2010 ANNUAL MEETING, APRIL 24–28. ANAHEIM AWAITS!

ASBMB today

Highlights from the 2009 ASBMB Annual Meeting

June 2009

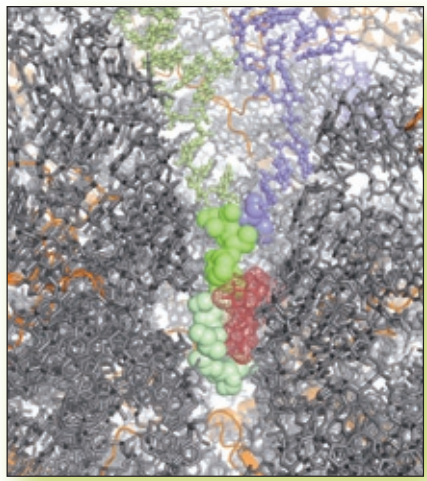
American Society for Biochemistry and Molecular Biology

TABLE OF CONTENTS

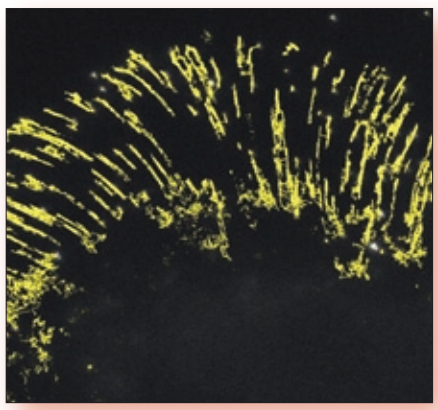
contents

JUNE 2009

ON THE COVER:
The 2009 ASBMB Annual Meeting in New Orleans is over, but you can read highlights from the meeting throughout this issue.



Nascent Peptide-dependent Ribosome Stalling. 30



A look at some of the science from the annual meeting. 32

podcast summary

This month's podcast features a lecture by the 2008 ASBMB Award for Exemplary Contributions to Education winner Michael Summers. In the podcast, Summers talks about his HIV research, mentoring undergraduate students, and diversity in the sciences.

To hear this and other podcasts, go to www.asbmb.org/Interactive.aspx.

ASBMB today

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

ASBMB Today
Nicole Kresge *Editor*
nkresge@asbmb.org
Nick Zagorski *Science Writer*
nzagorski@asbmb.org
Nancy J. Rodnan *Director of Publications*
nrodnan@asbmb.org
Barbara Gordon *Executive Director*
bgordon@asbmb.org

Magazine design & production: Amy Phifer

For information on advertising contact
Capitol Media Solutions at 800-517-0610
or Danf@capitolmediasolutions.com

ASBMB
www.asbmb.org

2008 APEX AWARDS FOR PUBLICATION EXCELLENCE

letters to the editor

Appreciation for Richards

Dear Editor:

I appreciated immensely the retrospective for Fred Richards composed by James Staros. As a graduate student in Fred's department at Yale, so many of the names mentioned in the article, and of several of the additional contributors, are familiar to me. Fred was a reader on my thesis, a collection of chemical and kinetic studies designed to examine the nature of the contribution of the horseradish peroxidase apoprotein to its peroxidatic mechanism. At my thesis presentation, Fred made a sage observation about the oxidation states of amino acids that enabled me to analyze my data in a more insightful manner than I had otherwise considered. I, of course, returned the favor by hitting the ball over his head at our annual faculty-student softball game because he was playing me much too shallow in center field. Fred handled it with his typical good humor; in and out of the lab, he was a first-class human being as well as a distinguished scientist.

Ira Weinryb
Gwynedd Valley, PA

Mac and PC Incompatible?

Dear Ms. Crespi:

As a longtime Mac user, I was a little surprised at some of the statements made in your April *ASBMB Today* advice column.

I agree that there are incompatibilities going back and forth between Mac and PC PowerPoint presentations. However, if one avoids copying and pasting and instead inserts graphics as pictures (*e.g.* jpg, tiff, etc.), one avoids many of these problems. To say that "You cannot show PowerPoint presentations on Apple computers in general" is true in some cases but certainly not all. Of course, one has to be careful of Office versions and file formats (.ppt *versus* .pptx), which, as you point out, is true on any platform.

The other statement I found curious was "...if you don't know if your MacBook will be compatible with an on-site projector..." I've been in this business for a while and cannot think of a single instance of this occurring.

Frankly, I see resolution incompatibilities that seem difficult to resolve on the PC side. Overall, I simply don't think the Mac is any less capable than a PC in this regard.

Although I thought that the discussion on Mac *versus* PC was misleading, thank you for the useful information in the articles regarding Google Docs.

Sincerely,
Gregory S. Shelness
Professor of Pathology
Wake Forest University School of Medicine

RESPONSE

Thank you for your letter; you bring up some good points about moving presentations across platforms. Personally, I am a longtime Mac user, and so I usually find it difficult to come up with complaints about them. But I think in the area of presentations, Macs do have a few weaknesses. I just got back from our annual meeting in New Orleans and a smaller meeting in Palo Alto, and I found that the biggest hurdle people encountered when preparing to present on a Mac was the absence of an adapter to connect the Mac to the projector. Also, moving presentations created in Keynote onto a PC was a concern. This is not to say that PC-based presentations aren't fraught with problems; it's just that so far, there is no perfect system.

I think, in the end, the best solution will be a technological one: laptops with built-in projectors!

October 8-11, 2009
Boston Park Plaza
Boston, MA

Conference Chairpersons:

Arnold J. Levine
Institute for Advanced Study, Princeton, NJ

Elizabeth H. Blackburn
University of California, San Francisco, CA

Joan S. Brugge
Harvard Medical School, Boston, MA

Robert A. Weinberg
Whitehead Institute for Biomedical Research, Cambridge, MA

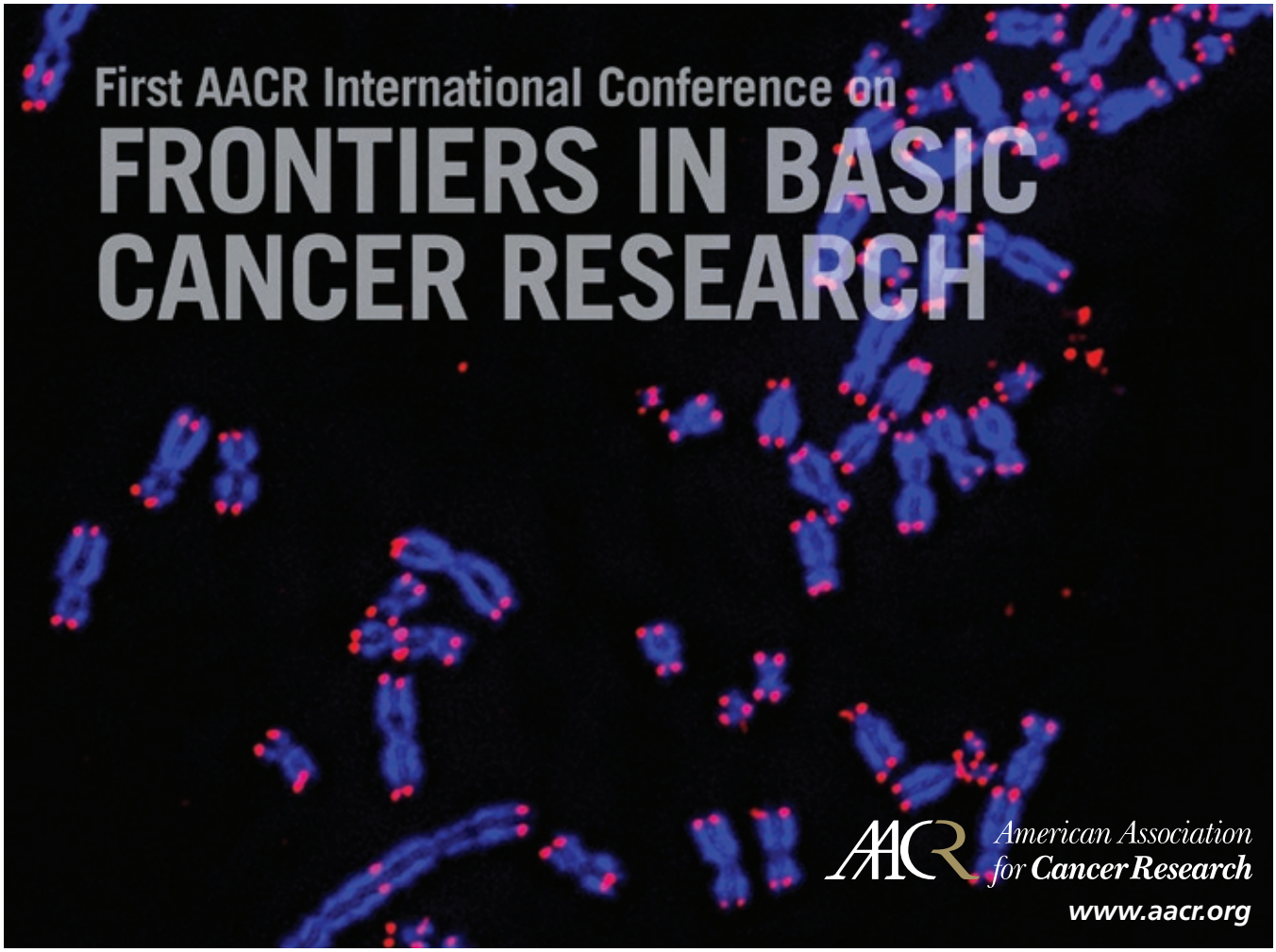
Frontiers in Basic Cancer Research will be a broad-based meeting with the goals of presenting the best in basic cancer research and giving early-career investigators the opportunity to interact with leaders in the field.

Abstract Submission, Award Application, and Early Registration Deadline: August 10, 2009

CONFIRMED SPEAKERS

Julian Adams
Gurinder Atwal
Stephen B. Baylin
Elizabeth H. Blackburn
Thomas Brabletz
Joan S. Brugge
Lewis C. Cantley
Carlo M. Croce
Gerard I. Evan
Alan R. Fersht
Stephen W. Fesik
Stephen H. Friend
Eyal Gottlieb
Daniel A. Haber
William N. Hait
William C. Hahn
Tyler E. Jacks
William G. Kaelin, Jr.
Arnold J. Levine
Scott W. Lowe
Guillermina Lozano
Tak W. Mak
Joan Massagué
Steven L. McKnight
Alea A. Mills
Kornelia Polyak
Neal Rosen
David M. Sabatini
Yigong Shi
Thea Dorothy Tlsty
Robert A. Weinberg

www.aacr.org/meetingcalendar



Same Time Next Year

BY GREG PETSKO

It's a cliché, but I think it does fit: a good time was had by all. Or, at any rate, if not by all, then at least everyone I talked to. The ASBMB Annual Meeting in New Orleans—the 100th in our society's illustrious history—was, I think, a great success. The weather was good, the venue was suitable if a little large (although it was possible to walk from one end of the Convention Center to the other, it was not possible to do so without camping overnight), the talks were terrific, and the locals were, as always, helpful, friendly, and delighted to see us. Because of my presidential duties, I only got to visit the French Quarter twice—once to get a muffuletta at the Central Grocery and once to dine at Tujagues and catch a late set at Preservation Hall—but the food and jazz were as good as I remembered. I hope we'll come back soon, and we will if they get that creationism in the public schools thing sorted out (more on that in a moment).

My favorite part of the meeting turned out, somewhat to my surprise, not to be the scientific talks (though as I said, they were fabulous) but rather the student poster sessions and similar activities. If you go to a meeting like this and don't interact with lots of students, you are definitely missing a ton of fun. Watching them explain their data, seeing the excitement on their faces, and hearing the enthusiasm for science in their voices—well, let me just say that it reminds you of why we all got into this business in the first place. Sometimes we can get so wrapped up in writing grants and teaching courses and refereeing manuscripts and attending committee meetings and all of the other trappings of modern scientific life that we forget the sheer joy of discovery. Well, these kids are experiencing it for the first time, and it's exhilarating to witness. I talked with numerous high school students, college students, and postdocs, and I came away feeling, if not exactly young again, then at least a good bit less old and tired.

Which brings me to an important point: the value of large scientific meetings. A lot of people these days question the utility of big meetings: they last too long; they're so big you never get to meet the people you want to meet; there are too many parallel sessions so you never get to see all the talks you really want to see; they're expensive for what you do get; and so on. Smaller meetings seem to be more in vogue: you know you're going to hear exactly what you want to hear and can see the people you need to see. So why bother attending large ones?

I think there are a couple of very good reasons. Nowhere else are you so likely to stumble into new areas of research. To be sure, for that to happen you have to go to talks outside your area of interest, but I have always believed that's what you should be doing at big meetings anyway. Small meetings are about reinforcing your expertise; big meetings are about expanding your horizons. Many of my projects and collaborations have arisen out of contacts at small meetings, but all of the significant changes of direction that I've taken in my research career have come from ideas generated at large meetings. But the other thing that large meetings have going for them is the sheer density of young people. Small meetings tend to be populated with the same collection of devotees, and the ratio of students to non-students at such meetings is extremely low. Large meetings are where you meet people you would never ordinarily meet, and if you want to drink from the Fountain of Youth that is interacting with students, a big meeting is the place to do it.

I guess what I'm saying is that, properly done, a big meeting is where communities spring up and grow. Our goal in the ASBMB is to create a community of scholars and to make our Annual Meeting the place where that community can come together and nurture its members. We welcome your feedback on how to do that better. Do you think we have too many parallel sessions? Let us know. Do you want more opportunities for small-scale interactions? Suggest how we can provide that. Are there activities that, if held on the last day of the meeting, would practically guarantee you would stay until the end (and thereby help us avoid the embarrassment of outstanding speakers lecturing to small audiences as the meeting winds down)? We'd love to know what they are. This is YOUR meeting, after all.

To be sure, no meeting will ever be perfect. Try as we might, things will inevitably go wrong. Illness or family emergencies will lead to last-minute speaker cancellations, frustrating even the best program planners. One of our awardees was unable to make his talk because thunderstorms grounded his aircraft in Houston. A key speaker at our Evolution of Creationism symposium was derailed by the flu, and another was delayed by more than five hours due to aircraft trouble, thereby proving once again that the existence of the airline industry remains the best evidence against the

concept of Intelligent Design. When such things happen, we muddle along, trusting in our patient, understanding, and good-humored membership to excuse our inability to work miracles. And so, I want to end this message with a special thanks to all of you for displaying all those qualities at the aforementioned symposium, because in spite of the absence of two of the featured participants, over 600 of you came and stayed. You heard how well-supported and relentless are the forces that would inject religious concepts into the teaching of science. And you heard how equally relentless we must be in our efforts to defend that teaching from attempts to distort it, politicize it, and demean it.

But you also heard the symposium end with a call for scientists to reach out to people of faith, to refrain from demonizing religion and its adherents, and to find common ground such as our mutual desire to care for the planet over which we have stewardship. I want to echo that call here. People of faith are not our enemies. True, we must be on guard against those who would force their belief system on our children and our society, and we must make clear that science is not another belief system, but rather an evidence-based way of learning about the world. But all science begins, I think, with a wonder at and love for the world we live in and the universe around us, and it is in that childlike quality, which animates all the best science, that scientists and people of faith can best find mutual respect and opportunities to work together.

Next year, April 24–28 to be precise, we will do it all over again. I hope you can join us. The 101st ASBMB Annual Meeting will be held in Anaheim, CA, the home of the original Disneyland. Should be a great place to bring your family. I was there once, almost 40 years ago (I've never been to the newer one in Florida—never seemed right to have a second one somehow). For the little children, they have Fantasyland, with Mickey Mouse, Donald Duck, Goofy, and other beloved Disney cartoon characters. For slightly older kids, they have Adventureland, with pirate ships and other exciting rides, and Frontierland, with cowboys and wagon trains and gunfights and Native American culture. And of course, for scientists of all ages, there's Tomorrowland, with rocket ships and other technological marvels. I'll still be ASBMB president, so I don't know how much time I'll have to myself, but for old time's sake, I hope I'll get a chance to do what I did 40 years ago: slip away from the scientific meeting (at that time, it was the American Physical Society) and head straight to Fantasyland. Sort of a metaphor for this job, now that I think about it.

FASEB Expands NIH Advocacy Reach through Public Campaign, Social Media

BY CARRIE D. WOLINETZ

FASEB is taking its advocacy for NIH outside of the Beltway and bringing its message straight to the American public. A new effort to support sustainable increases for NIH funding was launched on April 22nd by a coalition of universities, teaching hospitals, patient groups, and scientific organizations. The Research Means Hope campaign will use print, radio, and online advertising as well as electronic and social media to raise public awareness of the critical need for sustained, real growth in federal funding for medical research.

