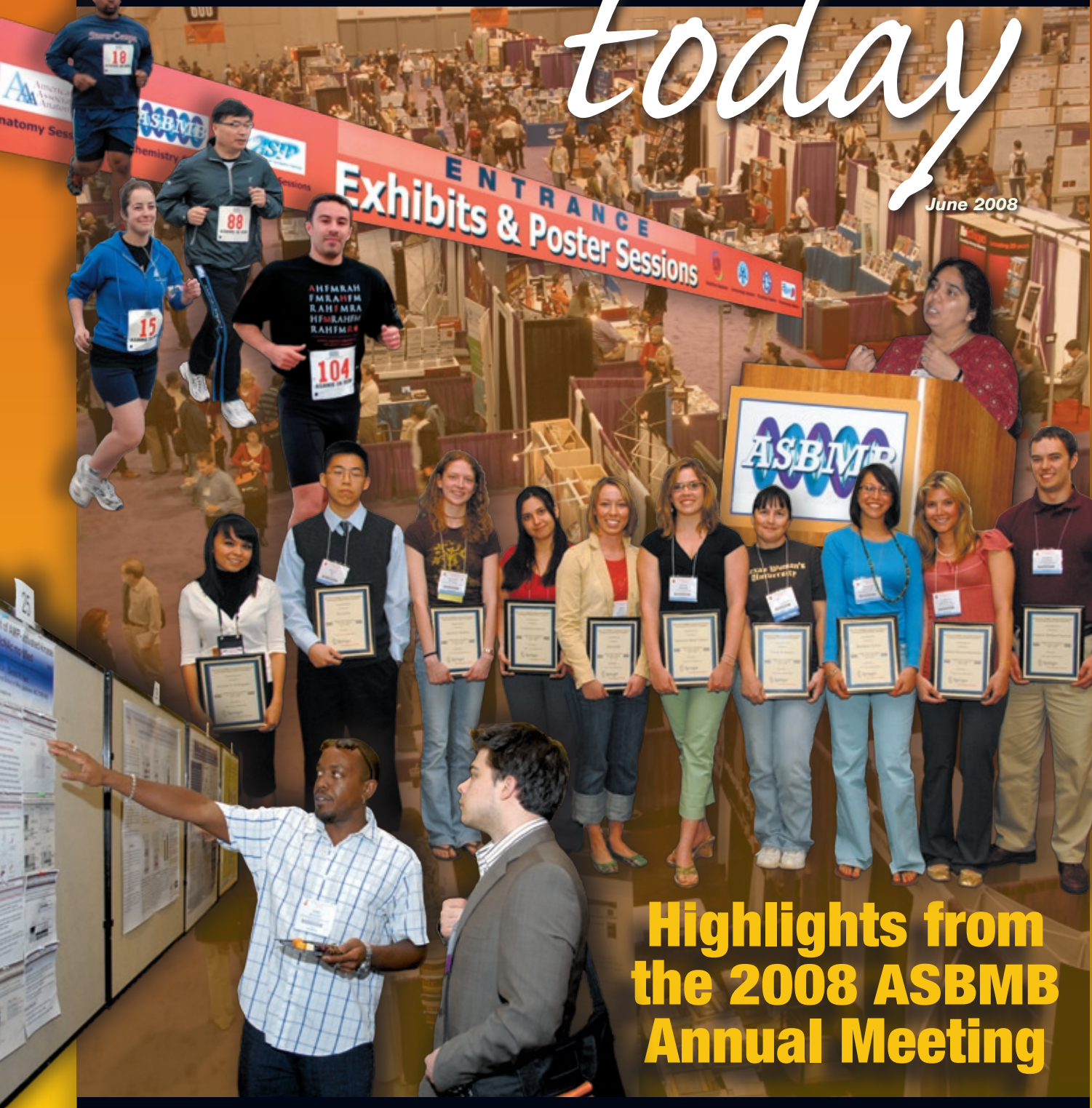
SEE INSIDE FOR A PREVIEW OF NEXT YEAR'S ANNUAL MEETING

ASBMB today

June 2008



Highlights from the 2008 ASBMB Annual Meeting

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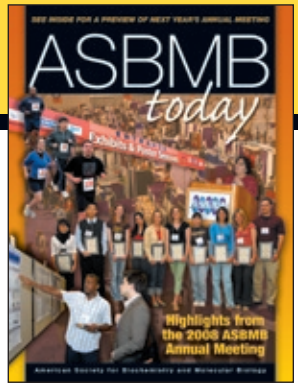

JUNE 2008

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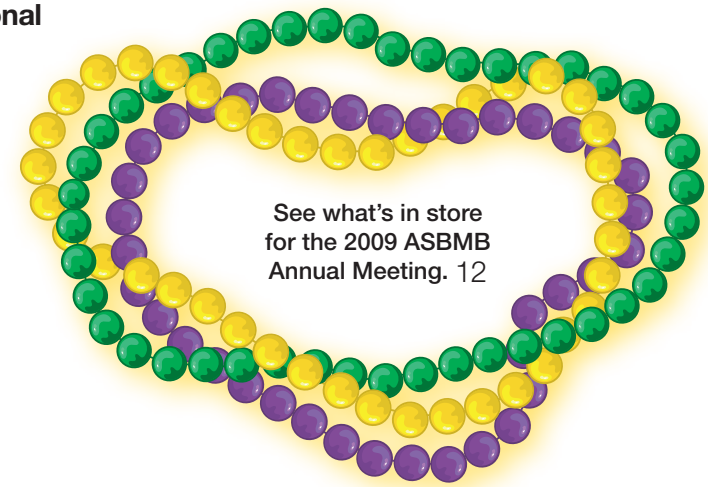

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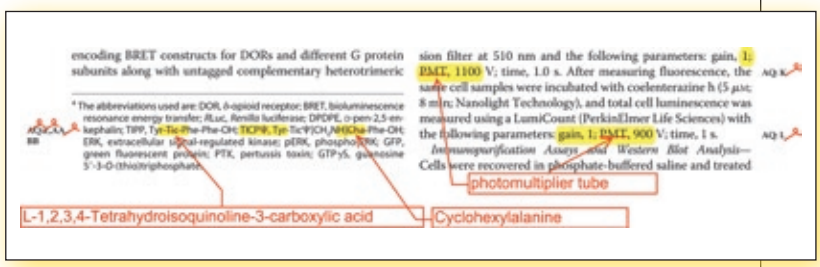

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Download the May ASBMB AudioPhiles *JLR* News Podcast and hear about a new genetic locus for triglycerides levels and a potential new marker for myelin damage.

This and other podcasts are available at: http://www.faseb.org/asbmb/media/media.asp

ASBMB today

A monthly publication of
The American Society for
Biochemistry and Molecular Biology

from the **editor**

Looking Back, Moving Forward

BY NICOLE KRESGE

Another ASBMB annual meeting has come and gone, and we at ASBMB would like to thank all the participants, attendees, and staff who helped make San Diego 2008 a great success.

For those who were not able to attend, or those who would like to relive the experience, *ASBMB Today* once again offers a comprehensive meeting overview. In this issue, we provide summaries of many of the meeting events, including the public affairs sessions, educational sessions, graduate and postdoctoral workshops, and minority scientist events. We also highlight a few of the outstanding scientific symposia, and we include a special video centerfold section looking at some of the real time imaging studies presented at the meeting this year. Be sure to log on to the online version of our magazine to capture the full experience of this dynamic research! Also make sure to check out the 2008 Award Lecture streaming presentations online at www.asbmb.org later this month!

This issue also features a preview of the 2009 meeting, which will be held April 18-22 in New Orleans, the home of jazz and beignets. *Don't forget to mark your calendars!*

Nicole Kresge

Our Science Policy Fellowship Program

BY HEIDI HAMM

As my presidency winds down—this will be my last column in this space as your president—I have been thinking about what lies ahead for the Society and for biomedical research in particular. As Yogi Berra is reputed to have once said, "It's tough making predictions—especially about the future!" But, as tough as it might be to make predictions, I think one that I am safe in making is that it is not going to be getting easier any time soon to obtain an NIH grant. This is why public policy is critically important as we look ahead; our new members must have the tools and know-how to cope with what is likely to be an increasingly tough funding environment.

This is why I am so pleased that the Society established an ASBMB Science Policy Fellowship in 2007. Under the program, a new Ph.D. (not beyond the post-doc stage) comes to Washington to spend 1 year working in the ASBMB public affairs office with our Director of Public Affairs, Pete Farnham. Pete is very experienced and we were confident when we set up the program that he would do well as a mentor for our Fellow.

The fellowship program is designed to provide new Ph.D.s who have little or no public policy experience with a broad background in the issues of science policy and advocacy. A goal of the program is that Fellows will leave with a better understanding of the American scientific enterprise and how policy decisions affect researchers, along with the knowledge to effectively communicate and advocate for a better understanding of scientists' concerns and work.

The Fellow participates in a range of activities, including Congressional meetings and hearings, agency briefings, seminars, and advocacy coalition meetings. The Fellow will also have significant freedom to follow specific topics and issues that are of interest to him or her. It is hoped that this fellowship will serve as a training program to encourage young scientists to get involved in the important policy issues faced by researchers.

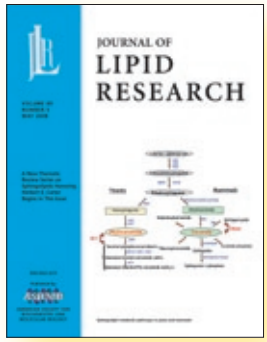
Our first Fellow came on board in October 2007. Her name is Angela Hvitved, a Ph.D. graduate in biochemistry from Rice University. Angela, who is smart, hard-working, and clearly interested in policy matters, has worked out extremely well. Among her growing list of contributions to the public affairs office, Angela started ASBMB's new monthly e-newsletter on government affairs, mailed to the 1,800 or so members of our Local Advocates Network—a list she also worked to expand during her first months with the staff.

Angela is also working on the ASBMB website hand-in-glove with other staff members, as this link between ASBMB and the world at large is updated, expanded, and made more user friendly. In the area of public affairs, members will have the option to subscribe to the e-newsletter and join the LAN. We are also hoping to set up an interactive forum, targeting students and post-docs, that will provide a space for information on education, career development, public affairs and advocacy, "science culture," and other issues of interest to this key group for the Society's future. Be looking for the new site to come on line soon.

Angela has also served as an advocate for the Society and for getting involved in public policy. She has attended the Science and Technology Policy graduate student forum at the National Academy of Sciences, spoke at an undergraduate career event at the University of Richmond, participated in a variety of NIH-arranged meetings on women's careers in biomedical research, will be presenting a poster at the Gordon Research conference on Science and Technology Policy in Big Sky Montana in August, and has attended numerous other meetings. She has also helped to arrange Capitol Hill visits for visiting ASBMB members, attended hearings for the Society, written contributions for *ASBMB Today,* participated in various coalition meetings, and made herself highly useful to the Society's public affairs efforts.

One of our long-term goals in creating this fellowship was to develop a cadre of individuals, who are well-versed in the complexities of biomedical research as well as the processes by which policies affecting research are made. Many of our future Fellows will go on to careers in science policy, and we look forward to having continuing interactions with them as our Society faces new challenges. We are now evaluating a very qualified group of applicants for Science Policy Fellow, and we are looking forward to getting to know our next Fellow come September 2008.

New Thematic Review Series on Glycerolipids to Begin in June Issue of *JLR*



BY MARY L. CHANG

Glycerolipids are the subject of a new thematic review series that will debut in the June issue of the *Journal of Lipid Research*. *JLR* associate editor Stephen G. Young of the University of California, Los Angeles, is coordinating the series, during which one review will appear in each issue until February 2009.

The class of glycerolipids encompasses the wide range of lipids containing glycerol. One such group is the triglycerides (fatty acid esters of glycerol). Most fat in food and in the human body exists as triglycerides. Elevated levels of triglyceride in a person's blood may be linked to coronary artery disease, the most common form of heart disease, and/or undiagnosed or untreated diabetes mellitus. Another class of glycerolipid is the phospholipid, which is amphipathic in nature and is an important component of most animal cell membranes. Distinguishing features of a phospholipid are its polar head group and two hydrophobic hydrocarbon tails (usually fatty acids). Phospholipids have been shown to have both structural and regulatory functions.

A major type of phospolipid in mammalian cells is phosphatidylcholine (PC), which derives its polar head group from choline, a natural amine and essential nutrient. In the June review, Zhaoyu Li and Dennis E. Vance of the University of Alberta, Edmonton, will discuss the activity and homeostasis of both compounds in mice. Embryonic death, muscular dystrophy, and gonadal dysfunction have been observed in mice with deficiencies in choline kinases or phosphocholine transferases (enzymes involved in the synthesis of PC). In the liver, phosphatidylethanolamine *N*-methyltransferase is important in PC biosynthesis; when mice do not have this enzyme and are fed a choline-deficient diet, they die from steatohepatitis and hepatic failure. Li and Vance's review will also explore how choline imbalance is resolved in the body by choline recycling and redistribution.

In July, Jean E. Vance, also of the University of Alberta, Edmonton, will review the synthesis and roles of the aminophospholipids phosphatidylserine (PS) and phosphatidylethanolamine (PE) in vital cell processes. PS has been of recent research interest for its exposure on the external face of cells in the early phases of apoptosis. PS has also been observed to have important roles in activating signaling proteins and directing certain proteins to membranes during endocytosis. PE appears to play a role in heart and liver cell activities, as well as contractile ring disassembly during cytokinesis. PE also supplies the ethanolamine moiety to some cell-surface signaling proteins.

Cardiolipin is found in ATP-producing membranes such as bacterial plasma and mitochondrial membranes. In the August review, Michael Schlame of the New York University School of Medicine will present a comprehensive look at prokaryotic and eukaryotic cardiolipin synthesis and the differences between them with respect to biological function. The unique acyl remodeling of cardiolipin will be addressed as interest in this process has increased due to the abnormal cardiolipin identified in some human diseases such as diabetes, heart failure, and Parkinson syndrome. How cardiolipin is incorporated into biological membranes and the possible relationship of cardiolipin degradation to the processes of apoptosis and mitochondrial fusion will also be discussed.

Biosynthesis of bacterial phospholipids for the cytoplasmic membrane and the regulation of this synthesis by acyltranferases will be reviewed in September by Yong-Mei Zhang and Charles O. Rock of St. Jude Children's Research Hospital. The acyl-acyl carrier protein (ACP) is the most important donor of acyl groups in bacterial phospholipid biosynthesis. The amount of long-chain acyl-ACP, the end product of fatty acid biosynthesis, has been linked to regulation of bacterial membrane phospholipids and therefore assembly of the membrane. Interestingly, PlsY, the most prevalent glycerol-phosphate acyltransferase among bacteria, has been found in the major human Gram-positive pathogens that use this enzyme pathway exclusively for phospholipid biosynthesis. Thus, the distinctive bacterial acyltransferases are potentially viable targets for future antibacterial compounds.

Be sure to check back in October for a look at the second half of *JLR*'s new glycerolipid review series.

Genetic Nondiscrimination Laid to Rest as a New Primate Research Bill Arises

BY CARRIE D. WOLINETZ

Just as the biomedical research community celebrated a major congressional victory in April, a newly introduced piece of legislation showed that there was still work to be done.

Genetic Information Nondiscrimination Act

The Genetic Information Nondiscrimination Act (GINA) was passed in the Senate by a vote of 95-0, clearing a major hurdle on the eve of National DNA Day. "This long-overdue legislation will provide the necessary protections against misuse of genetic information, allowing us to fully realize the potential of personalized medicine," praised FASEB President Robert Palazzo.

