BIOCHEMISTRY & MOLECULAR BIOLOGY TODAY

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Chair's Message

Our new academic year began with news of a possible storm that never became a threat, as it struck in weakened state away from our shores. I would like to think of this as a good augur to the rest of the year. I sincerely hope so, as so far 2011 has not inspired confidence. We know our budgetary challenges for the year ahead, and regardless of our position as to how we got here, we must find a way somehow to pursue our mission until better times come, something in which we do have some control every time we go to the polls to vote.

As we begin this new academic cycle, a serious challenge to our educational mission is the understandable appreciation by our faculty of the difficulty in committing support for a graduate student for up to 5 years. There are some approaches that may work for some:

1. Co-mentoring with another faculty member on a project of mutual interest. This does require more frequent consultation and a very explicit understanding as to publishing and subsequent applications for support. On the plus side, this enhances collaboration, increases mentoring experiences for the student and broadens the perspective of the dissertation project.
2. Working with the student to apply for external support, either from internal sources such as the McLoughlin Fund or from NSF and NIH. Again this will benefit the student by instilling grant- writing skills even as it sharpens the focus of the dissertation, and will require more direct mentoring by the professor resulting in a more integrated project.

Both these approaches require a step-up in commitment by both faculty and student, but on the plus side will improve those skills required by today's research environment.

The reason I bring up these alternatives is that it is clear that we are attracting very outstanding students, and I strongly believe we should do all we can to make sure their pursuit of knowledge is achieved, preferably in our own graduate program, which by the way I believe is the best around. We have the faculty and the staff to allow these students to fulfill their academic goals. As new approaches become feasible, we will bring these to you in our Newsletter.

Our Basic Science Weekly is off and running, and is being archived in the Departmental Web Site for those who miss an issue or two. Again, this is an opportunity to connect with fellow researchers who share our interests. If you have not done so, please make your contribution in the one-page format.

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Special Items of Interest

- Awards and Announcements—Page 2

Awards and Announcements

René Viñas, a post doctoral fellow in **Dr. Cheryl Watson's** Lab was recently awarded a travel award to attend The Society of Environmental Toxicology and Chemistry (SETAC) annual meeting in November. http://boston.setac.org/

Dr. Kishor K. Bhakat was awarded NIH R01 grant from NCI/NIH for five years. The title of the project is "Regulatory Functions of APE1 Acetylation".

Teresia Carreon, a Summer Undergraduate Research Program (SURP) student in **Dr. Kay Choi's** laboratory, received an Institute for Human Infections and Immunity (IHII) award for her research on classical swine fever virus N-terminal protease at the SURP poster session.

Dr. Maga Rowicka-Kudlicka was awarded an ITS NOVEL METHODS grant for the project "Novel Method for High-Resolution Detection of Double-Strand DNA Breaks" (which is part of grant 1UL1RR029876-01 from the National Center for Research Resources, National Institutes of Health).

Keerthi Gottipati, graduate student in **Dr. Kay Choi's** lab, received the McLaughlin Pre-doctoral fellowship for 2011-2013. Fellowship was awarded for her project on the Biochemical and Structural Characterization of Pestivirus N-terminal Protease (Npro).

Dr. Marc Morais was awarded a "competetive research program" grant from "The Alliance for Nanohealth" for the project titled Bacteriophage-Based Nanoparticles for the Detection and Diagnosis of Bacterial Pathogens.

Anil K. Mantha, Postdoctoral Fellow in **Dr. Sankar Mitra's** lab received a New Investigator Research Grant from Alzheimer's Association for two years.

Faculty on the Road

Dr. Catherine Schein gave the Biosyn lecture at the Universiteit Leiden, Leiden Institute of Chemistry, RA Leiden, Nederlands on June 24, 2011. The title was "From Anthrax to Polio: Computational and Structural Design of Novel Inhibitors of Bacterial Toxins and Antivirals".

She also gave a lecture on June 22, 2011 at Bayer Crop Science, Monheim Am Rhein, Germany, entitled "Physicochemical property signatures of IgE epitopes mediating cross reactivity between peanut and tree nuts".

