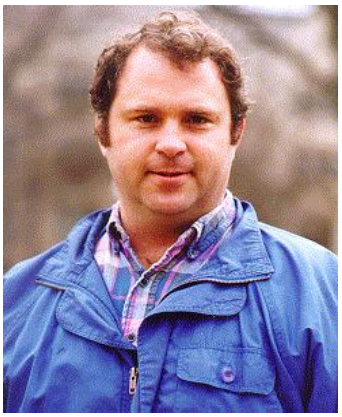
Fall 2003

Biochemistry News

Kansas State University – Alumni and Friends Newsletter

Newsletter Highlights:

News from the Department Head



Greetings from the Department of Biochemistry. Our classrooms and labs are busy, with increased numbers of undergraduate biochemistry majors and 17 undergrads working in research labs, the arrival of 10 new graduate students this year to bring us to a total of 35, and 15 postdocs and visiting scientists working in the department. We have had some changes this year. I transitioned from interim to regular department head in May. Paul Smith moved to the Department of Chemistry, but he will remain a member of the Biochemistry Graduate Group. A search is underway for a new faculty member in the department, with research emphasis is regulation of transcription in a eukaryotic system. Also, we have three new staff in our department offices: Molly Rink, our Senior Administrative Assistant who has been here since last fall, and two new Administrative Assistants, Kelly Gall and Rebecca de Rodriguez have joined us most recently.

The department was visited for two months this year by Dr. Aung San from the Department of Biochemistry at the Mandalay Institute of Medicine in Myanmar (former Burma). He visited classes and research laboratories with the goal of gathering information about our teaching and research methods to take back to the faculty and students in Myanmar.

The department has had another successful year in research. Among these accomplishments is the development of a new laboratory resource at K-State for the study of lipids, the Kansas Lipidomics Research Center. This center was established through a major NSF grant to Xuemin (Sam) Wang. You may read more about the lipidomics center and about the research activities of Michal Zolkiewski, Anna Zolkiewska and Larry Davis in this newsletter.

KANSAS LIPIDOMICS RESEARCH CENTER ESTABLISHED AT K-STATE

A new Kansas Lipidomics Research Center has been established in 2003 at Kansas State University. The Center's core research team includes five K-State scientists and three University of Kansas scientists. Dr. Xuemin (Sam) Wang, Professor in the Department of Biochemistry, is the Center's scientific director. Ruth Welti, Associate Professor of Biology and a member of the Biochemistry Graduate Group, oversees the analytical activities of the center. The Center is currently supported with a $1.2 million three-year grant from the National Science Foundation's Kansas EPSCoR program.

The study of cellular metabolites is an emerging new field called metabolomics. Lipidomics is part of that larger area of study. Studying metabolite profiles provides insight into health and disease processes. For example, biofluids like blood serum, urine, and the spinal fluids are tested routinely for metabolites. As metabolomics adds to the knowledge base, new diagnostic tests can be developed to screen for indicator molecules in these samples.

Collaborative research by Kansas Lipidomics Research Center scientists will focus on functions of lipids in plants and animals and their roles in cell growth, cell differentiation, or cell death. Lipids are the structural backbones of cell membranes. They are also the sources of metabolic energy and the sources of regulators of numerous cellular functions in all organisms. Alterations in lipid molecular species and functions are associated with human diseases such as obesity, heart disease, and non-insulin dependent diabetes. Within each cell, there are hundreds of types of lipids, and the lipid profile changes in response to signals from the cell's environment. Because of their sheer number and vast complexity, obtaining detailed information on lipid molecular species poses a daunting problem for scientists.

According to Dr. Wang, lipidomics, or a high-throughput, comprehensive approach to studying lipids has gained increasing scientific attention. "Realizing that lipids play pivotal roles in regulating a wide variety of cellular processes is one of the major advances in modern biology of the last 20 years," Dr. Wang explained in a recent interview in The Scientist. Having the Center as part of the state's science will place Kansas scientists in a much better position to compete for future funding.