GINA had been stalled for a year in the Senate due to a hold on the bill placed by Senator Tom Coburn (R-OK). The delay was particularly frustrating because in the decade since the first genetic nondiscrimination bill had been introduced, the Senate had unanimously passed the legislation multiple times only to have it languish in the House. When the House passed GINA last year and the President declared his support in a public speech, the bill seemed destined to become law until Senator Coburn's objection was raised. Fortunately, advocates and Senate leadership were finally able to overcome the objection, and GINA will soon be headed to the President's desk for signing. Palazzo offered congratulations to colleagues in the gene sciences, patient advocacy, and medical research communities "who have worked tirelessly with policymakers for more than a decade to pass these critical protections." "These dedicated grassroots efforts, together with the work of lawmakers like Senators Edward Kennedy (D-MA) and Olympia Snowe (R-ME) and Representatives Louise Slaughter (D-NY) and Judy Biggert (R-IL), deserve enormous credit for making GINA a reality." he said.

"Scientists rely on voluntary participation in research studies to further advance our understanding of the functioning of genes in health and disease—voluntary participation which is deterred by fears over genetic discrimination," Palazzo added. "Establishing legal protections for genetic information is a critical step forward for our clinical and translational enterprise."

Great Ape Protection Act

However, another new piece of legislation was introduced that has the potential to disrupt ongoing medical research. The Great Ape Protection Act (H.R. 5852), cosponsored by Representatives Edolphus Towns (D-NY), Thomas Allen (D-ME), Roscoe Bartlett (R-MD), Bruce Braley (D-IA), John Campbell (R-CA), Mary Bono Mack (R-CA), James Langevin (D-RI), and Dave Reichert (R-WA), was introduced in the House on April 17. The legislation would end all invasive research on great apes (chimpanzees, gorillas, bonobos, orangutans, and gibbons) in addition to mandating federally supported permanent retirement for all great apes currently used in federally funded research.

Closely related bills specifically aimed at chimpanzees have already been signed into law. In 2000, the Chimpanzee Health Improvement, Maintenance, and Protection (CHIMP) Act was passed unanimously by both the House and the Senate, requiring the government to provide for retirement of chimpanzees who are identified as no longer being needed in research. While the CHIMP Act did reserve the right of the government to retrieve the animals in the event of a public health emergency, this provision was later removed by passage of an amendment in December 2007. Earlier that year, the National Center for Research Resources had announced it would make permanent a decade-long moratorium on federal funding of chimpanzee breeding for research purposes.

Unfortunately, the Great Ape Protection Act, which is strongly supported by groups such as the Humane Society of the United States, defines "invasive research" quite broadly and would prohibit activities such as blood draws or sedation, even if the research was for the medical benefit of apes. FASEB is currently examining the potential impact of the legislation, which has been referred to the House Energy and Commerce, Foreign Affairs, and Ways and Means committees. No Senate equivalent has yet been introduced.

Carrie D. Wolinetz is Director of Scientific Affairs and Public Relations for the Office of Public Affairs at the Federation of American Societies for Experimental Biology (FASEB). She can be reached at cwolinetz@faseb.org.

SBIR Reauthorization Bill Passes House but Set-Aside Does Not Go Up

BY PETER FARNHAM

In late April, the House approved HR 5819, a reauthorization bill for the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTP) Program. The bill as debated on the House floor would have, among other provisions, raised the set-aside for grants to small businesses from the budgets of all federal agencies that fund at least $100 million in extramural research. However, thanks to an amendment offered by Rep. Vern Ehlers (R-MI), this provision was stripped from the bill before final passage.

Many academic research groups opposed the original wording, including FASEB, the Association of American Medical Colleges, and the Association of American Universities. According to FASEB's letter to Rep. Ehlers, "Increasing the set-aside at a time when budgets of the science agencies have stagnated will result in funding cuts for the peer-reviewed basic and applied research that fuel innovation… the Small Business Administration opposes increasing the set-aside for the SBIR program, citing both the lack of an empirical basis for such an increase and the effective reduction in funding that would remain available for agencies' core research programs."

Without the Ehlers amendment, the small business research set-aside for the SBIR program would have increased from its current level of 2.5% to 3%, and the set-aside for STTR would have doubled from 0.3% to 0.6%. Eleven federal agencies would have been affected, including the National Institutes of Health and the National Science Foundation. As much as $650 million would have been shifted from peer-reviewed basic and applied research available for any scientist to apply, to being set aside exclusively for small business, according to a White House statement of administration policy. The White House said that "… reducing these [peer-reviewed extramural research] funds directly undermines efforts by the Administration, Congress, and a broad coalition of business and academic leaders to enhance the Nation's competitiveness through increased support for high-priority basic research activities."

The bill does increase available awards from $100,000 to $300,000 for phase one and $750,000 to $2.2 million for phase two.

In an increasingly rare display of bipartisanship in the House, Appropriations Chair David Obey (D-WI) made the following statement in support of the Ehlers amendment:

"Let me simply say this bill is intended to increase the small business set-aside for these research programs. That does no harm for a large agency whose budget has been rising, such as the Department of Defense, but it can do immeasurable harm to the crown jewel of our research agencies in this country, the National Institutes of Health.

If we were to do what this bill does to NIH, it would result

in $187 million less being available for traditional medical research grants at medical research centers and universities. I think that that is not a good idea. The President's budget has already reduced the number of grants that NIH will be able to provide by almost 500 grants. This will add about another 500-grant reduction to the President's budget. That would mean that we would be supporting a grant level for the traditional NIH grants at about 1,100 fewer grants than was the case in 2007. I think that is a very bad idea. Therefore, when the bill comes before us, I would urge support of the Ehlers amendment, which will correct the problem with respect to the National Institutes of Health.

I know that some people will say, 'Well, we're not reducing the number of grants, we're simply shifting the nature of grants from traditional grants to small business grants.' But the fact is that the success rate for small business grants under this bill is expected to rise to 52%, whereas the success rate for applications for traditional NIH grants is expected to decline to 18%. That is a disparity that the scientific community and the country at large simply cannot afford.

NIH believes that there will not be sufficient high-quality grants under the small business set-aside to pass peer review over time, and that means they would simply have to lapse back precious research money that could be used for heart disease, for Parkinsons, for cancer, things like that.

So I would strongly urge, when this bill comes before us, to vote for the Ehlers amendment as a way to address that balance."

The bill now goes to the Senate, where it will be considered in the Small Business and Entrepreneurship Committee, chaired by Senator John Kerry (D-MA).

Peter Farnham CAE is ASBMB's public affairs officer, a position he has held since 1985. He can be reached at pfarnham@asbmb.org.

NIH Seeking Ideas on How to Spend Roadmap Money

The NIH Office of Portfolio Analysis and Strategic Initiatives (OPASI) announced in late April that it is seeking to identify major challenges to health research, as well as new and innovative solutions for these challenges. OPASI Director Alan M. Krensky issued the following announcement on April 22:

Dear Colleague:
I invite you to participate in a process designed to identify major, cross-cutting challenges to health research and to articulate solutions to these challenges. The NIH Roadmap for Medical Research, funded via the NIH Common Fund, is a series of programs that collectively seek to transform the way health research is conducted so that treatment, diagnosis, prevention, and/or understanding of human disease may be accelerated. Roadmap programs are intended to be stimulatory and are therefore supported by the Common Fund for a maximum of 10 years. These programs accept a high degree of risk to approach complex problems in new ways, to develop transformative tools and technologies, and/or to address fundamental knowledge gaps that impede progress in many disease areas. Each Roadmap program cuts across the missions of NIH Institutes and Centers as well across diseases and is expected to accelerate research on many diseases and conditions.

On April 22, 2008, NIH released a Request for Information (RFI) (http://grants.nih.gov/grants/guide/notice-files/NOT-RM-08-014.html) inviting input and ideas from the scientific community, health professionals, patient advocates, and the general public about major cross-cutting challenges and possible solutions. Collecting these ideas is an initial step in the process of identifying a new cohort of Common Fund/ Roadmap programs for Fiscal Year 2011. This RFI provides an opportunity for respondents to submit their own ideas. NIH expects to spend $30 to 50 million per year from within the currently projected Roadmap budget for new 5-year initiatives.

More information on this request can be found at: http://nihroadmap.nih.gov/

Peter Farnham

asbmb member spotlight

Bertino Granted Outstanding Achievement Award

Joseph R. Bertino, Interim Director and Chief Scientific Officer of The Cancer Institute of New Jersey and University Professor of Medicine and Pharmacology at the University of Medicine & Dentistry, Robert Wood Johnson Medical School, was recently granted the American Association for Cancer Research (AACR) Joseph H. Burchenal Memorial Award for Outstanding Achievement in Clinical Research.

The AACR and Bristol-Myers Squibb Co. established this award in 1996 to recognize outstanding achievements in clinical cancer research. The award honors the late Joseph H. Burchenal, Honorary Member and Past President of the AACR and a major figure in clinical cancer research. Bertino presented his award lecture at the AACR annual meeting this past April.

Bertino has been a leader in defining the mechanism of action of and resistance mechanisms to methotrexate and related important chemotherapeutic agents. These studies have ranged from characterization of the target of the drug, dihydrofolate reductase, to translational regulation of this enzyme, to the discovery of gene amplification as a mechanism of resistance in rodent systems. He was the first to demonstrate that dihydrofolate reductase gene amplification occurs in blasts from patients with acute lymphoblastic leukemia who are resistant to methotrexate.

Endowed Chair Established in Honor of Brinkley

Baylor College of Medicine's Board of Trustees in Houston, Texas, recently announced the establishment of the William R. Brinkley/BRASS Endowed Chair, named in honor of Bill Brinkley, senior Vice President and Dean of the Graduate School of Biomedical Sciences at Baylor College of Medicine.

Brinkley, the first holder of the Chair, has served as Dean of the graduate school for the past 17 years and has led the school to its present standing as one of the nation's leading centers for graduate education. Funding for the Chair was provided by friends of the Graduate School known as Baylor Research Advocates for Student Science (BRASS).

BRASS President Diana Brown said, "as the Dean of the Graduate School of Biomedical Sciences, William R. Brinkley, Ph.D., has championed BRASS and recognized its existence as an important element in the overall success of the graduate school. In gratitude for Dr. Brinkley's long-standing support of its mission, BRASS recently voted to name its endowed chair in his honor."

Brinkley served as Chair of ASBMB's Public Affairs Advisor Committee from 2000 to 2007 and was a member of the ASBMB Council.

Fanning Elected to German National Academy of Science

Ellen H. Fanning, a professor at Vanderbilt University, was recently elected to the German National Academy of Science (Deutsche Akademie der Naturforscher Leopoldina).

The German Academy of Sciences is the world's oldest continuously existing academy for medicine and natural sciences with a tradition of 355 years and more than 1,250 members all over the world. The academy maintains a network with scientific institutions of other European and non-European countries, organizes a large number of national and international meetings and symposia, and issues statements and recommendations.

Fanning studies DNA replication and damage repair in mammalian cells. Specifically, her laboratory is mapping the protein interaction surfaces between the viral DNA helicase T antigen, DNA polymerase-primase, and replication protein A. She is also using biochemical and genetic tools to elucidate how these interactions promote primer synthesis. Another aspect of Fanning's research program is the study of the role of protein phosphorylation in regulating the initiation of DNA replication in a cell-free system.

Loeb Granted Princess Takamatsu Memorial Lectureship

Lawrence A. Loeb, Professor in the Department of Biochemistry and Director of the Joseph Gottstein Memorial Cancer Research Laboratory at the University of Washington, was awarded the American Association for Cancer Research (AACR) Princess Takamatsu Memorial Lectureship this past April.

The AACR Princess Takamatsu Memorial Lectureship was established in 2007 to recognize an individual scientist whose novel and significant work has had or may have a far-reaching impact on the detection, diagnosis, treatment, or prevention of cancer and who embodies the dedication of the Princess to international collaboration.

Lawrence A. Loeb was honored for "his leadership in developing the concept of cancer as a mutator phenotype, based on his investigations of fidelity of DNA synthesis and mechanisms of spontaneous and chemical mutagenesis. He is also honored for pioneering the creation of novel biologically active enzymes generated by random nucleotide substitutions in defined regions of genes encoding the enzymes that correspond to their catalytic domains."

Loeb is well known for performing mechanistic studies of DNA transactions that contribute to genome stability, as well as his work on DNA replication fidelity.

de Mendoza Awarded Bernardo Houssay Prize

Diego de Mendoza, Professor of Microbiology and Genetics at the University of Rosario and Director of the Institute of Molecular and Cellular Biology of Rosario, National Council for Scientific and Technical Research (CONICET), in Argentina, was presented with a Bernardo Houssay prize by Argentinean President Nestor Kirchner. The prize for Science, Technology, and Innovation is awarded annually for outstanding work in one of six scientific fields.

de Mendoza studies prokaryotic lipid metabolism. Specifically, he and his colleagues have been studying how bacteria exert control over the fatty acid biosynthetic pathway and membrane phospholipid formation. His current research focuses on defining the regulatory signals and proteins that control lipid synthesis, understanding the detailed mechanism of sensors and transcription factors, and determining the high resolution structure of two key regulatory proteins.

Scanlan Honored with Cope Scholar Award

Thomas Scanlan, Professor of Physiology and Pharmacology at the Oregon Health & Science University's (OHSU) School of Medicine, was recently honored with the American Chemical Society's C. Cope Scholar Award.

The award, which was presented to Scanlan and nine other recipients, recognizes and encourages excellence in organic chemistry. It consists of $5,000, a certificate, and a $40,000 unrestricted research grant to be assigned by the recipient.

Scanlan, who studies chemical and biological aspects of steroid and thyroid hormone action, has been director of the OHSU Department of Physiology and Pharmacology's Program in Chemical Biology since the program was launched in 2006. The program develops small molecules that interact with biological target proteins.

Some of the compounds that Scanlan has developed include a selective thyromimetic that is about to be tested in a Phase II clinical trial as a potential cholesterol-lowering drug, and a novel thyroid hormone metabolite that is in preclinical development as a possible treatment for human injuries and diseases for which reducing metabolic demand may prove beneficial.

Scott Elected Fellow of Royal Society Edinburgh

John D. Scott, Senior Scientist at the Vollum Institute and Professor of Biochemistry at Oregon Health & Science University, was elected a fellow of the Royal Society Edinburgh, the national science academy of Scotland.

The Royal Society of Edinburgh is Scotland's national academy of science and letters. Its membership consists of over 1,400 peer-elected fellows, who are known as Fellows of the Royal Society of Edinburgh, denoted FRSE in official titles. The Society organizes public lectures and promotes the sciences in schools throughout Scotland.

Scott's research focuses on the specificity of signal transduction events that are controlled by anchoring proteins that facilitate rapid signal transduction by optimally positioning protein kinases and phosphatases in the vicinity of their activating signals and close to their substrates.

Tannenbaum Recipient of Cancer Research Award

Steven R. Tannenbaum, Underwood Prescott Professor of Toxicology and Professor of Chemistry at the Massachusetts Institute of Technology, recently received the American Association for Cancer Research (AACR) Award for Outstanding Achievement in Chemistry in Cancer Research.

The AACR and its Chemistry in Cancer Research Working Group established the award in 2007 to recognize the importance of chemistry to advancements in cancer research. The award is given for outstanding, novel, and significant chemistry research that has led to important contributions to the fields of basic cancer research, translational cancer research, cancer diagnosis, the prevention of cancer, or the treatment of patients with cancer.

Tannenbaum was chosen for his "research which has been of major significance to cancer research; contributions from his laboratory have been of seminal importance to advances in our knowledge of chemical carcinogenesis, molecular epidemiology of cancer and, more recently, anticancer drug development and evaluation." Tannenbaum received the award at the AACR annual meeting this past April.

Following an early career in food chemistry and nutritional biochemistry, Tannenbaum's research has focused on the formation, distribution, and metabolism of nitrate, nitrite, and N-nitroso compounds and their significance as environmental carcinogens. He also studies molecular epidemiology and the development and application of ultramicroanalytical tools for xenobiotics drugs and metabolites.

Four ASBMB Members Elected to National Academy of Sciences

Four ASBMB researchers are among the 72 new members and 18 foreign associates elected to the National Academy of Sciences (NAS) in 2008. Election to the NAS is considered one of the most prestigious honors a scientist can receive, and ASBMB is proud to recognize its members whose distinguished scientific achievements have been so honored this year.

