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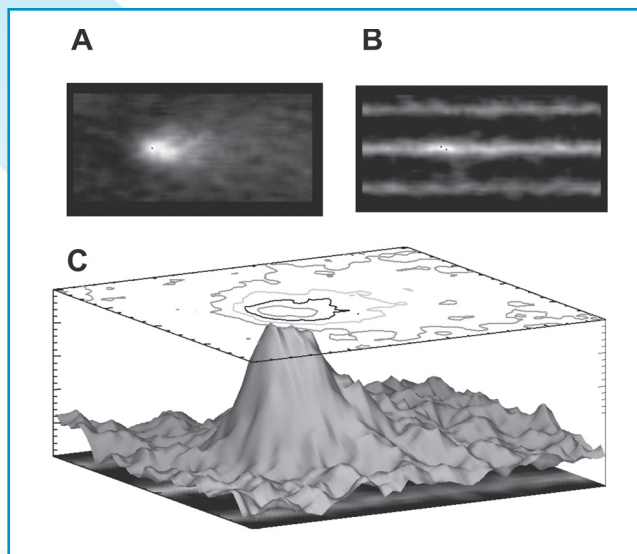
“With over 640 citations at the time Dr. Miller’s article was written, Dr. Lederer’s paper was one of the top three most cited and the newest paper on the list.”

Top Ten

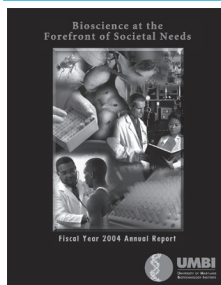
‘Top ten’ lists are very trendy these days and the scientific community has taken note of this easy way to organize and highlight significant contributions to a field. MBC professor Dr. W. Jonathan Lederer’s 1993 Science paper¹ on the discovery of calcium sparks rounded out such a list, which started with the original 1883 account from Sydney Ringer describing the now ubiquitous Ringer’s Solution. The list was published in Physiology News, one of the UK’s Physiology Society’s publications. The first installment of what is to be a series entitled ‘My 10 Key Papers’ appeared in the Winter 2004 issue as an article² by Dr. David Miller from the University of Glasgow on his picks for cardiac muscle research.

Ringer’s solution, which is still in use today in hospitals around the world, was originally developed by using the contractility of a cannulated frog ventricle to define the required mixture of potassium, sodium and calcium salts of chloride. The other papers on the list include papers defining the energetic functions of the heart, action potentials, calcium currents, and calcium induced calcium release. These findings are still the basis for much cardiac research today. By discovering discrete, localized releases of calcium they called sparks, Drs. Hepeng Cheng, W. Jonathan Lederer and Mark Cannell, working here in Baltimore, moved

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Calcium sparks and Transverse Tubules (TTs). The Ca^{2+} indicator fluo-3 was loaded into the heart cells to enable Ca^{2+} sparks to be visualized on a confocal microscope. A. Signal-averaged Ca^{2+} sparks. B. Sulfurhodamine B was added to the extracellular solution to image the TTs while Ca^{2+} sparks were imaged simultaneously. C. A surface plot showing the relationship between A and B. The site of the origin of the majority of Ca^{2+} sparks is the TT from the junctional SR (jSR). Taken from Cheng et al. (1996),



The UMBI Annual Report was published online, as well as a limited number of bound copies. The range of activities within the institution continues to be impressive and extremely wide-ranging from theoretical to eminently practical. Check out what the other centers are doing. The report can be downloaded from <http://www.umbi.umd.edu/budget/2005/2004ar.pdf>.

It is time for UMBI to again go before the legislature. This annual task is President Jennie Hunter-Cevera's, supported by the center directors, assistant directors and UMBI Central. The first session was before the House Subcommittee on Education and Economic Development on February 16, 2005, with the Senate version scheduled for March. The testimony is a prepared document that is distributed in advance to the committees, read by Dr. Hunter-Cevera, and which then becomes the basis for questioning. The annual testimony is available for UMBI personnel on the UMBI web site, legislative update page (<http://www.umbi.umd.edu/lu/index.htm>). This requires an UMBI login. This year's testimony is especially interesting, given the current review of UMBI by the USM Board of Regents (*Inside MBC*, Vol. 7, No. 5).