"The lack of sustainable NIH funding threatens to affect an entire generation of young researchers as the difficulty in obtaining grants drives our best and brightest scientists to seek opportunities outside of the lab. We can't afford that loss of talent in our search for medical breakthroughs," stated FASEB President Richard Marchase at the launch of the campaign.

FASEB is a founding member of Research Means Hope. Other founding members include the Association of American Medical Colleges, the Association of American Universities, Johns Hopkins University, and the Association of Public and Land-grant Universities.

This exciting new project, which is being pilot-tested in California and South Carolina, provides opportunities for the public and scientists to let members of Congress know the importance of medical research funded by NIH. It is the culmination of more than a year of public opinion research to examine which messages in support of medical research work best. The two initial pilot regions were chosen based on the affordability of the media markets and their representation in Congress by members who are important decision makers on NIH funding. If the campaign is successful, it may be expanded nationwide. FASEB is encouraging all of its member societies' scientists to spread the word in their own communities about this effort. To view the campaign materials or to get involved, please visit: www.researchmeanshope.org.

> **"The lack of sustainable NIH funding threatens to affect an entire generation of young researchers..."**

FASEB and Social Media

Meanwhile, FASEB is expanding its own reach through the use of social media by launching pages on Twitter and Facebook. "We all know that the potential power of reaching new and larger audiences with social media is tremendous," said Marchase. "FASEB's advocacy goal has always been to convey the critical importance of biomedical research to the health and well-being of our nation. These are exciting new tools to carry that message."

FASEB also hopes that social media will provide more opportunities for scientists and engineers to stay in touch and get involved with science policy issues and advocacy. The Federation wants to ensure that scientists have a variety of resources to keep up to date on science policy news and to express their views to policymakers and the public on issues important to biomedical research. To that end, FASEB has also updated its popular, state-specific slide presentations titled, "Breakthroughs in Bioscience: From NIH-funded Basic Research to Improved Health," with the most recent NIH funding information. The customizable slides are a useful way for researchers to let policymakers or members of their community know about the important medical breakthroughs funded by NIH. They are also a great way for members of Congress, their staff, or the media and the public to learn about federally funded, life-saving medical research in their own states. The slides can be found online at: opa.faseb.org/pages/Publications/NIH_PPT.htm.

Carrie D. Wolinetz is director of Scientific Affairs and Public Relations for the Office of Public Affairs at FASEB. She can be reached at cwolinetz@faseb.org.

See FASEB on:
Twitter: http://twitter.com/FASEBopa
Facebook: http://tinyurl.com/dlcwuj

Scientific Funding Could Be a Prescription for U.S. Economic Woes

BY CONGRESSMAN BRIAN P. BILBRAY (R-CA)

It is no secret that America is in the midst of the worst economic climate since the stagflation days of the 1970s. With unemployment rates at 8.5 percent and on the rise, a declining consumer confidence, and with retirement investments losing nearly half their value across the board, Americans are demanding solutions to our ailing economy.

Over the past few weeks, President Obama and Congress have attempted to solve the problem through various fiscal policies such as a $787 billion stimulus package. Arguments can be made about whether or not the package was necessary; one thing that should not be argued, however, is the need for a robust bipartisan investment in science and technology to jump-start our economy.

Throughout our nation's history, science and technology have been catalysts in helping the United States transcend some of its darkest economic periods. According to Niall Ferguson,[1] part of the reason the United States has been able to survive disastrous financial crises is that our country has long been "the world's most benign environment for technological innovation and entrepreneurship." Ferguson notes that "the Depression saw a 30 percent contraction in economic output and 25 percent increase in unemployment. But throughout the 1930s, American companies continued to pioneer new ways of making and doing things: think of DuPont (nylon), RCA (radio), and IBM (accounting machines)." Similarly, the high rate of inflation of the 1970s did not deter some of the world's largest computer firms from being started (Microsoft and Apple). Investing in today's scientific infrastructure is no exception to this.

Funding for NIH and NSF has the power to spur the kind of investments that will put us on the path to our future economic recovery. In fiscal year 2007, on average, each dollar of NIH funding generated roughly $2.50 in state economic output. This means that the $22.8 billion NIH received in 2007 generated $50.54 billion in new state business activity. Furthermore, NIH grants and contracts created and supported more than 350,000 jobs and generated wages in excess of $18 billion throughout the United States.

The NSF has a similar return on investment to NIH. Research started at the NSF has been instrumental in the success of many American companies. A digital library initiative grant awarded to Stanford University produced the internet legend Google. An NSF small business innovation research grant led to the development of one of our nation's leading alternative fuel producers, Virent, which is now creating a "green gasoline" from non-food crops that will reduce CO_2 emissions without driving up food costs. And a series of under $1 million grants to the University of Illinois led to the creation of Mosaic, the first web browser, which popularized the Internet and had a direct hand in creating the hundreds of thousands of jobs supported today by the electronic economy sustained through the World Wide Web.

However, for these funding initiatives to truly make an impact on our economy, they cannot exist in a vacuum or at a single point in time. Our government's "peak and valley" pattern of scientific funding must be replaced with a steady and consistent funding stream. It is disruptive to the flow of the scientific process if funding levels are flying high one year, only to be followed the next year with a crash landing. If we are to truly harness the best that our researchers have to offer, we must settle on consistent funding levels that are fiscally responsible, prudent, and scientifically sound. We must also recognize this funding as part of our national responsibility to promote the progress of science, a responsibility justified in Article One of the United States Constitution.

Nearly 70 years ago, President Franklin D. Roosevelt dedicated the first building at NIH with the immortal words, "We cannot be a strong nation unless we are a healthy nation." With a sustained commitment to resources for our nation's scientific enterprise, we can have both.

Congressman Brian P. Bilbray (R-CA) is a member of the House Committee on Science and Technology and co-chair of the Biomedical Research Caucus.

REFERENCE

Ferguson, N. (2009) What "Chimerica" Hath Wrought. *The American Interest Online*. Available from: www.the-american-interest.com/article.cfm?piece=533.

President's 2010 Budget a Disappointment to NIH Advocates

BY PETER FARNHAM

President Obama released his administration's 2010 budget proposal on Friday, May 8, and it landed with a bit of a thud, at least as far as NIH advocates were concerned. The budget proposes a 1.45 percent increase in NIH funding for 2010, a mere $445 million. And most of this has already been spoken for. $141 million of it goes to fund autism research, and the rest goes to support "cancer research," a research direction Obama said he would fund with a total of $6 billion in comments on the budget proposal he released in March.

In more bad news, the budget proposes a total of 9,849 new and competing Research Project Grants, a total of seven over the 2009 level. Noncompeting continuations are provided with inflationary increases of about 2 percent.

Overall, 52.9 percent of NIH's budget will be spent on research project grants and about 10.4 percent will go to support the intramural program at NIH.

Administration officials were quick to offer preemptive defenses of the proposal. NIH Acting Director Raynard Kington tried to be reassuring at the agency's budget briefing on the afternoon of May 8 at the NIH campus. And, in a sign that newly sworn-in HHS Secretary Kathleen Sebelius had been briefed on the complexities of the funding situation at NIH regarding the $10 billion in stimulus money NIH received in March, she said that "we certainly need to begin working on what happens in 2011 and 2012" with NIH's budget.

This is in reference to the "cliff" that NIH grantees face when the stimulus money runs out at the end of 2010. Readers of *ASBMB Today* will recall that the $10 billion in new—and temporary—money NIH received under the stimulus package was to be spent within two years, that is, by the end of 2010. Thus, unless there are major changes in NIH funding between now and 2011, NIH's overall budget will drop from about $40 billion to about $30 billion starting in 2011.

FASEB President Dick Marchase noted that "we would like to have seen the strong support for medical research expressed by President Obama matched by sizable funding increases for the National Institutes of Health in his fiscal year (FY) 2010 budget, although we remain optimistic about the future." After expressing gratitude for the stimulus funding and the small increase NIH received when other agencies were facing cuts, he continued, "the budget still raises serious concerns about the sustainability of the biomedical research enterprise. We need to ensure that jobs and innovations are maintained past FY 2011; it would be frustrating to lose ground when the scientific potential is so great and new medical breakthroughs may be so close."

FASEB (and ASBMB) have endorsed a 7 percent increase for NIH in FY 2010, as the first step in a long-term, sustainable, and predictable rate of growth in the NIH budget.

A senior official at the Association of American Medical Colleges noted that "The big question is: what happens when the recovery funds run out? We have created a lot of new infrastructure and created a lot more grants. When that $10 billion runs out, if the regular appropriation isn't able to take up that capacity, are we going to fall off of the cliff again?"

Senior scientists within ASBMB's membership with whom we have spoken also expressed considerable disappointment. One called the budget a "train wreck," while another allowed that, although the budget was not necessarily a train wreck, "we are on a siding and we won't get off until other things are cleaned up—and that is going to take a while."

Kington also commented on the cancer research money in the President's budget proposal. There has been grumbling that President Obama has unfairly singled out cancer for special treatment in the NIH budget (in fact, his long-term plan calls for a doubling of cancer research funding by 2017). Kington noted that "every single NIH

institute and center, I think, funds cancer research, so we are committed to advancing science in this area. I don't think that's inconsistent with the broad mission of the agency in any way."

The Clinical and Translational Science Award program at the National Center for Research Resources received a small cut, from $475 million in FY 2009 to $441.7 million in FY 2010. However, the cut was not considered significant enough to deter continued growth for the program.

A nine-page summary of the President's budget proposal is available on the NIH website at http://officeofbudget.od.nih.gov/ui/BudgetRequest.htm.

Good News for National Science Foundation, VA, DOE

The National Science Foundation enjoys strong budget growth under President Obama's proposal, continuing a trend begun during the Bush Administration, which strongly supported NSF increases. The President's budget proposes an NSF appropriation of $7 billion, an 8.53 percent increase. Core research programs at NSF would increase more than 10 percent to $5.7 billion. This increase comes on top of the $3 billion NSF received earlier this year under the stimulus package. The major research equipment and facilities construction account at NSF decreases by $35 million from 2009, although it did receive a stimulus boost earlier this year.

The Department of Veterans Affairs Medical and Prosthetic Research program received a very good 13 percent increase over 2009, increasing to $580 million.

Finally, the Department of Energy's Office of Science, which received $1.6 billion in stimulus money earlier this year, would get a regular budget increase of $100 million, increasing to $4.9 billion in 2010.

NIH Issues Conflict of Interest Notice

BY PETER FARNHAM

On May 11, NIH issued an Advance Notice of Proposed Rulemaking (ANPRM), published in the Federal Register, to gain public comments on whether modifications are needed to the Public Health Service regulations on the subject. Comments are due by July 7, 2009.

In 1995, the Public Health Service (PHS) and the Office of the Secretary of Health and Human Services (HHS) published regulations designed to promote objectivity in PHS-funded research by establishing standards to ensure that the design, conduct, and reporting of research funded under PHS grants, cooperative agreements, or contracts were not biased by any conflicting financial interest of an investigator.

Since these regulations were published, according to the notice, "the pace of translation of new discoveries from the research bench into effective treatment of patients has significantly accelerated. As a result, the biomedical research enterprise in the United States is extensive and growing in size and complexity. Recognition of the increasing complexity of biomedical research and the increased interaction between government and the private sector in meeting common public health goals have heightened public scrutiny regarding the regulatory requirements for investigator disclosure, management of conflicts, and federal oversight and have raised the question of whether changes to the regulation may be needed."

NIH staff believe that the complexities surrounding conflict of interest as an issue warrants a carefully considered, open dialogue with all affected parties to enhance regulatory compliance and effective oversight. Consequently, NIH seeks public comments on all aspects of potential regulation in this area and particularly on the following issues:

- expanding the scope of the regulation and disclosure of interests;
- the definition of "Significant Financial Interest;"
- identification and management of conflicts by institutions;
- assuring institutional compliance;
- requiring institutions to provide additional information to the PHS; and
- broadening the regulations to address institutional conflicts of interest.

A complete copy of the ANPRM can be found at: http://edocket.access.gpo.gov/2009/pdf/E9-10666.pdf.

The ASBMB Public Affairs Advisory Committee will be discussing this issue in the coming months; if you have thoughts on the subject, please share them with the ASBMB Public Affairs office at publicaffairs@asbmb.org.

Peter Farnham is director of Public Affairs at ASBMB. He can be reached at pfarnham@asbmb.org.

asbmb member spotlight

Bassler Presented with Wiley Prize

Bonnie Bassler, director of Graduate Studies and professor in the Department of Molecular Biology at Princeton University, has been awarded the eighth annual Wiley Prize in Biomedical Sciences. She was selected for her pioneering investigations of quorum sensing, a mechanism that allows bacteria to "talk" to each other to coordinate their behavior, even between species.

Bassler, who is also a Howard Hughes Medical Institute Investigator, studies the molecular mechanisms that bacteria use for intercellular communication. Her goal is to understand how bacteria detect multiple environmental cues and how the integration and processing of this information results in the precise regulation of gene expression.

The Wiley Prize in Biomedical Sciences is intended to recognize breakthrough findings in pure or applied life science research that is distinguished by its excellence, originality, and impact on our understanding of biological systems and processes. The international award is presented annually and consists of a $35,000 prize and a luncheon in honor of the recipient. The award is presented at a ceremony at The Rockefeller University, where the recipient delivers an honorary lecture as part of The Rockefeller University Lecture Series.

Hilvert Honored with Emil Thomas Kaiser Award

Donald Hilvert, a professor at the Swiss Federal Institute of Technology in Zurich, will be honored with the Protein Society's 2009 Emil Thomas Kaiser Award this summer. The award recognizes a recent, highly significant contribution in applying chemistry to the study of proteins.

Hilvert has been using chemistry to study proteins since he engineered semi-synthetic flavoenzymes with unexpected redox activities as a postdoctoral fellow. In collaboration with William Rutter (UCSF), he contributed to some of the earliest experiments in site-directed mutagenesis of enzymes. And, during his 20-year independent career, Hilvert has made seminal contributions to a range of interesting and challenging problems in enzymology and enzyme engineering. These contributions include the engineering and mechanistic analysis of catalytic antibodies, selenoenzymes, naturally occurring enzymes (*e.g.* chorismate mutase, PLP-dependent enzymes, and macrophomate synthase) and most recently, *de novo* designed enzymes. In the process, Hilvert and his collaborators have elucidated highly illustrative concepts regarding the similarities and differences between catalysis of proton transfer, Diels-Alder cycloaddition, Claisen rearrangement, decarboxylation, and aldol reactions by natural and manmade enzymes.

Chance Receives Honorary Degree

Britton Chance, Eldridge Reeves Johnson University Professor Emeritus of Biophysics at the University of Pennsylvania, received an honorary degree from Huazhong University of Science and Technology (HUST) this past April. In China, honorary degrees must be approved by the State Council's Academic Degree Committee and are generally conferred by a qualified education "unit" upon foreign experts, scientists, statesmen, and social activists for their contributions to academic, economic, educational, cultural, and health fields.

Chance is often recognized as the "father" of biophotonics because of his pioneering work on human optical spectrums, and throughout his research career, he has actively recruited and hosted Chinese students in his laboratory. As a result, in 1997, the first laboratory dedicated to biomedical photonics was established in China and was named the Britton Chance Center for Biomedical Photonics. Chance has been actively involved in setting up this laboratory, which is located at HUST. This close interaction has resulted in a world-class group of scientists researching topics ranging from brain activity to pancreatic cancer. In recognition of his contributions to Chinese science, Chance has also received the Friendship Award from the State Administration of Foreign Experts Affairs of China, as well as the Chime Bell Award from the Hubei government.

Dong Honored by AAI

Chen Dong, a professor in the immunology department at the University of Texas MD Anderson Cancer Center and Director of the Center of Inflammation and Cancer, was selected to receive the 2009 AAI-BD Biosciences Investigator Award from the American Association of Immunologists (AAI).

According to AAI, Dong received the award for his discovery of T helper cell 17 (Th17), its production of the inflammatory molecule interleukin-17 (IL-17), and their central role in both inflammatory and autoimmune diseases. The award, which recognizes outstanding, early-career research contributions to the field of immunology, was presented to Dong at the AAI annual meeting this past May.

Dong and his colleagues are currently studying the molecular mechanisms governing T cell tolerance to self antigens; the functional diversity and plasticity of helper T cells in immune responses; the molecular regulation of inflammatory responses; and the signal transduction mechanisms used during innate immune responses, with particular interests in the MAP kinase and ubiquitination pathways.