Michael R. Botchan, professor of biochemistry and molecular biology, *Department of Molecular and Cell Biology, University of California, Berkeley*

Kenneth A. Dill, professor of pharmaceutical chemistry, biochemistry, and biophysics, *Department of Pharmaceutical Chemistry, University of California, San Francisco*

Carol L. Prives, DaCosta Professor of Biology, *Department of Biological Sciences, Columbia University, New York City*

Anjana Rao, professor of pathology and senior investigator, Immune Disease Institute, *Harvard Medical School, Boston*


Botchan


Dill


Prives


Rao

Eight ASBMB Members Elected to American Academy of Arts and Sciences

ASBMB would also like to recognize the following researchers who were among the 190 fellows and 22 foreign honorary members elected this past year to the American Academy of Arts and Sciences, one of the oldest and most prestigious honorary societies in the United States.

Barbara A. Baird, Horace White Professor of Chemistry and Chemical Biology, *Cornell University, Ithaca, NY*

Graeme I. Bell, Louis Block Distinguished Service Professor in Medicine and Human Genetics, *University of Chicago*

Philip C. Hanawalt, Howard H. and Jessie T. Watkins University Professor of Biology, *Stanford University, Stanford, CA*

Richard Kolodner, executive director, Ludwig Institute for Cancer Research; professor of cellular and molecular medicine, professor of medicine, and Moores Cancer Center member, *University of California, San Diego*

John Kuriyan, Chancellor's Professor of Molecular and Cell Biology and Chemistry, *University of California, Berkeley*; investigator, *Howard Hughes Medical Institute*

Jeffrey Victor Ravetch, Theresa and Eugene M. Lang Professor; head of the Laboratory of Molecular Genetics and Immunology, *Rockefeller University, New York City*

Bruce William Stillman, president, Cold Spring Harbor Laboratory, *Cold Spring Harbor, NY*

Kevin Struhl, David Wesley Gaiser Professor of Biological Chemistry and Molecular Pharmacology, *Harvard Medical School, Boston*


Baird


Bell


Hanawalt


Kolodner


Kuriyan


Ravetch


Stillman


Struhl

SPECIAL ASBMB-SPONSORED SYMPOSIUM: Transcriptional Regulation by Chromatin and RNA Polymerase II

BY ALI SHILATIFARD

Eukaryotic DNA is several meters long and must be compacted into chromatin in a way that still enables access to the genes. The human genome encodes more than 30,000 distinct proteins, and the interaction of eukaryotic RNA Polymerase II (RNA Pol II) with chromatin plays a pivotal role in regulating the expression of these genes. Unfortunately, we still possess rudimentary knowledge of genome packaging and how the transcriptional machinery and its regulatory factors interact with the gene-coding sequences. Yet this process underlies all gene expression and is fundamental to development and differentiation. A central challenge to current research is determining how the synthesis of messenger RNA from such a large number of diverse protein-coding genes by RNA Pol II is coordinated.

There are many implications of defining the molecular mechanisms of gene expression by chromatin and RNA Pol II and its impact on our understanding of cellular development and disease. To address those implications, ASBMB is bringing together investigators for a focused meeting October 16-20, 2008 in Granlibakken, Lake Tahoe, titled *Transcriptional Regulation by Chromatin and RNA Polymerase II*.

Confirmed speakers so far include: Peter Becker, Shelley Berger, Joan Conaway, Jean Marc Egly, Tony Kouzarides, Mike Levine, Eric Olson, Frank Pugh, Danny Reinberg, Ramin Shiekhattar, Henk Stunnenberg, Robert Tjian, Jerry Workman, and Yi Zhang. The plenary lecture, "Chromatin and Transcription," given by Robert Roeder of the Rockefeller University, will describe recent work from his laboratory on transcriptional regulation by RNA Pol II. In addition to invited presentations, numerous talks will be chosen from submitted abstracts.

Defining how changes in chromatin and chromosome structure regulate transcription and development will be the focus of the first session, "Chromosome, Chromatin, and Transcription I," chaired by Frank Pugh of Penn State University. Robert Roeder will chair the second session, "Transcriptional Initiation/Activation and Chromatin," which will focus on the role of the factors involved in regulating the initiation and activation of transcription. Ronald Conaway of the Stowers Institute will chair the third session, "Transcriptional Elongation and Termination." This session will bring together the diverse roles of the RNA Pol II elongation factors and chromatin in the proper regulation of gene expression.

Tony Kouzarides of the Gurdon Institute will chair the fourth session, "Chromosome and Chromatin Modifications." Presentations in this session will cover recent studies of histone and transcription factor modifications and mRNA synthesis regulation. Yi Zhang of the University of North Carolina will chair the fifth session, "Chromosome and Chromatin Demodifications," which will explore macromolecular complexes involved in unmodifying post-translationally modified histones. I will chair the sixth session, "Chromosome, Chromatin, and Transcription II," which will explore the role of many macromolecular complexes implicated in transcriptional regulation. In the penultimate session chaired by Mike Levine of the University of California at Berkeley, "Chromatin, Transcription, and Development," recently identified roles for chromatin and transcription factors in development and disease pathogenesis will be discussed.

To conclude the meeting, Boyana Konforti, editor of *Nature Structural and Molecular Biology*, will chair an interactive review session during which attendees can discuss the topics covered throughout the meeting and possible future questions for the field.

Due to a limit of ~250 participants, we anticipate spaces for this meeting will fill quickly. In this event, however, we will make a concerted effort to ensure that every research group wishing to participate will be represented. See you at Lake Tahoe in October!

Transcriptional Regulation by Chromatin and RNA Polymerase II: A special ASBMB-sponsored symposium

OCTOBER 16-20, 2008 – GRANLIBAKKEN, LAKE TAHOE

Organizer: Ali Shilatifard, Stowers Institute for Medical Research

Registration and abstract deadline: September 5, 2008. Status (talk/poster) of submitted abstracts will be posted on the ASBMB web site by mid-September.

For more information and to register, please visit the Meetings page at www.asbmb.org.

Preview of the 2009 Meeting

BY JAMES HURLEY AND JOAN CONAWAY

When the two of us set out to draft a program for the 2009 annual meeting, we needed a simple unifying vision as a starting point. The function and compartmentalization of the cell struck us as apt. Cellular compartments, delimited by membranes, are the cornerstone of the organization of the eukaryotic cell. Bacteria, which lack membrane-bound organelles, are also organized into specialized subcellular regions. Molecular structure is the underlying basis of most of modern biochemistry and molecular biology, and we wanted the meeting to have a strong emphasis on structural approaches. Together with ASBMB president Heidi Hamm and the rest of the program committee, we are very pleased to bring you a 2009 meeting rooted both in the cellular function and the structural principles of proteins, nucleic acids, and lipids.

The biggest cellular compartment, the all-important nucleus or in bacteria the nucleoid, will get a lot of attention in this meeting. The Nuclear Transactions thematic group will include "DNA Replication, Repair, and Recombination," "Chromatin Regulation," "Gene Regulation: Transcription Initiation and Elongation," and "RNA: Processing, Transport, and Regulatory Mechanisms." The nuclear transactions theme is a big tent, and there will be plenty of coverage of prokaryotes, "nuclear" notwithstanding.

Nothing could be more fundamental to biochemistry than protein folding. The Protein Synthesis, Folding, and Turnover group includes themed meetings on "Protein Synthesis and Turnover" and "Protein Folding, Aggregation, and Chaperones." Talks will span folding from the perspectives of physicists to physicians, and everything between.

Both fundamental and applied aspects of molecular structure are central to this meeting. The Molecular Structure and Dynamics theme encompasses meetings on "Structural Enzymology and Enzyme Mechanism" and "Drug Design." The drug design themed meeting is intended in part to highlight the contributions of Society members from industry.

Much of the action in the cell, such as signal transduction, transport, and metabolism, occurs at membranes. The Cell Systems and Metabolism thematic group will include meetings on "Membrane Dynamics and Organelle Biogenesis" and "Metabolism and Disease Mechanisms."

And finally, cell signaling will be highlighted in the Signaling thematic group with symposia titled "Principles of Receptor Signaling" and "Lipid Signaling and Metabolism."

There will also be a special symposium celebrating the 50th anniversary of the *Journal of Lipid Research*.

The program committee is excited about making a push for a greener ASBMB meeting. Watch for more information as we move forward with this.

We look forward to seeing all of you in the Big Easy in 2009.

2009 ANNUAL MEETING PROGRAM DIGEST

NUCLEAR TRANSACTIONS THEMATIC GROUP

DNA Replication, Repair, and Recombination

Organizers: Wei Yang (NIH) and Anindya Dutta (University of Virginia)

SYMPOSIA:

Biochemistry of DNA Replication Initiation

DNA Replication Origins

DNA Repair and Genetic Diseases

Mechanism of DNA Repair, Replication, and Recombination

Chromatin Regulation

Organizers: Trevor Archer (NIH) and Ronen Marmorstein (The Wistar Institute)

SYMPOSIA:

Histone Modifications

Chromatin Recognition and Assembly

Chromatin Remodeling

Genomic Chromatin

Gene Regulation: Transcription Initiation and Elongation

Organizers: Seth Darst (Rockefeller University) and Jesper Svejstrup (Cancer Research UK)

SYMPOSIA:

Multisubunit RNA Polymerases: Lessons from the Structures

Initiation: Mechanisms and Regulation

Initiation: Dynamics of Transcription

Elongation and Termination

RNA: Processing, Transport, and Regulatory Mechanisms

Organizers: Traci Hall (NIH) and Ben Blencowe (University of Toronto)

SYMPOSIA:

Ribonucleoproteins

RNA Regulation and Transport

RNA Structure and Recognition

RNA Processing

PROTEIN SYNTHESIS, FOLDING, AND TURNOVER THEMATIC GROUP

Protein Synthesis and Turnover

Organizers: Ada Yonath (Weizmann Institute) and Chris Hill (University of Utah)

SYMPOSIA:

Ribosome Structure and Function

Regulation of Translation and Protein Targeting

Proteasome Structure and Function

Ubiquitin Pathway and Targeting

Protein Folding, Aggregation, and Chaperones

Organziers: Rob Tycko (NIH) and Judith Frydman (Stanford University)

SYMPOSIA:

Chaperone Machines and Cellular Protein Folding

Protein Folding and Aggregation Diseases

Molecular Structure of Amyloid Fibrils

Fundamental Principles of Protein Aggregation

2009 ANNUAL MEETING PROGRAM DIGEST continued

MOLECULAR STRUCTURE AND DYNAMICS THEMATIC GROUP

Structural Enzymology and Enzyme Mechanisms

Organizers: Richard Armstrong (Vanderbilt University) and Brian Crane (Cornell University)

SYMPOSIA:

Structure and Enzymology of Membrane Proteins

Prediction of Enzyme Function

Nitric Oxide Generation and Response

Mechanisms of Photochemical Sensors

Drug Design

Organizers: Daria Hazuda (Merck) and Brian Shoichet (University of California, San Francisco)

SYMPOSIA:

Membrane Proteins as Targets

High Content Approaches

Target Identification and Pathway Mining

Polypharmacology/ Networks/Drug Repurposing

CELL SYSTEMS AND METABOLISM THEMATIC GROUP

Membrane Dynamics and Organelle Biogenesis

Organizers: David Lambright (University of Massachusetts) and Frances Brodsky (University of California, San Francisco)

SYMPOSIA:

Organelle Biogenesis and Evolution

Cargo Sorting and Vesicle Targeting

Trafficking Mechanisms and Pathogen Subversion

Membrane Dynamics and Transport

Metabolism and Disease Mechanisms

Organizers: Sean Oldham (Burnham Institute) and Jürgen Wess (NIH)

SYMPOSIA:

Metabolic Signaling in Senescence and Aging

Signaling Pathways Involved in Diabetes

Metabolic Signaling and Obesity/Metabolic Syndrome

Metabolism and Nutritional Signaling

SIGNALING THEMATIC GROUP

Principles of Receptor Signaling

Organizers: Mark Lemmon (University of Pennsylvania) and Alex Toker (Harvard University)

SYMPOSIA:

Tyrosine Kinases in Cancer

Transmembrane Signaling by GPCRs

Signaling in Bacterial Receptor Systems

Proteolysis and Receptor Signaling

Lipid Signaling and Metabolism

Organizers: Suzanne Scarlata (State University of New York, Stony Brook) and Russell DeBose-Boyd (University of Texas, Southwestern)

SYMPOSIA:

Role of Membrane Domains in Cell Signaling

Phosphatidylinositol Signaling and Metabolism

Mechanisms for Lipid Storage and Transport

Novel Lipid-mediated Signaling Events

Special Symposium: Sponsored by *Journal of Lipid Research* on the Occasion of Its 50th Anniversary

Organizer: Steve Young (University of California, Los Angeles)

For up-to-date details visit www.asbmb.org/meetings

A Very Happening

BY NICK ZAGORSKI AND ANGELA HVITVED

From the first slide to the last round of applause, the 2008 ASBMB Annual Meeting proved to be another smashing success and, undoubtedly, a tremendous experience for the faculty, post-docs, students, and other attendees who arrived in sunny San Diego. And, while science—in the forms of symposia, posters, award lectures, and even informal collaborations discussed over pizza at the thematic receptions—was the main order of business at the annual meeting (see the accompanying *Science Focus* article), those in attendance, especially younger scientists, could partake in many other fun and educational events.

The 2008 meeting kicked off in earnest on Saturday evening, April 5, with the Herbert Tabor/ *Journal of Biological Chemistry* Lectureship, featuring distinguished biochemist I. Robert Lehman of Stanford University, lecturing on DNA replication and latency in the Herpes Simplex virus. Immediately following the lecture, meeting attendees

I. Robert Lehman *(center)* receives his Herbert Tabor/***Journal of Biological Chemistry*** Lectureship award. Also pictured are Heidi Hamm and Herbert Tabor.

Scott Strobel receives the Schering-Plough Research Institute Award from Yale colleague Anna Marie Pyle.

Peter Bruns (left), HHMI Vice-president for Grants and Special Programs, congratulates Michael Summers on his ASBMB Award for Exemplary Contributions to Education.

ASBMB President Heidi Hamm presents the William C. Rose Award to John Scott.

FASEB president Robert Palazzo and ASBMB president Heidi Hamm present a special award to William Brinkley (center), recognizing his many years of public affairs service to ASBMB.

Meeting

had a chance to unwind and recover from their jet lag at the Opening Reception and Dance. Accompanied by refreshments and live music (the soothing sounds of "The Kicks"), attendees young and old had the first of many opportunities to interact with their colleagues and to meet some new ones.

The rest of the meeting featured many other networking opportunities, such as the Scientific Thematic receptions, Young Experimental Scientists (YES) mixer, and receptions at the Graduate and Post-Doc Career Development Workshop (see the accompanying story on Development Workshop).

The meeting also featured a pair of events geared towards women and minority scientists.

On Tuesday, April 8, ASBMB hosted the Minority Scientists Networking Mixer, an informal luncheon where young minority investigators would have a chance to interact with their peers while also receiving advice from professors and

(Left to right) John Scott, Heidi Hamm, Alexandra Newton, and Walter Shaw get together at the presentation of the Avanti Award in Lipids, won by Newton.

C. David Allis (center) receives the ASBMB-Merck Award from Ken Koblan of Merck Research Laboratories and Heidi Hamm.

A. Joshua Wand presents the Herbert A. Sober Memorial Lectureship to S. Walter Englander.

Mina Bissell accepts the FASEB Excellence in Science Award from Robert Palazzo, Heidi Hamm, and Anne Reifel Miller of Ely Lilly.

educators on career opportunities, mentoring options, and other pertinent issues. Over 50 young scientists of diverse backgrounds attended the mixer, and they were able to meet several distinguished researchers, including ASBMB president Heidi Hamm, MAC chair George Hill, MAC member Phil Ortiz, and 2008 ASBMB award winner Michael Summers.