UMBI Strategic Plan Phase II



The drafting of the UMBI Strategic Plan finished the second and final phase—the development of tactics and metrics to achieve the five goals outlined in the first phase release in October, 2004—with the publication of the first draft of the complete plan in February. Tactics outline what UMBI will actually do to achieve the goals and metrics show how success will be measured. Committees were formed last November for each of the five goals: 1) Focus on interdisciplinary research for societal problems, 2) Keep UMBI in the forefront in biotechnology for the state of Maryland, 3) Increase UMBI presence in training and education, 4) Maximize UMBI's economic impact and 5) Increase UMBI's public profile. MBC faculty and staff were on all the committees formed except for Goal 3.

The Goal 2 committee was co-chaired by MBC Director, W.J. Lederer, and included Assistant Director Tim Hughes and MBC faculty members, Mervyn Monteiro and Joseph Kao. Dr. Ilia Baskakov represented MBC on the Goal 1 committee and Dr. Monteiro did double duty on the Goal 4 committee. MBC staffer and media liaison, Pamela Wright, worked on the Goal 5 committee.

The recently released draft of the final plan was then assembled from the committee reports by UMBI Central. Everyone in UMBI has been encouraged to review it and make suggestions. The final version should be out this coming spring.

UMBI President Dr. Jennie Hunter-Cevera spoke at the February MBC faculty meeting about the plan.

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Double Trouble?

In an unusual accident of timing, MBC hosted two seminar speakers on the same day. Dr. Robert Tycko spoke on "Molecular Structure of Amyloid Fibrils: Insights from Solid State NMR" at noon on January 10. Then at four o'clock, Dr. Michael Kapiloff presented his seminar entitled: "The mAKAP Signal Transduction Complex and the Induction of Cardiac Hypertrophy." While both speakers were excellent, scheduling will be reviewed more carefully in the future.

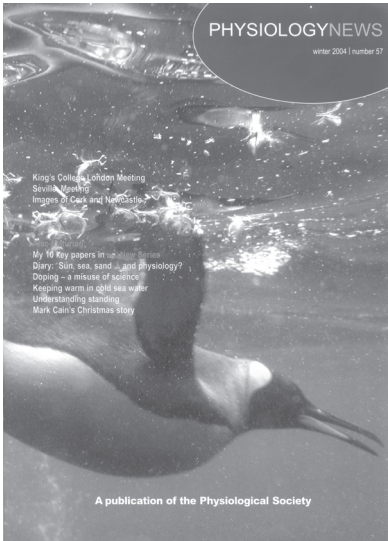
what had been theoretical concepts of local control into experimentally accessible ones. Calcium sparks, then, are the elementary units of calcium release in heart muscle. It is the release of calcium that initiates the contraction of heart cells. Thus, sparks are at the very foundation of heart function.

Dr. Lederer, who is Director of the Medical Biotechnology Center, was quite astounded at the inclusion of his ground breaking work on the list. “I am quite honored to be included in such illustrious company.” With over 640 citations at the time Dr. Miller’s article was written, Dr. Lederer’s paper was one of the top three most cited and the newest paper on the list.

Besides his laboratory’s work on calcium sparks, Dr. Lederer is also known for his discovery of a new cause of heart failure (*Inside MBC*, Vol. 6, No. 1). He travels extensively and has organized several international meetings on calcium signaling in heart.

¹Cheng, H., Lederer, W.J. & Cannell, M.B. (1993) Calcium sparks: elementary events underlying excitation-contraction coupling in heart muscle. *Science* 262, 740-744.

²Miller, D. (2004) A (highly personal) ‘Top Ten’ of cardiac muscle papers. *Physiology News*, Winter 2004, Number 57, pp. 9-11.