Currently, lipidomics researchers at K-State are working to identify lipids that regulate plant responses to pathogens and environmental stress and to identify plant genes involved in generating lipid regulators. Results of a recent lipid profiling study identified the function of a plant gene product that breaks down particular lipids when plants are exposed to freezing. The identification of relevant genes is an important step toward designing strategies to engineer crop plants, such as Canola, an emerging cash crop, for increased ability to withstand environmental stresses.

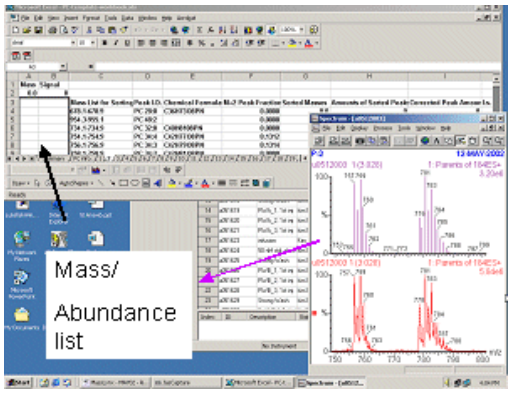
The Kansas Lipidomics Research Center can provide high-throughput lipid-profiling capability, making it the first facility of its kind. No other facility is offering comprehensive profiling of cell membrane lipids to the scientific community. The facility includes three components: the analytical lab, a technology development component, and a scientific research component.

- The Analytical Laboratory uses mass spectrometric comprehensive, and quantitative analysis of lipids. The Kansas research team unveiled its lipid profiling work publicly in summer 2002. Since then, collaborations are being developed with researchers nationally and internationally.

- The Technology Development component will develop even more advanced methods of analysis. This effort will be jointly carried out by scientists both at K-State and at the Mass Spectrometry Lab at the University of Kansas. Both groups have collaborated to improve the analytical technology already in use.

- The Scientific Research component will aim at elevating research capabilities and promoting collaboration among many Kansas scientists. To that end, the Center will host meetings, workshops and seminars for professionals, and be a training facility for students and postdoctoral researchers in lipidomic strategies and mass spectrometry technology.

For more information, see the lipidomics web site at: www.ksu.edu/lipid/lipidomics



Happy 90th Birthday to Don Parrish

Donald Parrish

K-State Professor Emeritus of Biochemistry Donald Parrish celebrated his 90th birthday on September 24th.

Professor Parrish was born in Fort Scott, KS in 1913. After graduating from Fort Scott Junior College and Kansas State University, he taught science and various other courses at Centralia, Lyons and Manhattan High Schools. He then obtained his Master¹s and Ph.D. degrees in Chemistry from KSU, after which he worked in the Departments of Chemistry and Biochemistry for 40 years, retiring in 1983. Professor Parrish taught courses in animal biochemistry and nutrition, and was a noted authority on vitamin A. He is a member of the Manhattan Area Retired Teachers Association and played clarinet for 60 years in the Manhattan Municipal Band from its founding in 1933 until 1993. However, he might be more familiar to many residents as the tall lean man frequently seen walking around Manhattan. In fact, Donald Parrish may have walked more miles in Manhattan than anyone else.

Karl Kramer Granted Emeritus Status

Karl Kramer retired after nearly 30 years of service from the USDA-ARS Grain Marketing and Production Research Center in January and has been accorded Adjunct Emeritus Professor Status by K-State. Dr. Kramer has been an adjunct member of the Biochemistry Department since 1974. He has been continuously active in the department and has served on many committees, lectured in biochemistry classes, supervised biochemistry graduate students, and has had numerous research collaborations with members of the department. Although he is officially retired, Dr. Kramer remains active in research. He will continue as A co-principal investigator in two NSF-funded projects with Dr. Muthukrishnan and Dr. Kanost on insect chitin synthesis and insect cuticle sclerotization (tanning). He also has retired from playing tennis but has begun a new career as an intercollegiate tennis official.

