

Inside MBC

"...molecular medicine through biotechnology"

Volume 5, Number 6

November-December, 2002

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UMBI Research Day

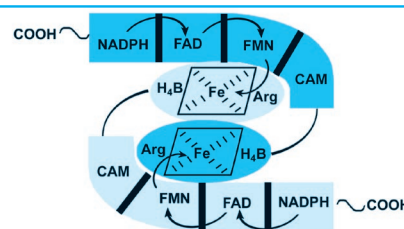
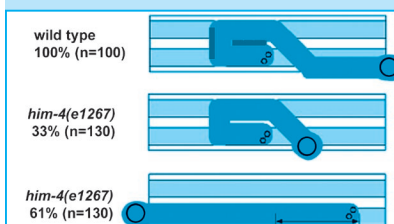
It has been some time since all the centers of UMBI came together to share research findings, so the meeting December 16, 2002 was particularly exciting. Dr. Marian Jackson, Associate Vice President for Academic Affairs, was the driving force behind this event and is to be congratulated on what many described as extremely useful. Though only four of the centers actually participated, there were over 100 attendees at the Shady Grove Center location. Three speakers each from the Center of Marine Biotechnology, the Center for Biosystems Research (formerly the Center for Agricultural Biotechnology), the Center for Advanced Research in Biotechnology and the MBC presented their work. The talks ranged from algae to zebra fish, and included biochemistry, biophysics, and ecology, among other disciplines. Often the state-of-the-art research was at the interface between two disciplines, which characterizes much of biotechnology.

MBC was represented by Dr. Ilia Baskakov, who spoke on conformational changes in prion proteins; Dr. Bruce Vogel, who spoke on basement membranes in *C. elegans*; and Dr. Shengyun Fang, who spoke on his work in the regulation of the ubiquitination process for signaling protein

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A Day in the Country-Retreat 2002

The diagram below illustrates a model from Dr. Bruce Vogel's talk on hemocytin in basement membranes, showing the effect of mutations on hemocytin function.



Above is from Dr. Gerald Rosen's talk on nitric oxide synthase pathways. Nitric oxide has been found to affect the immune system among other things.

It has been over 2 years since MBC held a retreat and the number of faculty members has risen substantially since then. It was particularly interesting to hear both the established investigators and the new ones present current work. The goal of the retreat was to highlight as many of the laboratories associated with the Center as possible, including those of associated faculty members from University of Maryland, Baltimore.

The first speaker was Dr. Terry Rogers who spoke on signaling in heart. Dr. Rogers research focuses on specific enzymes called phosphatases, which activate proteins. The first session continued with a presentation by Dr. Mervyn Monteiro and a review of his laboratory's discovery of ubiquitin, which is involved in Alzheimer's Disease. This

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Adjunct in Afghanistan

Our newest Assistant Professor (Adjunct), Kevin "Kit" Parker from Harvard University, will not be in the laboratory for a while. He was called up last month to active duty. He recently sent us this update: "This picture was taken as the sun was rising on the objective of our previous day's assault. ... We were waiting to be picked up by helicopters to move to our next objective higher in the mountains."



"Sunrise on the Objective" — Dr. Parker in Afghanistan.

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Retreat continued.

was followed by Dr. Chris Geddes and his fascinating work on fluorescent probes. Dr. Valeriy Lukyanenko then presented his recent work on calcium cycling in heart. Drs. Geddes and Lukyanenko are two of our newer faculty members.

The second session was as diverse as the first and included discussions of prion diseases such as Mad Cow Disease by Dr. Ilia Baskakov, of bioinformatics and vaccines by Dr. Les Baillie, of calcium signaling by Dr. Eric Sobie and of nitric oxide and its implications in disease by Dr. Gerald Rosen. The first afternoon session was dominated by cardiology subjects. Talks were given by Drs. Yibin Wang, Silvia Guatimosim and Long-Sheng Song, all relative new-comers to MBC. The session also included a talk by Dr. Shengyun Fang, the newest faculty member, who presented work on protein signaling. His work has important implications for areas of research, including neurodegenerative diseases and cancer.