Dr. Alex Kurosky attend the NHLBI Meeting July 14-15, 2011.

Dr. Krishna Rajarathnam presented a talk on his research 'How chemokines resolve inflammation? -- Playing the game of life and death' at the University of Nebraska Medical Center on 12th Aug 2011.

Graduate Program News

Tracy Toliver-Kinsky, Ph.D.
BMB Program Director

Congratulations to:

- **Kimberlee Burckart** and **Keerthi Gottipati** for selection as recipients of McLaughlin predoctoral fellowships;
- **Levani Zandarashvili** and **Abhijnan Chattopadhyay** for selection as recipients of Barbara Bowman awards (to be awarded at the annual GSBS awards luncheon);
- **Christof Straub** for selection as recipient of the Irma Mendoza award (to be awarded at the annual GSBS awards luncheon);
- **Hung Doan** for selection as recipient of the BCSO student award (to be awarded at the annual GSBS awards luncheon);
- **Paige Spencer** (BMB), **Huzhang Mao** (BMB), **Levani Zandarashvili** (MBET), **Alexandre Esadze** (MBET), and **Matthew Leitch** (MBET) for passing their qualifying examinations;
- **Kim Burckart** and **Paige Spencer** for admission to candidacy;
- *The following students for successful final defense:*

  Michal Szymanski (MBET), currently pursuing a postdoctoral fellowship at UTMB as a Jeane B. Kempner fellow,
  Hung Doan (BMB), returning to medical school to complete the requirements for the MD/PhD program,
  Debashish Sahu (MBET), pursuing a postdoctoral fellowship at Pennsylvania State University,
  Weiming Ni (BMB),
  Robert Malstrom (BMB).

Welcome

The graduate program extends a warm welcome to our new 2nd year students: **Leon Bae** (BMB, laboratory of Dr. Louise Prakash and Dr. Satya Prakash), **Juan Conde** (BMB, laboratory of Dr. Louise Prakash), **Scott McVicar** (BMB, laboratory of Dr. Darrell Carney), **Barbara Rolls** (BMB, laboratory of Dr. Ken Fujise), and to **Fanping Kong** (1st year, MBET).

Recent Student Publications

Xiaoxi Ju, Tilton, RG. & Brasier AR. Multifaceted role of Angiotensin II in vascular inflammation and aortic aneurysmal disease (2011). Aortic Aneurysm, ISBN 978-953-307-523-5.

Christof Straub, Konrad Pazdrak, Travis W. Young, Christof Straub, Susan Stafford and Alexander Kurosky. Priming of Eosinophils by GM-CSF Is Mediated by Protein Kinase C βII-Phosphorylated L-Plastin. J Immunol. 2011 Jun 1;186(11):6485-96.

Szymanski, M.R., Bujalowski, P.J., Jezewska, M.J.Gmyrek, A.M., Bujalowski, W. The N-Terminal Domain of the *E. coli* PriA Helicase Contains Both the DNA- and the Nucleotide-Binding Sites (2011). Energetics of Domain-DNA Interactions and Allosteric Effect of the Nucleotide Cofactors. *Biochemistry* Sept 2. [Epub ahead of print]

Szymanski, M. R., Jezewska, M. J., Bujalowski, P. J., Bussetta, C., Ye, M., Choi, K. H. & Bujalowski, W. (2011). Full-length dengue virus RNA-dependent RNA polymerase - RNA/DNA complexes. Stoichiometries, intrinsic affinities, cooperativities, base, and conformational specificities. *J Biol Chem*. Jul 2. [Epub ahead of print]

Szymanski, M. R., Jezewska, M. J. & Bujalowski, W. (2011). Binding of Two PriA-PriB Complexes to the Primosome Assembly Site Initiates Primosome Formation. *J. Mol. Biol*. 2011 Aug 5; 411(1):123-142. Epub 2010 May 27.

