

BIOCHEMISTRY & MOLECULAR BIOLOGY TODAY

MARCH 2011 NO. 260



Chair's Message

The Sun was shining on the 2nd of March during the 2011 BMB Faculty Retreat at the Galveston Convention Center. In addition to our faculty, we also invited a few research leaders from other Basic and Clinical Departments and Centers to share their wisdom with us. We began with a presentation from Dr. Andy Robertson, Chief Scientific Officer for the Keystone Symposia Meetings, [included in this issue](#) along with a brief synopsis of the retreat. Much of the talk centered on new perspectives to biological research centered on systems approaches and environmental influences, ranging from epigenetics at the molecular level to more ecological forces. Similarly, the importance of translational approaches and of communication skills was highlighted as key to funding efforts and the development of multi-investigator ventures spanning basic to clinical sciences. With regards to successful mechanisms for implementation of these cross-culture efforts, the key factor identified was the willingness to commit enough time and, as it's done in big pharma, the use of "group managers" who may not hold advanced degrees themselves but have organizational skills and can

focus on the maintenance of group efforts.

Afterwards, we broke into four preassigned brainstorming groups to address the four topics of the day, spanning from education to research. After a brief summary presentation we again split up into four groups to discuss implementation, followed by a summary session and our traditional ice cream event.

I was impressed by the focus and committed participation of all present in what was assuredly an informal gathering brimming with camaraderie. [A brief reading of the short summary of the meeting](#) is noteworthy for the many suggestions that we can implement promptly. However, now comes the time to "walk the talk" if you will, and actually begin the process of implementation. For example, the Department of Medicine is interested in the idea of pairing basic scientists with clinical counterparts in selected inpatient rounds, something that can be achieved within HIPPA constraints. I am also pursuing the request by junior faculty to be able to see successful NIH grants written by their senior colleagues. Discussions are going on as to how to best compose

internal study sections. We will convene a BMB Day Symposium to showcase our research portfolio to both our own BMB colleagues and the rest of UTMB as a mechanism to foster interactions. I hope to be able to designate a date in early summer for this event, early enough before or after NIH grant deadlines in June or July.

Our efforts can only succeed if we enlist our colleagues throughout the institution. I am confident this will not be a daunting obstacle, as similar conversations are taking place throughout the campus. I see the days ahead more as an exciting venture rather than a challenge. I say this because I know BMB has not only an outstanding faculty as well as superb students and postdocs, but also because of the spirit and open-minded discussions I have witnessed among ourselves these past few months.

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Special Items of Interest

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Awards and Announcements

Muralidhar Hegde, Postdoctoral Fellow in Dr. Sankar Mitra's lab, received an MDS Travel Grant to participate in the 15th International Congress of Parkinson's Disease and Movement Disorders, June 5-9, 2011 in Toronto, Canada. This award was presented by The *Movement Disorder Society's* Awards Committee.



He was also invited to join the "Chronicles of young scientists" as an "Editorial Board member". Chronicles of Young Scientists (CYS) is a cutting-edge, peer-reviewed journal published by Medknow Publishers.

Another accomplishment of Dr. Hegde's was an invitation to become an Associate Editor of the Journal of Alzheimer's Disease.

He was also awarded the Gopal Krishna Memorial Junior Scientist Award in Biochemistry from Association of Scientists of Indian Origin in America (ASIOA) to be given in Washington, DC on April 11, 2011.

Dr. Olivera Nesic-Taylor received a Mission Connect award from the TIRR Foundation. The title of the study is "Pre-clinical and clinical testing of FDA-approved compounds for the treatment of neuropathic pain following spinal cord injury".

Dr. Kay Choi was awarded NIH R01 grant from NIAID. The title of the grant is "Mechanism of RNA synthesis and 5' capping by dengue virus NS5 polymerase".



