

The Second International Interdisciplinary Conference on  
Vitamins, Coenzymes, and Biofactors

Combining the Fifth International Symposium on Vitamin B6,  
PQQ, Carbonyl Catalysis and Quinoproteins,  
and the Fifth International Congress on Vitamins and Related  
Biofactors

October 26-31, 2008

University of Georgia, Athens, Georgia, USA



September 9, 2008

Welcome to Athens, GA!

We are so very happy you are here to experience a great college town noted both internationally and nationally for its great music scene and the home of the well-respected and award winning University of Georgia.

Athens is a rapidly growing university town with a population of approximately 110,000 with one third being university students. A spirited and energetic community, the town offers visitors and residents a unique blend of Southern hospitality along with avant-garde entertainment.

I like to say, "It's a town where sports and music are played side-by-side!"

Downtown Athens is the touchstone of Athens' economic and cultural life, including world-renowned music venues that help create a lively nightlife, a wide array of award-winning restaurants, some of our oldest and most unique buildings, funky shops selling locally made art, and a beautiful greenway.

Five Points is a smaller commercial area nestled in one of Athens most desirable neighborhoods. Here, too, you will find equally great places to eat and shop in close proximity to your lodgings.

The greater community also enjoys beautifully maintained historic districts and historic homes, innovative local artist initiatives such as our brand new art bus shelters, and multiple recreational opportunities both passive and active.

Here is how others describe us: "Athens is a unique blend of the old and new, funky and conservative...intellectual excellence and pop culture, creative energy and laid back lifestyle."  
"-Athens, Georgia, Celebrating 200 years at the Millennium, 1999/

We hope your stay is fun and pleasant. Please visit us again in the future, as we enjoy having company!

Warm regards,

A handwritten signature in black ink that reads "Heidi Davison". The signature is written in a cursive, flowing style.

Heidi Davison  
Mayor

## Organizing Committee

Robert S. Phillips, Chair

Cory Momany

Gloria Ferreira

Victor Davidson

Michael Toney

Judith Klinman

Thressa Stadtman

Tadhg Begley

Giovanni Gadda

Angelo Azzi

K. Dakshinamurti

## International Advisory Committee

Mariarita Bertoldi (Italy)

Nicolai Faleev (Russia)

Markus Fisher (Germany)

Juha-Pekka Himanen (Finland/USA)

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Timo Korpela (Finland)

Toshihisa Ohshima (Japan)

Aaron Rabinkov (Israel)

Nigel Scrutton (UK)

Katsuyuki Tanizawa (Japan)

## **Sunday, October 26, 2008**

6:30-9:00 PM, Welcoming reception, Georgia Center for Continuing Education

## **Monday, October 27, 2008**

8:45-9:00 AM Opening remarks: Robert S. Phillips, University of Georgia, USA; Heidi Davison, Mayor of Athens

9:00-9:45 AM Nigel Scrutton, University of Manchester, UK, "Isotope Effects and Driving Force Studies of Proton Tunneling in Aromatic Amine Dehydrogenase"

Coffee break, 9:45-10:00 AM

10:00 AM-12:00 PM Scientific sessions

*Pyridoxal-5'-phosphate dependent enzymes* (Chair, Andrea Mozzarelli)

10:00-10:30 AM John Richard, University at Buffalo, New York, USA, "Model Studies on Cofactor Catalysis: PLP and Simple Ketones"

10:40-11:10 AM Gregory Hunter, University of South Florida, Florida, USA, "The remarkable molecular mechanisms underlying 5-aminolevulinic synthase catalysis"

11:20-11:50 AM Mita Bertoldi, University of Verona, Italy, "Insights into the Mechanism of Oxidative Deamination Catalyzed by DOPA Decarboxylase"

*Quinones and quinoproteins* (Chair, Katsu Tanizawa)

10:00-10:30 AM Stephen R. Wecklser, University of California, Berkeley, USA, "PQQ biogenesis: Demonstration of Enzyme Activity for PqqE and its Relationship to PqqD"