Once again the Women Scientists Networking Reception provided an excellent opportunity for socializing and learning about the careers and experiences of colleagues. The focus of this year's event was a panel of women pursuing non-research career paths, the work they do, and how they got there. Adele Wolfson moderated the panel discussion, and women from a wide range of professions talked about their backgrounds as well as what they like best (and sometimes least!) about their chosen occupations.

Although the career paths covered the gamut from science writer to scientific recruiter for industry, there was a general theme of feeling unfulfilled by benchwork and a strong desire for a career that utilized a broader set of skills than the lab requires. Opportunities in industry

And they're off! This year's meeting saw the return of the ASBMB 5K Fun Run.

ASBMB 5K FUN RUN Results

Women

FIRST PLACE
Emma Hart, *Mayo Clinic*

SECOND PLACE
Sarah Everman, *Arizona State U.*

THIRD PLACE
Erika Wisdom, *TTUHSC SOP*

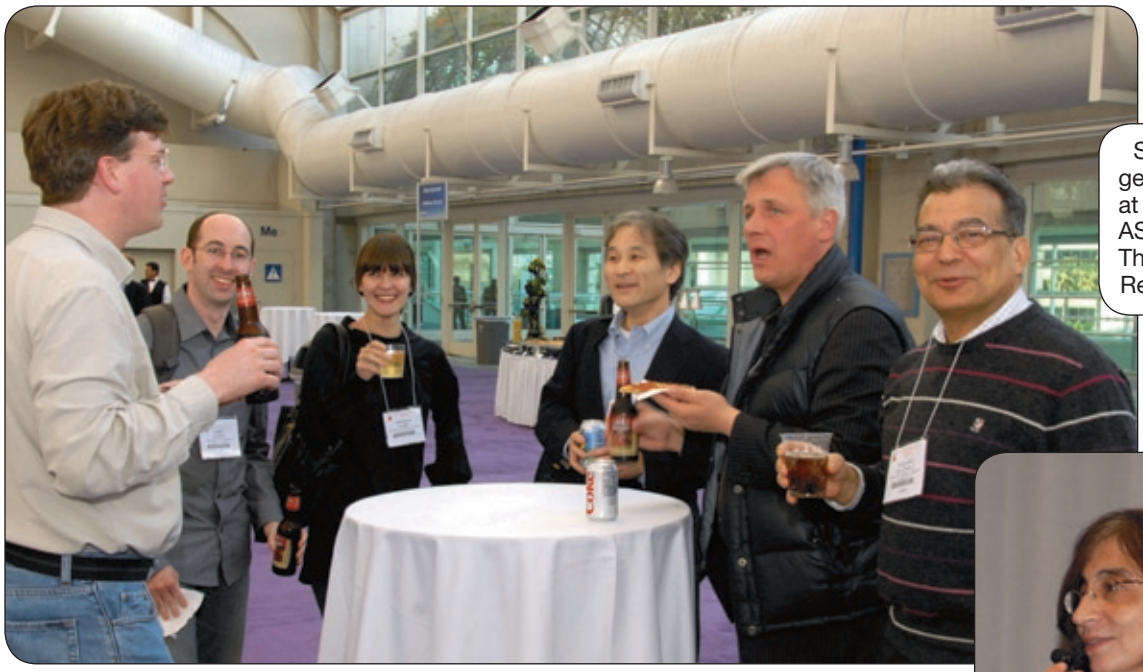
Men

FIRST PLACE
Vincent Pialoux, *U. of Calgary*

SECOND PLACE
Simon Doessing, *Bispebjerg Hospital*

THIRD PLACE
Michael Turner, *U. of Pittsburgh*

Meeting attendees unwind at the Opening Night Reception and Dance.



Scientists get together at one of the ASBMB Thematic Receptions.

Adele Wolfson moderates the Women's Scientist Networking Event

included a project manager at a small biotech firm and a talent recruiter. A program director from the National Science Foundation detailed her journey from academia to a federal agency, and self-employment options were described by a science writer and an independent consultant. Following the presentations, attendees, including the current and a previous president of ASBMB, mingled over appetizers and spoke one-on-one with the panelists about their experiences. Many younger members took advantage of the opportunity to learn more and seek advice on making the transition to a career outside of the lab.

For people who stay in the lab, publishing still remains a critical component. Keenly aware of this, ASBMB held a lunchtime workshop in collaboration with Cadmus titled, "How to Publish in the *JBC*." Over 100 people from around the globe registered for this event, perhaps best defined as a workshop designed to make the submission process less painful to everyone. Both *JBC* Editor Herb Tabor and Deputy Editor Robert Simoni attended the luncheon along with several Associate Editors and Cadmus staff.

The event began with informal introductions, followed by a presentation by A.E. William Smith on the editorial process and workflow for the roughly 11,000 papers that get submitted to *JBC* each year. Next, Cadmus art director Chris Everett discussed how to submit digital art and figures, and stressed the importance of maintaining image integrity in the modern Photoshop world. The workshop wrapped up with a Q&A session, during which other *JBC* editors provided some tips and tricks, such as George Carman noting that *JBC* has always prided itself on having clear and detailed "Methods" sections, so this is an area to pay close attention to when submitting.

Finally, outside of the convention center, Sunday morning, April 6, saw the return—by popular demand—of the ASBMB Fun Run, which was sponsored this year by Avanti. One hundred and sixty-five running/jogging/walking enthusiasts registered for this 5K event, which wound its way through San Diego's picturesque Marina Park. The local weather proved cooperative this year, and all of the participants had a great time running amidst the cool morning air; for those who missed it this year, the Fun Run will no doubt make its return at future meetings.

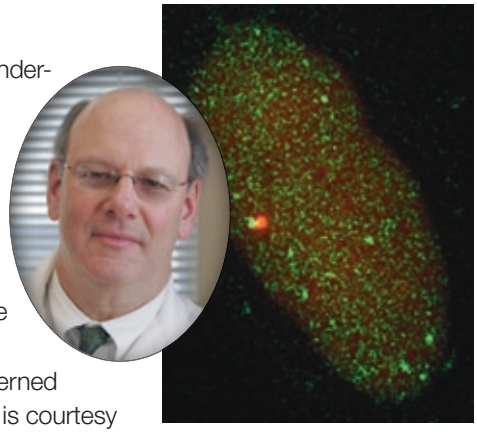
If you were unable to attend this year's conference in San Diego, fret not! Slides from several award lectures and other presentations will be posted on the ASBMB web site in the coming months. And, as always, it's never too early to start making your poster or your travel plans for next year's meeting in New Orleans, from April 18–22 (see accompanying 2009 preview).

ASBMB Today Online Special:

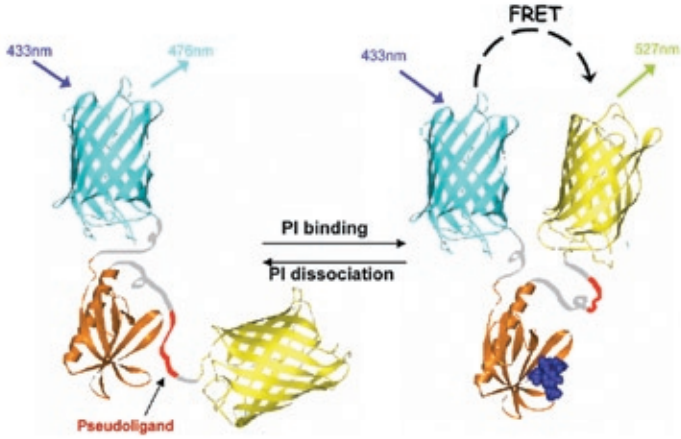
The faculty and students dancing at the Opening Night Reception weren't the only ones 'moving and shaking' at the 2008 Annual Meeting. Numerous researchers presented talks detailing their work in molecular and cellular dynamics, discussing the tools and strategies used to observe biological processes in real time (and in vivid color, too). Below is a sample of some of this year's talks, highlighting the broad reach of dynamic research, from genes to proteins to cells to embryos.

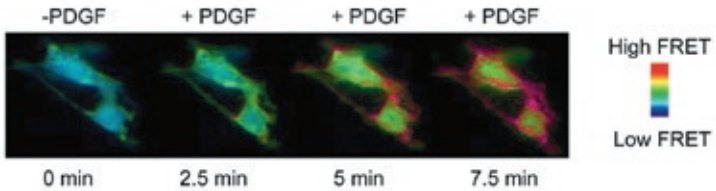
Scroll and click the mouse over the still images to play the videos.

RNA Transport and Localization



Robert Singer at the Albert Einstein College of Medicine believes that truly understanding gene expression requires knowing the fate of individual molecules. Therefore, a big aspect of his research is characterizing the real-time movements of mRNA-protein complexes (mRNPs) in mammalian cell nuclei. By generating inducible genes bearing downstream MS2 stem loops, Singer can visualize the developing transcripts and monitor their movement patterns using MS2-tagged fluorescent proteins. With this method, he has been able to follow the transcription process in detail and has helped resolve some controversies. For example, this movie, detailing mRNP movement in the nucleoplasm, confirms many beliefs that motility is not directed, but governed by diffusion (transcripts are in green, the gene locus is in red, and the movie is courtesy of: Shav-Tal, Y. et al. (2004) *Science*, **5678**,1797–1800).



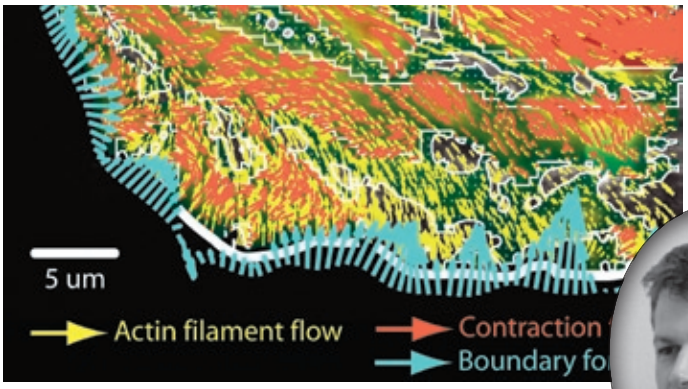


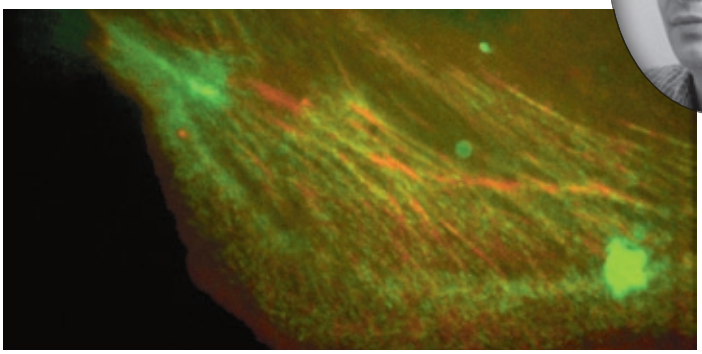
New Strategies for Imaging Protein Localization and Dynamics

Jin Zhang at the Johns Hopkins School of Medicine is visualizing kinase and phosphatase signaling dynamics using FRET-based biosensors. One such biosensor for phosphoinositides is shown above; it consists of two fluorescent proteins (yellow and cyan), a PH domain that specifically binds to PIP_3 and $PI(3,4)P_2$, and a PH pseudoligand. As PIPs accumulate, they compete with the pseudoligand for binding, thus unblocking the PH domain and bringing the fluorescent peptides together. The result is a kaleidoscopic color change that reveals when and where these important second messengers are being generated in a cell. The video highlights one example, showing NIH3T3 cells being stimulated with platelet derived growth factor.

(Biosensor figure courtesy of: Ananthanarayanan, B, Ni, Q, and Zhang, J. (2005) *PNAS,* **102**, 15081–15086).

A Dynamic Annual Meeting



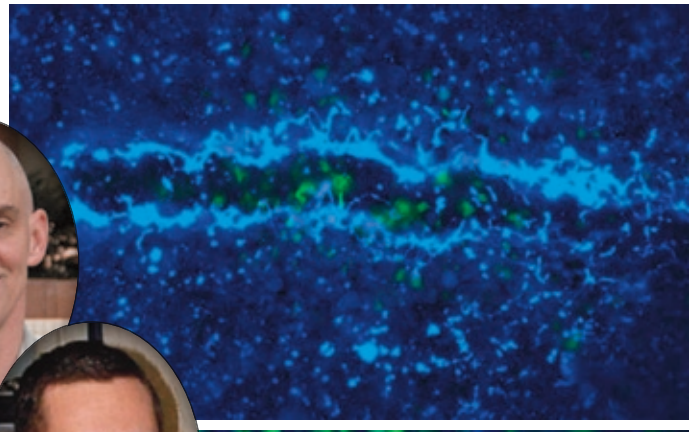


Cell Migration

Gaudenz Danuser at The Scripps Research Institute combines live cell imaging with computational analysis to reconstruct the intracellular and cell boundary forces that act in concert to mediate morphological dynamics. Such high-resolution image analyses of the molecular activities during cell protrusion are crucial to begin unveiling the complex orchestration of mechanical and chemical processes that mediate coordinated cell movements during directed migration. This video and adjoining vector map demonstrate the numerous forces at work as an epithelial cell maneuvers its actin filaments, myosin motor proteins, and other components of the cytoskeleton to undergo a wound healing response, retracting in the left half and protruding in the right.

Live Imaging of Developmental Processes

Charles Little at Kansas University Medical Center (KUMC), along with KUMC colleagues Andras Czirok and Brenda Rongish, combine their skills to study the motion of cells and extracellular matrix (ECM) proteins during embryogenesis. A major concept underpinning their work is *relative motion analysis,* which compares the amount of cell movement relative to ECM fibers. Their findings have surprisingly shown that most cellular motion is not active "migration" but in fact passive, tissue-based motion, observations that have a profound consequence for understanding the roles of both the ECM and the chemical signals purported to guide embryonic cells during early morphogenesis. This video provides a good highlight of tissue-based motion in an early stage developing quail. The epiblastic cells are in green, and the ECM protein fibronectin is in blue. As the cells "ingress" through the primitive streak, note the considerable motion of the fibronectin that appears to be moving into and then "rolling up" on each side of the streak.



ASBMB Hosts Graduate and Postdoctoral Development Workshop

BY NICK ZAGORSKI

Okay, you've just finished that last experiment and are ready to start writing your dissertation. Then what? Maybe you want to postdoc somewhere, although you're worried about how to nail that interview. Or maybe you're considering other options, but you're not exactly sure what careers are out there. To help enterprising young scientists facing either scenario, ASBMB set up a professional development program at this year's meeting.The program opened on Friday night with a lecture by Oregon Health & Science University professor and ASBMB council member John D. Scott to honor the graduate, postdoctoral, and minority student travel awardees. With a little help from video clips of ASBMB luminaries such as President Heidi Hamm and 2008 meeting award winner Alexandra Newton relating their personal experiences, Scott discussed the four "M's" of academic success: motivation, mentoring, manuscripts, and membership. He also stressed the educational and social value of conferences like the ASBMB meeting.

The students and post-docs listen attentively as panelists discuss strategies for success.

Saturday featured a full slate of events during which registered students and postdocs could glean more advice on how to take the next step. A morning panel session featured five speakers with science Ph.D.s offering insight into different career choices available to young scientists. Newton discussed the "traditional path" of tenured academic research and Neena Grover talked about faculty life at primarily undergraduate institutions like her school, Colorado College, where the emphasis is on teaching. Outside of academia, James Paterniti of Amylin Pharmaceuticals discussed the opportunities available in the biotechnology sector, *Molecular Cell* editor Feng Chen detailed the experience of overseeing a scientific journal, and John Emanuele, Jr., an attorney with Sommer Barnard PC, talked about patent law.