Publications

Shoeb M, Yadav UC, **Srivastava SK**, **Ramana KV**. Inhibition of aldose reductase prevents endotoxin-induced inflammation by regulating the arachidonic acid pathway in murine macrophages. *Free Radic Biol Med.* 2011 Aug 5. [Epub ahead of print].

Yadav UCS, **Shoeb M, Srivastava SK**, **Ramana KV**. Aldose reductase Deficiency protects from autoimmune and endotoxin induced uveitis in Mice. (In Press, Invest Ophthalmol Vis Sci).

Yadav UCS, **Shoeb M, Srivastava SK**, **Ramana KV**. (2011). Amelioration Of Experimental Autoimmune uveoretinitis by Aldose reductase inhibition In Lewis rats. (In Press, Invest Ophthalmol Vis Sci).

Savidge, T.C., Urvil, P., Oezguen, N., Ali, K., Choudhury, A., Acharya, V., Pinchuk, I., Torres, A.G., English, R.D., Wiktorowicz, J.E., Loeffelholz, M., Kumar, R., Shi, L., Nie, **W., Braun**, W., Herman, B., Hausladen, A., Feng, H., Stamler, J.S. and Pothoulakis, C. Host S-nitrosylation inhibits clostridial small molecule-activated glucosylating toxins. *Nat. Med.*, (*in press*), 2011.

Wlodarski, Tomasz; Kutner, Jan; Towpik, Joanna; Rychlewski, Leszek; **Kudlicki, Andrzej; Rowicka, Maga**; Dziembowski, Andrzej; Ginalski, Krzysztof. Comprehensive Structural and Substrate Specificity Classification of the Saccharomyces cerevisiae Methyltransferome. PLOS ONE Volume: 6 Issue: 8 Article Number: e23168 DOI: 10.1371/journal.pone.0023168 Aug 9, 2011

Alexey V. Nefedov, Indranil Mitra, Allan R. Brasier, and **Rovshan G. Sadygov**. Examining Troughs in the Mass Distribution of All Theoretically Possible Tryptic Peptides. Journal of Proteome Research, v.10, No.9, 2011 pp 4150–4157.

Szymanski, M.R., Bujalowski, P.J., Jezewska, M.J., Gmyrek, A.M., **Bujalowski, W**. N-Terminal Domain of the *E. coli* PriA Helicase Contains Both the DNA- and the Nucleotide-Binding Sites. Energetics of Domain-DNA Interactions and Allosteric Effect of the Nucleotide Cofactors. *Biochemistry* 2011 Sep 2. [Epub ahead of print]

Szymanski, M.R**.,** Jezewska, M.J., Bujalowski, P.J., Bussetta, C., Ye, M., **Choi K.H., Bujalowski, W.** Full-Length Dengue Virus RNA Dependent RNA Polymerase – RNA/ DNA Complexes. Stoichiometries and Energetics of Intrinsic Affinities, Cooperativities, Base and Conformational Specificities. *J Biol Chem.* 2011 Jul 2. [Epub ahead of print]

Featured Abstract by BMB Faculty

Examining Troughs in the Mass Distribution of All Theoretically Possible Tryptic Peptides

J. Proteome Res. 2011, 10, 4150–4157

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This work describes the mass distribution of all theoretically possibly tryptic peptides made of 20 amino acids, up to the mass of 3 kDa, with resolution of 0.001 Da. We characterize regions between the peaks of the distribution, including gaps (forbidden zones) and low-populated areas (quiet zones). We show how the gaps shrink over the mass range and when they completely disappear. We demonstrate that peptide compositions in quiet zones are less diverse than those in the peaks of the distribution and that by eliminating certain types of unrealistic compositions the gaps in the distribution may be increased. The mass distribution is generated using a parallel implementation of a recursive procedure that enumerates all amino acid compositions. It allows us to enumerate all compositions of tryptic peptides below 3 kDa in 48 min using a computer cluster with 12 Intel Xeon X5650 CPUs (72 cores). The results of this work can be used to facilitate protein identification and mass defect labeling in mass spectrometry-based proteomics experiments.