

BIOCHEMISTRY & MOLECULAR BIOLOGY TODAY

NOVEMBER 2009 NO. 250



Chair's Message



Graduate student orientation went very well this year thanks to the special effort of our present graduate students who did an outstanding job. We should all be proud of their spirit and commitment to our educational programs.

Even as our infrastructure continues to improve, plans for the renovation of our space in the Basic Science Building are on schedule. Once all the State mandated permits, etc are approved at the beginning of next year, the actual construction should begin.

As mentioned in earlier newsletters, we now have a postdoctoral office to represent the interests of postdoctoral fellows housed in the Graduate School. For information, contact Joanna Bremmer , who is in charge of the office. Also, work is almost finished on the creation of a Scientist Track parallel to the faculty track to address intervals between the end of postdoctoral training and independent faculty research positions and the need for career paths for specialized niches of expertise arising out of new areas of research.

Holiday Season approaches. Make sure to mark December 11th on your calendars for our 2009 Holiday Party. Alas, the Galveston Yacht Club is no more but I think we will all enjoy our venue at Fisherman's Wharf this year.

As busy as we all are, I hope you take out the time to enjoy the Holidays with your families and friends.



regino

Inside this issue:

Graduate Program Notes	3
Faculty Travels	4
Awards and Announcements	2
Publications	5

Special Items of Interest

- ✦ Graduate Program News—Page 3
- ✦ SECC Update—Page 2

Awards and Announcements

Vincent Dimayuga won a “Best Student Poster” award (\$100) in the Basic Science Research division at the 13th Annual Forum on Aging sponsored by the UTMB Sealy Center on Aging on November 12th, 2009. His poster was titled “Age-Associated Oxidative Modifications in Protein Disulfide Isomerase”.



From left to right: Rabab H. Al-Lahham (Basic Science Research), Carrie Ciro (ACE Unit Research), Vincent L. Dimayuga (Basic Science Research), Alyssa Baker (Medical Student Training in Aging Research), Dr. Ken Ottenbacher, Douglas Heiner (Medical Student Training in Aging Research), Kristen Sheffield (Minority Aging Research), Shanon Casperson (Pepper Center Research), Chris Fry (Pepper Center Research), David Gunderman (Pepper Center Research), Cristian Lasagna-Reeves (Neuroscience).

Dr. Bruce Luxon was issued his second patent of 2009: Engelhardt; J.P., Gorenstein; D.G., and Luxon; B.A., “Process and apparatus for combinatorial synthesis.”, U.S. Patent No. 7,576,037 (2009)



Marlene Starr, graduate student in Dr. Hiroshi Saito's lab, was selected to receive the Rose and Harry Walk Research Scholarship Award and the Stephen C. Silverthorne Memorial Scholarship Award.

Anasuya Roychowdhury received the Mendoza Award.

Michal R. Szymanski received the Robert A. Welch Award for Excellence in Graduate Research in Chemistry Scholarship Award. He also received the Barbara Bowman Scholarship Award.

SECC update: There is still time to give

As we enter the third week of the 2009-10 [SECC](#) campaign, we have already exceeded the half-way point of our monetary goal of \$500,000. We would love to see as many of our UTMB employees as possible participate in the campaign — every gift, no matter how large or how small, can make an important difference in someone's life. To see how your department's participation stacks up against others throughout campus, click [here](#). If you have questions regarding SECC, please contact Becky Walsdorf at bwalsdor@utmb.edu or ext. 27834.

Graduate Program News

Congratulations are in order to Kurtis Anderson, Gorenstein laboratory, for passing his qualifiers.

Our BMB Graduate Program Retreat, Friday, October 23rd was well attended and several goals were set regarding our curriculum and recruitment of highly qualified new students.

Three of our students won the BMB Travel Award this previous summer and below are excerpts from their recent meetings.

