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Biophysics in Baltimore

Baltimore hosts many conventions, but it is a really big deal when one of the scientific meetings that MBC faculty and students always attend comes to town. The annual Biophysical Society Meeting was held in Baltimore this year, making it easier for MBC's society members to participate. While MBC has presented up to 10 abstracts at this meeting before, this year there was a record 10 posters and 5 presentations.

Preparation starts early, with abstracts submitted in early October. That leaves about 3 months to finalize data and prepare figures. Even though this happens every year, there is still the anxiety of making sure it all fits, that text is accurate and clear, and that the layout is attractive. The process requires critiques and suggestions from colleagues, long hours and a slightly frantic printing session.

The MBC is very fortunate to have its own large format printer ("Posters Made Easy" *Inside MBC* Vol. 6 No. 1). Not only does this save money, but last minute changes can be handled easily. After the meeting, the posters are displayed in the halls for visitors and other non-biophysical colleagues to look at. The range of work is always astonishing and a tribute to the supportive and exciting research milieu at the MBC.

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"The process requires critiques and suggestions from colleagues, long hours and a slightly frantic printing session"

Dr. Silvia Guatimosim preparing her poster. Right: long hours on the computer. Below: Dr. Guatimosim and Pamela Wright compare corrections on two versions of the poster.



Legislative Session

This year's legislative session is particularly low-keyed. The state budget crisis continues and slots are still on the agenda. UMBI president, Dr. Jennie Hunter-Cevera and the center directors, including MBC's W. Jonathan Lederer, made their annual trek to Annapolis. By appearing before subcommittees, talking informally with legislators, presenting a united front and keeping UMBI's accomplishments in front of the public, the President and Center Directors hope to keep incursions into UMBI's budget to a minimum.



Left to Right: Dr. Yanathan Zohar, COMB Director; Dr. W. Jonathan Lederer, MBC Director; Dr. Donald Nuss, CBR Director; Dr. Jennie Hunter-Cevera, UMBI President; Mr. Dave Wilkins, Chief Operating Officer, IHV; Dr. Edward Eisenstein, CARB, Acting Director

Annual Report

UMBI's annual report came out online this year. While a limited number of bound copies was made available to legislators and others, general distribution of bound copies as had been done in the past was eliminated to reduce the cost of publication. This frugality was extended to the creation of the report as well. Dr. Marian Jackson's office coordinated the compilation of information from the centers and put the graphics together themselves. Previous reports were done by outside designers and photographers. The result was still an effective and interesting report that presents UMBI's accomplishments well. Kudos to Dr. Jackson and her assistant, Ms. Yvonne Cook, for a job well-done.

Congratulations!

MBC's first center-based charity project was a successful book drive for a city school. The effort, coordinated by Pamela Wright, netted a dozen books and \$200. The books and money were donated to the Furman Templeton Elementary School on East President Street, a mile or so from the MBC. Ms. Roselyn Lockwood, principal, acknowledged the totally unexpected gift in a letter to Mrs. Wright saying "we'd like to thank you and all of those who contributed to this extraordinary effort. We are extremely honored and appreciative." About 10 faculty and staff members contributed to the effort this year. Mrs. Wright hopes to begin to organize earlier next year and that more members of the MBC community will participate in this worth-while project.

Editor and Designer: Pamela B. Wright
Assistant Editor: Tim Hughes

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Assistant Publisher: Joseph Kao, Assoc. Director MBC

Contact us at: wrightp@umbi.umd.edu
or 1-410-706-8181

Medical Biotechnology Center
725 West Lombard Street
Baltimore, MD 21201 USA

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Biophysics Continued

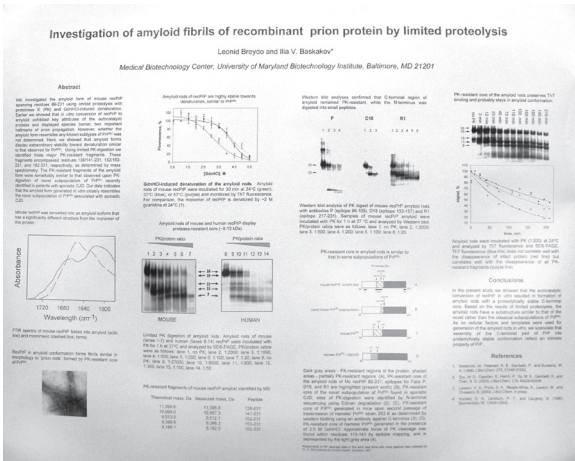
The following abstracts (*Biophysical Journal*, Volume 86, Supplement) were presented this year:

Presentations:

- Mohla, A, **Schulze, DH, Ruknudin, AM**. Exercise alters functioning of the heart through the macromolecular complex of sodium/calcium exchanger.
- Dilly, KW, **Guatimosim, S**, Frederick, C, Weisleder, N, Capetanaki, Y, & **Lederer, WJ**. Desmin and calcium signaling in heart.
- Sobie, EA, & Lederer, WJ**. A new system for spatially localized flash photolysis in cardiac myocytes.
- Guatimosim, S, Song, LS**, Reiken, S, Gerber, LK, Marks, AR, Matlib, MA, & **Lederer, WJ**. Defective Ca^{2+} signaling in diabetic myocytes: Ca^{2+} sparks, SR Ca^{2+} and RyR phosphorylation.
- Gryczynski, Z, Malicka, J, Matveeva, E, **Gryczynski, I, Lakowicz, JR**. Surface plasmon coupled emission - New technology for biomedical binding assays.

Posters:

- Salnikov, V, **Lederer, WJ, & Lukyanenko, V**. Ultrastructural characteristics of contacts between intermyofibrillar mitochondria and sarcoplasmic reticulum in rat ventricular myocytes.
- Chinopoulos, C, **Lederer, WJ**, Fiskum, G & **Lukyanenko, V**. The Ca^{2+} cycling in isolated rat cardiac mitochondria.
- Ramay, HR, **Sobie, EA, Lederer, WJ, & Jafri, MS**. A model of calcium dynamics in the rat ventricular sarcomere.
- Guatimosim, S, Song, LS, duBell, W, Rogers, T, & Lederer, WJ**. Disruption of ankyrin-B in the heart: implications for cellular function.
- Alexandrova, E, Agarawal, N, **Hartmann, H**, George, AL, & **Lederer, WJ**. Structural changes in the Na^{+} channel outer pore can modulate the fast inactivation state.
- Degtyar, V**, Cleemann, L, Morad, M. Elementary properties of voltage-, caffeine-, and puff-induced subarcolemmal cardiac Ca^{2+} signals.
- Song, LS**, Balke, CW, Cheng, HP. Defective local excitation-contraction coupling in failing spontaneously hypertensive rats.
- duBell, WH, Rogers, TB**. PPI regulates the steady-state amplitude of the murine ventricular L-type Ca current.
- Josephson, I**, Guia, A, Lakatta, E, **Lederer, WJ**, Stern, M. Elementary events in calcium-dependent inactivation of unitary L-type Ca channel currents.
- Collins, JH**. Muscle protein genomics: Myosin light chain isoforms found in the human and mouse genomes.
- Breydo, L, **Baskakov, IV**. Investigation of amyloid fibrils of recombinant human prion protein by limited proteolysis.
- Geddes, CD**, Aslan, K, Badugu, R, **Lakowicz, J**. Novel glucose and anion organic and plasmonic probes for physiological monitoring and safeguard.



The finished product from Drs. Breydo and Baskakov.