Faculty Retreat Summary—March 2, 2011

Dr. J. R. Perez-Polo called the meeting to order at 8:30 a.m. and introduced the guest facilitator, Dr. Andy Robertson, Chief Scientific Officer for the Keystone Symposia Meetings. Dr. Robertson gave a brief overview of his scientific career and summarized to the faculty what he has seen as developmental trends in basic science research towards more collaborative science with a health care application as absolutely critical particularly for NIH funding. Current and future research areas of concentration include Molecular Basis of Health & Disease, Complex Traits & Diseases, Integrative Metabolism, Structure of the cell – atoms to organelles, Omics , Epigenetics, Somatic Genetics, Quantitative Phenotyping, Stratification of Disease Populations, Systems & Modeling, and Environment. He emphasized the importance of Systems Biology and environmental approaches spanning the spectrum from ecology to epigenetics with deliberate attention to building and maintaining teams engaged in technology development, handling massive and disparate data sets, visualization in biology, sharing outcomes with non-experts, and translation. To achieve these goals the leadership should be positive, interested, involved, ambitious and develop strategic plans for implementation. These plans should be all about research and the greater good. A copy of Dr. Robertson’s power point presentation is attached. [MORE](#)

Faculty Retreat—Dr. Robertson’s Presentation

[Click below to view slides](#)



Hints of What’s to Come in Basic Biomedical Research

Andrew D. Robertson, PhD
Chief Scientific Officer
Keystone Symposia

Publications



Desai MM, Tumurbataar B, Zhang Y, **Chan LN**, Sun J, Chan TS. Aberrant transcription and post-transcriptional processing of hepatitis C virus non-structural genes in transgenic mice. *Transgenic Res.* 2011 Feb 24. [Epub ahead of print].

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Tammali R, Reddy AB, **Srivastava SK**, **Ramana KV**. Inhibition of aldose reductase prevents angiogenesis in vitro and in vivo. *Angiogenesis.* 2011 Mar 16. [In press].

Reddy AB, Tammali R, Mishra R, Srivastava S, **Srivastava SK**, **Ramana KV**. Aldose reductase deficiency protects sugar-induced lens opacification in rats. *Chem Biol Interact.* 2011 Mar 3. [In press]

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Yadav UC, **Ramana KV**, **Srivastava SK**. Aldose reductase inhibition suppresses airway inflammation. *Chem Biol Interact.* 2011 Feb 18. [In press]

Kalariya NM. **Ramana KV**, **Srivastava SK**, Van Kuijk FJGM. Post-translational protein modification by carotenoid cleavage products. *Biofactors.* 2011 [in press]

Ramana KV. Aldose reductase: New insights for an old enzyme. *Biomol Concepts* 2011 [In press].

Banerjee D, Mandal SM, Das A, Hegde ML, Das S, **Bhakat KK**, Boldogh I, Sarkar PS, **Mitra S**, **Hazra TK**. Preferential repair of oxidized base damage in the transcribed genes of mammalian cells. *J Biol Chem.* 2011 286: 6006-16 PMID: 21169365

Lee K, Kunkeaw N, Jeon SH, Lee I, Johnson BH, Kang G-Y, Bang JY, Park HS, Leelayuwat C, **Lee YS**. Precursor miR-886, a novel non-coding RNA repressed in cancer, associates with PKR and modulates its activity. *RNA in press*, 2011 .

Hegde ML (Corresponding Author), Hegde PM, Rao KSJ and **Mitra S**. (2011) Oxidative Genome Damage and Its Repair in Neurodegenerative Diseases: Function of Transition Metals as a Double-Edged Sword. *J Alzheimer's Disease.* In Press

Zheng L, Dai H, **Hegde ML**, Zhou M, Guo Z, Wu X, Wu J, Su L, Zhong X, **Mitra S**, Huang Q, Kernstine KH, Pfeifer GP, Shen B. (2011) Fen1 mutations that specifically disrupt its interaction with PCNA cause aneuploidy-associated cancer. *Cell Res*, In Press.

Jezewska, M.J., Szymanski, M.R., **Bujalowski, W**. The Primary DNA-Binding Subsite of the Rat Pol β . Energetics of the Interactions of the 8-kDa Domain of the Enzyme with the ssDNA. *Biophysical Chemistry* 2011 Jan 22. [Epub ahead of print]

Abhisek Mukherjee, Claudio Soto. Role of calcineurin in neurodegeneration produced by misfolded proteins and endoplasmic reticulum stress. *Curr Opin Cell Biol.* 2011 Feb 2. [Epub ahead of print].

Measuring protein synthesis using metabolic (2 H) labeling, high-resolution mass spectrometry, and an algorithm.

