committee (83)
Member: Pharmacognosy Faculty Search Committee (86-87)
Member: Rackham Dissertation/Thesis Selection Award (83, 85, 87)
Member: Training Grant Program Committee (83-90)
Member: Training Grant Financial Awards Committee (85-90)
Member: Committee on Microcomputer Use (84-present)
Member: Medicinal Chemistry Admissions Committee (85-89)
Member: Medicinal Chemistry Program Committee (85-89)
Member: Ad Hoc Committee on Equipment Upgrading for the College (85-88)
Member: Ad Hoc Committee Smith, Kline, French Lectureship Series (85)
Member: Blicke Lecture Planning Committee (80)
Member: College of Pharmacy Curriculum Committee (90-94, 94-present)
Second year coordinator for New cirrculium (96-present)
Member: PharmD Research Investigations Committee (88-90)
Faculty Advisor to Medicinal Chemistry Student Mini Meeting (82-85)
Chairperson: Blicke Lecture Section -Polyamines Biosynthesis (80)
Chairperson: NMR Committee (83-89)
Member: NMR Committee (89-present)
Member: University of Michigan Cancer Center, Drug Developement Group (91-Present)
Member: Teaching Evaluation Committee (92-94)
Chairman: Development of an LSA-Pharmacy Course Committee (94)

Doctoral Committees:

Chairman:

Medicinal Chemistry

Douglas M. Kalvin, February, 1985, "Synthesis of 4*R*- and 4*S* - and 3*R* - and 3*S* - Deuterated Homoserines. Synthesis of Specifically Deuterated 1-Aminocyclopropane-1-Carboxylic Acid." Post-doctoral fellowship in the Medicinal Chemistry Department at the University of Wisconsin and presently a Senior Medicinal Chemist at Abbott Laboratories.

Garry Dotson, March, 1994, "Mechanistic Studies on Phosphoenolpyruvate-Utilizing Enzymes Involved in Bacterial Cell Wall and Lipopolysaccharide Biosynthesis." Research Chemist DuPont Laboratory.

David Howe, September, 2002, "Mechanistic Studies on 1-Aminocyclopropane-1-carboxylic Acid Oxidase, Probing the Active Site." Research Chemist Tanabe Research Laboratories

Matthew Birck, June 2002, "Mechanistic Studies on 3-Deoxyoctulosonate 8-Phosphate Synthase: Evaluation of Alternate Substrates as Active Site Probes." Post Doctoral Research Associate Albert Einstein Medical Center.

Timothy C. Meredith, December 2005, "Mechanistic Studies on Arabinose 5-Phosphate Isomerase." Post Doctoral Research Associate Harvard Medical School.

Parag Aggarwal, December 2006, "Validating the KDO Pathway as a Potential Novel Antimicrobial Target: Analysis of KDO8P Phosphatase." Post Doctoral Research Associate N.I.H.

Mi (Lily) Zhou, January 2007, "Evolution of DAHP Synthase: From Archaea to Eubacteria." Post Doctoral Research Assistant - China.

Jingjing Li, January 2008, " Substrate Specificity and Metal Requirements of 3-Deoxy-D-*manno*-octulosonate 8-Phosphate Synthase (KDOPS)." Post Doctoral Research Assistant – University of Utah.

Li Yi, January 2009, " Studies of 3-Deoxy-D-*manno*-octulosonate 8-Phosphate Phosphatase: Mechanistic Insights and a Gene Fusion Example." Post Doctoral Research Assistant – University of Michigan.

Pharmacognosy

Kang-Man Lee, September, 1985, "Biosynthesis of L-Azetidine-2-Carboxylic Acid in *Actinoplanes ferrugineus.*" Postdoctoral fellowship in the Biochemistry Department at the University of Iowa and presently an Associate Professor in the College of Pharmacy at Ewha Woman's University, Seoul, South Korea.

King-Fai Yeung, September, 1987, "Degradation of L-Azetidine-2-Carboxylic Acid by *Enterobacter agglomerans* and *E. amnigenus.*" Owner/Practitioner of an Herbal Pharmacy in San Francisco, California.

Jong-Keun Son, May, 1988, "Chemical and Biochemical Degradation of *S*-Adenosyl-L-Methionine." Postdoctoral fellowship in the Medicinal Chemistry Department at the University of Michigan, in the Medicinal Chemistry Department at the University of Iowa and presently an Associate Professor in the College of Pharmacy at Yeung-Nam University, Gyeongsan City, South Korea.