First TSE Colloquium

Transmissible spongiform encephalopathy or TSE includes Mad Cow Disease along with Scrapies, Creutzfeld-Jakob Syndrome and several other neurodegenerative diseases caused

by prions—normal proteins that have become misfolded and infectious. Dr. Ilia Baskakov, MBC’s resident prion expert, was one of the primary organizers of the First Annual Baltimore TSE Colloquium held on February 16, 2005. The invitation only colloquium had less than 100 participants but they came from all over the globe. While public consciousness has been raised about these relatively rare diseases, truly useful information about the infectious agent is still minimal. Efficient diagnostic tests and sorting out sporadic (spontaneous) incidences from truly infectious occurrences are still lacking and rarely

discussed in the general media. Thus, it is critical that the small number of researchers who are active in this field meet regularly to exchange ideas.

Dr. Baskakov also presented a talk entitled “Substructure of the prion protein amyloid fibrils”. After the meeting, Dr. Baskakov invited several of the participants to tour his laboratory and the MBC.



Left to right: Dr. Philip Comer, DNV Consulting, UK; Dr. Michael Beekes, Robert Koch Institute, Germany; Dr. Ron Rogers, Health Canada; Dr. Bob Hill, Health Canada; and Dr. Ilia Baskakov, MBC.

MBC Happenings

Grants and Contracts

Dr. Ira Josephson, NIA, IPA Agreement, 2/1/2005, \$50,004, yr 1 of 1.

Dr Les Baillie, NIH UMB Subcontract, "Rational Design of an Anthrax Toxin Neutralizing Vaccine," 2/1/2005, \$463,618, yr 3 of 5.

Dr Les Baillie, NIH UMB Subcontract, "Generation of Spore Specific Research Materials," 2/1/2005, \$20,604, yr 1 of 2

Publications

Badugu R, **Lakowicz JR**, **Geddes CD**. A wavelength-ratiometric fluoride-sensitive probe based on the quinolinium nucleus and boronic acid moiety. *SENSORS AND ACTUATORS B-CHEMICAL* 104 (1): 103-110 JAN 3 2005

Badugu R, **Lakowicz JR**, **Geddes CD**. Cyanide-sensitive fluorescent probes. *DYES AND PIGMENTS* 64 (1): 49-55 JAN 2005

Badugu R, **Lakowicz JR**, **Geddes CD**. Fluorescence sensors for monosaccharides based on the 6-methylquinolinium nucleus and boronic acid moiety: potential application to ophthalmic diagnostics. *TALANTA* 65 (3): 762-768 FEB 15 2005

Chen BY, Cai JX, **Song LS**, Wang XQ, Chen ZH. Effects of ginkgo biloba extract on cation currents in rat ventricular myocytes. *LIFE SCIENCES* 76 (10): 1111-1121 JAN 21 2005

Lukomska J, Malicka J, **Gryczynski I**, Leonenko Z, **Lakowicz JR**. Fluorescence enhancement of fluorophores tethered to different sized silver colloids deposited on glass substrate. *BIO-POLYMERS* 77 (1): 31-37 JAN 2005

Badugu R, **Lakowicz JR**, **Geddes CD**. Boronic acid fluorescent sensors for monosaccharide signaling based on the 6-methoxyquinolinium heterocyclic nucleus: progress toward noninvasive and continuous glucose monitoring. *BIOORGANIC & MEDICINAL CHEMISTRY* 13 (1): 113-119 JAN 3 2005

Gryczynski I, Malicka J, Jiang W, Fischer H, Chan WCW, **Gryczynski Z**, Grudzinski W, **Lakowicz JR**. Surface-plasmon-coupled emission of quantum dots. *JOURNAL OF PHYSICAL CHEMISTRY B* 109 (3): 1088-1093 JAN 27 2005

Zwrick ME, McAfee F, Cutler DJ, **Read TD**, Ravel J, Bowman GR, **Galloway DR**, Mateczun A. Microarray-based resequencing of multiple *Bacillus anthracis* isolates. *GENOME BIOLOGY* 6 (1): Art. No. R10 2005

Chen BZ, Boukamel K, **Kao JPY**, Roerig B. Spatial distribution of inhibitory synaptic connections during development of ferret primary visual cortex. *EXPERIMENTAL BRAIN RESEARCH* 160 (4): 496-509 JAN 2005

