

BIOCHEMISTRY & MOLECULAR BIOLOGY TODAY

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Chair's Message

Spring is almost here -- not quite, but almost. It's time for the National Student Research Forum (April 24-25) and preparations for the Medical School courses for next year. Although the well-deserved retirement of Dr. Rong-Sen Shen will have a significant impact on our teaching efforts, the early preparations that Dr. Dragoslova Zivadnovic (Gaga) has made are bearing fruit. All seems to be going well so far, and we should be able to fill our teaching roster in a timely fashion. Thanks to all the faculty for their flexibility and help on this.

Over the next few weeks the final preparations for the Departmental Review should be complete. This has also afforded us the opportunity to review our ongoing

activities and plans for the future. Speaking of the Review, don't forget that the external reviewers will be here May 18-20, so please keep your calendars clear on those days.

After the recent presentation by Ralph Farr (the Director of Information Systems) and colleagues, Ralph mentioned that in addition to an "information superhighway" within Texas, there are similar possibilities with other institutions around the country and the world. If you are collaborating with groups outside Texas or the USA and would like IS to explore possibilities for high-speed access, please contact him directly or send me an email and I will compile a list of sites for IS to keep in mind as they expand the infrastructure needed.



Be sure to mark your calendars for Commencement exercises on May 3 (Graduate School) and May 31 (School of Medicine). A couple of hours on a Sunday mean a lot to our graduates and their families. See you there.

We have already posted the new positions for the Grant Preparation Core. We will keep you informed as soon as all is in place, although it will be a work in progress until all positions are filled in the fall. I hope that elements of it will be available in time for the June NIH grant deadlines.

Enjoy the Spring!

-regino

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Special Items of Interest

- Feature Article—[Dr. Jenny Gu's Antarctica Adventure](#)
- [Dr. Konkel's Research Coordinator's Columns Online](#)
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BCSO News

BCSO-award fund raiser update: Following a presentation at the BMB-faculty meeting in February, the BCSO award committee drafted official letters soliciting funds for the award-endowment. Faculty and Alumni will be contacted by the committee members in the next few weeks. We ask the faculty to support this unique endeavor by contributing generously.

BCSO community service updates: In the month of February BCSO participated in the Annual Galveston Beach Clean-up (http://bmb.utmb.edu/graduate_program/BCSO/activities/beachcleanup_08.html) and The Annual Galveston County Science and Engineering Fair (http://bmb.utmb.edu/graduate_program/BCSO/activities/sciencefair_08.html). Both events have been instrumental in educating Galvestonians and bringing students together in a team effort to serve the community.

BCSO educational/social events: We have nominated Dr. Peter Schultz (<http://schultz.scripps.edu/>) for the Pioneering Biological Discovery Seminar Series this year. The month of March began with our visit to the Houston Natural Science Museum on Sunday the 7th. The museum had the special exhibit 'Lucy' on display. We had our first student-faculty social hour on Friday, March 14th at Molly's Pub in Downtown Galveston. We had a great time and hope to continue this as a regular event on the second Friday of every month.

Updates on all events can be found on the BCSO homepage (http://bmb.utmb.edu/graduate_program/BCSO/index.html).

Student write-ups on past events can be read on the BCSO Activities page (http://bmb.utmb.edu/graduate_program/BCSO/activities/index.html).

-Keerthi Gottipatti

Awards and Announcements

Dr. Kota V. Ramana was selected as Research Services' "Researcher of the Month" for March, read more about it [here](#).

BMB Faculty and Staff Members to be Honored on Employee Service Day

Congratulations to the following BMB faculty and staff members who will be honored for their length of service to UTMB at the Employee Service Day ceremony on Thursday, March 27:

35 Years

Dr. J. Regino Perez-Polo, *Professor and Chair*

30 Years

Dr. Naseem Ansari, *Professor*

Rosemary Roque, *Senior Administrative Secretary*

Margie Wronski, *Senior Administrative Manager*

25 Years

Audrey Hart- Van Tassell, *Research Associate (Carney Group)*

Mary Boyle, *Administrative Coordinator*

20 Years

Lisa Pipper, *Systems Analyst*

15 Years

Rhoda Thompson, *Senior Administrative Secretary*

5 Years

Dr. Heidi Spratt, *Assistant Professor, Bioinformatics Program*

Dr. Surendra Negi, *Post-doctoral Fellow (Braun Group)*

A total of 220 years of service!

Featured Article: The Antarctic Experience

Dr. Jenny Gu is a currently a post doctoral fellow in Dr. Hilser's Lab. In the spring of 2007, she applied for the NSF Antarctic Biology Course Fellowship and was notified in the summer that she had been accepted and would qualify to spend one month at the United States Antarctic Program's base located at McMurdo Station, Antarctica. After passing all of the physical testing required, she flew to New Zealand on December 31st to begin her adventure on the ice. Below is her impression of her experience.