Guengerich Receives Award for Outstanding Achievement

F. Peter Guengerich, Harry Pearson Broquist Professor of Biochemistry and director of the Center in Molecular Toxicology at Vanderbilt University School of Medicine, received the third annual American Association for Cancer Research's Award for Outstanding Achievement in Chemistry in Cancer Research.

The award, which was established in 2007, recognizes the importance of chemistry to advancements in cancer research. It 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.

Guengerich was honored for his studies on the role of human cytochrome P450 in the metabolic activation of carcinogens to intermediates that mutate genes. He has also made major advances in the understanding of the reactions of metabolically activated carcinogens with DNA to form adducts, defining the details of mechanisms of several classes of carcinogens including the arylamines, vinyl halides, and dihaloalkanes.

Guengerich is a past recipient of the ASBMB Rose Award and is currently a *Journal of Biological Chemistry* Associate Editor.

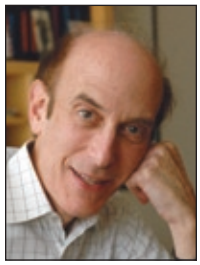
Campbell to Receive Prize in Developmental Biology

Kevin P. Campbell, professor and head of Molecular Physiology and Biophysics at the University of Iowa Roy J. and Lucille A. Carver College of Medicine, has been selected to receive the 2009 March of Dimes prize in Developmental Biology. Campbell will share the prize with Louis M. Kunkel for their pioneering work identifying the genes and proteins that cause muscular dystrophy.

Campbell is a Howard Hughes Medical Institute investigator as well as the Roy J. Carver Chair of Molecular Physiology and Biophysics and director of the Senator Paul D. Wellstone Muscular Dystrophy Cooperative Research Center. His work focuses on dystrophin, a cytoskeletal protein that is absent in the skeletal and cardiac muscle of patients with Duchenne muscular dystrophy. Current projects in his laboratory are aimed at determining the function of the dystrophin-glycoprotein complex.

The March of Dimes Prize has been awarded annually since 1996 to investigators whose research has profoundly advanced the science that underlies the understanding of birth defects. The prize was created as a tribute to Jonas Salk, who received Foundation support for his work to create a polio vaccine.

Lippard to Receive Linus Pauling Medal



Stephen J. Lippard, Arthur Amos Noyes professor of Chemistry at the Massachusetts Institute of Technology, will receive the 2009 Linus Pauling Medal from the Puget Sound, Oregon, and Portland Sections of the American Chemical Society. The annual award recognizes outstanding accomplishments in chemistry in the spirit of Linus Pauling, a native of the Pacific Northwest. Lippard is being honored for outstanding contributions to chemistry meriting national and international recognition.

Lippard's laboratory discovered and named the first metal-lointercalators, platinum terpyridine complexes that insert between the DNA base pairs and unwind the duplex. This research was followed by extensive studies of the covalent interactions of cisplatin and related anticancer drugs with DNA and an understanding of many of the features of the molecular mechanism of action. Lippard has also characterized proteins that form the soluble methane monooxygenase (MMO) and related systems in bacteria and has solved the x-ray crystal structures of the hydroxylase enzymes from MMO, toluene monooxygenase, and phenol hydroxylase. Through extensive spectroscopic and theoretical analyses and with the participation of several collaborators, many aspects of the molecular mechanism of dioxygen activation and alkane/arene hydroxylation were established by Lippard. In parallel work, synthetic models of the carboxylate-bridged diiron center in the hydroxylase were prepared as both structural and functional mimics of the enzyme active sites.

Five ASBMB Members Elected to NAS

Five ASBMB members are among the 72 new members and 18 foreign associates elected to the National Academy of Sciences in 2009. Election to the NAS is considered to be one of the most prestigious honors a scientist can receive. Those elected this year bring the total number of active NAS members to 2,150 and foreign associates to 404.

ASBMB would like to congratulate the following members for this achievement:

- **MARIAN B. CARLSON,** Professor, Department of Genetics and Development and Department of Microbiology, Columbia University, New York
- **JULI FEIGON,** Professor, Department of Chemistry and Biochemistry, University of California, Los Angeles
- **ROBERT L. FISCHER,** Distinguished Professor of Plant Biology, Department of Plant and Microbial Biology, University of California, Berkeley
- **HIROSHI NIKAIDO,** Professor of Biochemistry and Molecular Biology, Department of Molecular and Cell Biology, University of California, Berkeley
- **KEVAN M. SHOKAT,** Investigator, Howard Hughes Medical Institute, and Professor of Cellular and Molecular Pharmacology, Department of Cellular and Molecular Pharmacology, University of California, San Francisco

Bask in the California Sunshine—*Reserve the Dates!*

BY LAURIE S. KAGUNI

The 2010 Annual Meeting of the American Society for Biochemistry and Molecular Biology will be held in Anaheim, CA, in conjunction with Experimental Biology on April 24–28, 2010. The Society will offer an integrated and stimulating scientific program and a variety of special events during the meeting, including an Opening Reception, Thematic Receptions, a 5K Fun Run, and a Meet the Speakers Lunch.

Award Lectures

Myriad award lectures will punctuate scientific sessions and social activities. These lectures include the opening Herbert Tabor/JBC Lectureship, the ASBMB-Merck Award, the ASBMB Award for Exemplary Contributions to Education, the Avanti Award in Lipids, the William C. Rose Award, the Herbert A. Sober Lectureship Award, and the ASBMB/Schering-Plough Research Institute Award.

The Scientific Program

At the heart of the 2010 Annual Meeting is the scientific program organized by the ASBMB Program Planning Committee. The committee, in conjunction with the ASBMB Meetings Committee, has organized a dynamic and diverse scientific program that embraces the fundamental interest of the ASBMB membership, namely the "Chemistry of Life."

Highlighting the scientific scope of the Society, the scientific program will be organized into three Thematic Groups, with scheduling of individual Thematic Programs arranged to enhance maximal participation of meeting attendees. The Thematic Programs have been developed to provide in-depth coverage of specific topics within general areas, with the goal of appealing to biochemists and molecular biologists at all professional levels.

Genome Dynamics

The Genome Dynamics Thematic Group will address the central dogma of molecular biology through the themes of DNA Transactions (co-chairs: Thomas A. Kunkel, NIEHS and Ellen H. Fanning, Vanderbilt University), Chromatin and Transcription (co-chairs: Raymond C. Trievel, University of Michigan and Joseph C. Reese, Pennsylvania State University), Biological Chemistry of RNA (co-chairs: Martha J. Fedor, The Scripps Research Institute and Sarah A. Woodson, Johns Hopkins University), and Protein Synthesis, Catalysis, and Turnover (co-chairs: Terry Goss Kinzy, UMDNJ and Zhen-Qiang Pan, Mount Sinai School of Medicine).

Metabolism

The Metabolism Thematic Group will highlight regulation in human health and disease in themes of Lipid Interactions in Physiology and Disease (co-chairs: Daniel M. Raben, Johns Hopkins University and Mary F. Roberts, Boston College) and Metabolism and Disease (co-Chairs: John M. Denu, University of Wisconsin and Gerald W. Hart, Johns Hopkins University).

Cell Systems

The chemical nature and dynamics of cellular systems and macromolecules will be addressed in the Cell Systems Thematic Group. Themes include New Frontiers in Genomics and Quantitative Proteomics (co-chairs: Michael P. Washburn, Stowers Institute for Medical Research and David N. Arnosti, Michigan State University), Chemical Biology and Drug Discovery (co-chairs: Peter J. Tonge, Stony Brook University and Adrian Whitty, Boston University) and Systems Biology, Synthetic Biology, and Signal Transduction (co-chairs: James E. Ferrell, Stanford University and Wendell A. Lim, UCSF).

Symposia

Each theme in the three Thematic Groups hosts a symposium on each of the four days during the meeting, which will be held in alternating morning and afternoon sessions. Allied theme symposia will be scheduled at alternate, rather than concurrent times to offer attendees greater flexibility in planning their activities. Three short presentations are scheduled in each symposium that will be presented by individuals selected from submitted abstracts, with an emphasis on more junior scientists. Attendees will also have the opportunity to present their work in poster sessions that will be held during each day of the meeting.

Topical and Technical Workshops

ASBMB will offer additional opportunities for professional interactions at the 2010 Annual Meeting, in the format of topical and technical workshops. The Society's new Lipid Research Division will offer a workshop titled "Lipidology—From Basics to Biofuels and Cancer Therapeutics." A hands-on workshop titled "Protein Mass Spectrometry for Proteomics" will also be featured. In addition, the recent tradition begun at the 2006 Centennial Meeting of presenting Thematic Receptions following an afternoon session of the thematic symposia will continue, allowing attendees at all scientific levels to interact scientifically and to socialize. Members representing the scientific industry are encouraged to participate in both the scientific symposia and workshop programs and to offer suggestions of other possible avenues for engaging younger scientists.

Education and Minority Affairs

The Society continues its commitment to promote the research efforts of junior scientists at the undergraduate, graduate, and postdoctoral levels and to accentuate their interactions at the Annual Meeting. The Education & Professional Development theme (chaired by Peter J. Kennelly, Virginia Polytechnic Institute and State University) will offer symposia on Careers and Professional Preparation for BMB Students. The Minority Affairs theme (co-chaired by Craig E. Cameron, Pennsylvania State University and Robert S. Hoover, University of Chicago) will offer symposia on Hypertension: Mechanisms, Therapies, and Disparities. Undergraduate and Graduate/Postdoctoral Poster Sessions and Symposia will be held in conjunction with the EPD and MAC platforms, and all meeting registrants are welcome to attend these special sessions. A Meet the Speakers Lunch is also being planned.

ASBMB Today

Upcoming issues of *ASBMB Today* will present full-length articles describing the meeting themes and detailed information on the multifarious activities planned for the 2010 Annual Meeting.

Laurie S. Kaguni, ASBMB Meetings Committee Chair, is a professor in the Biochemistry and Molecular Biology Department at Michigan State University. She can be reached at lskaguni@msu.edu.

Biomedical Infrastructure in Chaotic Times

BY ALLEN DODSON

Is the recent economic stimulus legislation, in the context of the flat budgets of the past several years at NIH, a "$10 billion pulse-chase experiment" in support of biomedical infrastructure? Phil Needleman, an eminent researcher retired from both Washington University and Pfizer, colorfully gave the stimulus that description while speaking at an ASBMB annual meeting symposium organized by the ASBMB Public Affairs Advisory Committee (PAAC) and moderated by PAAC chair, Ralph Bradshaw. Needleman noted that the stimulus was certainly a less than ideal solution to NIH funding problems, particularly as they affect the support of technology development and deployment. In such an unusual and uncertain financial climate, how can NIH balance the needs of translational research against basic biomedical infrastructure and technological innovation?

To answer this question, the PAAC brought together some of the most prominent names in research technology to analyze the problems and explore options.

Examining the CTSAs

Much of the controversy in this area has focused on the prominent Clinical and Translational Science Award (CTSA) program administered by the National Center for Research Resources (NCRR), which is seen as a direct competitor for funding by many supporters of other technology programs. Barbara Alving, Director of the NCRR at NIH, offered her vision for the CTSAs at the ASBMB symposium. Alving noted that researchers with medical doctorates make up an increasingly small proportion of NIH grant awardees, at a time when industry is focused on product development. She also feels that the program, which she hopes will expand to its originally planned 60 center locations and $500 million annual budget, is necessary to improve the efficiency of transitioning research from the bench to clinical treatments.

To better understand the program's potential, ASBMB invited Henry Ginsberg, director of the CTSA of Columbia University Medical School and a prominent scientist in his own right, to describe his experiences. He noted that the CTSA at Columbia has greatly improved clinical infrastructure, allowing the university to facilitate collaboration between scientists of various disciplines and experts in statistics, regulatory affairs, and intellectual property elsewhere on campus. Wah Chiu, head of an NIH Biomedical Technology Resource Center (P41) at Baylor, agreed that CTSAs offered great potential, noting that he had collaborated with a local CTSA in Houston.

Needleman offered several proposals to improve the field, such as revamping the structure of clinical trials, funding pilot grants for validation of potential drug targets, and founding a Clinical Science Training Program (perhaps within the CTSAs) to train the next generation of investigators. Drawing on his experience in industry, Needleman argued that spreading the funding among the large number of planned centers duplicates effort and that a smaller number of centers with more funding might be more effective in an era of tight budgets.

Technological Innovation in the Balance

The P41 program at NCRR, of long standing and high productivity, is one of the areas feeling the funding crunch. Catherine Costello, director of the P41-supported Mass Spectrometry Resource at Boston University, observed that cuts in the P41 budgets have forced centers to apply for competitive small instrumentation grants (through the SBIR program) to fulfill their necessary role at the forefront of technological development. Also, because these awards can only be used to purchase commercially available equipment, they are not available for development of prototypes.

Other P41 directors expressed concern about personnel issues. Al Burlingame, who heads a Mass Spectrometry facility at UCSF, noted that he could no longer afford to hire interdisciplinary staff members due to reduced budgets. Keith Hodgson, director of the SLAC laboratory at Stanford, agreed, praising the past record of the P41 program for its role in producing the researchers needed to pursue cutting-edge science and development.

Michael Marron, director of the Division for Biomedical Technology at NCRR, remarked that the P41s are also charged with distribution of new technology and providing training so that the technology can become widely used. Alving also praised the P41s, stating that they are not going away, though she cautioned that they should look at ways to increase their efficiency given the challenge of limited funding.

No Easy Answers

Alving stated that there is an issue of balance supporting the CTSAs in an era of dialed back budgets. Marron agreed, noting that the recent budget woes at P41s have simply been the result of NIH-wide flat funding, rather than targeted cuts to the program. Alving pointed out that NCRR is a "center of centers," faced with needs to support a wide portfolio, which includes CTSAs, P41, and geographic diversity initiatives (such as the IDeA program). As Bradshaw observed in his introductory remarks for the symposium, the combination of past budget inadequacies and the extensive demands introduced by new and expanded programs has placed NIH in a very difficult position *vis-à-vis* technology support. He suggested that it may be time for a fresh look at portfolio distribution and allocation priorities within NIH.

Though the ASBMB PAAC symposium, which brought together representatives with a wide variety of viewpoints for a productive discussion of the issues, was a major success, the conversation is not over. Alving announced that NCRR will hold a conference in July 2009 to continue the discussion of institutional policies, experiences with shared core facilities, service, equipment, personnel needs, and specific needs of NIH. Members of ASBMB will surely look at the outcome of this meeting with substantial interest.

Allen Dodson is an ASBMB Science Policy Fellow. He can be reached at adodson@asbmb.org.

ASBMB's New Orleans Evolution Symposium a Big Hit

BY PETER FARNHAM

The ASBMB Public Affairs Advisory Committee continued its track record of pulling off large, well-attended symposia on important topics in public affairs with its April 20 symposium on "The Evolution of Creationism," held in New Orleans during the Society's 2009 annual meeting.

More than 600 people turned out to hear presentations by Barbara Forrest, a philosophy professor at Southeastern Louisiana University, and Ken Miller, a cell biology professor at Brown University. Both have been long-time advocates and activists in the area of evolution education.

The symposium was particularly well-timed and well-placed, being held in Louisiana, whose governor, Rep. Bobby Jindal, signed the Louisiana Science Education Act several months ago over the objections of most scientific organizations and scientists in the state. The act makes it easier to teach creationism in public school biology classrooms under the guise of "intelligent design."

Forrest traced the history of the current creationist movement in Louisiana and described how the act was in fact a brainchild of various creationist groups and not a free-standing, independent act to promote true scientific inquiry, as its sponsors had described it.

The concept of intelligent design holds that life on earth is too complex to have arisen by chance alone and that some overarching intelligence had to have been responsible for its beginnings. A key concept of intelligent design is that of "irreducible complexity," which holds that there are certain biological systems that cannot perform their functions if a single part is missing; therefore, they could not have evolved—they must have been created whole.

Miller's talk in particular focused on this concept and others related to the science of evolution and eloquently demonstrated how none of the assertions made by supporters of intelligent design, including that of irreducible complexity, have any basis in scientific reality.

Travel and illness problems precluded the participation of two of the four scheduled speakers, but ASBMB President Gregory Petsko performed yeoman's duty and presided at the symposium, giving an introductory talk that set the stage and kept the audience focused and in place for the two talks that followed.

The entire symposium was filmed and will be posted on the ASBMB website in the near future. We will, of course, inform you when it is available for viewing.

Peter Farnham is director of Public Affairs at ASBMB. He can be reached at pfarnham@asbmb.org.

scenes from

Tabor: John Grinnell of Cadmus Communications (*left*) presents David Davies (*center*) with the Herbert Tabor/*Journal of Biological Chemistry* Lectureship Award while Gregory Petsko (*right*) looks on.

