INSIDE MBC

MEDICAL BIOTECHNOLOGY CENTER -UNIVERSITY OF MARYLAND BIOTECHNOLOGY INSTITUTE

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Inside:

Legislative Analyst Visits MBC

As a state agency, University of Maryland Biotechnology Institute is under the same scrutiny as any other entity created and funded by the State of Maryland. This means that there is significant interaction with both the legislative and executive branches of government, most of which is handled by UMBI central. Many MBC faculty and staff members are not aware that it is happening, though *Inside MBC* has regularly noted when the President and Center Directors have gone before the house and senate subcommittees responsible for UMBI appropriations. However, we do not always go to them, they sometimes come here. That is what happened on August 16, 2004 when Legislative Analyst Monica Kearns visited the MBC.

Ms. Kearns works out of the Division of Fiscal & Policy Analysis which is part of the Office of Policy Analysis, Department of Legislative Services. The department provides many different services to the legislature. The Office of Policy Analysis has a particularly far reaching mandate. According to their web page (http://dls.state.md.us/top_pgs/org_str/org_opa_fiscal_policy_anal.html):

"During the annual session, staff is intensely involved with analyzing and reporting on the changes in the budget; identifying and evaluating new initiatives, programs, and policies; making recommendations; presenting findings before the budget com-

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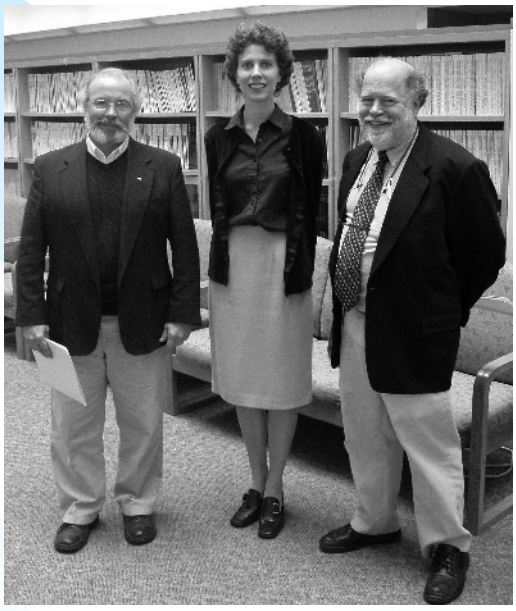
"...legislative analysts must be familiar with all of the entities to which a bill may pertain or a committee may be reviewing."



Left to right: MBC Assistant Director Tim Hughes, Legislative Analyst Monica Kearns and MBC Director W. Jonathan Lederer

UMBI News

New Staff Members

Dr. Jennie Hunter-Cevera, UMBI President, has reorganized her office staff. Yvonne Cook, formerly of the Office of academic Affairs, will now handle the President's Columbus Center office. Esther Pond will join Cindy Dieffenbach at the Rockville office as Executive Administrative Assistant. UMBI has a new Communications Specialist, Alicia Moran. She will work out of the President's office and will handle media matters, including press releases; legislative communications and the annual report. While she does not have a science background, she is well versed in public relations. MBC's Pamela Wright will still coordinate news releases out of MBC but Ms. Moran will initiate all media contact and regularly "check in" at the MBC to become acquainted with what happens here and at the other centers.

Analyst Continued

mittees; and preparing and processing the operating and capital budgets and supporting documentation. Additionally, for each bill that is introduced, staff, as required by law, prepares a "fiscal note" that contains an estimate of the fiscal impact of the bill on the revenues and expenditures of State and local governments during the year in which the bill is to become effective and for the next four years following that year."

In order to do this, legislative analysts must be familiar with all of the entities to which a bill may pertain or a committee may be reviewing. Ms. Kearns has been assigned the UMBI, one of several institutions with which she may have to be familiar in order to properly support the legislative process.