Austin Elam, Hilser laboratory, attended the Gibbs Conference on Biothermodynamics 2009:

“With a travel award provided by the Department of Biochemistry and Molecular Biology, I was able to travel to the 2009 Gibbs Conference in Biothermodynamics on October 3-6th. The conference is held at the Touch of Nature camp located outside of Carbondale, Illinois. Surrounding woods create an isolating environment, where attendees focus intently on biophysical research. Two keynote addresses were given by Linda Jen-Jacobson (University of Pittsburgh) and Michael Brenowitz (Albert Einstein College of Medicine) who gave the first inaugural Gary Ackers Lecture in Biothermodynamics. Topics of oral presentations covered nucleic acid structure and function, protein structure and function, macromolecular assemblies and interactions, and membrane assemblies and proteins. Perhaps the most useful aspect of the conference for me was the lengthy poster session where my poster received a lot of traffic, and I was able to field many questions and get feedback on my research.”

Christof Straub, Kurosky laboratory attended the World Congress of the Human Proteome Organization:

“I would like to thank the department for helping me fund my recent trip to the 8th Annual World Congress of the Human Proteome Organization in Toronto, Canada. The meeting was very insightful, as many of the world’s leaders in proteomics were present at the meeting. Aside from technological advances, one of the most noticeable trends was the widespread application of proteomics techniques in many areas of research; many diseases are now researched through proteomics approaches and exciting advances are being made.”

Our annual Orientation event was held Thursday, October 29th at 2pm and once again, our students excelled in providing an outstanding presentation to the first year students. We would like to thank our poster presenters’: the Iwahara laboratory, Bujalowski laboratory, the Jeschke laboratory, and the Rowicka-Kudlicka laboratory. Michal Szymanski, Bujalowski laboratory, carved the awesome pumpkin for our booth.



-Debora Botting

Faculty on the Road



Dr. Bruce Luxon attended the National CTSA Biomedical Informatics Director's meeting at NIH in Bethesda, MD. He was also at the Texas CTSA Informatics Director's meeting at UTSW Med in Dallas, TX and the American Medical Informatics Association annual meeting in San Francisco, CA.

Dr. Krishna Rajarathnam traveled Arlington, VA to On Oct 15 and 16 to review grants for the NIH 'Innate Immunity and Inflammation' Study Section.

Dr. Sankar Mitra gave a talk titled, 'Complexity in Repair of Oxidative Genome Damage and Its Regulation' at the 40th International Symposium on DNA Repair and Human Cancers supported by the Princess Takamatsu Cancer Research Fund. The meeting was held in Grand Palace Hotel, Tokyo, Japan during November 10-12 of this year. Some two dozen leading scientists in DNA repair and cancer research from US and Europe and a dozen from Japan presented their work. Dr Takashi Sugimura, ex-Director of National Cancer Center, Tokyo along with Dr. Susumu Nishimura of Tsukuba University and Dr. Lawrence Loeb of University of Washington organized the meeting.

Dr. Cheryl Watson attended the E.Hormone scientific meeting on October 20-24, 2009 at Tulane University in New Orleans, LA.

Dr. Shakeel Ansari attended the NIEHS Annual Center Director's Meeting in Milwaukee, WI on Sept 29–October 2, 2009.

He also Attended NIH Review-Small Business Applications Study Section in Rockville, Maryland on October 6-9, 2009.

Dr. John Wiktorowicz chaired a session on "Arrays" and gave an invited presentation on proteomic biomarkers at Proteomics Europe in Barcelona, Spain.

Dr. Bujalowski attended the Twenty-third Annual Gibbs Conference on Biothermodynamics Carbondale, Illinois. October 3-6, 2009. He gave a lecture on "Structure function relationship in hexameric helicases. Prelude to large molecule machines".

Michal R. Szymanski attended the Twenty-third Annual Gibbs Conference on Biothermodynamics Carbondale, Illinois. October 3-6, 2009. He presented a poster on "Energetics of the E. coli PriA Helicase Interactions with the Double Stranded DNA".

Dr. YongSun Lee presented a talk entitled "MicroRNAs and other small RNAs in cancer" at Baylor College of Medicine, to the Department of Molecular and Cellular Biology on October 22, 2009.