Merck: John Kuriyan (*right*) accepts the ASBMB-Merck Award from Gregory Petsko.

Avanti: (*left to right*) Al Merrill, Sarah Spiegel, and Walt Shaw, at Spiegel's Avanti Award in Lipids lecture.

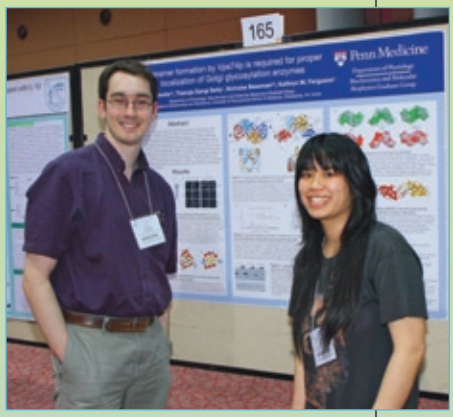
Schering-Plough: Phillip Zamore (*second from right*) accepts the ASBMB-Schering-Plough Research Institute Award. Also in the photo are (*left to right*) Gregory Petsko, Madhu Chitala of Schering-Plough, and C. Robert Matthews.

Advances in Lipid Metabolism: (*Left to right*) Stephen Young, Joseph L. Goldstein, Nobuyo Maeda, Jeffrey Gordon, Michael S. Brown, and Joseph Witztum celebrate the Golden Anniversary of the *Journal of Lipid Research*.

New Orleans

FASEB: (*Left to right*) Uma Kuchibhotla of Eli Lilly & Co., Susan Lindquist, Mark Lively, and Guy Fogleman get together at the presentation of the FASEB Excellence in Science Award, won by Lindquist.

Rose: Suzanne Pfeffer (*left*) and Gregory Petsko present the William C. Rose Award to Sandra Schmid.



Karl Schmitz discusses his poster at the Graduate and Postdoctoral Travel Award Symposium and Poster Session.

Education: Rochelle Schwartz-Bloom accepts the ASBMB Award for Exemplary Contributions to Education from (*left to right*) Ellis Bell, Craig Cameron, and Gregory Petsko.

Thematic Receptions: Meeting attendees network and discuss science at the thematic receptions following the afternoon symposia.

Women Scientists: Adele J. Wolfson (*left*) chairs a panel on which New Orleans locals (*left to right*) Laura Levy, Sunyoung Kim, Maureen Shuh, and Fiona Inglis speak about how their lives and research were affected by Hurricane Katrina.

(*left to right*) Alex Toker, James Hurley, and Mark Lemmon chat at the President's Reception.

President's Reception: ASBMB Executive Director Barbara Gordon and *JBC* Associate Editor Jerry Lingrel at the President's Reception.

Opening Reception: Meeting attendees relax at the opening reception in preparation for several days of exciting lectures.

Grad-Postdoc Program: Puneet Seth and Sara Gremillion listen while a panel discusses career options at the Graduate Student Postdoctoral Fellow Professional Development Session.

Petsko: Gregory Petsko addresses audience members at the Women Scientists Networking Event.

Hurley: 2009 Annual Meeting organizer James Hurley addresses the audience at the Herbert Tabor/*Journal of Biological Chemistry* Opening Lecture.

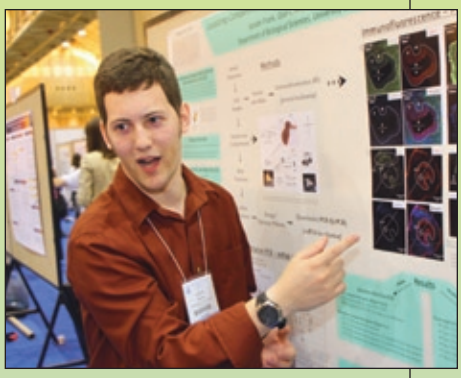
(*left to right*) David Chiluiza, Jun Ling, Sean Hu, and Wei Su discuss the day's talks at the Lipids and Signaling Thematic Reception.

Students network over lunch at the Graduate Student and Postdoctoral Fellow Networking Luncheon.

Grad-Postdoc Plenary: Audience members listen to Michael F. Summers' keynote lecture at the Graduate Student and Postdoctoral Fellow Travel Award Symposium and Poster Session.

Grad-Postdoc poster: Gabriela Granados enjoys some pasta at the Graduate Student and Postdoctoral Fellow Travel Award Symposium and Poster Session.

Minority Scientists Lunch: ASBMB Minority Affairs Committee member Thomas Landefeld and Kevin McKenzie at the Minority Scientists' Lunch.



Undergrad Poster Competition: Sander Frank explains his research at the undergraduate poster competition.

(*left to right*) Irene Evans, Andrea Sturm, Maria Selmer, and Karen Cooper share some drinks and food at the opening reception.

Fun Run Results

FEMALE RUNNERS:

1st – Luise King, Time: 21:42
University of Missouri

2nd – Sarah Everman, Time: 22:09
Arizona State University

3rd – Kathryn Brogan, Time: 23:09
Wayne State University

MALE RUNNERS:

1st – Erik Bakker, Time: 17:30
Academic Medical Center, Amsterdam

2nd – Kenneth Hallows, Time: 18:01
University of Pittsburgh

3rd – Juan Cordovez, Time: 18:19
SUNY – Stony Brook

Fun Run: Runners get ready to race at the starting line of the ASBMB 5K Fun Run.

2009 Thematic Best Poster Awards

Each year, all volunteered poster abstracts are judged by the Program Planning Committee for consideration of a Best Poster Award. This year, the Society awarded two $500 Best Poster Awards in each of the following scientific themes. Thank you to our judges and congratulations to all of our winners.

If you are a registered meeting attendee, you can see some of these posters plus many other uploaded meeting posters online at: submissions.miracd.com/eb2009/EPoster.

DNA Replication, Repair, and Recombination

Kausiki Datta, *University of Oregon*
Solution conformations of primer DNA shuttling between the polymerase and 3'-5' exonuclease sites of DNA polymerase I
PROGRAM NUMBER: 481.7

Jinjin Zhang, *The Ohio State University*
Crystal structure of *Escherichia coli* RecE exonuclease reveals a toroidal tetramer and a conserved architecture or processive DNA digestion PROGRAM NUMBER: 655.5

Chromatin Regulation

Min Zhang, *Indiana University School of Medicine*
The role of SWI/SNF in regulating smooth muscle differentiation PROGRAM NUMBER: 490.3

Erin Bowers, *Johns Hopkins University School of Medicine*
Identification and characterization of a novel p300 HAT inhibitor PROGRAM NUMBER: 488.1

Gene Regulation: Transcription Initiation and Elongation

Jung-Hoon Kang, *NIH/NICHD*
Interaction domains of components of the ER&α/Sp1 and C/EBP&β complex essential for prolactin receptor transcription PROGRAM NUMBER: 494.4

Deirdre O'Mara, *The Pingry School*
Physical models of transcription factors activated via histidine kinase two-component signal transduction signaling pathways
PROGRAM NUMBER: 495.18

RNA: Processing, Transport, and Regulatory Mechanisms

Mindy Steiniger, *University of North Carolina at Chapel Hill*
A subset of poly(A) factors is required for histone pre-mRNA processing in *Drosophila melanogaster* PROGRAM NUMBER: 662.7

Katie Deigan, *University of North Carolina at Chapel Hill*
Accurate SHAPE-directed RNA structure prediction PROGRAM NUMBER: 843.2

Protein Synthesis and Turnover

Haripriya Ramu, *University of Illinois, Chicago*
Nascent peptide-dependent ribosome stalling in drug-inducible antibiotic resistance
PROGRAM NUMBER: 496.5

Virginia Paola Ronchi, *Louisiana State University Health Sciences Center School of Medicine*
Functional characterization of UbcH7 interaction with the E6AP ubiquitin ligase
PROGRAM NUMBER: 848.7

Protein Folding, Aggregation, and Chaperones

Warren Kruger, *Fox Chase Cancer Center, Philadelphia*
Function rescue of mutant human cystathionine beta-synthase by manipulation of Hsp26 and C87 PROGRAM NUMBER: 673.5

Tatiana Perevozchikova, *University of Tennessee*
Small angle neutron scattering: A powerful tool to study polyglutamine aggregate formation
PROGRAM NUMBER: 851.7

Enzymology: Membrane Proteins, Enzymes, and Drug Design

Katharine Halligan, *Albany Medical College*
Cytoglobin regulates cell respiration and nitrosative stress through NO dioxygenation and co-localizes with inducible nitric-oxide synthase during vascular injury PROGRAM NUMBER: 852.3

Matthew Kellinger, *University of Texas, Austin*
Characterization of HIV-1 reverse transcriptase nucleotide specificity by conformationally sensitive fluorescence PROGRAM NUMBER: 853.1

Drug Discovery and Design

Lisa Ngu, *Northeastern University*
Structural response of the estrogen receptor ligand binding domain to selective ligand binding by spin label distance measurements
PROGRAM NUMBER: 714.2

Xiao Yao, *University of Texas at Dallas*
The role of heme in diverse kinase-mediated cell signaling pathways PROGRAM NUMBER: 894.3

Membrane Dynamics and Organelle Biogenesis

Sponsored by Wiley-Blackwell, Oxford, UK

Muslum Ilgu, *Iowa State University*
IMAGE tags for imaging gene expression in living cells in real-time PROGRAM NUMBER: 517.2

Sara Gremillion, *Rhodes College, Memphis*
A mutation in a COG4 homologue affects polarity establishment in the filamentous fungus *Aspergillus nidulans* PROGRAM NUMBER: 865.2

Metabolism and Disease Mechanisms

Chad Paton, *University of Wisconsin, Madison*
Loss of stearoyl-CoA desaturase activity increases ER stress and PKC&ζ mediated inhibition of Akt in response to saturated fatty acids in breast cancer cells
PROGRAM NUMBER: 678.5

Katrina Bogan, *Dartmouth Medical School*
Phosphate-regulated phosphatases Phm8 and Sdt1 are essential for chronological lifespan in budding yeast PROGRAM NUMBER: 855.7

Principles of Receptor Signaling

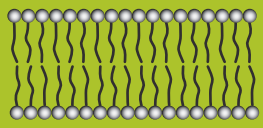
Jessica Fry, *Beth Israel Deaconess Medical Center/Harvard Medical School*
ADAM9 isoforms in breast cancer cell migration
PROGRAM NUMBER: 523.1

Anita Preininger, *Vanderbilt University Medical Center*
Myristoylation and its role in conformational changes associated with Galphai subunit activation PROGRAM NUMBER: 879.9

Lipid Signaling and Metabolism

Sandrine Lepine, *Virginia Commonwealth University School of Medicine*
Regulation of autophagy by sphingosine-1-phosphate phosphohydrolase 1
PROGRAM NUMBER: 520.8

Katarina Moravcevic, *University of Pennsylvania*
Characterization of novel PtdIns-4,5-P2 effector domains PROGRAM NUMBER: 873.6



Lipid Research in Europe

FRIEDRICH SPENER AND GERRIT VAN MEER

The Lipid Division has been expanding rapidly over the past several months. One of the things we've particularly enjoyed is the participation of our international colleagues. Below is a contribution from two of our international members.

Europe has a long tradition in lipid research, but interest declined toward the end of the last century, with a growing emphasis on genomics and proteomics. Nevertheless, some areas of lipid research remain strong. For example, major insights into the role of specific lipids in cell signaling, particularly phosphoinositides, come from European laboratories. European laboratories have also contributed to discoveries made on lipid-activated nuclear receptors; sphingolipid research; the transgenic expression of very long chain polyunsaturated fatty acids in rapeseed; and lipase research. From technological and analytical points of view, the new mass spectrometric methodology for lipid analysis has largely been developed in Europe. This has set the stage worldwide to take on the lipidomics challenge to fill the gaps left by genomics and proteomics data, with the aim to eventually arrive at a holistic view on the overall dynamic lipid organization and metabolism in cells, tissues, and body fluids.

Europe has started late in comparison to the monolithic U.S. and Japan, but we have managed to get off of the ground. First, we were awarded a grant (2005–2007) from the European Commission (EC), entitled "European Lipidomics Initiative—Shaping the Life Sciences." The aim was to popularize the term *lipidomics* through meetings, workshops, features, and interviews. All of this worked: we were asked to write a science policy briefing for the European Science Foundation, entitled "Structural Medicine II: The Importance of Lipidomics for Health and Disease" (2008; www.esf.org/publications/policy-briefings.html). Most importantly, we received a grant (2008) within the EC seventh Framework Research Program for a project involving 24 research groups, aiming to execute lipidomics by taking the lipid droplet as an example, followed by translational research toward human disease.

Thus, the European lipidomics community is ready to tackle both the basic and applied research required to unravel how lipids contribute to cellular and body function and to take on the challenge of elucidating the involvement of lipids in disease pathogenesis. It is the first step in creating a structure for lipidomics research for the next several decades. Funds have been provided to develop holistic, high-throughput, and high-content lipid analysis and to devise standard operating and processing protocols (SOPs and SPPs) for translational transfer of these techniques into the clinic. Information in connected databases containing the subsets of data in lipid structure, lipid metabolomics, proteomics, and genomics must be subjected to bioinformatics analysis, and this infrastructure must be maintained. Certainly, we also hope to enhance the number of researchers qualified in lipid research by this "-omics" approach.

In the last 10 years, the lipid community in Europe reorganized itself by streamlining a multifaceted image for more impact and efficiency. In "ICBL," our annual four-day basic science conference, "BL" now stands for Bioscience of Lipids (the 50th Jubilee conference will be held in Regensburg, Germany this year). The traditionally strong ties between basic research and industry led European societies to found, in 2001, the European Federation for the Science and Technology of Lipids (Euro Fed Lipid) to jointly publish the *European Journal of Lipid Science and Technology* and to strive for the highest standards in the annual Euro Fed Lipid Congresses (the seventh will take place in Graz, Austria). In the quest for excellence, Euro Fed Lipid has created three awards: The European Lipid Science Award, the European Lipid Technology Award, and the European Young Lipid Scientists Award.

These developments hold great promise for lipid research in Europe and in a broader sense for the competitiveness of European basic research as a whole, which should facilitate collaborations with our colleagues worldwide in addressing the complex lipid problems of the future.

Friedrich Spener is a professor in the Department of Molecular Biosciences at the University of Graz and can be reached at fritz.spener@uni-graz.at. Gerrit van Meer is the chairman of Membrane Enzymology at Utrecht University and can be reached at g.vanmeer@uu.nl.

Education at the Annual Meeting

BY ELLIS BELL

The Education and Professional Development Meeting within the ASBMB annual meeting in New Orleans this past April was extremely successful and attracted large audiences.

The program started on Saturday morning with two workshops. One workshop, organized by Debbie Neely-Fisher from J. Sargeant Reynolds Community College, focused on issues related to interactions between four-year and research-intensive institutions and the two-year colleges. The other workshop, "Connecting with K-12: Reaching out to High School Faculty," was organized by Margaret Johnson from the University of Alabama. Both workshops produced significant discussion among the participants. Hopefully, this will lead to increased interest in these critical areas, although as Neely-Fisher noted, "until there is a bigger push at the funding agencies to have schools and organizations include two-year schools and encourage two-year faculty to participate in research, it is going to be an uphill battle." As the move towards more research-based introductory courses in chemistry and biology gains momentum, it is critical that the community college system is included, because these colleges provide entry level courses for many students who go on to obtain four-year degrees.

The Undergraduate Poster Competition held on Saturday afternoon was an outstanding success with an excellent group of presentations by undergraduates from a wide variety of institutions around the country. A highlight of the event was the presence of Society President Gregory Petsko, who took time to talk to students and answer their questions. This year the posters included a number of "Smart Team" presentations organized by Tim Herman, involving high school, and in some cases middle school, students. In addition to presenting their posters in the main meeting, a number of undergraduates were invited to give platform talks at various symposia during the main meeting. Although I did not hear all of the talks, at the ones I did attend, it was impossible to tell that the speaker was an undergraduate and not a graduate student or postdoc. Walking around the posters, the same was true.

Sunday featured the Classroom of the Future Symposium, organized by Cheryl Bailey from the University of Nebraska-Lincoln. The symposium was standing room only and triggered some interesting discussion. The award lecture for Exemplary Contributions to Education featured recipient Rochelle Schwartz-Bloom from Duke University Medical Center. Schwartz-Bloom described the various outreach activities that she has pioneered during the last 25 years. The symposium also featured the Undergraduate Poster Session award winners and honorable mentions (see sidebar).