Following a networking luncheon, select travel awardees gave oral presentations about their posters. Graduate students Matthew Buczynski of UCSD, Monica Rodrigo Brenni of UCSF, Shonoi Barnett of the University of Buffalo, and Rui Ma of the University of Notre Dame presented first. Buczynski reported on the inflammatory response to the Lyme disease bacterium, Brenni talked about polyubiquitination determinants on the Ubc1 protein, Barnett went over the effects of site-directed mutations on OMP decarboxylase, and Ma discussed the mechanisms of apoptosis by L-PPMP and cis-Platin.

Postdoctoral students Yuhui Wang of UC-Berkeley, Matthew Gentry of UCSD, Michael Holinstat of Vanderbilt University Medical Center, and Carmen Otilia Catanescu of the Cleveland Clinic presented second. Wang shared data detailing how pre-adipocyte factor 1 inhibits adipocyte differentiation, Gentry highlighted the evolutionary conservation of the laforin protein, Holinstat talked about the temporal regulation of Rap1 in platelet aggregation, and Catanescu went over the molecular targeting of proteins by L-homocysteine.

The students and postdocs then split up into separate panel sessions tailored to their needs. On the student side, John Denu of the University of Wisconsin, Kim Orth of UT-Southwestern, and University of Wisconsin postdoctoral fellow Ann Miller held a panel on achieving success in graduate school. Their talks included tips on finding that perfect postdoc position, becoming a mentor even while you're still learning, and, perhaps most important, learning to manage time effectively so that you can get those research results while still enjoying the full graduate life and having fun beyond the bench. On the postdoctoral side, professors Lee Limberd of Vanderbilt and Peter Kennelly of Virginia Tech and Arizona State University postdoctoral fellow Miti Shah shared their perspectives on making the most out of your postdoctoral experience. The talks highlighted how the postdoc fits in to the "seasons" of a scientific career, and how it is necessary to use this time to evolve an independent research plan and create your own brand. The panelists also provided tips and tricks on succeeding in strenuous faculty interviews and, similar to the graduate sessions, relayed the importance of balance; postdocs are more than just publication machines. Perhaps the best take-home message from both sessions was: "Don't be a lab rat."

ASBMB 2008 Public Affairs Recap

BY ANGELA HVITVED

At this year's Experimental Biology meeting in San Diego, the ASBMB public affairs office participated in two sessions covering a broad range of issues that concern our members. A session called "Peer Review at NIH: Making Sure the System Works" was cosponsored by all societies participating in the meeting. It featured an overview of and an opportunity to comment on the recently released report regarding the National Institutes of Health peer review system and proposed changes. As regular readers of *ASBMB Today* know, the NIH has been undergoing an agency-wide review of their peer review system in an effort to optimize efficiency and ensure that the needs of both the research community and the public are met. This process was initiated in the summer of 2007 and has involved an in-depth attempt to engage all of the various affected communities through open houses and requests for information. Two working groups were established, one of which (the Advisory Committee to the Director Working Group) was co-chaired by ASBMB members Lawrence Tabak and Keith Yamamoto. This group released a report in February 2008 with their initial recommendations, followed by a period for public comment.

The session was standing room only, and participants continued to line up at the microphone until the room was needed for the next event

Speaking to a packed room, Tabak and Yamamoto presented an overview of their report "2007-2008 Peer Review Self-Study" and fielded questions and comments from the audience. The session was standing room only, and participants continued to line up at the microphone until the room was needed for the next event, reflecting the tremendous interest in this review process. It was clear that some of the recommendations in the report were more welcome than others, but those closely following the process noted that some of the most unpopular ideas already had been left out of the final draft. Although the formal comment period has ended, attendees were assured that the working group would remain responsive to the community as NIH moves forward with pilot testing of various recommendations. You can view the full report at enhancing-peer-review.nih.gov. Don't hesitate to contact the public affairs office with any questions or concerns.

The ASBMB public affairs session "Advocacy for ASBMB Members" focused on advocacy training with the goal of taking the "fear of the unknown" out of congressional meetings. Robert Wells, a member of the public affairs advisory committee and chair of the legislative issues subcommittee, chaired the event. The session opened with a short training video produced by ASBMB that followed two congressional visits by a delegation of scientists—one in which participants make a variety of mistakes and another in which they conduct a successful advocacy visit. Gary Kline, a senior policy advisor for Representative Brian Bilbray (R-CA) and the guest speaker at the session, described a day in the life of a House member and provided the audience with insight into how Congress works and the demands that legislators face. His presentation offered a unique perspective on the difficulties of advocacy, and he reiterated the importance of participating in the legislative process.

Attendance at this event was disappointing, underscoring the difficulty of getting large numbers of scientists to participate actively in science advocacy. Wells reviewed a letter that he and ASBMB Public Affairs Director Peter Farnham published in Science about the lack of political involvement by scientists and the excuses given for it (Wells, R. D., and Farnham, P. (2006) *Science* **314**, 1081). He discussed briefly his own advocacy experiences, noting that "one person can make a huge difference in Washington; I know this from personal experience. Take the initiative and get involved."

The public affairs office is ready to help ASBMB members by setting up appointments, providing literature and background information, and even joining congressional visits. You can find more information on our web site, www.asbmb.org. Just click on the "Advocacy" link or email our office, publicaffairs@asbmb.org. We hope you will make an effort to get involved in advocating for science; we need all the help we can get.

Angela Hvitved received her bachelor's degrees in biochemistry and philosophy from Iowa State University and her Ph.D. in biochemistry from Rice University. She is currently the ASBMB science policy fellow and can be reached at ahvitved@asbmb.org.

Return to Sender!

Which Method of Returning Proofs Is More Efficient?

This article is fourth in a series on publishing your research in the *Journal of Biological Chemistry*. The series will address a variety of issues that authors may have when writing and submitting articles to the *JBC*. The articles are written by Cadmus Communications, a Cenveo company, which is responsible for the editing, production, and printing of *JBC* articles.

We hear you and we agree… returning proofs electronically can be far more efficient. Together, ASBMB and Cadmus have adopted a process that allows you to mark up and send back your proofs via e-mail. This is faster, less expensive, and more environmentally friendly than returning proofs via express mail. However, as with all good things, there are some caveats (discussed below) for ensuring that your proofs are annotated appropriately. Now you have more choices: annotate the PDF on-screen, mark up a hard copy and scan it to PDF format, or send the marked copy via overnight mail. Which is best for your situation?

The Annotated PDF

Before beginning this process, you must have the correct tools. You will need the full version of Adobe Acrobat (not just Reader). The final product should mimic hand-marked proofs. There is a 5-step process:

1. **Indicate deletions in text by highlighting the area and using the Cross-out text tool. Select:**
   - Tools menu
   - Commenting
   - Highlight text tool or Cross-out text tool
2. **Use the Pencil tool to also indicate deletions in the margin with the proofreading symbol. Select:**
   - Tools menu
   - Drawing markups
   - Pencil tool
3. **Insert new text using the Call-out tool icon. Select:**
   - Tools menu
   - Drawing markups
   - Call-out tool
4. **Resize and move the text box so that it appears in white space and does not cover any correction.** See Figure 1.
5. **Use text boxes for responses to your queries.** See Figure 2.

If you have correctly performed this process the proofs should look like Figure 3.

As you can see from the illustration above the properly annotated proofs mimic the hand-marked proofs. Figure 4 shows an example of incorrect annotating. Some text boxes were used; however, the blue carets should have been changed to text boxes also.

Figure 5 has text comment boxes but these should have been changed to text boxes.

Figure 6 shows yellow balloon messages that should have been changed to text boxes.

The Scanned PDF

If the process outlined above is simply too much of a hassle, consider an alternative option. You may mark the proofs by hand with a pen and then scan the proofs and forms into a PDF document, which may be sent as a PDF attachment to e-mail. Although this process still involves paper, it has the benefits of time and postage savings associated with returning proofs electronically.

Express Mail

If you do not have access to a scanner, sending the hand-marked proofs and forms back by express mail is another acceptable choice.

So there you have it! If you are feeling adventurous and ready to try something new, follow the steps for the first option above to return annotated PDF files. Whichever method you consider, please choose the one that will ensure that all alterations are clear and easily understandable.

FIGURE ONE

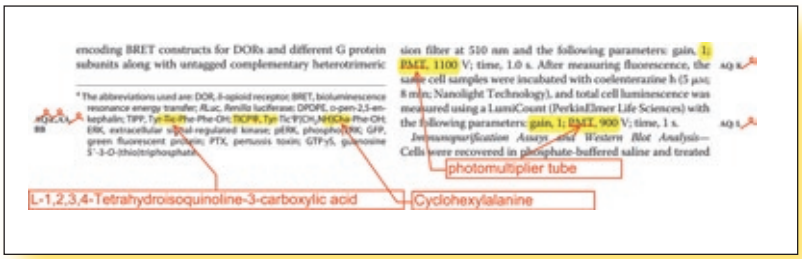


FIGURE TWO

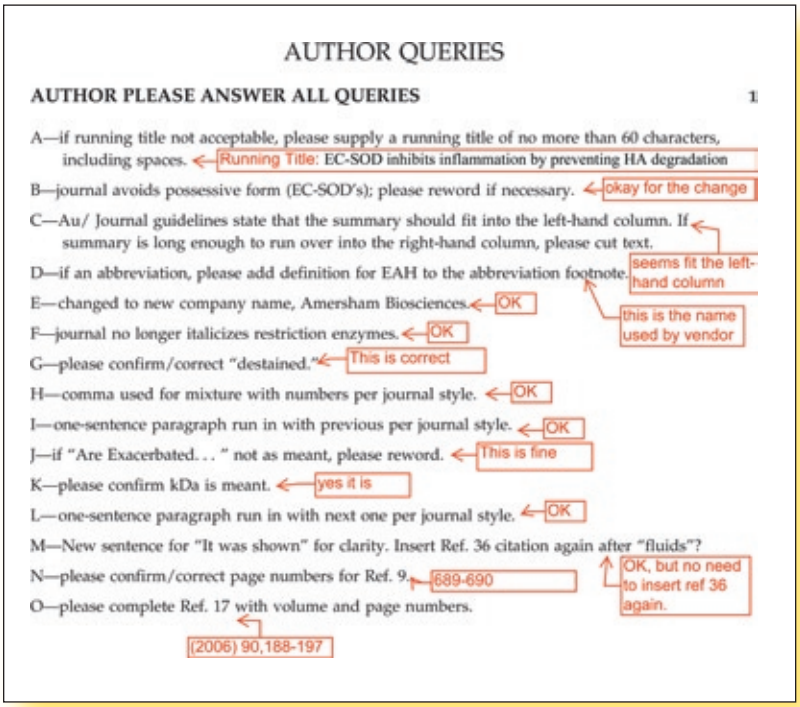


FIGURE THREE

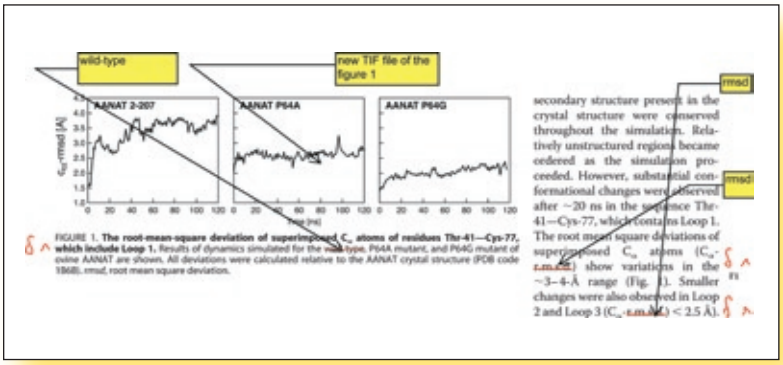


FIGURE FOUR

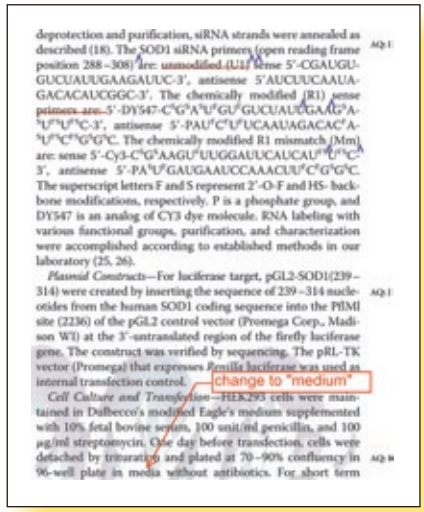


FIGURE FIVE

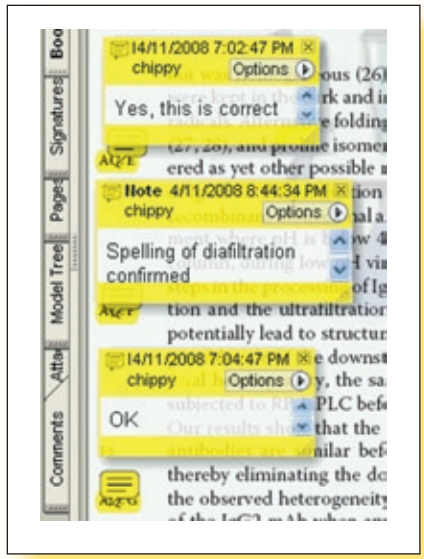
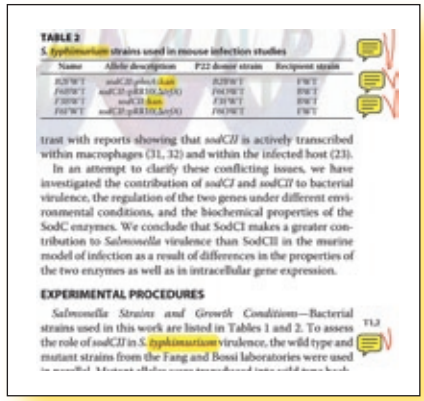


FIGURE SIX



2008 National Postdoctoral Association Meeting Recap

BY IAN M. BROOKS

With approximately 40,000 postdocs facing a dearth of academic faculty positions in a time of uncertain funding, the role and place of the postdoc within academia needs to change. In order for this to happen, postdocs must be provided with the tools they need to enter, survive, and flourish in a modern global marketplace. This was the message presented to the more than 250 delegates, representing research universities, institutes, and foundations in the U.S. and Canada, who gathered in Boston, MA, April 25-27 for the 2008 National Postdoctoral Association (NPA) annual general meeting.

An all-day session on Friday, April 25 was aimed specifically at representatives from postdoc associations and their administration colleagues in postdoc offices (PDOs). Estimates showed that approximately one-half of the postdoctoral delegates were attending for the first time, demonstrating an increasingly active movement for change within the postdoctoral community, as well as increasing awareness of the NPA and its mission. Using anonymous electronic "voting" technology, delegates were able to interactively discuss the progress made so far on the 2000 COSEPUP report "Enhancing the Postdoctoral Experience for Scientists and Engineers." The NPA was formed in 2003 to aid implementation of the action items identified in the report. The general consensus among delegates and leaders was that, although great strides have been taken in recent years to improve the working conditions of postdocs, there was still much room for improvement when it came to giving postdocs a voice.

The overarching theme of the conference was finding ways to help provide postdocs with the alternative training required to make them, as the scientists of today, employable in the job market within, or more likely outside of, the traditional academic career path. Although research labs are often supported by a variety of sources, most draw their major funding via R01 grants from the National Institutes of Health (NIH). The issue of the current NIH budget plateau was addressed in the keynote address delivered by Sharon L. Hays, associate director of the Office of Science and Technology Policy (standing in for John Marburger, science advisor to the President). Hays spoke at length of the policymaking processes in Washington, explaining that change takes time in this top-down situation. The lack of any imminent increase in NIH funding levels means that things aren't going to change anytime soon in academia. Because of this many postdocs are already looking at career options beyond the lab bench. There is still, however, a lack of so-called "soft" or "transferable" skills in the population. Postdocs have excellent postgraduate level training in their field of expertise, but this often doesn't cover essentials, such as time and personnel management, effective communication, dealing with the media, and so forth.