KSU Emeritus Biochemistry Faculty Breakfast Group

(Karl Kramer, Phil Nordin, Don Parrish, Ken Burkhard and Del Mueller)

Hageman Lecture

This Year's Richard H. and Elizabeth C. Hageman Distinguished Lecturer in Agricultural Chemistry was Dr. Bruce D. Hammock of UC-Davis. On October 29, 2003. Dr Hammock spoke on "The 'Juvenile Hormone' of Humans: Biochemistry of epoxyeicosanoids and their role in disease treatment". The next day he led a colloquium on the topic of "Potential and Problems with Recombinant Baculoviruses in Insect Control".

Dr. Hammock has had long interests in insects and insecticides, and their interactions with humans. He obtained a B.S. in Entomology at LSU. His University of CA-Berkeley included work in both Entomology and toxicology. Now a Professor of Entomology at UC-Davis, he was recognized for his original approaches by election to the National Academy of Sciences in 1999. His work has resulted in over 500 publications.

Dr. Bruce Hammock

Biochemistry Graduate Students Honored

The Department of Biochemistry at Kansas State University has honored four of its graduate students for their outstanding research and teaching achievements.

Jeff Fabrick, who earned his Ph.D. in biochemistry in Spring 2003, is a recipient of the department's Graduate Student Research in Biochemistry Award. The award recognizes excellent research accomplishments and includes a cash prize and a certificate.

Emily Ragan and Dave Hogenkamp, doctoral students, and Vladimir Yevseyenkov, a Master's student, are recipients of the department's Outstanding Graduate Student Teaching Assistant Award. The honor includes a certificate and a cash award.

Major Professor for Fabrick and Ragan is Mike Kanost, professor and chair of the Department of Biochemistry. Major Professors for Hogenkamp and Yevseyenkov are S. Muthukrishnan and Dee Takemoto, respectively, both professors of biochemistry.

Fabrick was recognized for his research on hemolymph proteins from tobacco hornworm Manduca sexta and their role in innate immunity. The innate immune responses in insects are activated by different pattern recognition proteins that bind to molecules (molecular patterns) present on the surface of microorganisms but absent from insects. Recently, Fabrick purified and cloned cDNA of a novel β-1,3-glucan recognition protein from the Indianmeal moth, Plodia interpunctella. Fabrick is now doing postdoctoral research at The University of Arizona.

Emily Ragan served as a special assistant for the lecture portion of the General Biochemistry class. In her research lab, she studies proteolytic enzymes from insect hemolymph. Hogenkamp was an instructor in the Introductory Organic and Biochemistry Laboratory class. He investigates the chitin protein synthase proteins in Manduca sexta. Yevseyenkov was an instructor in the General Biochemistry Laboratory class. He works on the role of protein kinase C in control of gap junctions in the retina

Recent Graduates from the Biochemistry Graduate Program

Jeffrey Fabrick (Ph.D. 2003, Kanost). "Purification, cDNA cloning, and biological significance of a β-1,3-glucan recognition protein and its amino- and carboxyl-terminal domains from the indianmeal moth, Plodia interpunctella". (Postdoc, Arizona State University)

Yongli Gu (M.S. 2003, Kanost)
"Characterization of three serine proteases present in hemolymph of the tobacco hornworm, Manduca sexta. (Research Assistant, Kansas State University)

Weiqi Li (M.S. 2002, Wang)
"Different Roles of Phospholipase D alpha and beta in Freezing Responses in *Arabidopsis Thaliana*" (Ph.D. Student, Wang)

Chunbo Qin (Ph.D. 2003, Wang)
"Cloning, Expression and Characterization of Multiple Froms of Phospholipase D in *Arabidopsis Thaliana*" (Moved to New York to join her husband. She is currently a Postdoc at Rockefeller University.)