Monday featured a symposium titled "Writing the Test Question Isn't Enough," jointly sponsored by ASBMB and the American Physiology Society and organized by Vikki McCleary and Katherine Sukalski from the University of North Dakota. Despite starting at 8:00 am, this symposium attracted a standing room only audience who heard a series of presentations focused on developing and using multiple choice questions to assess student learning. As with the "Classroom of the Future" symposium, each talk was followed by a provocative question and answer session. Monday early evening featured a workshop on "Transitions from Academia to Industry and Back" organized by Greg Bertenshaw from Correlogic Systems, Inc.

Tuesday's EB Wide Symposium "Life Science Education in the 21st Century: Making the Science We Teach Reflect the Science We Practice," organized by Lynelle Golden from APS featured brief presentations from both

Figure Caption: Elizabeth Brockson presents her poster at the Undergraduate Poster Session.

Undergraduate Poster Winners

SYSTEMS BIOLOGY

WINNER:

Matthew A. Shew, *Bowdoin College*

Honorable Mentions:

Frank Sander, *University of Delaware*

David M. Nemer, *University of Notre Dame*

Stephanie L. Myrick, *University of Delaware*

Maria B. Koenigs, *Bowdoin College*

Alex T. Ritter, *Concordia College*

CELL SIGNALING

Winner:

Bethany M. Bush, *Winthrop University*

Honorable Mentions:

Michael Schreiber, *Lawrence University*

John Musgrove, *Rhodes College*

Jarrett Failing, *North Dakota State University*

Jessica Miller, *Centenary College*

Andrew Haak, *Minnesota State University Moorhead*

Craig Kutz, *Minnesota State University Moorhead*

Jenny Canine, *Minnesota State University Moorhead*

PROTEINS AND ENZYMES

Winner:

Amber S. Majid, *University of Delaware*

Honorable Mentions:

Edith R. Bracho-Sanchez, *University of Florida*

Paola Fernandez, *California State University, Fullerton*

Adam M. Kerrigan, *College of the Holy Cross*

Kyle D. Schneider, *Grand Valley State University*

Ann K. Schufreider, *College of the Holy Cross*

Lori A. Scognamillo, *Saint Mary's College of California*

Nabil Thalji, *Louisiana State University*

DNA AND RNA

Winner:

Sean Fortier, *Northeastern University*

Honorable Mentions:

Chloe M. Benson, *Colorado College*

Julia L. Harris, *Capital University*

Caitlin Rice, *Hope College*

Katherine E. Deigan, *University of North Carolina at Chapel Hill*

Stephanie K. Furniss, *Colorado College*

Lindsay L. Hamilton, *University of Wisconsin-Madison*

faculty and funding agency representatives and was followed by a lively panel discussion.

The meeting's Education and Professional Development programming ended on Wednesday with a jointly sponsored workshop with the International Union of Biochemistry and Molecular Biology, organized by Duane Sears of UC Santa Barbara and Trevor Anderson from the University of KwaZulu-Natal, South Africa. The workshop was titled "Defining the Core of the Discipline and Developing Suitable Assessment Tools." After brief introductory comments from each presenter, there was an interesting discussion on concept inventories and the core knowledge of biochemistry and molecular biology. The session resulted in the formation of an informal network of colleagues interested in collaborating on these topics in the future. There will be a follow-up workshop at the IUBMB meeting in Shanghai in August.

A Small Meeting on Education

For those of you who didn't get enough education-centered information from the annual meeting, ASBMB is also sponsoring a small meeting titled "Student Centered Education in the Molecular Life Sciences" in Colorado Springs from August 5–8.

This special symposium is designed for educators engaged in teaching undergraduates. The meeting will focus primarily on emerging pedagogies in the education of students in the molecular life sciences. The goals of the meeting are to supply participants with educational approaches and materials that they can implement in their own classrooms and to provide them with networking and mentoring opportunities.

The principal focus of the meeting will be a series of hands-on workshop sessions, similar in style to Project Kaleidoscope, with ample time for networking. Each session will be run by a team of established educators, with a focus on small group participation as well as individual mentoring. Several plenary talks will be featured as well.

Among the workshops offered, there will be a two-session grant writing workshop that will involve evaluation, revision, and critique of abstracts. The workshop will be conducted by highly successful, predominantly undergraduate institution (PUI) faculty members with well-funded, established programs and by representatives from the major funding agencies. A critical component of this workshop is that participants will have the opportunity to follow-up with a mentor during the following year to help prepare and submit their own grant applications.

The meeting also will include sessions related to the recent white paper produced by ASBMB titled, "Biochemistry/Molecular Biology and Liberal Education: A Report to the Teagle Foundation." Discussions will focus on how to implement some of the report's recommendations. Full details of the program and registration can be found at www.asbmb.org/Page.aspx?id=2092.

Ellis Bell is 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. He can be reached at jbell2@richmond.edu.

Houston, We Have a Solution: Postdoc Meeting in Texas Provides Answers to Pressing Questions

BY IAN M. BROOKS

"Take charge of your destiny" was the message shared with more than 260 postdoctoral representatives from academic institutions and universities throughout the U. S. at the seventh Annual Meeting of the National Postdoctoral Association (NPA), held at the University of Texas Health Science Center and the University of Texas MD Anderson Cancer Center in Houston from March 27–29.

The NPA was formed in 2003 by an *ad hoc* group of postdocs from around the country. Their ambitious agenda was to provide a national voice for the estimated 89,000 postdoctoral researchers in the U. S. With the doubling of NIH's budget at the end of the 1990s, the number of postdocs soared. Often these "temporary" workers were working for years, frequently with low wages and without benefits. Supported by funding from the Alfred Sloan Foundation and the American Association for the Advancement of Science (AAAS), the NPA has grown in this brief period to become the national voice of postdocs, now recognized by NIH and the National Science Foundation (NSF) as one of the key forces driving their policies regarding postdoctoral training.

The focus of the 2008 NPA meeting was empowering postdocs by helping them find training in the transferable skills that they'll need to survive outside of a traditional academic environment. The recent NSF Science & Engineering Indicators highlighted the fact that fewer than 20 percent of postdocs in the life sciences are attaining the full-time tenure track position to which most of them aspire. The jobs simply aren't there. Because of this scarcity of jobs, increasing numbers of highly skilled and motivated young researchers are stuck in a holding pattern. Continuing the theme of personal development, the overarching message this year, perhaps in tune with the slogan of a new administration that has once more put science back where it belongs in policy making, was "Yes, you can."

Almost half of the attendees at the meeting were postdocs, and approximately half of this group were first-time visitors. "Knowing that new people are getting involved but also seeing familiar faces really indicates that we are getting our message out there," said current Chair of the Board Stacy L. Gelhaus, an NRSA postdoctoral fellow at the University of Pennsylvania. Also at the meeting were representatives of Postdoctoral Offices (PDOs), institutional support centers for postdoctoral fellows. "Seeing PDOs from the same institutions come back year after year shows that we're becoming part of the institutional memory of academic culture in the U. S.," said Gelhaus. She added, "What is perhaps more exciting is meeting representatives from PDOs and Postdoctoral Associations (PDAs) who are here for the very first time and realizing what a tremendous support network the NPA can provide."

The first day of the conference saw the traditional concurrent PDA/PDO sessions. Experienced leaders from both groups led their participants in discussion groups. Topics included an assortment of interests for PDOs and PDAs, new and old. Discussion topics ranged from self-governance and retaining interest across time to fundraising techniques. This last subject is particularly valuable in a time of budget shortfalls when many PDOs are struggling to retain the funds they need to stay open, and PDAs are fighting to retain the small budgets needed for providing lunches during career seminars or paying for the transportation for guest speakers. Later in the day, the two groups came together for a discussion of "best practices" for communicating needs between PDOs and PDAs. The lighthearted, group-wide discussion led by Phil Clifford, associate dean for Postdoctoral Education at the Medical College of Wisconsin, and Rob Milner, professor of Neural and Behavioral Sciences at Penn State School of Medicine, will be written up as a "self-help" guide and published by the NPA on its website later in the year.

The second day of the conference included a variety of events. The morning session featured the first Plenary Session, Keynote Address, and presentation of the NPA's Distinguished Service Award (DSA). The afternoon was filled with concurrent workshops offering a variety of services to both postdocs and administrators. The morning opened with an address on the state of the NPA by Gelhaus, who highlighted the accomplishments and changes of the previous year. The NPA has gone through a massive structural overhaul since the last meeting in April of 2008. A new executive director Cathee Johnson Phillips

was recruited, and the structure of the Committees of the Membership was streamlined. Gelhaus paid tribute to the staff and volunteers of the NPA, with special attention to the departing members of the Board for their dedication and hard work during the process. "Everyone, from our staff to our committee volunteers, showed great patience and dedication during this time."

Peter Fisk, cofounder of RAPT Industries as well as an experienced motivational speaker, presented the plenary lecture. His talk, titled "Putting Your Science to Work: Creating New Options and Opportunities via the Postdoc," was an entertaining call-to-arms to postdocs to acknowledge their talents and use them to sell themselves in the non-academic world. Fisk highlighted the many and various talents that postdocs, often unknowingly, possess and how these can be used to forge a new career.

The NPA Distinguished Service Award was presented to The Alfred P. Sloan Foundation, represented by Michael Teitelbaum, the foundation's program director. The Sloan Foundation is one of the largest philanthropic bodies in the U. S., giving grants to support original science and science education opportunities. The foundation was one-half of the founding sponsors of the NPA. Also honored at the meeting were those members who had made significant financial donations to the association.

Nobel Laureate Peter Doherty gave the keynote address. His talk, "Experiences of a Peripatetic Investigator" told the story of his upbringing in rural Australia and the journey that took him from studying infectious diseases in cattle to winning his Nobel Prize in Physiology or Medicine in 1996 for elucidating how immune T cells recognize their target antigens in combination with major histocompatibility complex (MHC) proteins.

The final day of the conference featured more concurrent workshops and the NPA town hall meeting. The town hall meeting is a popular event during which audience members questioned the NPA's executive director and chairperson. This year, much discussion focused on the current economic climate and what the NPA is doing to advocate for postdocs.

The Annual Meeting was not all work, however. A dine-around on the first night let delegates meet, network, and dine with fellow NPA members at some of Houston's finest restaurants, and the second night witnessed a "Texas-style BBQ" hosted by longtime NPA supporters Garnett-Powers & Associates, the Medical College of Wisconsin, and the University of Alabama. Local Texas brews, seemingly limitless barbeque, and live country music livened up the evening.

The economy was very much at the forefront of a lot of people's minds. At the opening reception, Member of the Board and Campaign Chair Daniel Gorelick introduced the NPA's new campaign, "Raising our Voice." Gorelick called on the membership to join the campaign and donate their time or resources to help the NPA achieve its mission. The Board of Directors has led by example with a 100 percent donation rate, according to Gorelick. Pacing around the crowded dining room, Gorelick explained the motivation behind the "Raising our Voice" campaign and pointed out ways the membership, largely financially strapped postdocs, could help. Talk to your mentors, he said, pointing out the power of networking and suggesting everyone open their BlackBerry and share their network with the NPA.

> **"...fewer than 20 percent of postdocs in the life sciences are attaining the full-time tenure track position to which most of them aspire."**

Phillips summed up the feelings of the board, "Although attendance at the 2009 Annual Meeting was down slightly from 2008, we were still, to say the least, thrilled. Given the current economy and the budget cutbacks at institutions, we had projected that attendance would be down by at least 20 percent. And, in spite of the dismal economic news, the attitude of those attending the meeting was upbeat and positive. It was a very productive meeting."

Ian M. Brooks is a research associate with the University of Tennessee Clinical & Translational Science Center as well as a member of the NPA Board of Directors. He can be reached at ibrooks1@utmem.edu.

"Change Has Come:" Celebrate, but DO NOT Become Complacent!

BY THOMAS D. LANDEFELD

I wrote an article for a recent issue of The Advisor,[1] *which is published by the National Association of Advisors for the Health Professions (NAAHP), an organization of over 1,000 health advisors across the country. This particular issue was dedicated to diversity and, as such, contained several excellent articles devoted to the topic. As I stated in my article, I generally do not support the use of the word "diversity," or at least in the way it is often used, as it does not always address the issue of underrepresentation of minorities. I find this is true whether we are talking about health professions or graduate school and the professoriate, which are usually more of an emphasis within ASBMB. However, since there are many common themes between these two fields, I am reprinting an adapted version of my article from the March issue of* The Advisor *in this column.*

The election of Barack Obama truly represents an event that many of us never believed we would ever see happen in our lifetime, and maybe for some, even in our children's lifetime! But it did happen, and we need to embrace it in all aspects of our lives. For those of us in academia, and especially the sciences, we have new hope that the underrepresentation of minorities will be addressed much more effectively than ever before and, concomitantly, issues such as minority health disparities will become more of a national priority (similar to the time when Dr. Satcher was Surgeon General under President Clinton). However, we *cannot* depend on hope alone. Nor can we just sit back and celebrate. The reasons are evident when we compare some statistics between Blacks and Whites in this country:

- unemployment: 9.0 percent *versus* 4.2 percent;
- median family income: $35,464 *versus* $63,156;
- college graduation rate: 41 percent *versus* 61 percent;
- families owning their own homes: 48.2 percent *versus* 75.8 percent;
- male prison inmates/100,000 population: 3,145 *versus* 471.

Moreover, in academia, if we look at the low percentages of underrepresented minorities in graduate and professional school programs, on the faculty in academic institutions, and serving as health care professionals, the problem becomes even more evident.

> "…for those of us who are committed to truly implementing change, we have to be much more proactive. We can no longer sit back and let tradition take its course."

So what do we do? First, for those of us who are committed to truly implementing change, we have to be much more proactive. We can no longer sit back and let tradition take its course. For example, using standardized test scores as a major criterion for acceptance into health professional schools is unquestionably a prime example of institutional racism and therefore one of the major contributing factors to the underrepresentation of minorities throughout academia. This issue has been on the table for a long time and is now referenced in the recent report from the Josiah Macy Jr. Foundation entitled, "Revisiting the Medical School Educational Mission at a Time of Expansion." And, despite the fact that most of us recognize this, we continue to go along with it, even when we are in positions to speak up and help to make a change.

Second, we have to truly promote and support "diversity" as it is defined relative to ethnic minority representation. It *cannot* be just a buzz word that institutions, agencies,

and businesses use to make themselves feel good and avoid making real changes. Nor can we allow a definition to be accepted such that "a group of white men with different colored hair" represents diversity. Again, many of us are in positions to contribute significantly to these dialogues and decisions about diversity but often choose not to do so. In fact, as Dr. Lovell Jones, a trusted friend and colleague, stated recently, too often "we go along to get along" because we are afraid of the "stress of confrontation or stress of assimilation," and either way, one loses." *This has got to change for change to truly occur.*

In both of these cases, as well as regarding those differences between Blacks and Whites to which I alluded earlier, change can only occur when the organizations, and individuals, truly recognize and acknowledge the role that white privilege plays, not only in those academic situations but also in those types of differences that we see in our country today, regardless of the skin color of the president. With this acknowledgement, White privilege can become a major point of discussion, which heretofore it has not been. Hopefully these discussions will be followed by a willingness by those with privilege to sacrifice some of their advantages to implement change. In other words, it will indeed take the efforts of many individuals, both minority and non-minority, to make the necessary changes, just as it did to elect Barack Obama as the first Black President! Unquestionably, this will not be easy, as this truly represents a case of "fighting the system," but to quote Frederick Douglass, "Without struggle, there is no progress." And, if there was ever a year to see progress (and change), it is 2009!

So, now is the time to go forward and speak out at your conferences, meetings, classes, and any other place where dialogues are taking place regarding diversity. Talk about the benefits of ethnically diverse participation, involvement, and decision-making not only in academia but also in society. Explain why we can never, as a nation, reach our full potential unless we are inclusive of *all* groups. And, although it was an important step to elect a Black President, he, and those around him, need a lot of help in making the type of change that is necessary. In fact, it calls for exactly the type of help that it took to get him elected—standing up, rallying, volunteering, and voting. That same type of commitment and support is needed to make the necessary changes to an academic system that is operating, in many ways, like it did in the 1960s. Are you ready? Quite frankly, if you are not ready after witnessing the events that have occurred in this country with the election of Barack Obama, then change in academia is not going to happen. As indicated in the report from the Josiah Macy Jr. Foundation, the time is definitely prime for "revisiting the medical school educational mission" and increasing the representation of under-served populations. As pre-health advisors, we have to be major players in the effort to address this critically important problem in our medical community and in society in general.

Author Alice Walker once appropriately stated, "Ignorance, arrogance, and racism have bloomed as superior knowledge in all too many universities." Let's change that—*NOW*.

Thomas D. Landefeld is a professor and pre-health advisor at California State University, Dominguez Hills. His website can be found at www.thomaslandefeld.com, and he can be reached at tlandefeld@csudh.edu.

