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Molecular Cardiology Symposium

The largest subdivision of the Medical Biotechnology Center is the Institute of Molecular Cardiology (IMC), headed by W. Jonathan Lederer. Though emphasizing cardiac research, this group is so diverse that often the range of topics being addressed in the Institute is not immediately apparent to all of its members. To remedy this, the institute held its first in-house symposium on November 26, 2003 in the MBC 6th floor conference room. As the schedule on page 3 shows, the topics were wide-ranging. They went from whole animal physiology ("Using ECG Telemetry to Study Cardiomyopathy" by Hali Hartmann) to DNA replication ("Alternative Splicing of NCX1: Functional Characteristics and a Mechanism???" by Dan Schultz).



Logo for the Institute of Molecular Cardiology

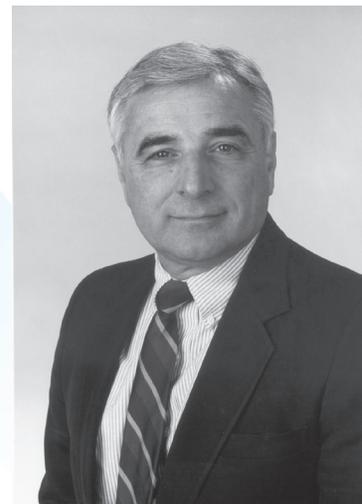
Both methodology ("Culturing Methods for Adult Rat and Adult Mouse Cardiac Cells" by Cecilia Frederick) and theory ("The role of shape in Cardiac Development" by Andy Ziman) were included. Being the first of its

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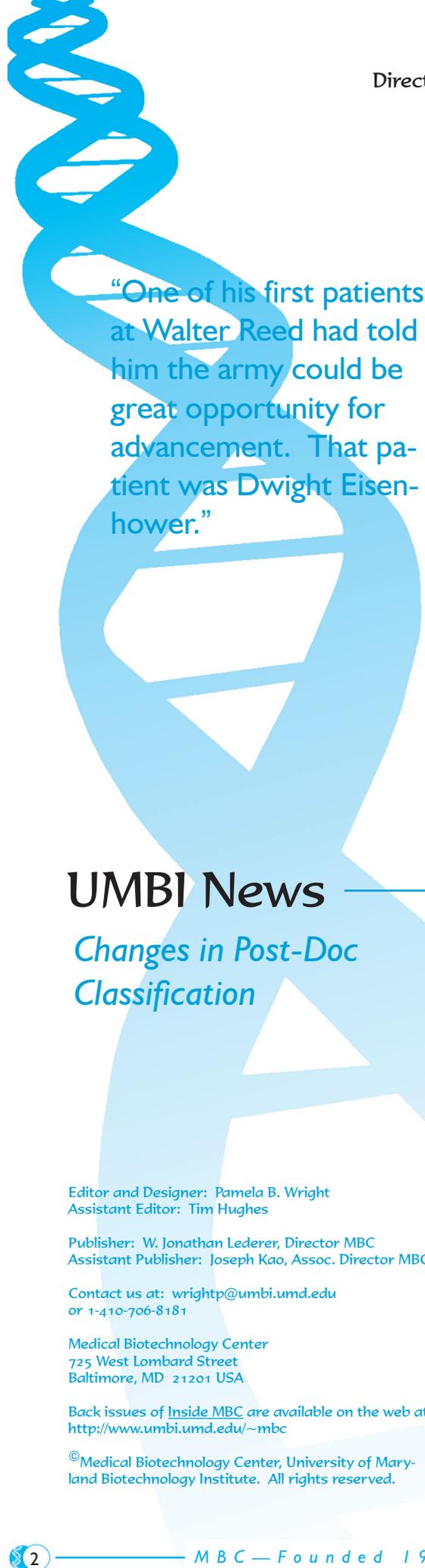
MBC Timeline

The First Permanent Director

In the "best-laid-plans-of-mice-and-men" tradition, Dr. Edmund Trammont did not start out to become a leader in infectious disease research and MBC's first director. He went to Rutgers to continue the family building tradition, pursuing an engineering degree. There he became interested in sanitary engineering, which lead him to a course in microbiology. That opened up a whole new world for him. He dumped engineering, switched to pre-med, and eventually went to Boston University Medical School. That early interest in microbes matured and continued throughout his medical school training and residency at Bellevue Hospital (Cornell) in New York City. When he was drafted in 1969, a lucky chance and a Washington D. C. snowstorm sent him into the Surgeon General's office, which netted him an assignment at Walter Reed Hospital. It was "the best thing that ever happened" to him. He completed his medical training there and went on to do an Infectious



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Director Continued

“One of his first patients at Walter Reed had told him the army could be great opportunity for advancement. That patient was Dwight Eisenhower.”