To this end, the closing session on Sunday, April 27, chaired by Joan Chesney, director of the Office of Academic Programs at St. Jude Children's Research Hospital, focused on the efforts of her committee to create a system of six core competencies for postdocs. These competencies are loosely modeled on the current system employed by medical schools to track faculty and residents in the latter stages of their training. They include building specific skills in scientific knowledge, research skill development, communication skills, professionalism, leadership and management skills, and the responsible conduct of research. However, Thomas Gething, director of the Office of Postdoctoral Affairs at the University of Washington, urged those PDOs not already part of their institutional graduate schools to merge as soon as possible. Many of the mechanisms for training postdocs in certain of the competencies are already in place for graduate students, suggesting the movement for change within academia may have other implications than just the further training of postdocs.

Ian Brooks received his BSc in Animal Physiology from The University of Leicester, UK, and a Ph.D. in Biology from the Pennsylvania State University in 2003. He is currently a postdoctoral fellow at the University of Tennessee Health Science Center in Memphis. In addition to his research he is a regular contributor to www.Lablit.com (http://www.Lablit.com) and maintains a blog on the Nature Network (http://network.nature.com/blogs).

The Continuing Evolution of Education and Professional Development at ASBMB 2008

BY ELLIS BELL

The annual meeting in San Diego saw several innovations in the programming of the Education and Professional Development (EPD) Committee. On Saturday, April 5 there were two morning workshops for primarily undergraduate institution faculty, one led by Duane Sears from the University of California, Santa Barbara on assessment issues and the other led by Marilee Benore Parsons from the University of Michigan, Dearborn, along with Mark Wallert and Joe Provost from Minnesota State University Moorhead on the integration of real research into course work. Both programs were well-attended and provided many opportunities for interaction and networking.

The highlight of the day is always the Undergraduate Poster Competition, and this year was no exception. Over 150 undergraduates presented their work to a panel of volunteer judges. The organizing committee, chaired by Kathleen Cornely and the various Graduate Program sponsors of the event, deserves much credit for the success of the competition, as do many volunteers who helped judge the event. Each student received written feedback after the competition, and 4 theme winners were selected along with a number of honorable mentions (see box). The awards, sponsored by Springer, were made at the Education Award Plenary Lecture on Sunday. Immediately after the competition there was a special session for students interested in attending graduate school, organized by Peter Kenelly from Virginia Tech and Tom Baldwin from the University of Arizona.

On Sunday, after the highly successful "Classroom of the Future" symposium, organized by Adele Wolfson from Wellseley, the ASBMB Education award was presented to Mike Summers from University of Maryland, Baltimore County for his work on the Meyerhoff Scholars program. EPD-sponsored events then continued with a very well attended Grant Writing Workshop for young faculty, given by Parag Chitnis from the National Science Foundation, and the always successful Women's mentoring reception, organized by Adele Wolfson.

In 2009, EPD programming will be along the same lines as this year, with the addition of a number of cross-disciplinary sessions. This year there were many "education" sessions throughout the week, however, these were sponsored by other societies. For next year's meeting, there is a push to have these sessions jointly sponsored and attended by meeting societies. Look for ASBMB to be a co-sponsor of one or more of these sessions.

Craig Cameron of Penn State with the undergraduate award winners (from *left* to *right*, Aly Bourreza, Jason Andrew Metcalf, Patrick James Knerr, and Krista Neal)

2008 Undergraduate Poster Competition Awards

PROTEINS AREA BEST POSTER WINNER
Patrick James Knerr
UNIVERSITY OF DELAWARE

PROTEINS AREA HONORABLE MENTIONS
Teresa R. Brown
TEXAS WOMAN'S UNIVERSITY
Ilka Decker
UNIVERSITY OF TOLEDO
Stephanie Marie Dreher
UNIVERSITY OF DELAWARE
Abby Goltz
HOPE COLLEGE
Brent Keller
MINOT STATE UNIVERSITY
TaeSoo Kim
SUNY STONY BROOK
David E. Lapham
ALMA COLLEGE
Virzhiniya Lekova
UNIVERSITY OF RICHMOND
Hao Li
UNIVERSITY OF WISCONSIN-MADISON
Jane A. Macdonald
ALMA COLLEGE

SYSTEMS BIOLOGY AREA BEST POSTER WINNER
Jason Andrew Metcalf
WASHINGTON UNIVERSITY

SYSTEMS BIOLOGY AREA HONORABLE MENTIONS
Stephanie Culver
UNIVERSITY OF DELAWARE
Carolyn Reeves Dominica
UNIVERSITY OF DELAWARE
Andrew William Harmon
UNIVERSITY OF DELAWARE
Rachel L. Kubiak
GRAND VALLEY STATE UNIVERSITY
Brian Reon
LOUISIANA STATE UNIVERSITY
Kevin Ro
UNIVERSITY OF CALIFORNIA
LOS ANGELES
Lissette S. Velasquez
THE UNIVERSITY OF ARIZONA
Ryan Matthew Wood
VIRGINIA COMMONWEALTH UNIVERSITY

SIGNALING AREA BEST POSTER WINNER
Aly Bourreza
UNIVERSITY OF DELAWARE

SIGNALING AREA HONORABLE MENTIONS
Vivek Dhaval Desai
UNIVERSITY OF DELAWARE
Andrew Kekupa'a Knutson
UNIVERSITY OF NOTRE DAME
Jason D. Mintz
RUTGERS UNIVERSITY
Jonathan M. Rawson
GRAND VALLEY STATE UNIVERSITY

NUCLEIC ACID AREA BEST POSTER WINNER
Krista Neal
UNIVERSITY OF DELAWARE

NUCLEIC ACID AREA HONORABLE MENTIONS
Karen Borchert
CARLETON COLLEGE
Melissa Warriner
UNIVERSITY OF DELAWARE
Ken H. Loh
HARVEY MUDD COLLEGE

Ellis Bell is currently Professor of Chemistry and Chair of the Biochemistry & Molecular Biology Program at the University of Richmond. He is also Chair of the ASBMB Education and Professional Development Committee.

Mirror to the Society

BY GARRY D. DOTSON

We have recently attended our annual ASBMB meeting, which was held from April 5-9 in San Diego, CA. The Minority Affairs Committee (MAC) sponsored a symposium focusing on healthcare disparities with respect to mental health. A preview of the symposium was highlighted by George Hill, Chair of the ASBMB MAC, in the October issue of *ASBMB Today*. The first session, "Health Disparities in Alzheimer's Disease: Advances in Understanding Disease Pathogenesis," was organized by Takita Sumter (Winthrop University) and chaired by Hill. Thomas Montine (University of Washington), Lisa Gentile (University of Richmond), and Mohamed Farah (Johns Hopkins University School of Medicine) gave presentations. Montine presented the "complex convergence" of diseases, which underlie and define dementia, and Farah and Gentile presented talks on the enzymes β-secretase and γ-secretase, respectively, which are important in amyloid plaque formation in the pathogenesis of Alzheimer's disease.

MAC chair George Hill talks to attendees at the Minority Scientists' Networking Mixer and Luncheon.

The second session, "CNS Diseases: Depression and Anxiety," was organized and chaired by Marcos Milla (Roche Palo Alto). Milla gave an overview of how depression and anxiety are over-represented in both minorities and underserved populations. Charles Chavkin (University of Washington) presented his research on stress-induced dysphoria, which is mediated by the κ-opioid system. Satinder Singh (Oregon Health and Sciences University) presented x-ray crystallographic model studies she has performed on the LeuT neurotransmitter sodium symporter in complex with various inhibitors. Renee Martin (Roche Palo Alto) ended the second session by giving a kinetic and thermodynamic assessment of inhibitors of the serotonin transporter (SERT).

On Tuesday, the MAC sponsored a Minority Scientists' Networking Mixer and Luncheon. This annual event fosters interactions between scientists who are at various stages of their professional careers. I had the opportunity to be seated at the same table as the President of ASBMB, Heidi Hamm, and listen to her engage students, encouraging them to get involved in ASBMB. Also, in attendance was Michael Summers (University of Maryland Baltimore County), who earlier in the week had received the ASBMB Award for Exemplary Contributions to Education for his work with the Meyerhoff Scholars Program. Many of the students who attended the mixer were energized by this networking opportunity and were seen throughout the remainder of the meeting at the MAC-sponsored technical sessions.

The third session, "Integrating Discovery and Applications," was organized by Craig Cameron (Penn State University) and Jerome Nwachukwu (New York University School of Medicine). Nwachukwu also served as the chair. This session highlighted advances in technologies that will most certainly impact industrial and biomedical research for years to come. James Sherley (Boston Biomedical Research Institute) presented his research on adult stem cell expansion technologies, where he described the mathematical modeling of adult stem cell growth patterns, which displayed asymmetric cell kinetics. Pamela Sharpe (DuPont Central Research and Development) presented research on industrial biotechnology, which highlighted the metabolic engineering of a methanotrophic bacterium for the production of caratenoids used in commercial aquaculture. Cameron closed the third session by presenting a strategy that could be applied universally to virus attenuation for vaccine development.

The final symposium, "Drug Abuse," was organized and chaired by Phillip Ortiz (Empire State College). Presentations were given by Habibeh Khoshbouei (Meharry Medical Center), Diwahar Narasimhan (University of Michigan), Nancy Zahniser (University of Colorado), and Sanika Chirwa (Meharry Medical Center). Khoshbouei described her research on methamphetamine addiction, showing the partitioning of dopamine transporters within a membrane microdomain in response to methamphetamine. Narasimhan presented his work on thermal stable cocaine esterase with possible applications in preventing lethal-

The Networking Luncheon also provided scientists with an opportunity to network and discuss minority issues with colleagues.

ity and addiction associated with cocaine, and Zahniser showed from her research individual differences in cocaine activation mediated by inhibition of striatal dopamine transporters. Chirwa gave the final talk on the effects of *in utero* exposure to methamphetamine on offspring.

Overall, the MAC symposium was very well organized and the presentations were of the highest quality. However, I personally would have liked to see a much higher attendance at each of the technical sessions.

Over the past six months, the following articles have appeared in the "Minority Affairs" section of *ASBMB Today*: "Minority Student Conferences: ASBMB's Involvement," "The Future of Minority-targeted Programs and Groups," "Pathways to Excellence and Equity in Research Science," "Do We Actually Need to Care about Minorities and Diversity?", "Are Molecular Biologists and Biochemists Doing Enough?", and "Undergraduates from Historically Underrepresented Groups—How Do We Capture Them?" These articles have been written or solicited by members of the MAC and represent some of the major issues and challenges facing the scientific community with respect to the minority populations it serves and those within its ranks. Throughout these articles one comes across words and phrases such as visibility, participation, education, professional development, opportunities, leaky pipeline, under-representation, and healthcare disparities. These terms are used in the discussion of an array of issues that fall under the purview of minority affairs. The mission of the MAC is to increase cultural diversity in the fields of biochemistry and molecular biology by increasing the participation, visibility, and status of minorities within ASBMB. This is part of the overall goal of ASBMB, which is to advance the science of biochemistry and molecular biology through publication of scientific and educational journals, organization of scientific meetings, advocacy for funding of basic research and education, support of science education at all levels, and promoting the diversity of individuals entering the scientific workforce. In other words, "minority affairs" are "Society affairs."

In his autobiography "Mirror to America," the renowned historian and academician John Hope Franklin holds up the tapestry of his vast life experiences as a reflective surface to show attributes of American society over the span of his life. As with Franklin's life, the experiences of those under-represented in the sciences can provide a society with a unique vantage point from which to survey its progress and to plot effectively a more inclusive future course.

At next year's annual meeting in New Orleans, make it your point to attend a MAC-sponsored event. I assure you it will be time well spent!

Garry D. Dotson, Ph.D., is an assistant professor of medicinal chemistry in the College of Pharmacy at the University of Michigan, where he studies prokaryotic biosynthetic pathways as possible targets for the development of antimicrobial medicinals. He currently serves as a member of ASBMB's Minority Affairs Committee. He can be reached at gdotson@umich.edu.

Linking Teaching, Research, and Service at an Undergraduate Institution

BY NEENA GROVER

My path to becoming an undergraduate professor started during my postdoctoral years when the department needed someone to teach the organic and biochemistry courses to the nursing students. When asked, I was willing to give it a try. Up to this point, I had evaluated teaching only through the lens of research faculty who often complained about their onerous teaching responsibilities and the lack of intelligence of their students. You can imagine my surprise when I found teaching to be a fun and rewarding activity with fully engaged students. Thus began my exploration into a career that included teaching.

I didn't get my undergraduate education in this country, so I had no idea about the different kinds of positions that are available. I didn't know the difference between a research university, a master's degree granting institution, a community college, or a private liberal arts college. As I began researching the difference between the various options, I became aware of the problems in our educational system. I knew immediately that I wanted to improve the quality of science education and make science fun for a larger number of people. Many schools have teaching positions, but not all of these come with start up funds or the expectation to do research. Schools that have the best combination of teaching and research are often devoted to undergraduate education and are known as PUI (primarily undergraduate institutions). All good undergraduate institutions get many applicants for each position and have the luxury to interview candidates that have teaching and research experience with undergraduate students. I got a 1-year sabbatical replacement position that gave me a chance to learn to teach full time (14 credit hours per semester) along with developing research ideas suitable for undergraduate students. I used the time to make myself competitive by learning about educational research, developing relevant technological skills, and developing reasonable expectations for undergraduate research. A lot of preparation and oodles of luck got me multiple offers. I accepted a faculty position at Colorado College and have found it to be rewarding on levels beyond my expectations.

Most academic tenure track positions have three components that are considered important: teaching, research, and service. At most schools, course evaluations have to be good, but your publication record and your ability to bring in the money are of primary importance. At a good undergraduate institution, all three components are important. Excellence in teaching is expected along with developing an externally fundable research program. Working with students effectively is the key to success at an undergraduate institution.

An undergraduate professor ideally does not separate teaching and

Grover

Neena Grover is an Associate Professor and the Chair of the Department of Chemistry and Biochemistry at Colorado College. She was trained in the laboratories of Holden Thorp at the University of North Carolina at Chapel Hill and Olke Uhlenbeck at the University of Colorado at Boulder. She has trained over 62 undergraduate students in her research laboratory in the last 8 years. Her current research is in the area of small RNA thermodynamics and metal-RNA interactions. She is the Southwest Regional Director of ASBMB's Undergraduate Affiliate Network and is the Outreach Editor for the ASBMB Educational and Professional Development publication *Enzymatics*.

> "I knew immediately that I wanted to improve the quality of science education and make science fun for a larger number of people."

research into two non-overlapping components, as research with undergraduate students is mostly teaching and research on improving teaching is scholarship. Ideally, the service one chooses to get involved in serves both your teaching and research goals. An undergraduate professor is a teacher-scholar. A successful teacher-scholar brings research into teaching, teaching into research, and engages the local communities while doing all this.

How does one integrate teaching, scholarship and service? For the most part, one does not have to reinvent the wheel but learn to adapt and adopt ideas. Methods of integrating research into teaching, such as Problem-based Learning, have already been developed. I also integrate Service Learning into my courses; for example, I teach nucleic acid chemistry using the HIV/AIDS-based Problem-based Service Learning problem that I have written. Students learn the concepts from current research on human immunodeficiency virus (HIV), design research projects to learn nucleic acid techniques, and present workshops on HIV prevention to the local community and work at local AIDS counseling centers. Students who work in my research laboratory also do Service Learning as part of their projects.

> "A successful teacher-scholar brings research into teaching, teaching into research, and engages the local communities while doing all this."