REFERENCE

1. Landefeld, T. D. (2009) "Change Has Come:" Celebrate but DO NOT Become Complacent! *The Advisor* **29** (1).

Falling into Outcomes Research in Healthcare

BY MONICA HORVATH

Like many graduate students, I entered a highly multidisciplinary molecular biology and biochemistry program that placed an almost daunting number of opportunities at my feet. Five years later, I graduated with a Ph.D. in computational biology. I spent most of my graduate research working with large, public databases of mutations and genome builds, looking for DNA sequence patterns that could be culpable in conferring a disease state. One of the biggest challenges was not the inherent biology but simply figuring out how to make disparate data sets support each other in a way that was amenable to creative questions. Nomenclature, vocabulary, and numbering systems for genome data can all differ such that a series of scripts (usually in PERL or PYTHON) must be created to get everything on the same footing. Data massaging is where I spent most of my time. A few years and an NIH postdoctoral appointment later, I have left genomics and am now a senior research analyst for the Duke University Health System, working in outcomes research. I am the statistics and data analytics expert for the Computerized Patient Safety Initiatives team, which serves three hospitals and a smattering of clinics. So just how did this transition occur?

Well, simply put, I enjoy data. I like playing with graphs, analysis techniques, and all of the sundry manipulations at one's fingertips when deploying anything from advanced statistical packages to the omnipresent Microsoft Excel. I absorb books by Edward Tufte (www.edwardtufte.com/tufte) and have always been fascinated by how data presentation can, at its best, combine a series of complex, interrelated ideas to convey a single, compelling thought, or at its worst, turn the simplest idea into mud. During my postdoctoral period, I worked with an NIH group seeking to correlate oddities in cancer gene function to known mutations in human populations. In examining the pharmacogenomics literature, I was intrigued to learn that mutation screening was being used in clinics. As a result, I started to investigate public health fields, particularly outcomes research. This field seeks to study the impact of healthcare interventions, whether they are due to changes in clinical culture, implementation of health information technology, changes made to treatment protocols, or the effect of billing systems on patient safety and quality of care. I soon found that outcomes research has a lot of challenges similar to those I experienced in bioinformatics, particularly in the area of data overload.

For one example, consider the wide variety of systems one interacts with when receiving service at a clinic or hospital. All operational systems such as check-in, care provider notes, electronic health records, laboratory orders, and medication management, just to name a few, are potentially altered during a patient visit. Each of these systems has its own data standards and is often housed within proprietary, vended databases. Given such characteristics, the data is then often kept in its own silo to satisfy immediate storage needs, which creates a warehouse of "dirty" data sets that are difficult to integrate. I encountered the same challenges in bioinformatics.

Likewise, healthcare is almost in a

Horvath

Monica Horvath received her B.S. in chemistry from the University of Pittsburgh and her Ph.D. in molecular biophysics from the University of Texas Southwestern Medical Center (2005) under the guidance of Harold "Skip" Garner. In her dissertation, she analyzed the rates of human gene lesions to develop predictive rules that could pinpoint additional sites of mutation. During her postdoctoral training, Horvath worked in environmental genomics at the National Institute for Environmental Health Sciences. She joined Computerized Patient Safety Initiatives (CPSI) in late 2006 as the team's research analyst. Skilled in biocomputing, database interaction, and biostatistics, she serves as the data analysis expert and takes the leading role in writing CPSI publications as well as developing Cognos BI reports on patient safety data.

data crisis where the sheer volume of information makes it very challenging to develop clinically meaningful analyses that are regularly communicated back to patient care stakeholders. This is a grave problem even within the same hospital. But being able to analyze trends in healthcare metrics is critical to patient safety and quality, particularly where adverse events are concerned. In fact, the Centers for Medicare and Medicaid Services (CMS) have a growing list of "never events," that is, serious and costly health care errors that simply should never occur, such as wrong site surgery or bed sore development. CMS is withholding insurance payments to treat these conditions as they are viewed as the healthcare provider's fault, and private insurers are following in its footsteps. The "never event" list is also expanding to include cases of more common mishandlings in care, such as poor glycemic control within a hospital. As a result, health systems are highly motivated to both monitor adverse event rates closely and look for trends or spikes as well as drill into that data to pinpoint correctable system and process failures. These root causes are what permit such costly and harmful events to re-occur, but the "scorecard" of a hospital cannot be known without consistent measurement of these incidents. As a bioinformaticist, it soon became crystal clear that all of the electronic data created as a byproduct of patient care is really a treasure trove of information. If it is mined in the right manner, it can help a health system automatically identify adverse events and medical errors, assess its performance in critical areas, and make healthcare a better experience overall for both the patient and provider.

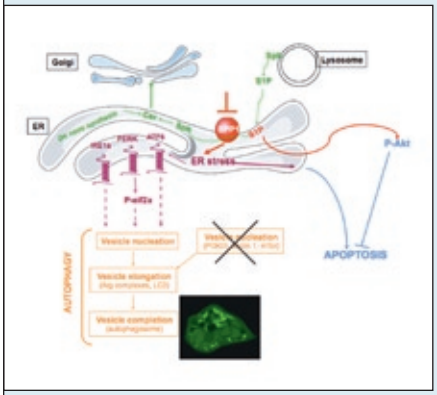
So with regards to landing a job at Duke, I would like to say I had a meticulously well-planned method to transition out of traditional bioscience and into clinical realms, but I didn't. Although I had my eyes open for any opportunities, joined local professional associations, and enrolled in some clinical research courses, finding a position involved a lot of networking and a dollop of luck. I was incredibly fortunate that a postdoc friend of mine passed along my name to a recruiter who was looking to hire a research analyst at Duke. My friend was looking for a position that was more pharmacological in nature but tagged me as an informaticist. I think this anecdote underscores the importance of not only networking with individuals already gainfully employed but keeping in close contact with one's fellow trainees. The recruiter was looking for someone with a master's degree in public health but was so pressed to find a candidate that the director holding the opening was willing to interview a Ph.D. I was honest about my background and emphasized the aspects of my training that would translate well to a healthcare setting, and within a week, I had a job offer for a position that I would soon find was more satisfying for me than anything I could imagine in basic science.

I work with a team of pharmacists and IT specialists to improve the quality of patient care and to strengthen Duke University Healthcare System's commitment to patient safety. I act as a liaison between the IT personnel administrating clinical databases and the clinicians or patient safety officers that need to ask critical safety or quality research questions. I wear many hats in filling this position. First, as a patient safety specialist, I coordinate and execute a variety of complex activities involved in gathering, compiling, and analyzing data to develop performance metrics across Duke Medicine. Quite often, this requires some scripting in using the skills I developed in graduate school to massage large data sets into a form digestible by programs that apply statistics. Sometimes I play more of a consultant's role, where I provide advice about statistics, the appropriateness of certain data sets, and the viability of a given question of interest to a researcher, usually a medical doctor. And when success is aquired so that quality solutions are found and implemented, I become a medical writer who both devises publication strategies and creates most of the content submitted for publication. Since the use of medical records for any act of research requires Institutional Review Board approval, I often write study protocols, secure approvals, and provide counsel for continuing review. Finally, at times I act as a systems analyst to ensure that data collection by hospital operations as a by-product of patient care is done in a manner that can easily be extracted later for research use.

So is this still science? Not so much anymore, but it is at times. Am I still focused on publications and grant funding? Yes, funding is still a hurdle for research. But in reflecting upon my career path, I have found that it is not so much the research question that keeps me engaged in a project but the steps one takes along the way to conquer that topic. So whether I am sitting with an unmanageable database of human mutations or six years of patient lab orders, I have found happiness in a position that ties me closer to a clinical end point. This job is the perfect fit for my interests and eccentricities.

BEST POSTER WINNER: Lipid Signaling and Metabolism Theme

Sphingolipid metabolites like sphingosine-1-phosphate (S1P) and ceramide have recently been implicated in autophagic cell death, though their role is not yet understood. In the work presented in this award poster, the researchers showed that small interfering RNA down-regulation of SPP1, an endoplasmic reticulum (ER)-associated enzyme that dephosphorylates S1P into sphingosine, could increase autophagy, as evidenced both visually by confocal microscopy and qualitatively by anti-LC3 Western blotting. SPP1 down-regulation increased the levels of several downstream targets of ER stress, such as CHOP, Bip, and phospho-eif2, while inhibiting initiators of ER-stress signaling could counteract the loss of SPPI. Interestingly, the mTor pathway was not affected; yet SPP1 downregulation increased the phosphorylation of Akt, which promotes cell survival against apoptosis. The researchers concluded that by regulating intracellular S1P levels, SPP1 may help regulate both autophagy and apoptosis.



Shown is a scheme depicting the involvement of sphingosine-1-phosphate phosphohydrolase 1 (SPP1) and its substrate S1P in regulation of autophagy and apoptosis. (*De novo* biosynthesis of ceramide (*Cer*) and reutilization of sphingosine (*Sph*) via SPP1 are also shown.)

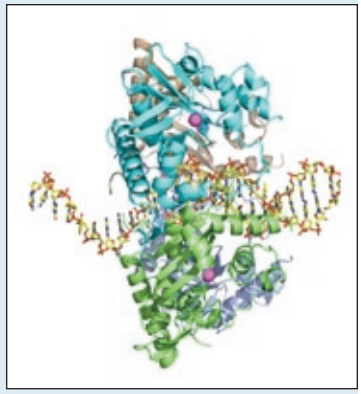
Regulation of Autophagy by Sphingosine-1-phosphate Phosphohydrolase 1

Sandrine Lépine, Danielle Schramm, Sheldon Milstien, and Sarah Spiegel

Department of Biochemistry and Molecular Biology, Virginia Commonwealth University School of Medicine

BEST POSTER WINNER: DNA Replication, Repair, and Recombination Theme

RecET, encoded in some strains of *Escherichia coli*, is a simple and efficient phage-derived recombination system that can promote homologous recombination via single strand annealing. A 5'–3' exonuclease (RecE) resects the DNA end created at the break to form a 3'-overhang, whereas a recombinase (RecT) loads onto the overhang to promote annealing with a complementary strand of single-stranded DNA (ssDNA). To get a better sense of how RecET works, the researchers in this award poster solved the crystal structure of the RecE C-terminal nuclease domain at 2.8 Å resolution. The structure reveals that RecE forms a toroidal tetramer with a central tapered channel that can bind double-stranded DNA (dsDNA) at one end but is partially plugged at the other end by the C-terminal segment of the protein. Mutational analysis suggests a mechanism in which dsDNA enters through the open end of the central channel, where the 5'-end strand accesses one of the four active sites while the 3'-end strand passes through the partial plug at the back of the tetramer.



Shown is a side view of the RecE tetramer with its DNA substrate modeled in, visualizing the proposed mechanism of action.

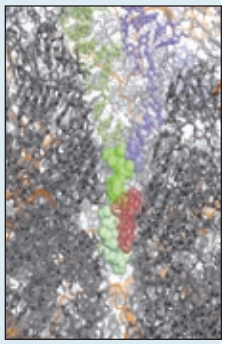
Crystal Structure of *Escherichia coli* RecE Exonuclease Reveals a Toroidal Tetramer for Processing Double-stranded DNA Breaks

Jinjin Zhang, Xu Xing, Andrew B. Herr, and Charles E. Bell

Department of Molecular and Cellular Biochemistry, Ohio State University College of Medicine and Department of Molecular Genetics, Biochemistry & Microbiology, University of Cincinnati College of Medicine

BEST POSTER WINNER: Protein Synthesis and Turnover Theme

Ribosomal stalling, which can regulate protein synthesis, controls expression of several inducible antibiotic resistance genes. In the absence of antibiotics, a regulatory "leader gene" is translated, whereas the downstream resistance gene is not, due to unfavorable mRNA folding; in the presence of antibiotics, a drug-bound ribosome stalls at the leader gene, changing mRNA conformation and activating translation of the resistance gene. Stalling depends on a specific nascent peptide sequence engaging the ribosome, but the exact mechanisms are unknown. In this award-winning poster, the researchers analyzed a number of resistance genes and showed that stalling nascent peptides range from three to ten amino acids, and though they differed in sequence, contain some common motifs. Mutagenesis of the ermAL1 gene revealed the importance of the sequence IAVV at the C terminus of the stalling peptide that is attached to the tRNA in the ribosomal P site; unexpectedly, the nature of aminoacyl-tRNA in the A site was also critical for stalling. The researchers propose that for the ribosome to stall, a nascent peptide of specific sequence has to come in contact with sensory elements in the ribosome, and the stalling signal has to be communicated to the peptidyl transferase center.



A nascent peptide (*green*) in the exit tunnel of a ribosome, attached to the tRNA in the P site; amino acid residues critical for stalling are shown in *bright green*, the A site aminoacyl-tRNA in *blue*, the antibiotic erythromycin in *red*, rRNA residues in *gray*, and ribosomal proteins in *orange*.

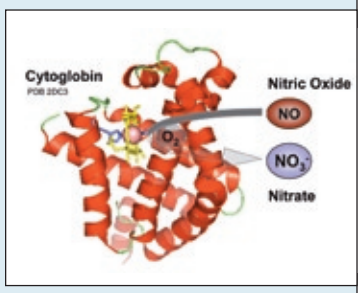
Nascent Peptide-dependent Ribosome Stalling in Drug-inducible Antibiotic Resistance

Haripriya Ramu, Sai Lakshmi Subramanian, Nora Vazquez-Laslop, and Alexander S. Mankin

Center for Pharmaceutical Biotechnology, University of Illinois at Chicago

BEST POSTER WINNER: Enzymology: Membrane Proteins, Enzymes, and Drug Design Theme

The newly discovered cytoglobin protein can bind molecular oxygen and dioxygenate nitric oxide (NO) *in vitro*, but the lack of an associated reductase has raised doubts about the ability of cytoglobin to dioxygenate NO *in vivo*. To elucidate cytoglobin's role in NO metabolism, the researchers in this award poster stably expressed short hairpin RNA targeting cytoglobin in mouse fibroblasts, resulting in an 80 percent reduction of cytoglobin levels. The low cytoglobin cells had diminished NO consumption and a shift in the ratio of NO metabolites produced; a normal response to NO could be re-established in these cells through expression of human cytoglobin. The researchers also demonstrated that cytoglobin was expressed in primary aortic adventitial fibroblasts and smooth muscle cells in various species and that cytoglobin co-localized with inducible nitric oxide synthase in rat neointimal vascular smooth muscle cells following vascular injury. Based on these results, this study reveals a pivotal *in vivo* role for cytoglobin in cell-mediated NO dioxygenation to regulate nitrosative stress and cell respiration during inflammation and injury.



A cytoglobin molecule overlaid with the NO dioxygenation reaction it catalyzes is shown.

Cytoglobin Regulates Cell Respiration and Nitrosative Stress through NO Dioxygenation and Colocalizes with Inducible Nitric-oxide Synthase during Vascular Injury

Katharine Halligan, Frances Jourd'heuil, Catherine Vincent, Nicole McGrath, Margarida Barroso, and David Jourd'heuil

Center for Cardiovascular Sciences, Albany Medical College

Symposia Science Highlights

BY NICK ZAGORSKI

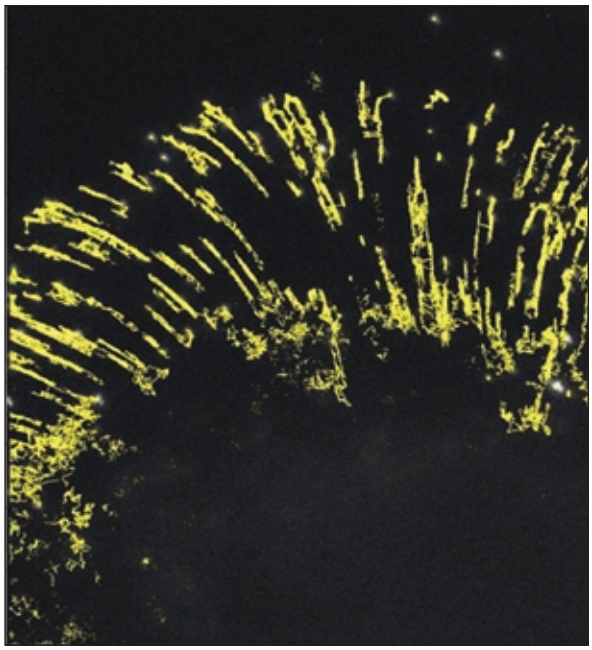


Figure 1. Sergio Grinstein shows that the cytoskeleton helps guide cell surface movement of the Cdc36 receptor by means of molecular "railroad tracks."