Disease Fellowship. While the research side of Walter Reed was well known for infectious disease work, the hospital had very little. With the Viet Nam War going on and a plethora of nasty bugs attacking the troops, army doctors needed increased training. He started the infectious disease program at the hospital, the first of many programs and projects he worked on in the army. Few draftees remain in the army after their tour is done. However, he said he stayed because he didn't see anything better or more interesting on the “outside.” He became a career officer. One of his first patients at Walter Reed had told him the army could be great opportunity for advancement. That patient was Dwight Eisenhower. Definitely, someone who knew what he was talking about.

The army did afford great opportunities. Although most people think of military life as virtually nomadic with many moves, Dr. Tramont was fortunate to spend his entire career based in Washington, D.C., mostly at Walter Reed Army Institute of Research in a variety of leadership positions. His early work was with syphilis and other sexually transmitted diseases (STDs). His practical, engineering predisposition led him to work on vaccines, as well as, developing policies within the army to handle a world full of infectious organisms. When AIDS became a problem, his STD work put him in a perfect position to formulate policy and develop a research program for the Department of Defense, as Director of the Military Medical Consortium for Applied Retroviral Research, HIV Research Program at Walter Reed. It was his extensive management and practical, applied research experience that made him an ideal choice for the first permanent director of MBC. Dr. Tramont was officially appointed in September, 1991.

UMBI News

Changes in Post-Doc Classification

When UMBI began using the University of Maryland, College Park personnel computer system, several accommodations were required. One is the elimination of the job category of post-doctoral fellows. This is not a classification that College Park uses. This has caused much consternation among the faculty. In research laboratories, it is the post-doctoral fellows who contribute much of the data, but they are still in training and require supervision. College Park relies mostly on undergraduate and graduate students. The first post-graduate job category there is Research Associate, a faculty level appointment. Usually Research Associates have with 3+ years of post-graduate training. Post-doctoral fellows receive lower salaries and minimal benefits, reflecting their in-training status. The cost to hire a Research Associate is usually much greater. MBC has traditionally relied heavily on fellows, unlike some of the other centers and thus the bears the brunt of the change. Even recent graduates must now be hired as Research Associates. Until College Park creates a new job classification or UMBI develops its own personnel computer system, MBC will explore the development of a postdoctoral training program.

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kind, the 30 or so participants were not sure what to expect. But after just a few talks it was clear that many investigators were not aware of the extent of the research that was going on in the “other” laboratories and it was clearly important to have yearly symposia. Even though some of the participants had worked closely together or attended the same journal club, some were really amazed to hear what other people were doing. Just as important was getting a chance to talk to each other informally about this novel research. All in all it was judged a successful and worthwhile event, one that will be repeated annually.

Network Changes

MBC’s Mike Kelly and IHV’s Dave Ashley, the IT guys, recently finished re-configuring the entire network in the building. They changed the server addressing from static to dynamic. That means that individual work stations do not have a unique IP address, but are assigned one as they access the network. While a user will not necessarily notice any difference, it makes a big difference to network operation. Previously, Mike and Dave kept track of every single IP address and which machine it was on. This often caused conflicts when two machines were accidentally given the same IP address. With dynamic addressing, this is not necessary and new machines are easily accommodated. Users did have to change the server address on their individual machines, so that workstations would know to request an IP address from the server.

As MBC continues to grow, the IT infrastructure needs to keep pace. In an effort to reduce network problems, Mike has installed a new print server. This is a dedicated machine to handle all networked printers. In actuality, he took the old network server and made it the print server and bought a new network server. In the past, printers used the same server as the all other functions, including links to the larger UMBI network, FTP, and individual directories. In the old configuration, a print error could shut the entire network down, which was happening all too frequently in the recent past. Mike is also expecting to revamp the operating system on the new network server early next year.