In an effort to introduce her to the MBC, Dr. W. Jonathan Lederer, MBC Director, and Mr. Timothy Hughes, Assistant Director, put together a small packet of information. In addition to that she visited the laboratories of faculty members, Dr. Mervyn Monteiro, Dr. Ilia Baskakov, Dr. Chris Geddes and Dr. Lederer, to get a feel for the range of activities at the MBC. Ms. Kearns' report will be used by both the Senate and House committees as they review the budgets and activities of UMBI and other institutions. It will be her recommendations in those fiscal notes that can make or break components of UMBI's budget. Having a chance to talk with the analyst who is responsible for reviewing UMBI was very informative for us and we hope that is was informative for Ms. Kearns as well It was a real pleasure to welcome Ms. Kearns to the Medical Biotechnology Center.

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http://www.umbi.umd.edu/~mbc

Congratulations!

Jing Liang and Jingsong Zhu, graduate students in Dr. Mervyn Monteiro's laboratory, successfully defended their theses on July 9 and July 28, respectively. Ms. Liang thesis was entitled "Characterization of Ubiquilin and Its Newly Identified Interactor-ERUX" and Mr. Zhu's was entitled Calmyrin Functions as a Ca^{2+} Sensor". Both of the newly-minted Ph.D.s have returned home to China.

Remembering Philly

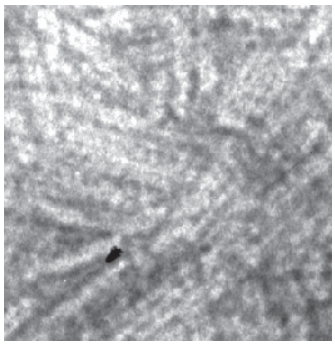
Scientific symposia come in many flavors from one that is small and narrowly focused like the Gordon Research Conference (*Inside MBC*, Vol. 7, No. 3) to one that is large and spans many disciplines similar to the Annual Biophysical Society meetings (*Inside MBC*, Vol. 7, No. 1). Somewhere in between are meetings organized around specific diseases. These conferences often combine basic research with therapeutics and clinical studies.

Dr. Mervyn Monteiro and members of his laboratory regularly participate in one such meeting, the Annual International Conference on Alzheimer's Disease and Related Disorders organized by the Alzheimer's Association. The processes that lead to these debilitating disorders that rob individuals of memories and function are very complex and the meeting brings together experts in many fields. The ninth annual meeting was held in Philadelphia, July 17-22, 2004. Dr. Monteiro's research focuses on the processes involved in the development of these diseases. As a senior researcher, Dr. Monteiro co-chaired the session "Disease Mechanisms: Other Related Mechanisms" but also presented a talk entitled "Regulation of Presenilin Biogenesis and Metabolism by Ubiquilin" in the "Protein Handling" session. At this meeting, Dr. Monteiro was particularly busy as he also handled the discussion of a poster entitled "Calcium Binding Regulates Calmyrin Interaction with Presenilin-2" co-authored by Jingsong Zhu, Stacy M. Stabler, and James B. Ames, a faculty member at CARB.

Members of Dr. Monteiro's laboratory also presented three other posters: "Investigation of Mechanism of Ubiquilin Interaction with Presenilin-2" by Diana L. Ford and Dr. Monteiro; ""ERUBX, a Novel ER Membrane-Associated Protein That Interacts with Ubiquilin" by Jing Liang, Dr. Howard Doong, and Dr. Monteiro; and "Mechanisms of Presenilin Regulation by Ubiquilin" by Leann K. Massey and Dr. Monteiro.

Prion Paper in *Science*

Mad-cow disease and a handful of other vexing neurological disorders are known to be caused by prions or "infectious" proteins. However, the question of whether or not proteins by themselves can be infectious (the "protein-only hypothesis") has been controversial since the hypothesis was first proposed. In an important new paper Dr. Ilia Baskakov of the Medical Biotechnology Center and his co-workers at the University of California San Francisco have made a significant breakthrough. They have finally done what skeptics in the field have said must be done in order to substantiate the hypothesis: "… the final proof of the protein-only hypothesis will require the engineering *in vitro* of a synthetic infectious protein capable of propagating a prion *in vivo*." (1). In a report in Science published on July 30, 2004 (2), they have presented the first evidence that a synthetic protein can be infectious *in vivo*.