Baltimore Bound Speakers

The Biophysical Society Annual Meeting attracts participants from all over the U.S. and the world. Local researchers, including those at the MBC, take advantage of the local availability of usually long-distance visitors and invite them to stay an extra day or two to give seminars. This year, MBC had two such visitors. Dr. Ilya Baskakov hosted Dr. Ron B. Wetzel from the University of Tennessee who spoke on “Structural studies on A-beta amyloid fibrils and protofibrils” and Dr. W. Jonathan Lederer invited his former post-doctoral fellow, Dr. Godfrey L. Smith, from the University of Glasgow, Scotland, to present “Modulation of the Cardiac E-C Coupling Using Adenoviral Mediated Up-Regulation of specific Proteins.” In addition to seminars arranged here, MBC also co-sponsors seminars with its sister institutions. On February 18, 2004, in conjunction with the Department of Physiology, UMB, and the Maryland Center for Heart, Hypertension and Kidney Disease, MBC sponsored a seminar by Junichi Nakai from the Riken Brain Science Institute, Hirosawa, Japan, entitled “Improvement and Application of GFP-based Calcium-Sensing Protein (G-CaMP).”

MBC also hosted a seminar on January 13, 2004 by National Academy member, Reed B. Wickner, Chief of the Laboratory of Biochemistry and Genetics at the National Institute for Diabetes and Digestive and Kidney Diseases, NIH, and an expert in prions. His talk entitled, “Yeast Prions: Proteins Can Be Genes,” focused on the elements necessary for amyloid formation and how prions can usurp the cellular machinery.

MBC Happenings

Honors

Dr. Chris Geddes chaired the Chemistry and Biophysics Study section, NIH, February 26-27, 2004.

Comings and Goings

Dr. Yuri Negulaev is a Visiting Assistant Professor in Dr. W.J. Lederer's laboratory. **Drs. Valeriy Lukyanenko and Silvia Guatimosim** have been appointed Assistant Professors (Non-tenure).

Grants and Contracts

Dr. Eric Sobie, AHA, "Regulation of Cardiac Calcium Sparks and CICR," 1/1/04, \$65,000, yr 1 of 4.

Dr. Mervyn Monteiro, NIH, "Function of Alzheimer Disease Presenilin 2," 2/1/04, \$263,344, yr 5 of 5.

Dr. Les Baillie, NIH, UMB, "Rational Design of an Anthrax Toxin Neutralizing Vaccine," 2/1/04, \$450,115, yr 2 of 5.

Publications

Frackowiak D, Ptak A, Gryczynski Z, **Gryczynski I**, Targowski P, Zelent B. Fluorescence polarization studies of B-phycoerythrin oriented in polymer film. *PHOTOCHEMISTRY AND PHOTOBIOLOGY* 79 (1): 11-20 JAN 2004

Matveeva E, Malicka J, **Gryczynski I**, Gryczynski Z, **Lakowicz JR**. Multi-wavelength immunoassays using surface plasmon-coupled emission. *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS* 313 (3): 721-726 JAN 16 2004

Liu HB, Bergman NH, Thomason B, Shallom S, Hazen A, Crossno J, Rasko DA, Ravel J, **Read TD**, Peterson SN, Yates J, Hanna PC. Formation and composition of the *Bacillus anthracis* endospore. *JOURNAL OF BACTERIOLOGY* 186 (1): 164-178 JAN 2004

Zhou X, Gao DQ, Michalski J, Benitez JA, **Kaper JB**. Induction of interleukin-8 in T84 cells by *Vibrio cholerae*. *INFECTION AND IMMUNITY* 72 (1): 389-397 JAN 2004

Gryczynski I, Malicka J, Gryczynski Z, **Lakowicz JR**. Radiative decay engineering 4. Experimental studies of surface plasmon-coupled directional emission. *ANALYTICAL BIOCHEMISTRY* 324 (2): 170-182 JAN 15 2004

Shen JX, Wang SQ, **Song LS**, Han TZ, Cheng HP. Polymorphism of Ca^{2+} sparks evoked from in-focus Ca^{2+} release units in cardiac myocytes. *BIOPHYSICAL JOURNAL* 86 (1): 182-190 Part 1 JAN 2004

Zheng MZ, Dilly K, Cruz JD, Li MX, Gu YS, **Ursitti JA**, Chen J, Ross J, Chien KR, **Lederer JW**, **Wang YB**. Sarcoplasmic reticulum calcium defect in Ras-induced hypertrophic cardiomyopathy heart. *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY* 286 (1): H424-H433 JAN 1 2004