Antarctica, what can I really say about it? It's simply a continent resting at the south of a spinning globe covered in ice and snow. Yet, especially with the terrain rolled out on a Google map spread, it seems a bit larger than life. Before the discovery of this continent, the Greek postulated that there must be land to the south to balance out the land to the north. The rewards of discovery did indeed come many centuries later in the early 1900s proving their guesstimate to be correct, with the south that is.

To put things into historical perspective, nothing was known about this continent until the last century. To me, it is amazing how little we know and how much remains to be discovered and understood in this universe. The successful conquest of Antarctica was initially driven by the search for the magnetic south pole to gain an added advantage for trade, a goal which I think is largely justified. The race to the geographic south pole, however, was definitely driven by the male ego. I envy only the fact that I could not have done it myself.



Although Robert Falcon Scott failed to reach the pole first, preceded only by a few weeks by Roald Amundsen, he was the first to advance Antarctic scientific discovery and should be commended for his contributions. With his team he brought along talented, multi-disciplinary scientists who systematically catalogued their geophysical and biological findings *en route*. Even in the presence of brilliant minds, the crew manually hauled cargos weighing thousands of tons through blizzards across the continent. The dedication of these men to discovery, devoting 90% of their effort to survival and 10% to science, must be appreciated.

Today, science in Antarctica is conducted with significantly better research support and safety measures implemented. The Antarctic Biology Course, sponsored by the National Science Foundation, was designed to expose scientific and logistical issues associated with this continent. This mission is achieved in the continued spirit of Scott's early expedition by taking on an integrative approach. Spearheaded by Drs. Donal Manahan and Deneb Karentz, twenty students from around the world, with a wide range of different backgrounds, convened at McMurdo Station to participate in this brilliant program. Other instructors, for whose time and effort we are indebted to, are Mark Denny, Allison Murray, George Somero, Adrian Burd, Jonathan Cohen, Vincent Deneff, and Dietmar Kueltz.

The overarching theme of the course is to understand adaptive strategies used by organisms to survive the extreme weather. The continent is characterized as the driest, windiest, and coldest place on this planet with six months of constant sunlight during the summer followed by six months of darkness. The air temperature varies significantly from 4° C to -20° C around the station during a month of summer in January, but during the winter the temperature has been reported to go as low as -130° C. Less variation is observed in the ocean water with a fairly constant surface temperature at -1° C. Consequently there are no native terrestrial mammals and the exciting dynamics of life is found trapped in the ice and the water beneath it.

The course lectures covered biochemical and physiological adaptations to abiotic stress imposed by global warming, the circumpolar current, and high UV radiation. The biodiversity and community structure of marine microorganisms also

provided added adaptive strategies for survival. Coupled with the lectures, our schedules were kept busy with fieldwork at four main sampling sites for data collection. Three of these sites involved sampling ocean water for marine life and measuring physical properties such as temperature and salinity. At Britina Island, we aimed to understand their unique pond formation and characteristics through computational modeling to understand the stress faced by microbes in the water. Other laboratory work included studying the heat shock response of various marine invertebrates and metabolic adaptation to starvation stress.

Participants of the course ranged from a Smithsonian institute ecologist studying the global complexity of heterogeneous life distribution to a highly reductionist investigator understanding biochemical adaptations with a new understanding of sequence encoded biophysical properties. This mix of expertise included investigators who have isolated microbial communities in caves, discovered new species in Arctic permafrost, and studied tubeworms residing in hyperthermal vents. Forced to work, sleep, and eat together for a whole month, the experience was certainly not one to be regretted.

Resting just across McMurdo station in Scott's hut, the ghost of our early explorers serve as a constant reminder of the hardships endured. Unlike research expeditions today, often lasting a few months or even weeks, this hut was a critical shelter in which they found refuge from the harsh cold winters for several years. Remnants of supplies, empty tins of biscuits, burned coal, and rotting meat await the next expedition of eager explorers ready to challenge Nature for the last 50 years. The lives of all the men, in the parties of both Scott and Amundsen, were claimed by the cold, unrelenting winds of the Continent. The passion for exploration and discovery can sometimes be life consuming, but it is these unfortunate sacrifices that bring enlightenment and reveal the beauty of the world in which we live.

(For more pictures and movies: <http://www.biothena.com>)

-Jenny Gu, Ph.D.



ONLINE Research Coordinator's Corner
www.bmb.utmb.edu/department/RCC/

Administrator's Notes

Welcome Back to TK Kirtley

TK was on medical leave for a while, and we are certainly happy to have her back at work now with **Ernest Leal** and **Joann Broz** in the Financial Group.

Administrative Support for the Sealy Center for Structural Biology

Following the retirement of Karen Jones, a new Administrator has been recruited for the Center and will be arriving shortly. In the meantime, **Lisa Pipper** has been working with **Angelina Johnson** to manage administrative planning for the upcoming [Structural Biology Symposium](#). **Angelina** has also gone above and beyond to help keep all the Center's administrative machinery running. Their efforts are much appreciated by the Center's Director, Dr. Vince Hilser, and the other Center members.