Gabriel A. Cook (M.S. 2003, Tomich)
"Structural Determination of a Monomeric Channel-Forming Peptide Derived Frim the Glycine Receptor M2 Segment" (Ph.D. Student, Tomich)

Haiqing Yi (M.S. 2002, Muthukrishnan)
"Using *CAH* as Selectable Marker in Sorghum Transformation"

From the Laboratory of Michal Zolkiewski

Our laboratory grew over the last several years and currently has five members. A biophysicist from Russia, Vladimir Akoev joined our group in summer 2001. Vladimir is an expert in physical characterization of proteins using calorimetry and analytical ultracentrifugation. Sabina Kedzierska, a biochemist from Poland, joined in summer 2002. Sabina's expertise is in the area of molecular biology, microbiology, and protein chemistry. Three graduate students are currently working towards their PhD degrees: Micheal Barnett from Kansas, Zhonghua Liu from China, and Maria Nagy from Romania. Vekalet Tek, a protein chemist from Turkey spent two years in our group and moved in 2002 to the National Renewable Energy Laboratory in Golden, Colorado. Our research is focused on the structure and function of selected proteins from a large family of AAA ATPases. These proteins are "molecular machines" that use energy from ATP to perform specific tasks, such as protein assembly, disassembly, folding, and disaggregation. We use techniques of molecular and cell biology, protein biochemistry and biophysics to study the mechanism of reactions involving AAA ATPases. In the last two years, our group published 5 research papers and presented several lectures and posters at the Annual Midwest Stress Response and Chaperone Meetings in Evanston, Illinois, at the FASEB summer research conference on Protein Folding in the Cell in Saxtons River, Vermont, and at the Symposia of the Protein Society in San Diego, California and Boston, Massachusetts

Dr. Michal Zolkiewski

From the Laboratory of Anna Zolkiewska

The research in our laboratory is focused on cell signaling by adhesion receptors. We are interested particularly in two groups of such receptors: integrins and ADAM proteins. We study their roles in the development, function, and regeneration of skeletal and cardiac muscle. We are using various biochemical, molecular, and cellular biological methods to understand how these receptors work, how their activities change during aging, and how certain defects in their structure lead to muscle diseases such as muscular dystrophies. The results of our studies have been recently published in 3 papers and presented at Gordon Research Conference on "Signaling by Adhesion Receptors" and FASEB Summer Research Conference on "Skeletal Muscle and Satellite Cells". We have currently four laboratory members: Zhefeng Zhao and Haiqing Yi are graduate students working towards their Ph.D. degrees, Denise Wood is a Research Assistant, and Pyroja Sulaiman is a post-doc who has recently joined us from India. Joanna Gruszczyska-Biegala spent one year working as a Research Assistant in our laboratory and has just returned back to the Nencki Institute of Experimental Biology in Poland. Yi Cao, a former graduate student in our lab, received her Ph.D. last year and became a post-doc at Fred Hutchinson Cancer Research Center in Seattle. She works in a renown group, well recognized for their cutting edge research in the area of transcriptional regulation and myogenesis.

Dr. Anna Zolkiewska

From the Laboratory of Lawrence Davis

During the past couple years we have focused mainly on techniques for cleaning up soil contamination using plants. We have been using sunflowers as a model system and a compound called benzotriazole, which is found in antifreeze and airplane deicer, as the chemical of interest. Very recently we have applied techniques of infrared microscopy to look at where the benzotriazole ends up in the plant. Ken Dokken is a biochemistry graduate student working on this project. Several chemical engineering graduate students and a couple of undergraduates have worked on it too.

Part of our work includes outreach to other communities. This summer we had visitors from the Altai Republic in central Asia. Very likely I'll be going to visit them next summer.

I am still involved with nitrogenase. I am chairing a Gordon Research Conference on that topic in June of 2004.

Several former graduate students have kept in contact. You've probably seen news about them already. Their babies are growing up quickly. I have a new granddaughter now too. She has her own website at davismn.net with almost daily updates.

Dr. Lawrence Davis

College of Arts and Sciences Honors Crystal Sapp

At K-State's 26th annual Classified Employees Recognition Ceremony May 21, Crystal Sapp was named Classified Employee of the Year. Crystal has been the accountant in the biochemistry department for 11 years. She received her bachelor's degree in accounting from K-State in 1991. She is married, has two grown daughters, a grandson, and has a new baby granddaughter!