Agenda		
Time	Activity	Title
8:30-9:00	Gathering with food	
9:00-9:30	Daniel Schultz	Alternative Splicing of NCX1: Functional Characteristics and a Mechanism???
9:30-10:00	Abdul Ruknudin	Recent findings on the NCX1 macromolecular complex in heart
10:00-10:15	Break	Next talk starts during break
10:15-10:30	Cecelia Frederick	Culturing Methods for Adult Rat and Adult Mouse Cardiac Cells
10:30-11:00	Bill duBell	Regulation of Murine Ventricular L-Type ICa by Opposing Protein Kinase and Phosphatase Activities
11:00-11:30	Marisa Gigena	Protein Phosphatase 2A (PP2A) in heart
11:30-12:00	Ira Josephson	Unitary Properties of Cardiac L-Type Calcium Channel Currents
12:00-1:00	Lunch	Next talk starts during lunch
12:30-1:00	Vadym Degtyar	Elementary Properties of Voltage-, Caffeine-, and Puff-induced Subsarcolemmal Cardiac Ca ²⁺ Signals.
1:00-1:30	Silvia Guatimosim	Defective Ca ²⁺ signaling in diabetic myocytes: SR Ca ²⁺ , Ca ²⁺ sparks and RyR phosphorylation.
1:30-2:00	Long-Sheng Song	FK506 Binding Proteins and its Functions in Heart
2:00-2:30	Hali Hartmann	Using ECG Telemetry to Study Cardiomyopathy
2:30-2:45	Break	Next talk starts during break
2:45-3:00	Elena Alexandrova	A Study of Electrophysiological Properties of Sodium Channels
3:00-3:30	Andy Ziman	The Role of Shape in Cardiac Development
3:30-4:00	Valeriy Lukyanenko	SR-Mitochondrial Crosstalk in Cardiac Cells
4:00-6:00	Reception: wine and cheese	

Symposium agenda

It’s All in the Name

If there is something in a name, then the title of Dr. Ron Kopito’s seminar on November 18, 2003 was not exactly reminiscent of Shakespeare’s famous quote. Yet “Cellular Garbage: Protein (Mis)folding and Neurodegenerative Disease” was one of the most fascinating seminars hosted by MBC this year. Dr. Kopito studies the cellular mechanisms by which cells get rid of unneeded, damaged or used proteins—cellular garbage. Like human activity, cells produce waste that must be sorted and packaged, either for recycling or degradation. When this process goes awry, waste products build up. This build up has been implicated in many neurodegenerative diseases, including ALS, Huntingtons and Parkinson’s.

The waste disposal system of a cell requires that proteins be unfolded to be tagged for proteolysis (breakdown) or transported to a new location. This is a multi-step, energy requiring process, with a protein undergoing folding and unfolding. In the process, proteins are ubiquitinated, that is, multiple ubiquitin molecules are attached to the protein as a signal to chaperone proteins that the tagged protein is to be delivered to the proteosomes for degradation. Proteins have a tendency to aggregate. The ubiquitin tag is partially responsible for preventing this. However, aggregates still form. When aggregates do form, they must be shunted to the lysosomes pathway. All of this complicated cellular machinery requires that proteins be presented in a recognizable configuration. However, when proteins are misfolded, the system breaks down. The cell does not recognize the protein or the aggregate and disease may ensue.

MBC Happenings

Honors

Dr. Chris Geddes has been invited to become a member of Kluwer Academic Publishers Scientific Advisory Board.

MBC nominated **Dr. Joseph P.Y. Kao** for UMBI to put forward for the Regent's Teaching Award.

Drs. Eric Sobie and **Long-Sheng Song** were appointed as Assistant Professors (Non-Tenure).

Comings and Goings

Research Assistant **Tracy Gelner** left Dr. Mervyn Monteiro's laboratory. **Dr. Vadim Salnikov**, a visiting scientist from the Institute of Biochemistry and Biophysics, Russian Academy of Sciences, Kazan, Russia, has returned for 6 months to continue his work with Dr. Valeriy Lukyanenko.

Grants and Contracts

Dr. W. J. Lederer, NIH, "Calcium Sparks in Heart Muscle," 12/1/03, \$371,250, yr 1 of 5.