Geddes CD, **Gryczynski I**, Malicka J, Gryczynski Z, **Lakowicz JR**. Fluorescence detection gains in sensitivity. *PHOTONICS SPECTRA* 38 (2): 92-+ FEB 2004

Rosen GM, Beselman A, Tsai P, Pou S, Mailer C, Ichikawa K, Robinson BH, Nielsen R, Halpern HJ, MacKerell AD. Influence of conformation on the EPR spectrum of 5,5-dimethyl-1-hydroperoxy-1-pyrrolidinyl: A spin trapped adduct of superoxide. *JOURNAL OF ORGANIC CHEMISTRY* 69 (4): 1321-1330 FEB 20 2004

Baskakov IV. Autocatalytic conversion of recombinant prion proteins displays a species barrier. *JOURNAL OF BIOLOGICAL CHEMISTRY* 279 (9): 7671-7677 FEB 27 2004

Continuing Education

MBC was fortunate to be invited to participate in a bioinformatics course presented by NIH on two databases available from the National Center for Biotechnology Information (NCBI), part of the National Library of Medicine—one for molecular biology (GenBank) and the other for scientific publications (PubMed). GenBank, in particular, is an extremely valuable resource for genetic sequences. Sequences can be compared, analyzed and virtually translated. However, the sheer volume of the material and all the possible permutations for accessing and analyzing make it nearly impossible to learn on one's



own. The course was organized by Dr. Terry Rogers as part of his NIH program project grant in which MBC Director Dr. W. Jonathan Lederer participates. The day-long course is in two part: a morning presentation and an afternoon hands-on workshop shown above.

Redmond C, **Baillie LWJ**, Hibbs S, Moir AJG, Moir A. Identification of proteins in the exosporium of *Bacillus anthracis*. *MICROBIOLOGY-SGM* 150: 355-363 Part 2 FEB 2004

Sin A, Chin KC, Jamil MF, Kostov Y, **Rao G**, Shuler ML. The design and fabrication of three-chamber microscale cell culture analog devices with integrated dissolved oxygen sensors. *BIO-TECHNOLOGY PROGRESS* 20 (1): 338-345 JAN-FEB 2004

Badugu R, **Lakowicz JR**, **Geddes CD**. Noninvasive continuous monitoring of physiological glucose using a monosaccharide-sensing contact lens. *ANALYTICAL CHEMISTRY* 76 (3): 610-618 FEB 1 2004

Raines KW, Cao GL, Porsuphatana S, Tsai P, **Rosen GM**, Shapiro P. Nitric oxide inhibition of ERK1/2 activity in cells expressing neuronal nitric-oxide synthase. *JOURNAL OF BIOLOGICAL CHEMISTRY* 279 (6): 3933-3940 FEB 6 2004

Rasko DA, Ravel J, Okstad OA, Helgason E, Cer RZ, Jiang LX, Shores KA, Fouts DE, Tourasse NJ, Angiuoli SV, Kolonay J, Nelson WC, Kojsto AB, Fraser CM, **Read TD**. The genome sequence of *Bacillus cereus* ATCC 10987 reveals metabolic adaptations and a large plasmid related to *Bacillus anthracis* pXO1. *NUCLEIC ACIDS RESEARCH* 32 (3): 977-988 FEB 2004

Massey LK, Mah AL, Ford DL, Miller J, Liang J, **Doong H**, **Monteiro MJ**. Overexpression of ubiquitin decreases ubiquitination and degradation of presenilin proteins. *JOURNAL OF ALZHEIMERS DISEASE* 6 (1): 79-92 FEB 2004

Talks and Travels

Dr. Chris Geddes was on the program committee for the 2004 International Society for Optical Engineering Biomedical Optics meeting held January 24-29 in San Jose, CA. He also chaired a session and gave a presentation entitled: "Plasmonic Glucose sensing Based on the Aggregation of Nanometer-sized Nobel-metal Colloids."