10:40-11:10 AM Sandra Puehringer, University of Salzburg, Austria, "Structural studies of the cofactorless oxidase PqqC"

11:20-11:50 AM Carrie Wilmot, University of Minnesota, USA, "MauG: an enzyme involved in the biosynthesis of the tryptophan tryptophylquinone cofactor of methylamine dehydrogenase"

12:00-2:00 PM lunch and poster sessions: Pyridoxal-5'-phosphate dependent enzymes; Quinones and quinoproteins

2:00-6:00 PM Scientific sessions

*Pyridoxal-5'-phosphate dependent enzymes* (Chair, Mita Bertoldi)

2:00-2:30 PM Andrea Mozzarelli, University of Parma, Italy, “*O*-Acetylserine Sulfhydrylase and Serine Acetyltransferase: from Protein-Protein Interactions to Novel Antimicrobial Agents”

2:40-3:10 PM Dalibor Milić, University of Zagreb, Croatia, “Structural Studies of the Enzymatic Mechanism of *Citrobacter freundii* Tyrosine Phenol-lyase”

3:10-3:40 PM Coffee break

3:40-4:10 PM Aaron Rabinkov, Weizmann Institute of Science, Israel, “Thiol-disulfide organization in alliin lyase (alliinase) from garlic (*Allium sativum*)”

4:20-4:50 PM Robert Phillips, University of Georgia, USA, “The Crystal Structure of the *Pseudomonas dacunhae* Aspartate-Beta-Decarboxylase Reveals a Novel Oligomeric Assembly for a Pyridoxal-5'-Phosphate Dependent Enzyme”

5:00-5:30 PM Abraham Parola, Ben-Gurion University of the Negev, Israel, “Reduced Tight Assembly of Trpase Tetramer Enhanced PLP Release Leading to Dissociation and Cold Inactivation”

5:40-6:10 PM Ben Liu, University of Texas, USA, “Mechanistic Studies of C-4 Deoxygenation in the Biosynthesis of Desosamine”

*Quinones and quinoproteins* (Chair, Victor Davidson)

2:00-2:30 PM Katsu Tanizawa, Osaka University, Japan, “Involvement of an Iron Sulfur Protein and a Subtilisin-like Protease in the Posttranslational Modification of Quinohemoprotein Amine Dehydrogenase”

2:40-3:10 PM Hirohide Toyama, University of the Ryukyus, Japan, “Three quinoprotein alcohol dehydrogenases of *Pseudomonas putida* HK5: Analysis of promoter activities”

3:10-3:30 Coffee break

3:40-4:10 PM Mamoru Yamada, Yamaguchi University, Japan, “Menaquinone as well as ubiquinone as a bound quinone crucial for catalytic activity and intramolecular electron transfer in *Escherichia coli* quinoprotein glucose dehydrogenase”

4:20-4:50 PM Koji Sode, Tokyo University of Agriculture & Technology, Japan, “The Cutting Edge in the Biomolecular Engineering of Pyrroloquinoline Quinone Glucose Dehydrogenases

and Their Industrial Application”

5:00-5:30 PM Sam Hay, University of Manchester, UK, “Hydrostatic Pressure: A New Probe of Promoting Motions in Enzyme Catalysis”

6:30-8:30 PM Dinner

## **Tuesday, October 28, 2008**

9:00-9:45 AM, Hideyuki Hayashi, Osaka Medical College, Japan, “Substrate- and Product-Assisted Catalysis and Reaction Specificity in Pyridoxal Enzymes”

Coffee break, 9:45-10:00 AM

10:00 AM-12:00 PM Scientific sessions

*Pyridoxal-5'-phosphate dependent enzymes* (Chair, Aaron Rabinkov)

10:00-10:30 AM Tohru Yoshimura, Nagoya University, Japan, “Role of Pyridoxal 5’-Phosphate of GabR, a Transcriptional Regulator of *Bacillus subtilis*”

10:40-11:10 AM Tomokazu Ito, Nagoya University, Japan, “A novel zinc-dependent D-serine dehydratase from *Saccharomyces cerevisiae*: Identification and application”