Rosen GM, Burks SR, Kohr MJ, **Kao JPY**. Synthesis and biological testing of aminoxyls designed for long-term retention by living cells. *ORGANIC & BIOMOLECULAR CHEMISTRY* 3 (4): 645-648 2005

Takimoto E, Champion HC, Li MX, Belardi D, Ren SX, Rodriguez ER, Bedja D, Gabrielson KL, **Wang YB**, Kass DA. Chronic inhibition of cyclic GMP phosphodiesterase 5A prevents and reverses cardiac hypertrophy. *NATURE MEDICINE* 11 (2): 214-222 FEB 2005

Baskakov IV, Bocharova OV. *In vitro* conversion of mammalian prion protein into amyloid fibrils displays unusual features. *BIO-CHEMISTRY* 44 (7): 2339-2348 FEB 22 2005

Bocharova OV, Breydo L, Parfenov AS, Salnikov VV, **Baskakov IV**. *In vitro* conversion of full-length mammalian prion protein produces amyloid form with physical properties of PrP^{Sc}.

In the Thick of It

Since an advertisement was placed in *Science* last October, MBC has been flooded with applications for a tenure track Assistant Professorship. As of the end of December, nearly 300 applications had been received. After reading every application, the search committee finalized a short list of 6 candidates who were invited to give a seminar and come for an interview.

The first candidate to come in was Dr. Caryn Outten from Johns Hopkins University on January 26. She was quickly followed by Chieh Chang (Rockefeller University, 2/2/2005), Yanzhuang Wang (Yale University, 2/4/2005), Michael Bradshaw (Stanford University, 2/7/2005), and Dr. Yang Hong (University of California San Francisco, 2/8/2005). After a brief respite, the last candidate, Dr. Huai-hu Chaung (University of California San Francisco) came through on February 28.

The research these young scientists discussed reflected the excellent institutions they represented. Because of the highly interactive nature of MBC research, the new faculty member needs to fit in well, both in personality and research interests. MBC hopes to have the perfect candidate on board by this summer.

JOURNAL OF MOLECULAR BIOLOGY 346 (2): 645-659 FEB 18 2005

Ge XD, Kostov Y, **Rao G**. Low-cost noninvasive optical CO₂ sensing system for fermentation and cell culture. *BIOTECHNOLOGY AND BIOENGINEERING* 89 (3): 329-334 FEB 5 2005

Osorio CG, Crawford JA, Michalski J, Martinez-Wilson H, **Kaper JB**, Camilli A. Second-generation recombination-based *in vivo* expression technology for large-scale screening for vibrio cholerae genes induced during infection of the mouse small intestine. *INFECTION AND IMMUNITY* 73 (2): 972-980 FEB 2005

Leverton LQ, **Kaper JB**. Temporal expression of enteropathogenic *Escherichia coli* virulence genes in an *in vitro* model of infection. *INFECTION AND IMMUNITY* 73 (2): 1034-1043 FEB 2005

Talks and Travels

Dr. W.J. Lederer, Session Speaker, 3rd Annual Larry and Horti Fairberg Cardiac Workshop: The Communicative Cardiac Cell. "Molecular Control of SR Release," Sintra, Portugal. January 15-19, 2005.

Dr. W.J. Lederer, Symposium Speaker, 49th Annual Meeting of the Biophysical Society, "Ca²⁺ Spark Regulation in Heart", February 13, 2005. Dr. Lederer was also one of the Symposium organizers.

Dr. Ilia Baskakov, Invited Presentation, Keystone Symposia: Molecular Mechanisms of Transmissible Spongiform Encephalopathies, "The First Synthetic Mammalian Prion," Utah, January 12, 2005

Dr. Ilia Baskakov, Platform Presentation, 49th Biophysical Society Annual Meeting, "The First Synthetic Mammalian Prion," Long Beach, CA, February 16, 2005.

Dr. Shengyun Fang, Seminar Speaker, Department of Physiology and Pediatrics, Johns Hopkins University, "Multiple roles of gp78 in ER-associated degradation," January 14, 2005.