Member:

Chemistry

Anrong Lee (1983)
Lindsey Brown (1984)
Bernard Hulin (1984)
Juan J. Luengo (1984)
Roberto I. Fernandez (1985)
Scott L. Dax (1985)
Susanna Lee (1986)
Robert Paley (1986)

Paul H. M. Harrison (1987, University of Alberta, Canada)
Minn-Chang Chen (1987)
Carl Deering (1987)
Francis Liu (1987)
Kelly Teng (1988)
Soon Sin Oh (1989)
Zhengqing You (1989)
Michael E. Houston (1992, University of Waterloo, Canada)
Michael Z. Hoemann (1993)
John Lakanen (1994)
Peter J. Stengel (1994)
Tracey Rapp (1996)
Mike Navin (1996)
Roger Clark (1999)
Bill Gundluch
William John Smith III (2002)
Donald L. Warner (2002)
Matthew A. Zajac (2003)

Biochemistry
Carol S. Federiuk (1982)
Verna Frasca (1986)
Chris Valahos (1986)
Jacalyn Greene (1988)
Marc Taylor (1988)
Yunde Zhao (1999)

Medicinal Chemistry
Maria Varela (1984)
Richard DiPietro (1984)
Jamey P. Weichert (1985)
Andrew Kawasaki (1986)
Karen Meyer (1988)
Laurie Strawn (1988)
Daniel J. Ricca (1988)
Steven Krawczyk (1989)
Stephen C. Bergmeier (1990)
Jennifer Hines (1991)
Debbie Heyl Clegg (1991)
Jung S. Lee (1991)
William Malachowski (1993)
Mark Burns (1993)
Norman M. Olken (1993)
Karen Kieler (1994)
Robert A. Pufahl (1994)
Paula Bush-Krosky (1997)
Fan-Lu Kang (1997)

Hemant Khanna (200)
Jason Perry (1999)
Jordon Elhalabi (2000)
Donald McKenzie (2000)
Susanne Theresa Nonekowski (2001)
David Evers (2002)
Michelle Spiering (2002)

Pharmacognosy
Leander J. Valdes (1983)
Shaorong Chong (1994)

Pharmaceutics
Stephen J. Rose (1990)
Audra L. Stinchcomb (1995)

Special Research Directed

Pharm. D.'s Project
Patricia Camazzola (1983)
Patricia Fabrizio (1983)
Tina Shier (1989)
Cindy Bakst (1989)
Joseph Hendrickson (1992)
Adrainus Lim (1993)
Jeffrey J.-Kee Chin (1993)
Sarah A. Blanck (1993)
Michelle M. Spencer (1994)
Brian L. Callahan (1994)
Emily C. Grammel (1996)
Nancy M. Stierle (1996)
Scott Haranda (1997)
Christopher J. Adis (1997)
Michael N. Altese (1998)
Joe Contreras (1999)
Dana Lynn Randall (1999)
Ceret (1999)
Mayur Patel (1999)
Megan Brewster (1999/2000)

N. I. H. Bridges Program
Edgar S. Diaz

University Research Opportunities Program (UROP)

Angela Herrera (91)
Matthews Moore (91)
Robert C. Middleton (91)
Heather Costa (91)

Jesse Brady-Davenport (92)
Matthews Curin (92)
Jerremy Gajawski (92)
Beth Ernst (93)
Olivia Juhn (93)
Claudia Cotca (94)
Kristen Klein (94)
Andy Yuan (95)
Lauren Williams (96)
Ed Chou(96)

Undergraduates

Lee Fradkin, Ph.D. in the Microbiology Department at U.C.L.A. and postdoctoral fellowship at Stanford with Dr. A. Kornberg.

Shahrokh Khani-Oskouee, M.S.T. University of Michigan Medical School and Biochemistry Department and presently Assistant Professor, University of Michigan.

Jeff Jones, Ph.D. in the Medicinal Chemistry Department at the University of Washington and postdoctoral fellow, University of Wisconsin with Dr. M. Cleveland.

Steven Zawisza, PharmD. University of Michigan presently a pharmacist.

Julie Gastier, Rochester Institute of Technology undergraduate, special summer program student, graduate student Harvard University in Molecular Biology and postdoctoral fellow.

Special High School Students
Marcus Armstead (1981)
Mike Montero (1984)
Donna Diokno (1985)
Stacy Ho (1986)
Carlos Schofeld (1988)
Stacie Tate (1989)
Georgia Blake (1990)
Mayur Patel (1991)
Tyresa Steels(1992)
Tumi Adebiyi (1996)
Kimika Edwards (1998)

Postdoctoral Fellows
Kondareddiar Ramalingam
Pullachipatti Subramanian
Palaniappagownder Nanjappan
Makarand P. Gore
Rajesh K. Dua
Mahmoud A. Tayeh
Hamzah Mohammed Salleh

Galina Sheflyan
Appavu Sundaram
Henry Duewel
William Taylor
Fang Hao
Jing Wu
Pan-Fen Wang
Alejendra
Li Yi