Kasumov T, Ilchenko S, Li L, Rachdaoui N, **Sadygov RG**, Willard B, McCullough AJ, Previs S. *Anal Biochem.* 2011 May 1;412(1):47-55. Epub 2011 Jan 20.

BCSO News

On March 9 and 10, the BCSO was proud to host Dr Sankar Ghosh, Professor and Chair, Department of Microbiology and Immunology at Columbia University, as the first speaker of the **2011 Pioneering Biological Discovery Seminar Series**. Dr Ghosh, an international expert in the field of NF- κ B signaling, interacted with students and faculty from the Biochemistry and Molecular Biology (BMB) graduate program and the Molecular Biophysics Educational Track (MBET) throughout the day on March 10. He also delivered a seminar titled “**New Insights into Innate Immune Signaling by Toll-like Receptors**”, where he shared some exciting new findings from his laboratory with the audience at the BSB auditorium, which was filled beyond capacity. BMB faculty and students were really excited to meet with such an eminent scientist and worked really hard to make it a grand success.

The next speaker in the Seminar series is going to be **Dr Klaus Hahn**, Professor at the Department of Pharmacology, University of North Carolina – Chapel Hill. Dr Hahn, a pioneer for developing research tools for imaging and manipulating protein activity within



cells and animals, will deliver a lecture titled “**Peeking and poking at rapid signaling *in vivo*”** on **Thursday April 21, at 4 PM** at the **BSB Auditorium**. The BCSO cordially invites every member of the BMB family to join us at what promises to be a fascinating talk. If you have any questions regarding Dr Hahn’s visit or would like to meet with him, please contact Kimberlee Burckart (kiburcka@utmb.edu).

For other questions or suggestions regarding the Pioneering Biological Discovery Seminar Series or the BCSO in general, please contact Hung Doan (hqdoan@utmb.edu), BCSO Chair or Abhijnan Chattopadhyay (abchatto@utmb.edu), Vice Chair.

Faculty on the Road

Dr. Sankar Mitra traveled to India to give a talk at the Indo-US Workshop on DNA Base Excision Repair, Brain Function and Aging in Hyderabad on January 11 and also gave a talk at the Silver Jubilee Anniversary Meeting of the Society of Neurochemistry, India on January 9, 2011.



Dr. Alex Kurosky attend the ABRF in San Antonio, TX on February 18-22. He also attended the AAAAI meeting in San Francisco, CA on March 19-23, 2011.

Drs. **John Wiktorowicz** and **Kizhake Soman** attended the US HUPO in Raleigh, NC on March 19-23, 2011.

Michal R. Szymanski attended the Biophysical Society 55th Annual Meeting. March 5-9, 2011.

Baltimore, Maryland. He presented a poster titled The *Escherichia coli* PriA Helicase Specifically Recognizes Gapped DNA Substrates.

Featured Abstract by BMB Faculty**Preferential Repair of Oxidized Base Damage in the Transcribed Genes of Mammalian Cells**

Banerjee D, Mandal SM, Das A, Hegde ML, Das S, Bhakat KK, Boldogh I, Sarkar PS, Mitra S, Hazra TK. . J Biol Chem. 2011 286: 6006-16

Preferential repair of bulky DNA adducts from the transcribed genes via nucleotide excision repair is well characterized in mammalian cells. However, definitive evidence is lacking for similar repair of oxidized bases, the major endogenous DNA lesions. Here we show that the oxidized base-specific human DNA glycosylase NEIL2 associates with RNA polymerase II and the transcriptional regulator heterogeneous nuclear ribonucleoprotein-U (hnRNP-U), both *in vitro* and in cells. NEIL2 immunocomplexes from cell extracts preferentially repaired the mutagenic cytosine oxidation product 5-hydroxyuracil in the transcribed strand. In a reconstituted system, we also observed NEIL2-initiated transcription-dependent base excision repair of 5-hydroxyuracil in the transcribed strand, with hnRNP-U playing a critical role. Chromatin immunoprecipitation/reimmunoprecipitation studies showed association of NEIL2, RNA polymerase II, and hnRNP-U on transcribed but not on transcriptionally silent genes. Furthermore, NEIL2-depleted cells accumulated more DNA damage in active than in silent genes. These results strongly support the preferential role of NEIL2 in repairing oxidized bases in the transcribed genes of mammalian cells.