Alumni News

Yifei Zhu (Ph.D. 2001, Kanost) is now a happy mother taking care of a nine-month old baby and working at Silgen as well. She really enjoys the weather in the Bay area and invites friends to stop by anytime. Her address is 34510 Milburn Terrace, Fremont, CA 94555 and her email is yfzhu01@yahoo.com.

Congcong Ma (M.S. 1997, Ph.D. 1999, Kanost) is currently a senior scientist at Applied Biosystems in Foster City, CA. She is working on developing a high throughput SNP analysis product. Her son, Ben, is in the fifth grade and plays piano, violin, clarinet, and tennis.

Yi Cao (Ph.D. 2002, Zolkiewska) is now a post-doctoral fellow in Fred Hutchinson Cancer Research Center in Seattle, WA. In 2003, Yi obtained a highly competitive Interdisciplinary Training Grant entitled "Statistical Analysis of Patterned Gene Expression". In her free time, she hikes the mountains around Seattle with husband, Jianchun Dong (Ph.D. 2001, Roche).

Hongxing Lei (Ph.D. 2003, Smith) is currently a post-doctoral fellow with Prof. Yong Duan at the University of Delaware where he is continuing his studies into protein folding using computer simulations. In addition, he is also attempting to understand protein-protein interactions using docking approaches.

Suha Saleh (Ph.D. 2000, Takemoto) is now an instrcutor of Biology at University of Texas at El Paso. She now has a son and daughter.

Lynn Wagner (B.S. 1997, Ph.D. 2002, Takemoto) is now a postdoctoral fellow at University of Washington in Seattle.

Jim Dyer (Ph.D. 1996, Wang) is a faculty member at Montclair State University, New Jersey.

Liwen Xu (Ph.D. 1996, Wang) is currently a Research Scientist at Stanford University.

Dahao Ling (M.S. 2000, Wang) is currently a Research Associate at Arena Pharmaceuticals, San Diego.

Kirk Pappan (B.S. 1992, Ph.D. 1998, Wang) is now a Postdoctoral Associate at Washington University, St. Louis.

Xiaoraong Wang (M.S. 1995, Muthukrishnan) finished her doctoral work at UPenn and has recently moved to UCLA as a post-doctoral fellow to work on asthma.

Lei Wang (M.S. 1996, Muthukrishnan) has recently moved to Auburn to take up a post-doctoral work in Scott-Ritchey Research Center in Veterinary School after two years as a research associate at Yale University.

Hong Zhang (M.S. 2000, Muthukrishnan) is currently working in Celera Genomics, a biopharmaceutical company in South San Francisco, CA, as a senior associate scientist in Molecular Biology and Protein Expression dept. She and her husband (also a KSU graduate) are busy taking care of their 4 year old daughter, Carolinen.

Please tell us about yourself!

Let your friends know what you are up to.

Please include:
- your name -degree/year
-personal activities -position/title
-anything else!

E-mail us at: **Biochem@ksu.edu**

We Thank Our Alumni

Dear alumni and friends,

The Department of Biochemistry would like to thank our alumni for their generous support. Endowment from past donations allows us to offer scholarships to undergraduate students, which certainly helps them in these times of tuition increases and enhances our recruiting of top students. General funds supplement the department's operating budget to enhance our ability to provide a high quality of education to our students and to attract and support new faculty.

We hope you will keep in touch with us and your former classmates by contributing your news to our newsletter. Would you please take a minute to send us your news by mail or email? Please include your name, address, degree & year, employer, position and title, to make certain that our files are current, and news about you, your career, and your family.

If you wish to donate to any of the Biochemistry Foundation funds (see below) please send your contribution to the Department of Biochemistry and indicate which fund you wish to donate to. Please call us at 785-532-6121 or email biochem@ksu.edu if you have any questions.

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KSU Biochemistry on the World Wide Web
http://www.k-state.edu/bchem/

Our homepage contains information on the Department of Biochemistry, faculty, undergraduate and graduate programs, courses, seminar, and core facilities. Other K-State related pages that might be of interest:

KSU Alumni Foundation http://www.k-state.com

E-Collegian Newspaper http://www.spub.ksu.edu