The final session started with a presentation by Dr.

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The Susquehanna River, as seen from the back of the Donaldson-Brown Conference Center in Port Deposit, Maryland.

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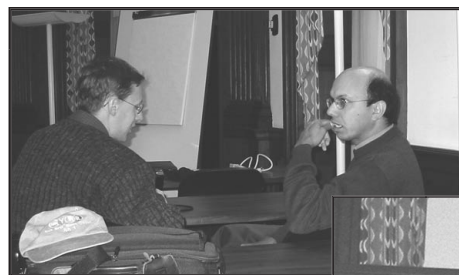
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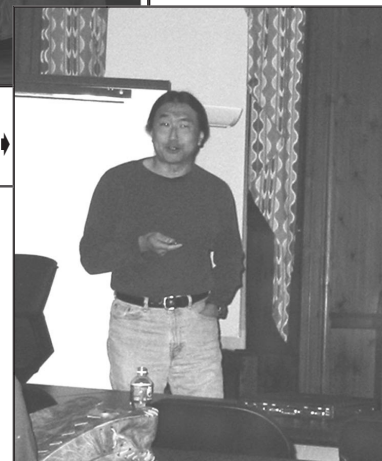
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♦Dr. Ilia Baskakov and Dr. Mervyn Monteiro in discussion.

Dr. Joe Kao ♦



♦Dr. Terry Rogers, UMB



All MBC participants at the 2002 MBC Retreat

MBC Retreat 12/3/02 -- Program Agenda

Presenter	Title
8:00 - 9:00 AM	<i>Arrival/Continental Breakfast</i>
9:00 - 9:20 AM	T. Tegers Targeted signaling cascades in cardiac myocytes
9:20 - 9:40 AM	M. Monteiro Regulation of ubiquitination by Ubiquitin
9:40 - 10:00 AM	C. Geddes Metal-enhanced Fluorescence: Applications to medical imaging, diagnostics and the Analytical Sciences
10:00 - 10:20 AM	V. Lukyanenko Regulation of sarcoplasmic reticulum Ca^{2+} cycling by cyclic adenosine diphosphate-ribose
10:20 - 11:10 AM	<i>Break (30 minutes)</i>
11:10 - 11:30 AM	I. Baskakov Conformational diversity of the prion protein: one protein - many folds
11:30 - 11:50 PM	L. Baillie From anthrax to sharks, via genomes
11:50 - 12:10 PM	E. Sobie Why does a spark not ignite a bonfire? Controlling Ca^{2+} signaling in the heart
12:10 - 12:30 PM	G. Rosen Nitric Oxide Synthase: Pathways to Regulate Superoxide Production
12:30 - 1:50 PM	<i>Lunch (80 minutes)</i>
1:50 - 2:10 PM	S. Fang The tumor autocrine motility factor receptor as an ubiquitin ligase for ERAD
2:10 - 2:30 PM	Y. Wang A Cardiac restricted Inducible Transgenic Approach in Studies of Heart Failure
2:30 - 2:50 PM	S. Guatimosim RyR macromolecular complex: a tale of phosphatases and kinases
2:50 - 3:10 PM	L. Song Ca^{2+} Signaling in Cardiac Myocytes Overexpressing the α_1 Subunit of L-type Ca^{2+} Channel
3:10 - 3:40 PM	<i>Break (30 minutes)</i>
3:40 - 4:00 PM	B. Vogel Epithelial Morphogenesis in <i>C. elegans</i> : The Role of Extracellular Matrix Proteins
4:00 - 4:20 PM	H. Hartmann Cardiomyopathy in HIV-1 Transgenic Rat
4:20 - 4:40 PM	J. Kao Light and Cellular Neurophysiology
4:40 - 5:00 PM	R. DiGate The Mechanism of Type IA Topoisomerases