Amyloid fibril form of a prion protein produced by Dr. Baskakov's in vitro *method.*

Using the protocol that Dr. Baskakov developed for the cell free conversion of recombinant PrP into infectious amyloid fibrils (3), a critical first step in the process, they injected the synthetic, infectious fibrils into transgenic mice. These mice developed neurological symptoms. Brain extracts from these mice were then injected into normal mice, which subsequently showed the same symptoms, demonstrating the infectious nature of the artificially created prion.

Before joining the MBC faculty, Dr. Baskakov was a postdoctoral fellow with Dr. Stanley Prusiner, who won the 1997 Nobel Prize in Physiology or Medicine for his discovery of prions. Dr. Baskakov noted that creation of a synthetic infectious prion "is an essential step forward toward understanding the chemical nature of the infectious agent of mad-cow disease and other prion maladies." He has established his own prion research group here at the MBC which is at the forefront of prion research. He continues to develop *in vitro* methods for the production and detection of prions and for examining the biophysical properties of prion proteins.

(1) Soto, C. & Castilla, J., The Controversial Protein-Only Hypothesis of Prion Propagation, Nature Medicine Online, pp S63-S67, July 2004.
(2) Legname, G., Baskakov, I.V., Nguyen, H.O.B., Riesner, D., Cohen, F.E., DeArmond, S.J., Prusiner, S.B. 2004. Synthetic Mammalian Prions. Science 305:673-676.
(3) Baskakov, I.V., Legname, G. , Baldwin, M.A., Prusiner, S.B., Cohen, F.E. 2002. Pathway Complexity of Prion Protein Assembly into Amyloid. Journal of Biological Chemistry 277:21140-21148.

MBC Happenings

Comings and Goings

Dr. Xuxian Shen has left Dr. Shengyun Fang's laboratory and **Dr. Liping Feng** has left Dr. Mervyn Monteiro's laboratory. **Mathias Rieckeher**, Laboratory Assistant, has left Dr. Monteiro and returned to Germany. **Dr. Qingyuan Yang** has joined Dr. Ilia Baskakov's laboratory as a Research Associate.

Dr. Russell DiGate, who started as a primary faculty member at the MBC and then moved to the School of Pharmacy as Chair of the Department of Pharmaceutical Sciences and later Associate Dean, has been named Dean of the Philadelphia College of Pharmacy at the University of the Sciences in Philadelphia.

Grants and Contracts

Dr. Shengyun Fang, NIH, "Novel Functions for gp78 in ER-associated Degradation," 7/1/04, $297,000, yr 1 of 5.

Dr. Bruce Vogel, AHA, "Molecular Genetics of Fibulin," 7/1/04, $132,000, 2 yr-award.

Dr. Ira Josephson, NIH, "NIA IPA Agreement," 7/1/04, $46,560, 6 mo award.

Dr. Les Baillie, UMB/NIH, "Highly stable, Antrax Specific Antibodies,"7/1/04, $60,083, yr 2 of 2.

Dr. Joesph Kao, NIH, "Caged Probes for Celluar Physiology," 7/1/04, $350,460, yr 3 of 4.

Dr. W. Jonathan Lederer, Columbia University/NIH, "Calcium Dependent Cardiac Arrhythmias," 8/1/04, $369,034, yr 3 of 5.

Publications

Aslan K, Zhang J, **Lakowicz JR, Geddes CD**. Saccharide sensing using gold and silver nanoparticles - A review. JOURNAL OF FLUORESCENCE 14 (4): 391-400 JUL 2004

Lukomska J, Malicka J, **Gryczynski I, Lakowicz JR.** Fluorescence enhancements on silver colloid coated surfaces. JOURNAL OF FLUORESCENCE 14 (4): 417-423 JUL 2004

Lakowicz JR, Geddes CD, Gryczynski I, Malicka J, Gryczynski Z, Aslan K, Lukomska J, Matveeva E, Zhang JA, Badugu R, Huang J. Advances in surface-enhanced fluorescence. JOURNAL OF FLUORESCENCE 14 (4): 425-441 JUL 2004

Zhang J, Malicka J, **Gryczynski I, Lakowicz JR.** Oligonucleotide-displaced organic monolayer-protected silver nanoparticles and enhanced luminescence of their salted aggregates. ANALYTICAL BIOCHEMISTRY 330 (1): 81-86 JUL 1 2004