Dr. Marc Morais was an invited speaker at "The 2009 Idaho State University Practical Bioinformatics Workshop: From Genome to Phenotype" on Oct 17th.

Publications

A novel class of small RNAs: tRNA-derived RNA fragments (tRFs) **Yong Sun Lee**, Yoshiyuki Shibata, Ankit Malhotra, and Anindya Dutta. *Genes Dev.* November 15, 2009 23: 2639-2649; doi:10.1101/gad.1837609

Dalley, B., Podawiltz, A., Castro, R., Fallon, K., Kott, M., **Rabek, J.**, Richardson, J., Thomson, W., Ferry, P., Mabry, B., Hermesmeyer, P., and Smith, Q. 2009. The joint admission medical program: a statewide approach to expanding medical education and career opportunities for disadvantaged students. *Acad. Med.* 84:1373-1382.

Abstract: **Rabek, J. P.**, Lieberman, S. A., Frye, A. W., Thomas, L., and Anderson, G. D. Comprehensive curricular changes and subsequent step 1 score improvement across student groups. Association of American Medical Colleges Annual Meeting, Research in Medical Education Section, November 6-11, 2009.

Hemauer SJ, Nanovskaya TN, Abdel-Rahman SZ, Patrikeeva SL, Hankins GD, Ahmed MS. Modulation of human placental P-glycoprotein expression and activity by MDR1 gene polymorphisms. *Biochem Pharmacol.* 2009 Nov 5. [Epub ahead of print].

Iraida E. Andreeva, Anasuya Roychowdhury, Michal R. Szymanski, Maria J. Jezewska and **Włodzimierz Bujalowski**. Mechanisms of interactions of the nucleotide cofactor with the RepA protein of plasmid RSF1010. Binding dynamics studied using the fluorescence stopped-flow method. *Biochemistry.* 2009 Nov 10;48(44):10620-36.

Choi KH, Rossmann MG. RNA-dependent RNA polymerases from Flaviviridae. *Curr Opin Struct Biol.* 2009 Nov 13. [Epub ahead of print].

Mechanisms of interactions of the nucleotide cofactor with the RepA protein of plasmid RSF1010. Binding dynamics studied using the fluorescence stopped-flow method.

Andreeva IE, Roychowdhury A, Szymanski MR, Jezewska MJ, Bujalowski W. [Biochemistry](#). 2009 Nov 10;48(44):10620-36. Department of Biochemistry and Molecular Biology, Sealy Center for Structural Biology, The University of Texas Medical Branch at Galveston, 301 University Boulevard, Galveston, Texas 77555-1053, USA.

The dynamics of the nucleotide binding to a single, noninteracting nucleotide-binding site of the hexameric helicase RepA protein of plasmid RSF1010 has been examined, using the fluorescence stopped-flow method. The experiments have been performed with fluorescent analogues of ATP and ADP, TNP-ATP and TNP-ADP, respectively. In the presence of Mg(2+), the association of the cofactors proceeds as a sequential three-step process [Formula: see text] The sequential nature of the mechanism indicates the lack of significant conformational equilibria of the helicase prior to nucleotide binding. The major conformational change of the RepA helicase-nucleotide complex occurs in the formation of (H-N)(2), which is characterized by a very high value of the partial equilibrium constant and large positive changes in the apparent enthalpy and entropy. Strong stabilizing interactions between subunits of the RepA hexamer contribute to the observed dynamics and energetics of the internal transitions of the formed complexes. Magnesium cations mediate the efficient and fast conformational transitions of the protein, in a manner independent of the structure of the cofactor phosphate group. The ssDNA bound to the enzyme preferentially selects a single intermediate of the RepA-ATP analogue complex, (H-N)(2), while the DNA has no effect on the intermediates of the RepA-ADP complex. Allosteric interactions between the nucleotide- and DNA-binding site are established in the initial stages of formation of the complex. Moreover, in the presence of the single-stranded DNA, all the transitions in the nucleotide binding to the helicase become sensitive to the structure of the phosphate group of the cofactor.