Retreat continued

Bruce Vogel on the round worm *C. elegans*. This simple organism is ideal for studying tissue architecture, which is Dr. Vogel's research area. Dr. Hali Hartmann discussed her work on HIV-induced heart failure, one of the little recognized consequences of the AIDS epidemic, and Dr. Joseph Kao then discussed his novel photochemical approaches to studying the nervous system, and how his work may lead to very innovative drug designs. The day ended with Dr. Russell DiGate's fascinating work on topoisomerases, enzymes which act directly on DNA. Because several of MBC's faculty have primary appointments elsewhere, the retreat included representatives from several UMB departments in the School of Medicine, including the Departments of Physiology and Biochemistry and Molecular Biology and from the School of Pharmacy.

As can be seen in the agenda on left, the range of work in the MBC is considerable and exciting. From anthrax to ubiquitin, there was something for everyone and the potential for truly making a difference in important areas of human health.

The day was cold but clear as the entire MBC research staff trekked to Port Deposit and USM's Donaldson-Brown Conference Center on the east side of the Susquehanna River. The conference center is an old estate house perched high above the river and surrounded by a working farm. It was beautifully decorated for the season, though thankfully there was no snow to complement the tastefully arranged greens. Hot chocolate, tea and coffee greeted the participants as they arrived, as well as hot and cold breakfast fare. The Conference Center's kitchen is one of its biggest attractions. Between cookies and pastries during the breaks and the lunch of roasted turkey sandwiches or beef in mushroom sauce, all of the participant were impressed with the accommodations. Though the biting cold kept many from venturing outside, a few hardy souls did just that and were rewarded with a incredible view of the Susquehanna River. Suggestions for next year include a return visit but in a warmer season.

*The Donaldson-Brown Conference Center
Port Deposit, Maryland*



MBC Happenings

Comings and Goings

Dr. Kevin "Kit" Parker has been appointed Adjunct Assistant Professor. **Ms. Lynn Keimig** joined us through the Calcium Signaling Program Project Grant (**T. Roger, Y. Wang and W.J. Lederer**) as Program Administrator. **Dr. Sunanda Deb** joined MBC as a Postdoctoral Fellow with **Dr. Ilia Baskakov**.

Congratulations to **Andy Ziman**, graduate student in **W.J. Lederer's** laboratory, who has passed his oral examinations.

Dr. Steve Jones of the Canadian Science Centre for Human and Animal Health, Winnipeg, Manitoba, gave a seminar entitled "Immunity to Ebola and Plague" at the MBC on November 7, 2002. **Dr. Les Baillie** was the host.

Grants and Contracts

Dr. W. Jonathan Lederer, NIH, NHLBI, "Calcium Sparks in Heart Muscle." 12/1/02, \$306,553, yr 5 of 5.

Dr. Ira Josephson, NIH, NIA, Intergovernmental Personnel Assignment, 11/1/02, \$63,522

Publications

Crawford JA, **Kaper JB**. The N-terminus of enteropathogenic *Escherichia coli* (EPEC) Tir mediates transport across bacterial and eukaryotic cell membranes. *MOL MICROBIO* 46 (3): 855-868 NOV 2002

Zhu WY, **Melera PW**. Basal levels of metallothionein I and II expression in mouse embryo fibroblasts enhance growth in low folate through a cell cycle mediated pathway. *CELL BIOLOGY INTL* 25 (12): 1261-1269 2001

Tolosa L, Kostov Y, Harms P, **Rao G**. Noninvasive measurement of dissolved oxygen in shake flasks. *BIOTECH BIOENG* 80 (5): 594-597 DEC 5 2002

Sullivan LP, Wallace DP, Gover T, **Welling PA**, Yamaguchi T, Maser R, Eppler JW, Grantham JJ. Sulfonylurea-sensitive K⁺ transport is involved in Cl⁻ secretion and cyst growth by cultured ADPKD cells. *J AM SOC NEPHROL* 13 (11): 2619-2627 NOV 2002