11:20-11:50 AM Tathagata Mukerjee, Cornell University, USA, “Identification and characterization of PLP catabolic genes in *Mesorhizobium loti* MAFF303099”

*Flavoenzymes and pterins* (Chair, Giovanni Gadda)

10:00-10:30 AM Russ Hille, University of California, Riverside, USA, “The reaction mechanism of xanthine oxidoreductase”

10:40-11:10 AM Denis J. Stuehr, Cleveland Clinic, USA, “Redox Cycling of Tetrahydrobiopterin within Nitric Oxide Synthase: Mechanisms and Implications for Uncoupled Oxygen Reduction”

11:20-11:50 AM Peter Macheroux, Graz University of Technology, Austria, “Structure and Mechanism of Berberine Bridge Enzyme – a Flavoenzyme with a Bicovalently Linked FAD Cofactor”

12:00-2:00 PM lunch and poster sessions: Biosynthesis of Biofactors; Flavoenzymes and pterins

2:00-6:00 PM Scientific sessions

*Biosynthesis of Biofactors* (Chair, Tadhg Begley)

2:00-2:30 PM Andrei Osterman, Burnham Institute for Medical Research, USA, “Comparative genomics of NAD biosynthesis”

2:40-3:10 PM Ivo Tews, Heidelberg University, Germany, “Vitmain B6 Biosynthesis by a 640 kDa protein complex”

3:10-3:40 PM Coffee break

3:40-4:10 PM Steve Ealick, Cornell University, USA, “Recent Developments in the Structural Biology of Thiamin Biosynthesis”

4:20-4:50 PM Paola Mera, University of Wisconsin, USA, “Structural and Functional Analyses of the Human-type Corrinoid Adenosyltransferase (PduO) from *Lactobacillus reuteri*”

5:00-5:30 PM Robert H. White, Virginia Tech, USA, “New Anaerobic Routes for Coenzyme Biosynthesis and Their Implications in the Evolution of Life”

5:40-6:10 PM Biswarup Mukhopadhyay, Virginia Tech, USA, “TBA”

*Flavoenzymes and pterins* (Chair, Russ Hille)

2:00-2:30 PM Andrea Mattevi, University of Pavia, Italy, “Investigating the Oxygen Reactivity in Flavoenzymes”

2:40-3:10 PM Giovanni Gadda, Georgia State University, USA, “Enzyme-substrate Preorganization in the Alcohol Oxidation Catalyzed by Choline Oxidase”

3:10-3:40 PM Coffee break

3:40-4:10 PM Kenji Inagaki, Okayama University, Japan, “Molecular Characterization of L-Glutamate Oxidase from *Streptomyces* sp.”

4:20-4:50 PM Dale Edmondson, Emory University, USA, “The Covalent FAD Environment in Monoamine Oxidase: Influence on Catalysis”

5:00-5:30 PM Leslie Poole, Wake Forest University, USA, “Mechanisms of Catalysis and Thiol-Disulfide Interchange Pathways in AhpF and AhpC of the Bacterial Alkyl Hydroperoxide Reductase System”

5:40-6:10 PM Toshihisa Ohsimia, Kyushu University, Japan, "The functional and structural characteristics of FAD, FMN and ATP-containing dye-linked L-proline dehydrogenase complex from *Pyrococcus horikoshii*"

6:30-8:30 PM Dinner

### **Wednesday, October 29, 2008**

9:00-9:45 AM Victor Davidson, University of Mississippi Medical Center, USA, "Mechanistic Insights into the Biosynthesis of Tryptophan Tryptophylquinone, a Protein-Derived Cofactor"

10:00 AM, Leave for excursion to North Georgia mountains, lunch at Wolf Mountain winery, visit Brasstown Bald mountain after lunch, return 6:00 PM.