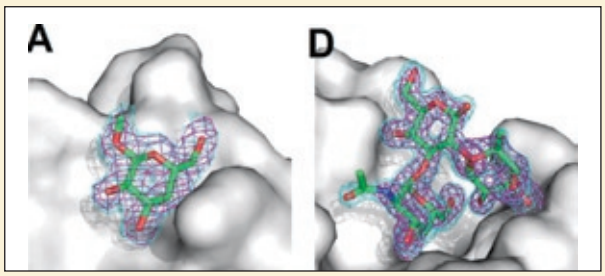
For most of my time at Colorado College, I have been the only biochemist in the department. Thus, I had to learn about many different areas of biochemistry. I also read literature in diverse fields from education and psychology to gender studies to improve as an educator and to find interconnections between science and what is traditionally considered non-science. My goal is to encourage students with diverse backgrounds and skills to stay in science. Thus, I have to learn to teach in new ways. Teaching is one of the fun parts of my job; it is challenging and time-consuming and requires constant tweaking, but it is also very rewarding. Students generally rise to the standards we set. If we prepare them properly, they can do just about anything. The most difficult part of the job is perhaps finding a balance between administrative responsibilities and being a teacher-scholar. Most undergraduate institutions are primarily faculty governed and expect faculty to be active participants in their department, division, and the college. The level of these responsibilities changes at different stages of one's career, but success of an institution depends on a reasonable number of faculty members taking their administrative tasks seriously.

Liberal arts institutions also allow faculty to teach in areas outside of their specialization. Thus, I get to teach courses such as Gender and Science and can develop new courses for the 1st year students or on topics of general interest. The introductory science courses at all educational institutions are in desperate need of creativity. There is much to be done to prepare all students to live in this technologically driven, scientific world. It is really no surprise that a majority of our students cannot tell us why seasons change let alone make intelligent decisions on stem cell research. Undergraduate education needs people with a high level of motivation and creativity to reform what we teach and how we teach it.

The perks of being at an undergraduate institution are that I get to be creative and have fun in my research and in my classroom and still train bright, creative students in my research area so they can go on to graduate schools. I can do the same things as anyone else or can use the flexibility in this position to try new things. I can write and review papers, sit on panels, and organize meetings but can also be involved with students to develop creative ways to work on significant issues in our community. As with all fun things, the only problem is finding the time to do everything.

A Bigger Carbohydrate Binding Family

Protein-carbohydrate interactions are central to numerous cellular processes, from breaking down sugars for energy to distinguishing a host from a pathogen. One group of proteins that make such interactions possible is the carbohydrate-binding module (CBM) family, a set of ancillary proteins that are components of larger multimodular enzymes. 50 CBM families are currently known, but this JBC paper pushes that number to 51. The researchers performed structural and functional studies on putative CBMs from two glycoside hydrolases of the pathogenic bacterium Clostridium perfringens. These new CBMs, GH95CBM51 and GH98CBM51, did not display much sequence similarity to existing families, but the crystal structures showed that they formed β-sandwich folds characteristic of this class. The CBMs had different specificity; GH98 was restricted to binding glycans bearing blood group A/B antigens, whereas GH95 bound numerous galacto-configured sugars. A bioinformatic analysis of this new family revealed ~60 CBM51s clustered into six subfamilies, including modules found in both pathogenic and non-pathogenic bacteria.



Surface representations of the binding sites of the two new members of CBM family 51: GH95 (*A*, with bound methyl-β-D-galactose) and GH98 (*D*, with bound blood antigen trisaccharide).

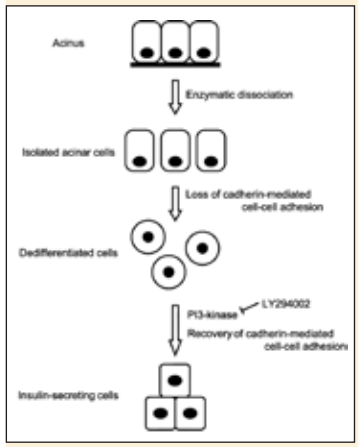
Divergent Modes of Glycan Recognition by a New Family of Carbohydrate-binding Modules

Katie J. Gregg, Ron Finn, D. Wade Abbott, and Alisdair B. Boraston

J. Biol. Chem. 2008 **283**, 12604-12613

jbc

Pancreatic Cells Can Change Their Spots



The mechanism of pancreatic cell transdifferentiation from digestive acinar cells to insulin-secreting endocrine cells.

Increasing evidence is revealing that even terminally differentiated cells retain the ability to convert to other cell types. The pancreas is a prime example of trans-differentiation, as exocrine cells that aid in digestion have been shown to convert to hormone-secreting endocrine cells. The mechanism behind this conversion is largely unknown, as is why plasticity seems largely confined to *in vitro* studies. This *JBC* paper helps solve both mysteries by demonstrating that cadherin-mediated cell-cell adhesion is critical in inducing transdifferentiation of mouse pancreas cells. Following enzymatic disruption of intercellular contacts, exocrine cells dedifferentiate, form tiny spherical structures held together by cadherin, and then transform to endocrine cells; neutralizing cadherin-mediated adhesion freezes the cells in a dedifferentiated state. In addition, this process activates PI3 kinase, which is critical for completing the transformation. This study may help develop new cell-based therapies for diabetes, and it also explains the rarity of *in vivo* exocrine-to-endocrine conversions, as even in severe cases of pancreatitis or cancer cell-cell contacts are not completely destroyed.

Role of Cadherin-mediated Cell-Cell Adhesion in Pancreatic Exocrine-to-Endocrine Transdifferentiation

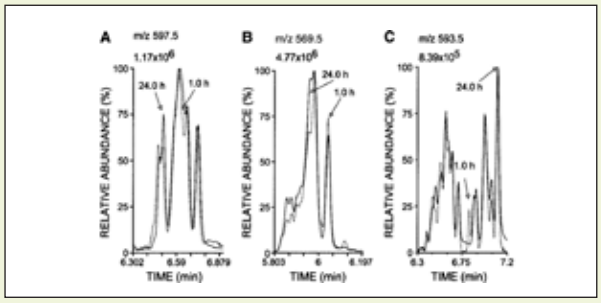
Kohtaro Minami, Hirotoshi Okano, Akinori Okumachi, and Susumu Seino

J. Biol. Chem. 2008 **283**, 13753-13761

jbc

Molecular Marker for Myelin Damage

Free radical damage is believed to contribute to the progression of many diseases of the central nervous system. Especially vulnerable to free radical peroxidations are the polyunsaturated fatty acids enriched in the brain, such as adrenic acid (AdA) in myelin and docosahexaenoic acid (DHA) in neuronal membranes. However, while F_4-neuroprostanes derived from DHA provide stable and selective markers of oxidative damage to neuronal membranes, a reliable marker for myelin damage is lacking. In this *JLR* paper, the researchers combined AdA with a free radical initiator and found products that closely resembled F_2-isoprostanes that are produced from arachidonic acid oxidation, just two carbons longer. These F_2-dihomo-isoprostanes were also far more abundant in oxidized extracts of myelin compared to samples of gray and white matter. The researchers applied this new marker to tissue samples of Alzheimer's disease (AD) patients and found that white matter axons in AD had higher levels of both F_4-neuroprostanes and F_2-dihomo-isoprostanes compared to age-matched controls, suggesting that AD damages both the axons and surrounding myelin in white matter.



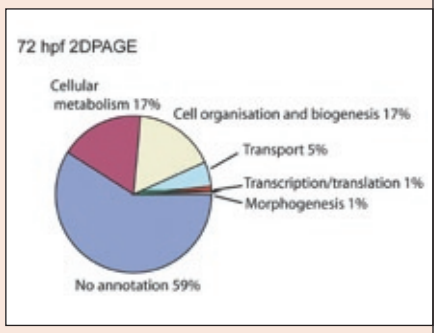
Mass spectrometry analysis reveals that the oxidation of adrenic acid (A) produces multiple isoprostanoids that more closely resemble F_2-Isoprostanes (B) than F4-neuroprostanes (C).

F_2-dihomo-isoprostanes Arise from Free Radical Attack on Adrenic Acid

Mike VanRollins, Randall L. Woltjer, Huiyong Yin, Jason D. Morrow, and Thomas J. Montine

J. Lipid Res. 2008 **49**, 995-1005

Profiling Zebrafish Development



The overall protein profile (as determined by 2D-PAGE followed by MALDI-TOF/TOF) of a zebrafish embryo at 72 hours post-fertilization.

With their high fecundity, short gestation, and large, transparent embryos, zebrafish have become an ideal model to study embryonic development in vertebrates. In this *MCP* paper, the authors created high quality protein profiles of two separate stages of zebrafish embryo growth (72 and 120 h postfertilization) to better quantify how protein expression changes during this development process. They used two different approaches (electrospray ionization and matrix-assisted laser desorption ionization mass spectrometry analysis) that identified 1384 and 477 unique proteins, respectively, with about 30% overlap between the two data sets. Combining the two approaches, this study provides peptide-level evidence for over 1500 genes in zebrafish embryos, of which around 15% were hypothetical, predicted, or unannotated. Analysis of changes in protein expression revealed that proteins involved in energy production, transcription/translation, and cell cycle control were more abundant at 72 hpf compared to 120 hpf, which is consistent with the faster cellular growth and protein synthesis earlier in development.

Analysis of the Zebrafish Proteome during Embryonic Development

Margaret B. Lucitt, Tom S. Price, Angel Pizarro, Weichen Wu, Anastasia K. Yocum, Christoph Seiler, Michael A. Pack, Ian A. Blair, Garret A. FitzGerald, and Tilo Grosser

Mol. Cell. Proteomics 2008 **7**, 981-994

A Sampling of ASBMB 2008 Symposia

BY NICK ZAGORSKI

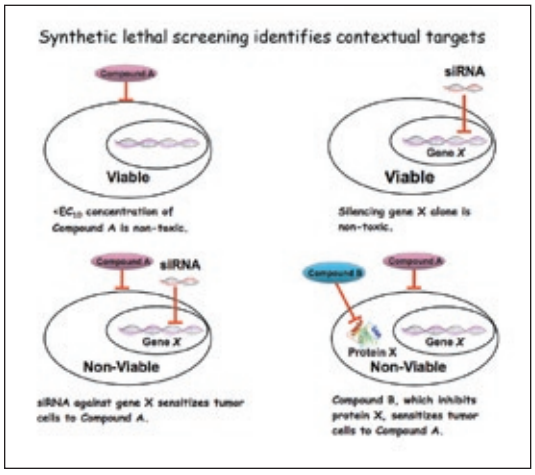
The scientific presentations assembled for the 2008 Meeting gave scientific gourmands another vast buffet of the latest innovations, emerging trends, therapeutic breakthroughs, and unexpected connections in the fields of biochemistry and molecular biology. Attendees had over 60 different symposia to choose from, and while this year's meeting wanted to spotlight systems biology and the increasing discipline of RNA biology, the composition of the scientific talks once again encompassed every area of basic biological research. The selected summaries below represent just a tiny smattering of some of the fascinating research heard at the San Diego convention center:

Drug Discovery in Academic Settings

Finding that next great drug is no walk in the park; the discovery and development of a typical pharmaceutical requires 12-14 years and tens of millions of dollars, not to mention tremendous infrastructure. Hurdles like these are the reason most academic labs generally only involve themselves in the first step of drug development: target identification (although large medical institutes can also carry out clinical trials, the last step of the process).

However, in these changing times, academic institutes may want to reconsider their role in this process, and in this symposium a group of intrepid researchers discussed how they have taken a bigger role in drug development—conducting validation and optimization studies—given their available resources.

Colleen Niswender, part of Jeffrey Conn's research group at Vanderbilt University, was interested in finding a way to improve upon dopamine replacement therapy in treating diseases like Parkinson's. The group sought to discover new positive allosteric modulators (PAMs) of the mGluR4 receptor, similar to a recently identified compound called PHCCC. They first managed to identify 400 PAMs using a high-throughput screen, and then narrowed down the list by means of a clever assay that coupled glutamate receptor activation to potassium channel activity. Niswender and her colleagues used the assay to find a very potent and selective PAM that has already shown some promise in rodent Parkinson's models.



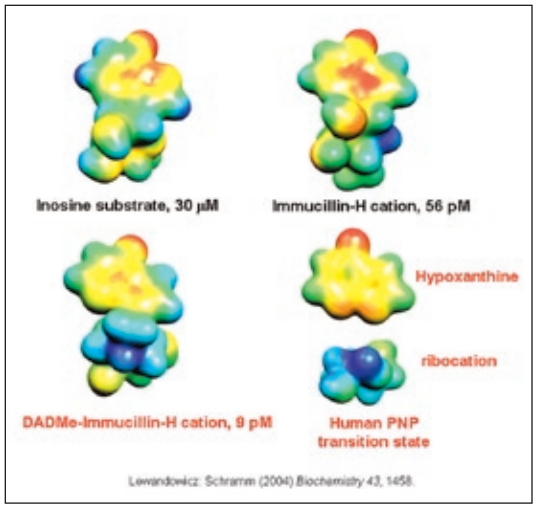
A general model of the screening approach John Lazo and Peter McDonald use to find new therapeutic drugs.

Universities can even help out without high-throughput technology, as John S. Lazo at the University of Pittsburgh managed to do. With a few months and the efforts of just a single talented graduate student, Peter McDonald, Lazo developed a clever siRNA screen to determine if potential drugs are viable by seeing if their mechanisms are different than existing drugs. Using microtubule destabilizers as the model, they subjected cells to the minimum drug levels that produced toxic effects; next they passed over a small siRNA library over the cells to see which ones enhanced toxicity. Such a screen provides the added benefit of finding combinations that may work synergistically.

Enzymes as Drug Targets

Speaking of drug development, speakers at this symposium discussed how they were trying to "teach an old dog new tricks," so to speak. Enzyme inhibitors like penicillin and its related B-lactam antibiotics have been drug mainstays for years, but microbes and cancer cells are building up stiff resistance to current agents.

Vern Schramm at the Albert Einstein College of Medicine talked about one such new avenue in drug identification: transition state analogues. As enzymes convert a substrate into a product, they proceed through a high-affinity chemically unstable state known as the transition state. By combining isotope-effect experiments using isotope-labeled substrates with computational chemistry, Schramm can generate maps of electrostatic potential in an enzyme active site. With that information, he can design



By looking at electrostatic similarity, Vern Schramm can design compounds that mimic enzyme transition states, like these immucillins targeting purine nucleoside phosphorylase (PNP).

chemically stable molecules that closely resemble the transition state and confer extremely tight binding.

Schramm went over one of his big success stories, analogues for the enzyme purine nucleoside phosphorylase (PNP). This purine degrader is vital for proper T-cell function, and genetic deficiency in PNP leads to apoptosis for rapidly dividing T-cells. Inhibition of PNP can be used to treat leukemia (overactive T-cell division) and autoimmune disease (T-cell clones attacking self-epitopes). To combat the former, Schramm developed an analogue of the PNP transition state called Immucillin-H (now in clinical trials). A second-generation analogue (DADMe-Immucillin-H) acted as an "ultimate inhibitor;" A single oral does of this immucillin, which binds over 2 million times tighter than the substrate, rapidly depleted blood PNP activity and was effective for the average lifespan of a red blood cell.

Chi-Huey Wong at the Scripps Research Institute provided an overview of his research endeavors, which look at finding drugs for the sugar transferring enzymes that help create glycoproteins, macromolecules essential for pathogenic microbes. One approach he detailed was his development of fluorescent probes that he could incorporate into glycoprotein synthesis pathways, enabling him to "see" glycoconjugates in living cells. With these probes, he could employ a visual screen for new sugar transferase inhibitors.

Wong mentioned his lab is working on multiple enzyme targets, including transglycosylases and transpeptidases, using structure-based, mechanism-based, and screening-based protocols to find new drugs. He closed by highlighting that all three approaches are inter-related, and new drug identification efforts really should use all three to find the best candidates.