As with most scientific meetings, the main focus for the attendees at ASBMB 2009 in New Orleans was the lectures and presentations. This year's meeting offered over 50 symposia spanning 13 different research fields and five overarching thematic groups (Nuclear Transactions; Protein Synthesis, Folding and Turnover; Cell Systems and Metabolism; Molecular Structure and Dynamics; and Signaling). To provide some sense of the exciting science discussed this year, we present below brief recaps of two presentations from each of nine selected themes.

Lipid Signaling and Metabolism

Lysophospholipids like sphingosine 1-phosphate (S1P) and lysophosphatidic acid (LPA) are small signaling molecules, mediated by cell surface G protein-coupled receptors, which are becoming increasingly associated with a broad range of physiological and pathophysiological functions. Jerold Chun at the Scripps Research Institute studies one of these pathological aspects: the role of lysophospholipid receptors in neurological diseases such as multiple sclerosis (MS). In his talk, Chun described some of his recent work using mutant mice lacking S1P receptors to decipher some of the biological events that underlie the development of MS. He also discussed mechanistic studies with the experimental MS therapeutic FTY720 (Novartis, currently in Phase III trials), which may represent the first example of a human medicine functioning through lysophospholipid receptor signaling mechanisms.

An interesting talk regarding some new insights into phagocytosis was presented by Sergio Grinstein from the Hospital for Sick Children in Toronto. Phagocytosis is an important immune process undertaken by macrophages and other white blood cells, though the means by which plasma membrane proteins migrate and coalesce on the cell surface during phagocytosis is not understood. Grinstein discussed his group's work in using molecular level imaging and tracking techniques to investigate CD36, a receptor that mediates oxidized LDL (oxLDL) uptake by macrophages. He noted that a subset of CD36 receptors exhibited linear movement patterns on the cell surface but that this linear motion was not motor-driven; rather, it was simply diffusion occurring within a narrow trough-like corridor created by the cytoskeleton (Fig. 1). He reported that by confining CD36 receptors along a narrow pathway, the cell was promoting protein aggregation, a prerequisite for oxLDL binding and endocytosis.

Mechanisms of Receptor Signaling

Many communal bacteria communicate with each other by releasing, sensing, and responding to small molecule signals in a process known as quorum sensing. This decentralized form of communication allows bacterial cells of the same species or even different species living together to synchronize certain activities across a population. In his talk, Fred Hughson of Princeton University discussed his group's efforts in developing a molecular understanding of how bacteria detect the quorum sensing signals, called autoinducers, and how that sensory information is transduced to control behavior on a community-wide scale. By adopting an integrated approach that combines organic chemistry, biochemistry, bacterial genetics, and crystallography, they've uncovered more mechanistic insight into quorum sensing circuits,

which could also lead to more understanding of transmembrane signal transduction via two-component sensor kinases (a recurring and vital signaling system in bacteria, yeast, and fungi) as a whole.

In higher organisms, a critical signaling role is taken up by the protein-tyrosine kinases (PTKs), enzymes that regulate many aspects of growth and development. Dysregulated PTKs are frequently associated with cancers; and thus, they are attractive pharmacological targets. Phil Cole at Johns Hopkins University has been particularly interested in three specific PTKs (Src, Abl, and EGFR), and in his talk, he highlighted many of the biochemical approaches his group has taken to analyze PTK mechanisms, substrate selection, and regulation. He particularly noted a unique approach used in his lab, known as chemical rescue, that allows researchers to inactivate and reactivate enzymes to better study their function; when combined with analog kinase inhibitors, crystallography, and mass spectrometry, a comprehensive picture of PTKs begins to emerge.

Metabolism and Disease Mechanisms

Triglycerides represent the main form of both dietary and stored fat, and thus enzymes that regulate triglyceride synthesis may constitute key drug targets to treat obesity, insulin resistance, and other phenotypes of the metabolic syndrome. In her presentation, Cristina Rondinone from Roche's metabolic diseases division presented evidence indicating that small molecule inhibitors of enzymes such as diacylglycerol *O*-acyltransferase (DGAT) and stearoyl-CoA desaturase 1 (SCD1) can improve metabolic profiles in animal models of insulin resistance and diabetes. By reining in lipid synthesis via inhibition of different enzymes, triglyceride levels in various metabolically active tissues such as liver, muscle, and pancreas could be lowered, resulting in beneficial effects such as decreased hepatic glucose output, increased muscle fatty acid oxidation, and improved β cell function.

The molecular signaling defects underlying pancreatic β cell failure, which contributes to all forms of diabetes, are not fully understood.

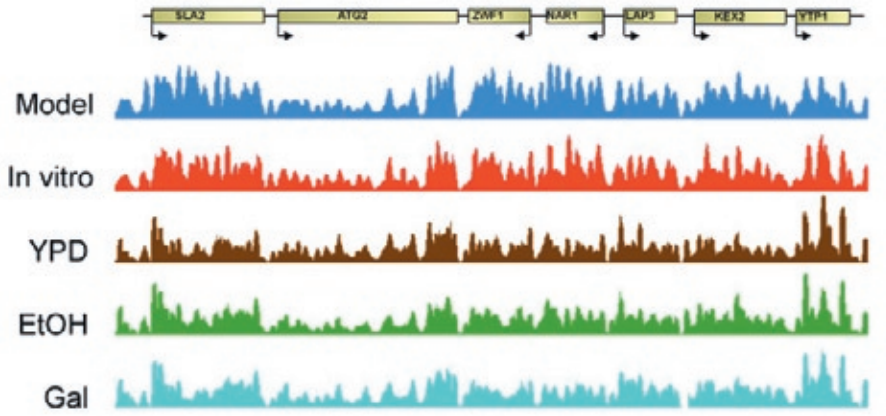


Figure 2. A region of *Saccharomyces cerevisiae* chromosome 14, comparing nucleosome positions obtained either in a purified *in vitro* system or from yeast grown in three different media with Jon Widom's "nucleosome code" model.

The tyrosine phosphatase Shp2 functions in insulin-regulated glucose metabolism in insulin-responsive tissues, making it a potential candidate for β cell dysfunction. Gen-Sheng Feng from the Burnham Institute for Medical Research described the phenotypic analysis of several new mouse models developed in his lab aimed at deciphering how the Shp2 phosphatase regulates downstream leptin and insulin signals in various cell types. One particularly interesting result was that, while forebrain neuron-specific Shp2 deletion mice developed early onset obesity and leptin resistance, transgenic mice expressing a dominant-active mutant of Shp2 in forebrain neurons exhibited enhanced sensitivity to leptin and resistance to diet-induced obesity.

Histone Modifications and Chromatin Remodeling

Cells undergoing developmental processes are characterized by persistent non-genetic alterations in chromatin represented by distinct patterns of DNA methylation and post-translational histone modifications. These epigenetic changes were the subject of the talk by Shelley Berger of the Wistar Institute, who studies the bewildering complexity of histone modifications in both yeast and mammals. She presented data from her lab demonstrating that levels of the evolutionarily conserved yeast NAD^+-dependent Sir2 histone deacetylase protein are reduced in aging yeast cells and that this is correlated with compromised transcriptional silencing at specific subtelomeric regions in replicatively old cells. This Sir2-mediated activity in yeast may represent an evolutionarily conserved function in the regulation of replicative aging by maintaining

intact telomeric chromatin. "This highly praised lecture has significant implications for the connection between chromatin regulation and replicative aging," notes theme organizer Trevor Archer of the National Institute of Environmental Health Sciences.

Another well received presentation in this highly active field of epigenetics and chromatin architecture was given by Jon Widom of Northwestern University. Widom presented recent results, obtained using a reconstituted system comprising only purified genomic DNA and histones, which showed that the interplay between DNA and histones can provide and even specify the location of nucleosomes within the genome. This "nucleosome positioning code" is superimposed on top of the already known regulatory and gene-encoding information present on chromosomes. The work, which was done in collaboration with Eran Segal of the Weitzmann Institute, suggests that genomes utilize the nucleosome positioning code to facilitate specific chromosome functions, such as delineating functional *versus* nonfunctional binding sites for regulatory proteins; and to define the next higher level of chromosome structure itself (Fig. 2). This study could have broader implications for various DNA-mediated nuclear activities.

RNA: Processing, Transport, and Regulatory Mechanisms

Splicing regulatory elements (SREs) play central roles in the control of pre-mRNA splicing and exon evolution. Chris Burge's group at the Massachusetts Institute of Technology (MIT) has been studying the regulatory properties of such elements using techniques such as deep RNA sequencing. At the meeting, he presented an analysis of intronic G-rich elements bound by the splicing regulatory protein hnRNP H. These elements were shown to correlate with adjacent splice sites of intermediate strength, and evidence was shown, which suggested that these G-rich elements have a "buffering" capacity that results in the accumulation of splice site mutations impacting the evolution of new splicing patterns. Also presented was evidence that nucleosomes carrying specific histone modifications correlate with exon location. As theme organizer Traci Hall of the National Institute of Environmental Health Sciences notes, "These results have raised intriguing questions about the possible roles of histones in RNA processing and the protection of exonic sequences against DNA damage."

Another innovative technique involving RNA is being developed by Kevin Weeks and his group at the University of North Carolina. Known as selective 2'-hydroxyl acylation analyzed by primer extension (SHAPE) chemistry, this technology can quantify RNA backbone flexibility at single nucleotide resolution and may

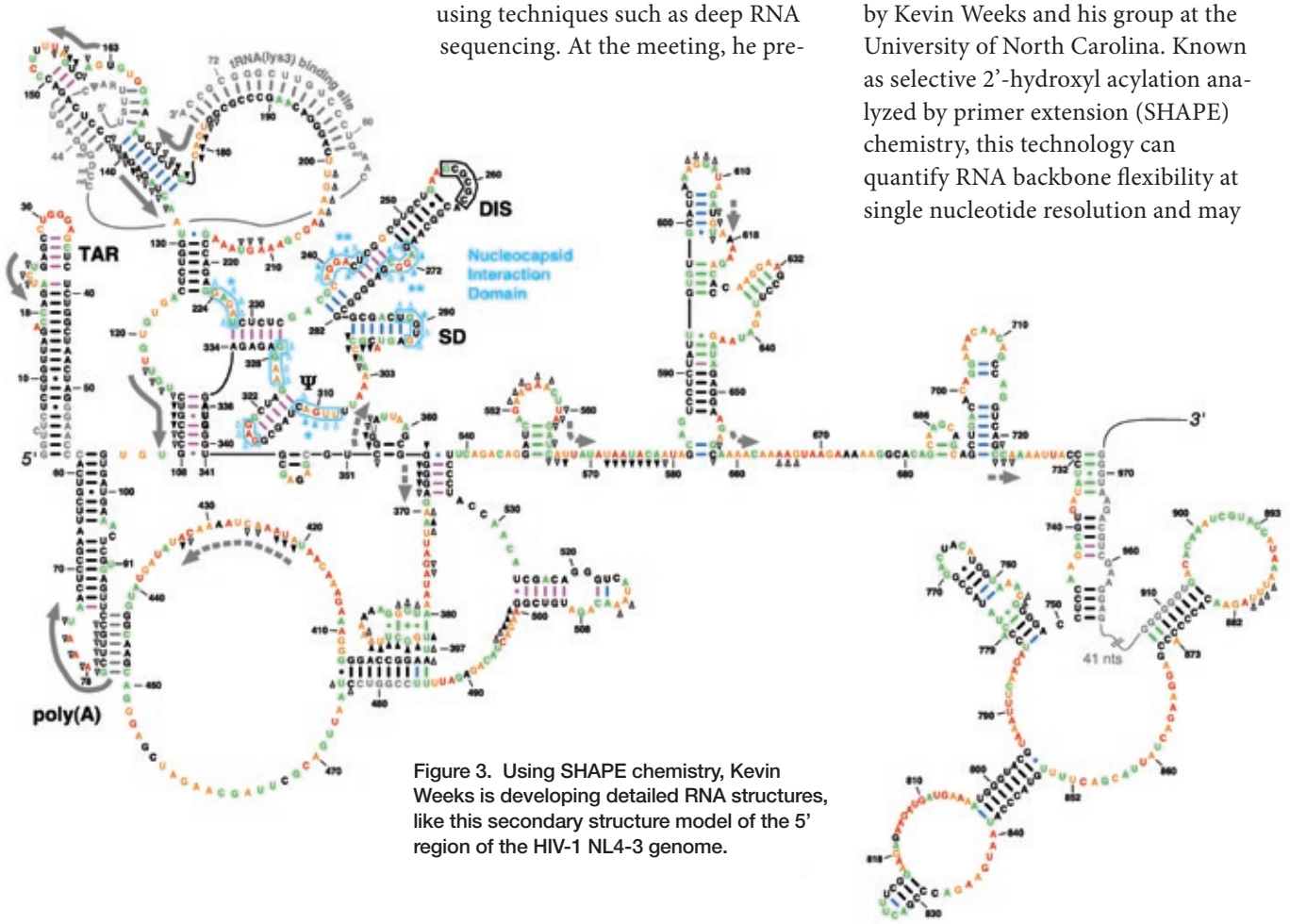


Figure 3. Using SHAPE chemistry, Kevin Weeks is developing detailed RNA structures, like this secondary structure model of the 5' region of the HIV-1 NL4-3 genome.

address one of the great remaining problems in molecular biology: understanding the detailed global structure of large RNA molecules. Weeks noted that SHAPE technology could someday make analysis of RNA secondary and tertiary structure as straightforward, in principle, as DNA sequencing and should be able to provide informative analysis for any RNA in a cellular or viral transcriptome. As a challenging test, Weeks' lab is currently looking into the architecture of a 9,200-nucleotide-long HIV-1 RNA genome in order to understand how the structure contributes to viral infection and replication (Fig. 3).

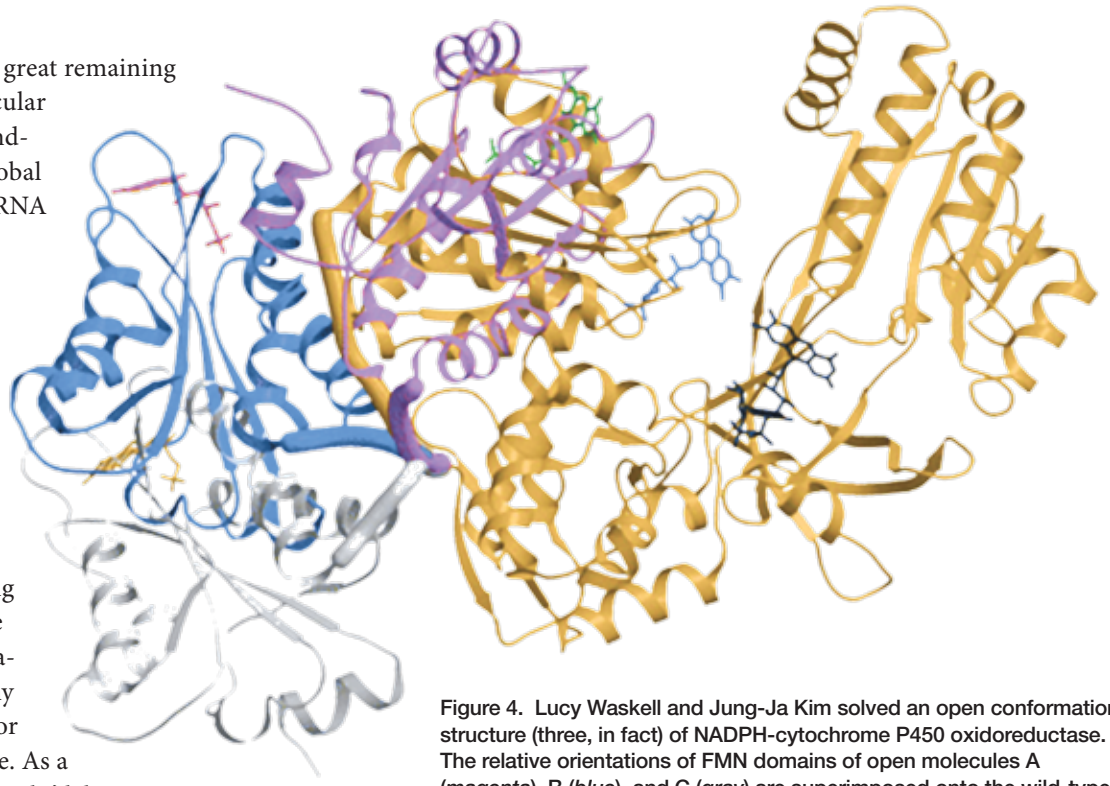


Figure 4. Lucy Waskell and Jung-Ja Kim solved an open conformation structure (three, in fact) of NADPH-cytochrome P450 oxidoreductase. The relative orientations of FMN domains of open molecules A (*magenta*), B (*blue*), and C (*gray*) are superimposed onto the wild-type CYPOR structure (*gold*).