Winalski CS, Shortkroff S, Mulkern RV, Schneider E, **Rosen GM**. Magnetic resonance relaxivity of dendrimer-linked nitroxides. *MAGNET. RESON. MED.* 48 (6): 965-972 DEC 2002

Rosen GM, Schneider E, Shortkroff S, Tsai P, Winalski CS. Use of sodium triacetoxyborohydride in the synthesis of nitroxide biradicals. *J CHEM SOC-PERKIN TRANS 1* (23): 2663-2667 2002

Xu L, Zhan YT, **Wang YB**, Feuerstein GZ, Wang XK. Recombinant adenoviral expression of dominant negative I kappa B alpha protects brain from cerebral ischemic injury. *BIOCHEM BIOPHYS RES COMM* 299 (1): 14-17 NOV 22 2002

Talks and Travels

W. J. Lederer, 11/3/02, Invited Speaker, Butcher Symposium on Genomics and Biotechnology, University of Colorado, "From Stuttering Start to Solid Success: University of Maryland Biotechnology Institute (UMBI)."

W. J. Lederer 11/13/02, Invited Speaker, Department of Physiology and Biophysics, University of Washington, "When Sparks Fly: Calcium Signaling in Heart."

W. J. Lederer 12/5/02, Invited Speaker, Department of Physiology and Biophysics, University of Nevada, Reno, "Sparks and Calcium Signaling in Heart."

Research Day continued

degradation. In addition, MBC had four posters up, out of the approximately two dozen there. Drs. Hali Hartmann, and Valeriy Lukyanenko displayed posters, as well as graduate student John Weaver from Dr. Gerald Rosen's laboratory.

Though there are already many fruitful collaborations between centers, events like this will reinforce them while stimulating new ones. Cross-center interactions benefit everyone at UMBI and a UMBI Research Day should become an annual event.

Adjunct continued

Dr. Parker, who had worked with Dr. W. Jonathan Lederer, did not even have a chance to settle into his new faculty position at Harvard before leaving. He had finished a postdoctoral fellowship at Johns Hopkins, which included the work with Dr. Lederer. His work centered on nanobiology techniques involving microfabrication and a novel system for growing single cells in pre-defined shapes to investigate the effect of structure on calcium sparks and wave propagation. He expects to expand on this work, once he returns to civilian life. All of his friends and colleagues are looking forward to his safe return.

Holiday Parties

Because of the compressed time between Thanksgiving and Christmas this year, MBC annual holiday party was held November 26, 2002. The time change did not affect the quality of either the food or the company; both were excellent. As this was a pot-luck event, ethnic cuisine dominated the selections, and the variety seemed endless. It was too hard to choose between dishes, so everyone overate but no one complained! A special thanks to Tongo Best, Administrative Assistant, who organized this fête, as she has done before.

UMBI also had its annual holiday party on December 13, 2002 in the Hyatt Inner Harbor. Christine Kaufman from the Office of Operations and Finance did an excellent job organizing it this year. She also added a new toy drive to help those less fortunate. For those with too far to drive, there was an overnight special at the hotel. Judging by the attendance, this annual event is definitely on everyone's must go list.

W. J. Lederer 12/7/02, Invited Speaker, Department of Bioengineering and Physiology, University of Utah, Salt Lake City, "How Ca²⁺ sparks are born and die."

P. Melera and M. Monteiro 12/13/02, Organizers of the 4th Annual Student/Faculty Retreat & 10th Annual Student/Faculty Convocation, Molecular & Cell Biology Graduate Program, University of Maryland, Baltimore.

S. Fang, 12/13/02, Invited Speaker Plant Molecular Biology Laboratory, Rockefeller University, New York, "Ubiquitination in ER-associated degradation."