### **Thursday, October 30, 2008**

9:00-9:45 AM Amnon Kohen, University of Iowa, USA, "Flavin-dependent thymidylate synthase: The diverse role of FAD"

10:00 AM-12:00 PM Scientific sessions

*Biosynthesis of Biofactors* (Chair, Robert H. White)

10:00-10:30 AM Marc Fontecave, CNRS-CEA-Université Joseph Fourier, France, "Biosynthesis of mineral cofactors: the case of [Fe-S] clusters"

10:40-11:10 AM Petra Haenzelmann, University of Wuerzburg, Germany, "Insights into the Radical-Based Synthesis of Precursor Z, the First Step of Molybdenum Cofactor Biosynthesis"

11:20-11:50 AM Silke Leimkuehler, Universität Potsdam, Germany, "The biosynthesis of the molybdenum cofactor in *E. coli* and humans: a link to FeS cluster biosynthesis"

*Flavoenzymes and pterins* (Chair, Dale Edmondson)

10:00-10:30 AM Marco Fraaije, University of Groningen, The Netherlands, "Elucidating the role and mechanism of covalent flavinylation"

10:40-11:10 AM Alessandro Aliverti, University of Milano, Italy, "Ferredoxin-NADP<sup>+</sup> reductases of Apicomplexa: unique properties of protozoan plant-type enzymes"

11:20-11:50 AM Patrick McTamney, University of Maryland, USA, “Structure of Iodotyrosine Deiodinase: Mechanistic Implications”

*Biomedical Aspects of Vitamins/Biofactors* (Chair, Arthur Cooper)

10:00-10:30 AM Norihisa Kato, Hiroshima University, Japan, “Vitamin B6 Suppresses Autophagy Induced by Nutrient Starvation”

10:40-11:10 AM Tomoko Kayashima, Hiroshima University, Japan, “Dietary Vitamin B6 Suppresses Colon Heat Shock Proteins, Targets for Cancer Therapy, in 1,2-Dimethylhydrazine-treated Rats”

11:20-11:50 AM Shyamala Dakshinamurti, University of Manitoba, Canada, “Pyridoxal Phosphate Binds to L-type Calcium Channels in Vascular Myocytes”

12:00-2:00 PM lunch and poster sessions: Biomedical Aspects of Vitamins/Biofactors

2:00-6:00 PM Scientific sessions:

*Biomedical Aspects of Vitamins/Biofactors* (Chair, K. Dakshinamurti)

2:00-2:30 PM Y. Sone, Ochanomizu University, Japan, “Influence of Dose Level of Vitamin C on the Expression of Vitamin C Transporters in ODS Rats”

2:40-3:10 PM Arthur Cooper, New York Medical College, USA, “Metabolism of Endogenous and Exogenous Electrophiles through the Mercapturate/Cysteine S-conjugate  $\beta$ -Lyase Pathway”

3:10-3:40 PM Coffee break

3:40-4:10 PM Takashi Tamura, Okayama University, Japan, “Selenite Assimilation into Formate Dehydrogenase H depends on Thioredoxin Reductase in *Escherichia coli*”

4:20-4:50 PM Vincent C.O. Njar, “Novel atypical retinoic acid metabolism agents (RAMBAs) for treatment of cancers”

5:00-5:30 PM Robert Rucker, University of California, Davis, “Pyrroloquinoline Quinone: Physiological Properties and Nutritional Significance”

7:00-10:00 Conference banquet

**Friday, October 31, 2008**

9:00-9:45 AM, Ronald Eitenmiller, University of Georgia, USA, “Advances in Folic Acid and Folate Research – Nutrition, Fortification and Analysis”

10:00-12:00 AM Scientific sessions

*Biomedical Aspects of Vitamins/Biofactors* (Chair, Robert Rucker)

10:00-10:30 AM Krishnamurti Dakshinamurti, University of Manitoba, Canada, “A microarray study of the effect of biotin repletion on pancreatic gene expression in biotin-deficient rats”

10:40-11:10 AM Paul Voziyan, “Pyridoxamine and diabetic retinopathy”

11:20-11:50 AM Angelo Azzi, “New insights in the Vitamin E mechanism and its protection against human disease”

12:00 PM Closing remarks

12:30-2:00 PM lunch