Publications

Gupta A, **Rao G**. A study of oxygen transfer in shake flasks using a non-invasive oxygen sensor. BIOTECH BIOENG 84: 351-358 NOV 5 2003

Champion HC, Georgakopoulos D, Haldar S, Wang LL, **Wang YB**, Kass DA. Robust adenoviral and adeno-associated viral gene transfer to the in vivo murine heart - Application to study of phospholamban physiology. CIRCULATION 108: 2790-2797 DEC 2 2003

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Karmali MA, Mascarenhas M, Shen SH, Ziebell K, Johnson S, Reid-Smith R, Isaac-Renton J, Clarks C, Rahn K, **Kaper JB**. Association of genomic O(-)island 122 of *Escherichia coli* EDL 933 with verocytotoxin-producing *Escherichia coli* serotypes that are linked to epidemic and/or serious disease. J CLIN MICROBIO 41: 4930-4940 NOV 2003

Ge XD, Tolosa L, Simpson J, **Rao G**. Genetically engineered binding proteins as biosensors for fermentation and cell culture. BIOTECH BIOENG 84: 723-731 DEC 20 2003

Holiday Parties

'Tis the season to be merry and MBC did just that with two different gatherings. On November 14, Tongo Best organized MBC's annual "international pot-luck". As usual the dishes were as diverse as MBC's staff. From Chinese dumplings to Dr. Lederer's famous beans, everything was delicious and plates were piled high. It is one of those gatherings that brings out the best in everyone's culinary talents.

December 23 saw MBC's Winter Holiday party. UMBI did not have an all-institutional one due to the budget crunch. It was thought inappropriate, and rightly so, to subsidize a party when staff had been let go. In lieu of that, MBC had its own low keyed get together. Instead of lunch, desserts and hors d'ourves were assembled. Again the company was congenial and the fare exceptional. MBC also kicked off a book collection for a local elementary school organized by Pamela Wright, Assistant to the Director.

Kao JPY, Rosen GM. Esterase-assisted accumulation of 3-carboxy-2,2,5,5-tetramethyl-1-pyrrolidinyloxy into lymphocytes. ORG BIOMOLECULAR CHEM 2: 99-102 2004

Karmali MA, Mascarenhas M, Petric M, Dutil L, Rahn K, Ludwig K, Arbus GS, Michel P, Sherman PM, Wilson J, Johnson R, **Kaper JB**. Age-specific frequencies of antibodies to *Escherichia coli* verocytotoxins (Shiga toxins) 1 and 2 among urban and rural populations in Southern Ontario. J INFECT DISEASES 188: 1724-1729 DEC 1 2003

Geddes CD, Parfenov A, Roll D, Uddin MJ, **Lakowicz JR**. Fluorescence spectral properties of indocyanine green on a roughened platinum electrode: Metal-enhanced fluorescence. J FLUOR 13 (6): 453-457 NOV 2003

Pugh VJ, Szmanski H, Moore WE, **Geddes CD, Lakowicz JR**. Submicrometer spatial resolution of metal-enhanced fluorescence. APPLIED SPECTROSCOPY 57 (12): 1592-1598 DEC 2003

Zhang H, Noble D, **Cannell M**, Orchard CH, Lancaster M, Jones SA, Boyett MR, Holden AV, **Jafri MS, Sobie EA, Lederer WJ**, Demir SS, Michailova A, Delprincipe F, Egger M, Niggli E, Smith GL, Loughrey CM, MacQuaide N, Dempster J, Trafford AW. Dynamics of cardiac intracellular Ca²⁺ handling - From experiments to virtual cells. ITNL J BIFURCATION AND CHAOS 13 (12): 3535-3560 DEC 2003

Talks and Travels

Dr. Joseph P.Y. Kao, Invited Speaker, Department of Physiology, University of Sydney, Australia, "Probing and Manipulating Physiology with Light Flashes" November 28, 2003.

Dr. W. Jonathan Lederer, Keynote Speaker, Annual Totman Medical Research Fund Retreat, Stowe, VT, "Occluded Elements in Calcium Signaling," November 6, 2003.

Dr. Joseph P.Y. Kao represented the MBC at the Annual Meeting of the Association of Chairs of Departments of Physiology, St. Kitts, West Indies, December 5-6, 2003.