Aslan K, **Lakowicz JR, Geddes CD**. Nanogold-plasmon-resonance-based glucose sensing. ANALYTICAL BIOCHEMISTRY 330 (1): 145-155 JUL 1 2004

Geddes CD, Parfenov A, Roll D, **Gryczynski I,** Malicka J, **Lakowicz JR**. Roughened silver electrodes for use in metal-enhanced fluorescence. SPECTROCHIMICA ACTA PART A-MOLECULAR AND BIOMOLECULAR SPECTROSCOPY 60 (8-9): 1977-1983 JUL 2004

Lakowicz JR, Malicka J, Huang J, Gryczynski Z, **Gryczynski I.** Ultrabright fluorescein-labeled antibodies near silver metallic surfaces. BIOPOLYMERS 74 (6): 467-475 AUG 15 2004

Gu L, Troncoso JC, Wade JB, **Monteiro MJ.** *In vitro* assembly properties of mutant and chimeric intermediate filament proteins: insight into the function of sequences in the rod and end domains of IF. EXPERIMENTAL CELL RESEARCH 298 (1): 249-261 AUG 1 2004

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Stokes NR, Zhou X, Meltzer SJ, **Kaper JB.** Transcriptional responses of intestinal epithelial cells to infection with Vibrio cholerae. INFECTION AND IMMUNITY 72 (7): 4240-4248 JUL 2004

Gryczynski I, Malicka J, Nowaczyk K, Gryczynski Z, **Lakowicz JR.** Effects of sample thickness on the optical properties of surface plasmon-coupled emission. JOURNAL OF PHYSICAL CHEMISTRY B 108 (32): 12073-12083 AUG 12 2004

Zhang J, Roll D, **Geddes CD, Lakowicz JR.** Aggregation of silver nanoparticle-dextran adducts with concanavalin A and competitive complexation with glucose. JOURNAL OF PHYSICAL CHEMISTRY B 108 (32): 12210-12214 AUG 12 2004

Gryczynski I, Malicka J, Gryczynski Z, **Lakowicz JR**. Surface plasmon-coupled emission with gold films. JOURNAL OF PHYSICAL CHEMISTRY B 108 (33): 12568-12574 AUG 19 2004

Goldstein S, **Rosen GM,** Russo A, Samuni A. Kinetics of spin trapping superoxide, hydroxyl, and aliphatic radicals by cyclic nitrones. JOURNAL OF PHYSICAL CHEMISTRY A 108 (32): 6679-6685 AUG 12 2004

Talks and Travels

Dr. Valeriy Lukyanenko, Invited Speaker, Department of Pharmacology and Physiology, University of Rochester, NY, "Ryanodine Receptors in Ventricular Muscle Cells," August 12, 2004.

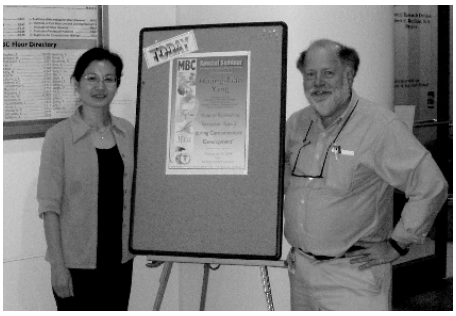
Dr. W. Jonathan Lederer, Invited Speaker, International Society for Heart Research, Brisbane, Australia, " Molecular Control of SR Ca^{2+} Release: Synchronization Versus Dyssynchronization", August 8, 2004.

Patents and Licenses

Dr. Ilia Baskakov filed a provisional patent on August 18, 2004 for "Method of Monitoring *In Vitro* Conversion of Full-Length Mammalian Prion Protein to Amyloid Form with Physical Properties of PrP."

Summer Speaker

Dr. Hunag-Tian Yang, Investigator and Chief, Laboratory of Molecular Cardiology, Health Science Center, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, visited the MBC on July 19, 2004. She presented her work on "Role of Ryanodine Receptor Type 2 during Cardiomyocyte Development." Her laboratory uses stem cell techniques to look at structural changes as heart cells develop.



Dr. Yang and Dr. W. Jonathan Lederer with the poster advertising her seminar.