Pharm. D. Academic Advisees

Sochalski, A.	Christopher Tenhoor	Tammy E. Patrick	Wing-Shan M. Wong	Scott VanEyk
Shafer, A.	Lisa Vartanian	Anthony R. Porcari	Amy Wong	Christine Van Horn
Sulewki, R.	Marcy Woronoff	Susan J. Richey	Nathan Worthington	Susan Wernig
Sila, M.	Nada Yousif	Colleen M. Riggs	Ying Wu	Jeffrey Waise
Thibault, J.		Christine E. Roschek	Tongqing Zhang	Lee Wages
Wilson, D,		Mary B. Sancimino	Susan Wernig	Denise Weidig

Other Services to the College of Pharmacy

Trip to Merrillville, Indiana for Recruiting Midwest Pharmacy Students to go to Graduate School (83, 84, 91, 92).
Trip to California to Users School for the IBM WP-270 SY NMR spectrometer and train and check out new users of our NMR.
Trip to Germany to evaluate the Bruker AM-500 MHz NMR with Dr. J. Shafer of the Biochemistry Department and study other spectrometers in order to decide which spectrometer to purchase.

Single Amino Acid Substitutions in either YhjD or MsbA Confer Viability to 3-Deoxy-D-*manno*-oct-2-ulosonic Acid (Kdo)-Depleted *Escherichia coli* Uwe Mamat, Timothy C. Meredith, Parag Aggarwal,[3] Annika Kühl, Paul Kirchhoff, Buko Lindner, Anna Hanuszkiewicz, Jennifer Sun, Otto Holst, and Ronald W. Woodard, University of Lubig, 26 International Carbohydrate Symposium, Madrid, Spain July 22, 2012

NMR Studies on Substrate Specificity of Arabinose 5-phosphate Isomerase
L. Gabrielli, S. Merlo, C. Airoldi, L. Cipolla, P. Sperandeo, A. Polissi, F. Nicotra, T. P. Holler, and R. W. Woodard, 26 International Carbohydrate Symposium, Madrid, Spain July 22, 2012

A Gram-Positive D-arabinose 5-phosphate isomerase?, Department of Medicinal and Biological Chemistry, University of Toledo 3/21/2012,

A Gram-Positive D-arabinose 5-phosphate isomerase ?
Victoria A. Assimon, Pan-Fen Wang, Alejandra Yep, Tod Holler, and Ronald W. Woodard*
Keystone Meeting on Chemical Biology and Novel Tools in Pharmacology, Santa Fe, NM

A Gram-Positive D-arabinose 5-phosphate isomerase?
David L. Cech, Pan-Fen Wang, Victoria A. Assimon, Jeffrey M. Schaub, Christopher J. Holt, Tod P. Holler, and Ronald W. Woodard
MECC U of I Chicago, Oct 12-13, 2012

Mechanistic Probing of PD404182 by Targeting *Acinetobacter baumannii* KdsA. Christopher J. Holt, Trevor Wood, and Ronald Woodard. Pharmacological Sciences Training Program Symposium, University of Michigan, Ann Arbor, MI, March 15, 2013.

A Gram-Positive D-arabinose 5-phosphate isomerase?
David L. Cech, Pan-Fen Wang, Victoria A. Assimon, Jeffrey M. Schaub, Christopher J. Holt, Tod P. Holler, and Ronald W. Woodard
Pharmacological Sciences Training Program Symposium, University of Michigan, Ann Arbor, MI, March 15, 2013

D-arabinose 5-phosphate isomerase in Strange Places, Jiangnan University, Food sciences April 15, 2013.

Expression and purification of Gluconate-6-Phosphatase Dehydrogenase, Lactate dehydrogenase, and Inorganic Pyrophosphatase from Aska collection. Marquis Douglas, Pan Fen Wang, David Cech, Chris Holt, Tod P. Holler, and Ronald Woodard. IREU Closing Symposium, Ann Arbor, MI, August 9th, 2012.

Synthesis of 3-Deoxy-D-*manno*-octulosonic Acid for Use in Substrate Displacement Assay for Kdo Transferase. Andreea Temelie, Pan Fen Wang, Christopher Holt, Ronald W. Woodard. UROP Spring Research Symposium, Ann Arbor, MI, April 24th, 2013.

AMAB-D-13-00294R1- Lingqia Su, Chenhua Xu, Ronald W. Woodard, Jian Chen and Jing Wu Applied Microbiology and Biotechnology "A novel strategy for enhancing extracellular secretion of recombinant proteins in Escherichia coli

AEM00239-13R1 - Lingqia Su, Ronald W Woodard, Jian Chen, and Jing Wu Extracellular location of Thermobifida fusca cutinase expressed in Escherichia coli BL21(DE3) without mediation of a signal peptide)

David Cech, Pan Fen Wang, Tod P. Holler and Ronald W. Woodard , Discovery of a novel feedback inhibition pathway in the single-domain arabinose 5-phosphate isomerase of Bacteroides fragilis