Thanks to All BMB Members for Effort Given to Preparation for State Fire Inspectors' Visit

Research groups have done an excellent job evaluating labs and associated spaces and addressing any fire safety concerns. The date of the Fire Inspectors' visit has not been announced but is expected to occur soon. All the effort given to preparing for the inspection has also resulted in noticeable improvement in appearance of lab areas and adjacent corridors. It will be good to keep things in shape in anticipation of the upcoming visit by the External Review Committee, whose members will spend May 19 and 20 evaluating the Department and the BMB and BSCB graduate programs.

Landscaping Project Associated with the GNL

Work on the GNL landscaping project has temporarily affected access on the east side of the Basic Science Building. The project managers have expressed their appreciation of Department members' cooperation and tolerance as the work progresses. After the east-side work is completed, there will be some additional disruption as work is done on the south side of BSB and MRB. We will continue to work with the project managers to minimize inconvenience to building occupants and users.

-Marianne

**13th Sealy Center for Structural Biology and Molecular Biophysics
Symposium**

The University of Texas Medical Branch

May 16-17, 2007

Registration is Open.

Please visit our website at: www.scsb.utmb.edu/symposium

Training for use of ECRT (ee-cert) System for Reporting Effort on Research Projects

Training in use of the new system will begin on April 7. Training may be completed online or by attending one of several classroom sessions to be offered. The schedule for the general classroom sessions will be available by April 1. At least one special classroom session for BMB members will also be set up. All faculty and staff members working on any sponsored research project will be required to complete the training and pass the competency evaluation.

Faculty on the Road



Dr. Stan Watowich was invited to speak at the Unite For Sights 5th Annual International Health Conference at Yale University, April 11 -14, 2008, in Benoit Roux in Chicago. His talk was entitled "Global Grid Computing Initiative to Discover Dengue Antivirals".

Dr. Satish K. Srivastava traveled to San Francisco, CA to collaborate with Dr. Deepak Srivastava at Gladstone Institute of Cardiovascular Disease on March 6-12, 2008.

Dr. Tapas Hazra attended the Radiation Therapy Oncology Group Meeting in San Diego. Jan 17-20, 2008.

To have your travels included in the monthly newsletter, please send the information directly to Lisa Pipper (lpipper@utmb.edu) by the 1st of each month.

BMB Faculty Publications

Hong Dou, Corey A. Theriot, Aditi Das, Muralidhar L. Hegde, Yoshihiro Matsumoto, Istvan Boldogh, Tapas K. Hazra, Kishor K. Bhakat, and Sankar Mitra Interaction of the Human DNA Glycosylase NEIL1 with Proliferating Cell Nuclear Antigen: THE POTENTIAL FOR REPLICATION-ASSOCIATED REPAIR OF OXIDIZED BASES IN MAMMALIAN GENOMES. [J. Biol. Chem. 8, February 2008; Vol. 283, No. 6, 3130-3140.](#)

Muralidhar L Hegde, Tapas K Hazra, Sankar Mitra, Early steps in the DNA base excision/single-strand interruption repair pathway in mammalian cells. *Cell Research* (2008) 18:27-47. doi: 10.1038/cr.2008.8; published online 1 January 2008

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Featured Abstract by BMB Faculty

Early steps in the DNA base excision/single-strand interruption repair pathway in mammalian cells

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Base excision repair (BER) is an evolutionarily conserved process for maintaining genomic integrity by eliminating several dozen damaged (oxidized or alkylated) or inappropriate bases that are generated endogenously or induced by genotoxicants, predominantly, reactive oxygen species (ROS). BER involves 4-5 steps starting with base excision by a DNA glycosylase, followed by a common pathway usually involving an AP-endonuclease (APE) to generate 3' OH terminus at the damage site, followed by repair synthesis with a DNA polymerase and nick sealing by a DNA ligase. This pathway is also responsible for repairing DNA single-strand breaks with blocked termini directly generated by ROS. Nearly all glycosylases, far fewer than their substrate lesions particularly for oxidized bases, have broad and overlapping substrate range, and could serve as back-up enzymes *in vivo*. In contrast, mammalian cells encode only one APE, APE1, unlike two APEs in lower organisms. In spite of overall similarity, BER with distinct subpathways in the mammals is more complex than in *E. coli*. The glycosylases form complexes with downstream proteins to carry out efficient repair via distinct subpathways one of which, responsible for repair of strand breaks with 3' phosphate termini generated by the NEIL family glycosylases or by ROS, requires the phosphatase activity of polynucleotide kinase instead of APE1. Different complexes may utilize distinct DNA polymerases and ligases. Mammalian glycosylases have nonconserved extensions at one of the termini, dispensable for enzymatic activity but needed for interaction with other BER and non-BER proteins for complex formation and organelle targeting. The mammalian enzymes are sometimes covalently modified which may affect activity and complex formation. The focus of this review is on the early steps in mammalian BER for oxidized damage.