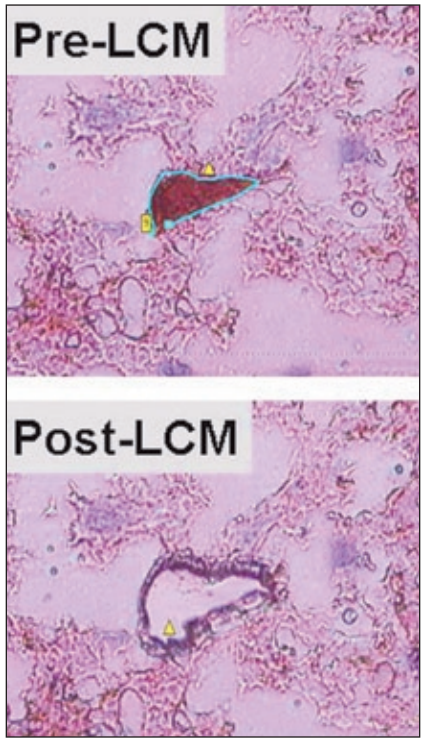
Laser Capture Microdissection for Molecular Analysis

Laser capture microdissection (LCM) is a powerful new tool (first developed a little over a decade ago) that's expediting the analysis of complex cell and tissue samples. In simple terms, this innovative approach allows a researcher to literally grab a selected area of a biological specimen and pull it out of the surrounding tissue.

With LCM, it becomes easier to remove specific cell or tissue subtypes from a sample, reducing the levels of contamination; thus, LCM is a great way to acquire pristine samples for genomic and proteomic studies, and researchers presented data on LCM's use on a variety of tissues, such as extraditing cancerous cells from surrounding healthy tissue or plucking out tiny lesions on blood vessels.

Thomas Montine at the University of Washington has been using LCM to analyze neuronal inclusions, the dense protein aggregates inside cells that are "calling cards" of many neuronal diseases, including multiple sclerosis, Alzheimer's, and Parkinson's.

In his discussion, he addressed some new insights into the composition of two types of inclusions: neurofibrillary tangles (NFTs) and Lewy bodies. While these protein aggregates are primarily composed of PHF-tau (NFT) and a-synuclein (Lewy), Montine's LCM analysis uncovered 71 and 42 other proteins in these tangles, many of which had previously not been associated with these structures. One interesting result was validating GAPDH (glyceraldehyde 3-phosphate



Using LCM, researchers like Thomas Montine can pluck protein aggregates right out of cells, such as this neurofibrillary tangle.

dehydrogenase) as a component of NFTs, suggesting this protein should not be considered a housekeeping gene in studies of diseased neurons.

Montine noted that another advantage of LCM is the ability to determine structural information that can be difficult to obtain with antibodies. He showed how LCM enabled him to uncover the poly-ubiquitination patterns on the Tau protein, which may promote aggregation.

Metabolism and Neurodegeneration

Over the past several years, research has begun to reveal that the metabolic network is far more connected to other molecular pathways than previously anticipated. This symposium featured researchers discussing one such area where metabolism is finding new importance: neuronal development, function and degeneration.

One critical protein that spans both these areas is AMP-activated kinase, or AMPK. This kinase acts like a cell's energy monitor; when energy stores are depleted, such as during hypoxia or hypoglycemia, AMPK cranks up its activity, phosphorylating a host of other proteins to limit energy expenditure and boost energy production. It may not be a surprise that AMPK would be vital in the brain, which uses up a tremendous amount of energy to maintain its continual flow of information. However, even neurons do need to control their output, because if they don't problems like epileptic seizures can occur.

Avtar Roopra at the University of Wisconsin-Madison discussed some of his research investigating the metabolic aspects of epilepsy. He noted that people with epilepsy have long been able to somewhat control seizures with the aid of extremely-low sugar ketogenic diets, suggesting glucose levels regulate nerve over-activity. He managed to mimic this ketogenic effect with a sugar analog called 2-Deoxy-D-glucose, which can trick AMPK into thinking the cell's sugar levels are low and so the neurons try and conserve energy and not become so overactive.

Roopra noted enthusiastically that these results highlight the potential of using metabolic drugs as a new therapeutic approach. The AMPK activating drug Metformin, for example, is widely used by diabetics, and at proper doses could slow down neuronal stimulation without adversely affecting other brain activity.

Post-Translational Modifications

A protein's story is not complete once that final amino acid gets attached during translation. Following synthesis, proteins can still undergo a host of changes that will affect their structure and function. These post-translational modifications can be either reversible or permanent, and include processes such as phosphorylation, glycosylation, and ubiquitination.

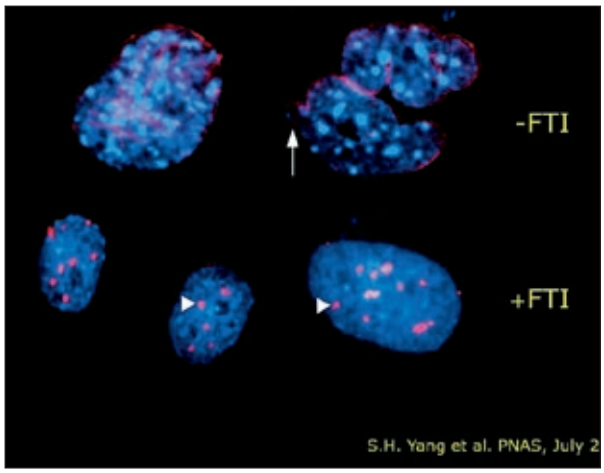
One of the more unusual protein modifications occurs with the structural protein lamin A; this component of the nuclear lamina undergoes multiple modifications including the addition of a farnesyl chemical group that is subsequently cleaved off. While the purpose of this very temporary modification remains somewhat mysterious, it is certainly essential; mutations that prevent farnesyl cleavage of lamin A produce severely brittle cell nuclei, and as a result progerias, the premature aging disorders.

Perhaps then it might be better to simply prevent farnesylation in the first place. That was one topic covered by Stephen Young of UCLA, whose lab is heavily involved in studying lamin A processing. He noted that while FTIs (farnesyl transferase inhibitors) do produce improvements in two different mouse models of progeria, these inhibitors do fall short of being a complete cure, because unfarnesylated lamin A cannot reach the proper locations in the nucleus, thus still leaving the nuclear lamina somewhat deficient.

Young also went on to discuss some recent work that revealed interesting correlations between individuals with progeria and AIDS patients taking protease inhibitors. These anti-HIV drugs inhibit the farnesyl-cleaving enzyme ZMPSTE24, thus producing phenotypes similar to progeria. This connection helps better explain some of the frequent side effects of protease inhibitors, such as gaunt facial features and increased atherosclerosis risk.

Drug Abuse

The popular drug of choice may cycle, but drug abuse remains a major problem. To effectively combat drug abuse and addiction, we really need to understand the molecular basis of how the various psychoactive, mood



Stephen Young has found that Farnesyl transferase inhibitors can alleviate some progeria symptoms by preventing bad lamin A (in red) from reaching the nuclear envelope.

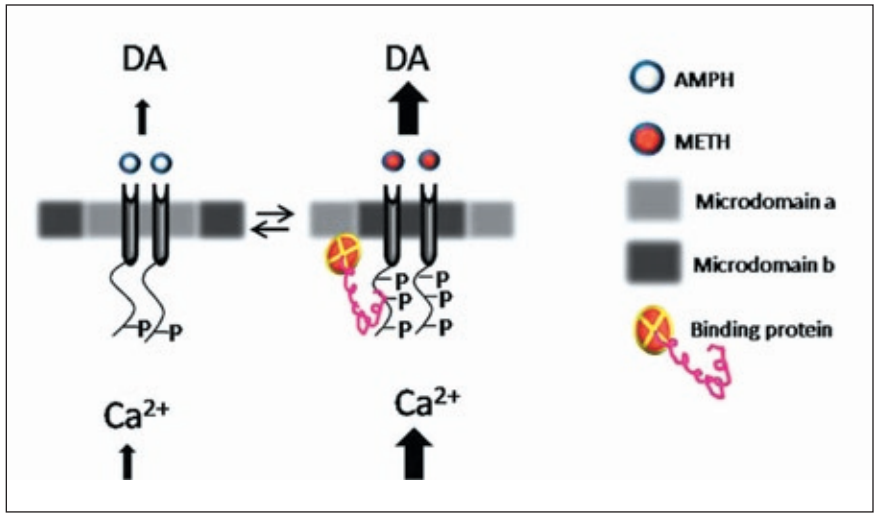
altering agents work in the brain. The presenters at this symposium tried to shed some light on the mechanisms of drug action, especially those that affect the neurotransmitter dopamine.

Habibeh Khoshbouei at Meharry Medical College examined the differences between amphetamine and the methamphetamine. These two drugs act in a complex manner by competing with dopamine for reuptake into neurons following release into the synapse, and stimulating more dopamine release once back inside the nerve. Meth is more potent of the two because it can work at lower resting potentials, and is also better at releasing intracellular calcium stores in cells.

Khoshbouei did add though that meth may be more than just a stronger version of amphetamine. She conducted some FRAP (Fluorescence Recovery After Photobleaching) experiments with dopamine transporters and noted that both control and amphetamine treated cells had similar recovery times, while meth treated cells had far less recovery. She thinks meth may promote association of dopamine transporters with some other mobile membrane microenvironments, which may relate to its enhanced effects.

Compared to meth, cocaine operates by a fairly simple mechanism; it binds to the dopamine transporter and slows down transport, thus increasing the time dopamine spends in the synapse. Nancy Zahniser and her lab at University of Colorado Denver have been looking at how such a straightforward mechanism can produce drastic differences in the behavioral responses of animals given equal doses of drug.

The variation likely lies in how the dopamine transporters respond to the presence of cocaine; in high responders, the transporters rapidly up-regulate in response to cocaine, so while the initial burst is greater, these animals return to baseline more quickly. Low responders, though, have more insensitive transporters and don't up-regulate as quickly and/or as much. Zahniser suggests that this lack of up-regulation may contribute to a more addictive phenotype, as low-responding rats tend to show behaviors associated with greater reward and motivation for cocaine.



One possible model developed by Habibeh Khoshbouei of how membrane microdomains contribute to methamphetamine's increased effect over dopamine transporters.

Roles for Small Non-Coding RNAs

When you consider that the average human has roughly the same number of protein coding genes as the 1,000-cell nematode *C. elegans*, it strongly suggests that other factors are involved in human complexity. Those factors are undoubtedly in the non-genic portions of DNA, which rises in abundance in higher organisms. And it's one of the smallest non-coding elements in the genome that's been making big headlines of late: the microRNAs.

MicroRNAs are tiny chains, around 18-24 nucleic acids long, that have been emerging as key gene expression regulators by attaching to and inhibiting mRNA transcripts. Much like gene-modulating proteins, microRNAs can act as both oncogenes and tumor suppressors, and their important role in cancer was highlighted by Frank Slack at Yale University.

Slack focused on *let-7*, a highly conserved (~800 million years) microRNA, first identified in *C. elegans* as an inhibitor of cell division. *Let-7* binds to complementary sites in the 3'-untranslated region of the *Ras* gene, thus it interacts with one of the major cancer genes. In mice and humans, let-7 is particularly abundant in the lungs, making it an attractive target for new lung cancer therapies. Slack noted *let-7* treatment proved successful in both cell culture and xenograft studies, leading him to try his luck on animal models. He then discovered that nasal administration of *let-7* to a mouse model of *RAS* –activated lung cancer could slow down tumor growth, as well as radiosensitize the cancer cells for added therapeutic effect.

Nick Zagorski, Ph.D., a graduate of Johns Hopkins and Cornell Universities, is a science writer for ASBMB. He can be reached at nzagorski@asbmb.org.

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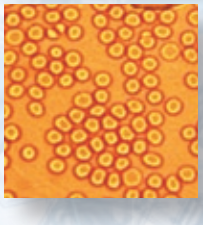
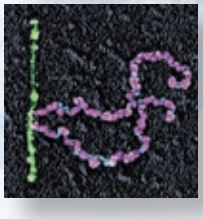

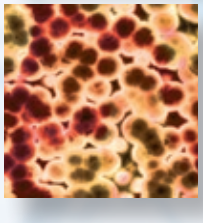
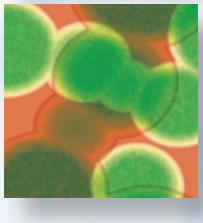
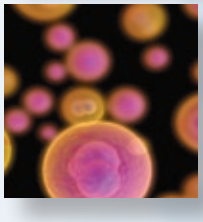
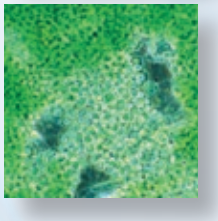

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SAN FRANCISCO, CA
http://scientificsessions.diabetes.org

90th Annual Meeting of the Endocrine Society
JUNE 15–18, 2008
SAN FRANCISCO, CA
www.endo-society.org/apps/Events/Event.cfm?EventID=1253

Understanding Aging: Biomedical and Bioengineering Approaches
JUNE 27–29, 2008
LOS ANGELES, CA
www.mfoundation.org/UABBA

33rd FEBS Congress & 11th IUBMB Conference
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ST MALO, FRANCE
Organizers: Susan Miller and Bernard Badet
http://TinE2008.org
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Natural Genetic Engineering and Natural Genome Editing
JULY 3–6, 2008
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www.navbo.org/BSCS08Workshop.html

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www.bb.iastate.edu/~gfst/homepg.html

International Conference on Structural Genomics
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www.spine2.eu/ISGO

World Congress on the Insulin Resistance Syndrome
SEPTEMBER 25–27, 2008
LOS ANGELES, CA
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13th International Congress on Hormonal Steroids and Hormones & Cancer
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QUEBEC CITY, CANADA
www.ichshc2008.com/

OCTOBER 2008

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OCTOBER 3–5, 2008
PINE MOUNTAIN, GA
www.selrc.org

Mitochondrial Biology in Cardiovascular Health and Diseases
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BETHESDA, MD
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Translating Science into Health: *Cytokines in Cancer and Infectious Diseases*
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GRANLIBAKKEN, LAKE TAHOE
Organizers: Katalin F. Medzihradszky and Ralph A. Bradshaw, UCSF
www.asbmb.org/meetings

Transcriptional Regulation by Chromatin and RNA Polymerase II
OCTOBER 16–20, 2008
GRANLIBAKKEN, LAKE TAHOE
Organizer: Ali Shilatifard, Stowers Institute for Medical Research
Plenary Lecturer: Robert G. Roeder, The Rockefeller University
www.asbmb.org/meetings

NOVEMBER 2008

2nd Latin American Protein Society Meeting
NOVEMBER 4–8, 2008
ACAPULCO, GRO. MEXICO
www.laproteinsociety.org

2008 Annual Meeting of the Society for Glycobiology
NOVEMBER 12–15, 2008
FORT WORTH, TX
www.glycobiology.org

DECEMBER 2008

The Annual Meeting of the American Society for Matrix Biology (ASMB)
DECEMBER 7–11, 2008
SAN DIEGO, CALIFORNIA
www.asmb.net/

The 48th American Society for Cell Biology Annual Meeting
DECEMBER 13–17, 2008
SAN FRANCISCO, CA
http://ascb.org/meetings/

APRIL 2009

3rd International Congress on Prediabetes and the Metabolic Syndrome—Epidemiology, Management, and Prevention of Diabetes and Cardiovascular Disease
APRIL 1–4, 2009
NICE, FRANCE
www.kenes.com/prediabetes

ASBMB Annual Meeting
APRIL 18–22, 2009
NEW ORLEANS, LA
www.asbmb.org/meetings

JUNE 2009

VIII European Symposium of the Protein Society
JUNE 7–11, 2009
ZURICH, SWITZERLAND
Organizer: Andreas Plückthun (University of Zurich)
www.proteinsociety.org

3rd EuPA Meeting—Clinical Proteomics
JUNE 14–17, 2009
STOCKHOLM SWEDEN
http://www.lakemedelsakademin.se/templates/LMAstandard.aspx?id=2529

APRIL 2010

ASBMB Annual Meeting
APRIL 24–28, 2010
ANAHEIM, CA
www.asbmb.org/meetings

AUGUST 2010

14th International Congress of Immunology
AUGUST 22–27, 2010
KOBE, JAPAN
www.ici2010.org