DNA Replication, Repair, and Recombination/ Genome Dynamics

One long-studied and still unanswered problem in the replication field is how cyclin-dependent kinases (cdks) stimulate the initiation of DNA replication. Hiroyuki Araki from Japan's National Institute of Genetics presented one solution in his engaging lecture. His group's work in *Saccharomyces cerevisae* indicates that cdk phosphorylation of two critical proteins, SLD2 and SLD3, promotes the recruitment of a complex containing Pol ε-GINS-SLD2-DPB11 (termed the pre-landing complex; pre-LC) to the CDC45-SLD3 complex bound at the origin of replication. He noted that the pre-LC, which is formed in a CDK-dependent and prereplication complex (RC)-independent manner, is quite fragile and is detected only with the aid of a cross-linking agent, which has made it hard to identify. Intriguingly, neither SLD2 nor SLD3 are conserved in higher eukaryotes so, unfortunately, the mechanism by which cyclin-cdk stimulates the G_1-S transition in higher eukaryotes still remains unclear.

Double-strand break repair is a two-sided affair. When programmed, it's essential for both the repair and recombination of DNA; however, this same process can lead to unwanted translocation events that are the driving forces behind several cancer types. Maria Jasin from the Sloan-Kettering Institute gave a clear summary of the alternate pathways of double-strand break repair, such as those for individual breaks compared with translocations and their implications in various human cancers. She also discussed her group's recent application of engineering sequence-specific zinc finger endonucleases to generate DNA breaks at targeted locations on human chromosomes. "This work opens the floodgates to study disease-related DNA breaks and potentially for gene therapy in stem cells without excessive genomic manipulation," says Anindya Dutta from the University of Virginia, one of the theme organizers.

Protein Folding, Aggregation, and Chaperones

The non-native states of proteins are far more heterogeneous than native structures, making them extremely difficult to access experimentally. Using the cold shock protein CspTm1 as an example, Ben Schuler from the University of Zurich gave an interesting lecture describing his group's work using single molecule Förster resonance energy transfer (FRET) to monitor the conformational distributions of unfolded proteins, including the dependence of these distributions

on solvent conditions, temperature, and interactions with cellular factors like molecular chaperones. He highlighted that such measurements are becoming an increasingly important tool to investigate protein dynamics and quantify previously inaccessible characteristics of the free energy surfaces for folding. Single molecule FRET is certainly an important technological advance that should have numerous future applications.

Chris Dobson from the University of Cambridge provided a conceptual overview of the causes and consequences of protein misfolding in the cell and how this related to some of the basic properties of polypeptides, which included insights into why some sequences are more aggregation-prone than others. He also presented new and exciting data on ultra-fast NMR techniques to study of co-translational nascent chain folding, which theme organizer Judith Frydman of Stanford University states is "a true experimental *tour de force*." As protein folding is inherently coupled to protein synthesis and chain elongation, there is considerable evidence that some nascent chains fold into their native structures before they release from the ribosome. Until now, proving this process on an atomic level has been elusive, but these findings take us one step closer to a detailed picture of co-translational folding.

Structural Enzymology

NADPH-cytochrome P450 oxidoreductase (CYPOR) is a multi-domain flavoprotein that reduces P450 enzymes and whose homolog, NOS-reductase, reduces the catalytic domain of nitric-oxide synthase. All previously published structures of these proteins are in a closed state where the FMN domain cannot interact with the partner domain. A large-scale conformational change has long been proposed to open the structure, and now, thanks to the presentation by Lucy Waskell from the University of Michigan Medical School, this hypothesis has been proven true. Her group, along with Jung-Ja Kim's group at the Medical College of Wisconsin, solved the structure of an open conformation of P450 reductase, which was achieved using a CYPOR variant containing a 4-amino acid deletion in the hinge connecting the FMN domain to the rest of the protein (Fig. 4). She highlighted a proposed model of reductase activity, noting that pivoting of the hinge region exposes the FMN domain and allows the enzyme to interact with its redox partners.

John Spudich at the University of Texas described how his group has been designing new photochemical sensors based on the sequence and structure of natural ones, research that provides insight into both the mechanisms and evolution of these light-harvesting proteins. Citing the microbial rhodopsins, Spudich noted that this family of some 4,800 homologous members operates as either light-driven ion pumps (transport rhodopsins) or photosensory receptors (sensory rhodopsins). Advances in crystallography, spectroscopy, and genetics have begun to clarify how minute modifications enable rhodopsins with similar architectural structure to carry out their distinctly different molecular functions. Highlighting this elegant simplicity of nature, Spudich then showed how a change of only three amino acids could convert a proton-pump rhodopsin to a functional photosensor.

Drug Discovery and Design

The G protein-coupled receptor (GPCR) family is the most abundant group of proteins in the "receptor-ome," and, as noted previously, GPCR signaling is tightly linked with many diseases. Bryan Roth from the University of North Carolina spoke about the potential power in screening drugs and drug-like compounds in a massively parallel fashion against the GPCR-ome. He believes this technology would be ideal in mining the molecular target(s) responsible for drug actions and their off-target effects. "The cool idea he put forth is that many drugs developed to be specific in fact hit many targets," says theme organizer Brian Shoichet of the University of California-San Francisco, adding that, "for many of these drugs, especially those treating CNS disorders and cancer, their efficacy *depends* on this polypharmacology."

Massive, high-content screening and mining for use in drug discovery and design can be undertaken at the genomic, in addition to the proteomic, levels. Rick Bushman from the University of Pennsylvania presented one such promising application of genome-wide screening: targeting infectious diseases by identifying novel genes and pathways in host cells required for pathogen replication. Bushman discussed a new integrated, multiscale approach his group and colleagues have been working on to study early stage HIV replication, which combines genome-wide small interfering RNA (siRNA) analyses with interrogation of human interactome databases. This enabled them to assemble a robust host-pathogen biochemical network consisting of over 200 host and HIV-encoded proteins, from which they identified a diverse subset of proteins that could influence nuclear import or viral DNA integration.

Nick Zagorski is a science writer for ASBMB. He can be reached at nzagorski@asbmb.org.

THE AMERICAN SOCIETY FOR CELL BIOLOGY

49th ANNUAL MEETING

December 5–9, 2009

San Diego Convention Center
San Diego, CA

WHERE ELSE CAN YOU FIND...

SCIENTIFIC BREADTH
From under the hood of the cell to cell division, prokaryotes to sex cells: intriguing proteins ripe for detailed biochemical analysis

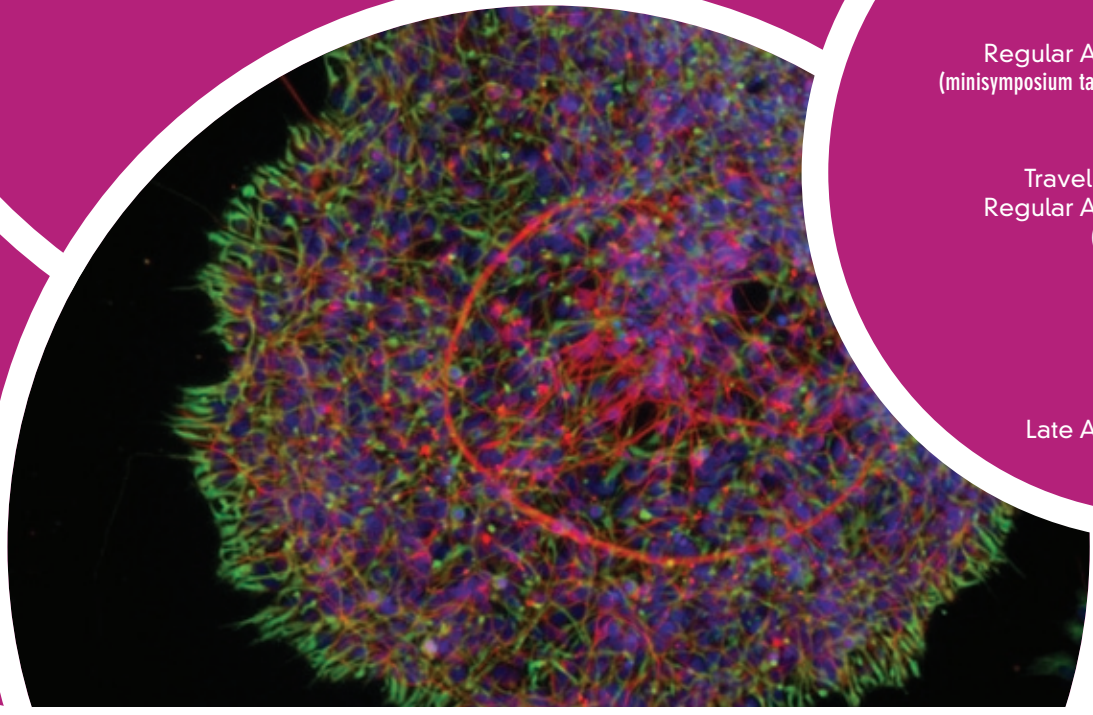
SCIENTIFIC DEPTH
From molecular motors to what is life

SCIENTIFIC STARS
From Jan Lowe to Andrea Musacchio, see how cell biology has gone molecular

SCIENTIFIC EDUCATION
Tutorials and exhibits from leading companies on the latest products

SCIENTIFIC FUN
The one and only CellSlam...and Celldance: Only at the ASCB Annual Meeting
Scientists explain their science and present their films; you *have* to be there!

DON'T MISS IT! | www.ascb.org/meetings



IMPORTANT DEADLINES

JULY 30
Regular Abstract Submission
(minisymposium talk or poster consideration)

SEPTEMBER 1
Travel Award Application
Regular Abstract Submission
(poster consideration only)

OCTOBER 1
Early Registration

OCTOBER 15
Late Abstract Submission

scientific meeting calendar

JUNE 2009

21st American Peptide Society Symposium
JUNE 7–12, 2009
BLOOMINGTON, IN
www.21staps.org

Cancer Proteomics 2009
JUNE 8–12, 2009
DUBLIN, IRELAND
www.selectbiosciencies.com/conferences/files/Agendas2009/CP2009_Agenda.pdf

Systems Biology: Integrative, Comparative, and Multi-scale Modeling
JUNE 11–14, 2009
AMES, IA
www.bb.iastate.edu/~gfst/phomepg.html

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

VII European Symposium of the Protein Society
JUNE 14–18, 2009
ZURICH, SWITZERLAND
www.proteinsociety.org

XV International Symposium on Atherosclerosis
JUNE 14–18, 2009
BOSTON, MA
www.isa2009.org

International Conference on Cytochrome P450
JUNE 21–25, 2009
OKINAWA, JAPAN
www.p450meetings.com

Gordon Research Conference: Atherosclerosis
JUNE 21–26, 2009
TILTON, NH
www.grc.org/programs.aspx?year=2009&program=athero

SEB at Glasgow 2009
JUNE 28–JULY 1, 2009
GLASGOW, SCOTLAND
www.sebiology.org/meetings/Glasgow/glasgow.html

Gordon Research Conference: Stress Proteins in Growth, Development, & Disease
JUNE 28–JULY 3, 2009
ANDOVER, NH
www.grc.org/programs.aspx?year=2009&program=stressprot

JULY 2009

6th GERLI Lipidomics Meeting
JULY 1–3, 2009
RENNES, FRANCE
www.gerli.com/rennes2009english.htm

Gordon Research Conference: Molecular Membrane Biology
JULY 5–10, 2009
ANDOVER, NH
www.grc.org/programs.aspx?year=2009&program=molecmemb

Short Course on Statistical Genetics & Statistical Genomics
JULY 13–17, 2009
HONOLULU, HI
www.soph.uab.edu/ssg/nsfstatgen/nsfsecondannual

Gordon Research Conference: Molecular & Cellular Biology of Lipids
JULY 19–24, 2009
WATERVILLE VALLEY, NH
www.grc.org/programs.aspx?year=2009&program=lipids

SWLA 4th Annual Scientific Forum
JULY 24–26, 2009
OKLAHOMA CITY, OK
www.lipid.org

23rd Annual Symposium of the Protein Society
JULY 25–29, 2009
BOSTON, MA
www.proteinsociety.org

Protein Lipidation, Signaling, and Membrane Domains
JULY 26–31, 2009
SAXTONS RIVER, VT
src.faseb.org

AUGUST 2009

Student-centered Education in the Molecular Life Sciences: Essentials for Educating Biochemistry and Molecular Biology Undergraduates
AUGUST 5–8, 2009
COLORADO SPRINGS, CO
www.asbmb.org/meetings

Gordon Research Conference: Molecular, Biophysical, & Biomechanical Understanding of Skin Barrier Formation, Function, & Disease
AUGUST 9–14, 2009
WATERVILLE VALLEY, NH
www.grc.org/programs.aspx?year=2009&program=barrier

ACS Fall 2009 National Meeting & Exposition
AUGUST 16–20, 2009
WASHINGTON, D.C.
www.acs.org/meetings

Kern Aspen Lipid Conference
AUGUST 22–25, 2009
ASPEN, CO
www.uchsc.edu/kernconference

Gordon Research Conference: Mechanisms of Cell Signaling
AUGUST 23–28, 2009
OXFORD, ENGLAND
www.grc.org/programs.aspx?year=2009&program=mechcell

18th International Mass Spectrometry Conference
AUGUST 30–SEPTEMBER 4, 2009
BREMEN, GERMANY
www.imsc-bremen-2009.de

SEPTEMBER 2009

50th International Conference on the Bioscience of Lipids
SEPTEMBER 1–5, 2009
REGENSBURG, GERMANY
www.icbl2009.de

Systems Biology for Biochemists
OCTOBER 22-25, 2009
TAHOE CITY, CA
Organizer: Arcady Mushegian, Stowers Institute for Medical Research
www.asbmb.org/meetings

MWLA Annual Scientific Forum
SEPTEMBER 25–27, 2009
CINCINNATI, OH
www.lipid.org

World Congress on Oils and Fats and 28th ISF Congress
SEPTEMBER 27–30, 2009
SYDNEY, AUSTRALIA
www.isfsydney2009.com

6th International Congress on Heme Oxygenases in Biology and Medicine
SEPTEMBER 30–OCTOBER 4, 2009
MIAMI BEACH, FL
www.hemeoxygenases.org

OCTOBER 2009

3rd ESF Functional Genomics Conference
OCTOBER 1–4, 2009
INNSBRUCK, AUSTRIA
www.esffg2008.org

SACNAS National Conference: Improving the Human Condition: Challenges for Interdisciplinary Science
OCTOBER 15–18, 2009
DALLAS, TX
www.sacnas.org/confnew/confclient

7th Euro Fed Lipid Congress
OCTOBER 18–21, 2009
GRAZ, AUSTRIA
www.eurofedlipid.org/meetings/graz/

Systems Biology for Biochemists
An ASBMB Sponsored Special Symposium
OCTOBER 22–25, 2009
LAKE TAHOE, CA
www.asbmb.org/page.aspx?id=2096

Bioactive Lipids in Cancer, Inflammation, and Related Diseases (11th International Conference)
OCTOBER 25–28, 2009
CANCUN, MEXICO
www.bioactivelipidsconf.wayne.edu

NOVEMBER 2009

Annual Biomedical Research Conference for Minority Students
NOVEMBER 4–7, 2009
PHOENIX, AZ
www.abrcms.org/index.html

7th Annual World Congress on the Insulin Resistance Syndrome
NOVEMBER 5–7, 2009
SAN FRANCISCO, CA
www.insulinresistance.us

Annual Meeting of the Society for Glycobiology
NOVEMBER 12–15, 2009
SAN DIEGO, CA
www.glycobiology.org

4th Barossa Meeting: Cell Signaling in Cancer and Development
NOVEMBER 18–21, 2009
BAROSSA VALLEY, SOUTH AUSTRALIA
sapmea.asn.au/conventions/signalling09/index.html

20th International Symposium on Glycoconjugates
NOVEMBER 29–DECEMBER 4, 2009
SAN JUAN, PR
www.glyco20.org

FEBRUARY 2010

Biophysical Society 53rd Annual Meeting
FEBRUARY 28–MARCH 4, 2009
BOSTON, MA
www.biophysics.org/Default.aspx?alias=www.biophysics.org/2009meeting

APRIL 2010

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

JUNE 2010

8th International Conference on Hyaluronan of the International Society for Hyaluronan Sciences
JUNE 6–11, 2010
KYOTO, JAPAN
www.ISHAS.org

11th International Symposium on the Genetics of Industrial Microorganisms
JUNE 28–JULY 1, 2010
MELBOURNE, AUSTRALIA
www.gim2010.org

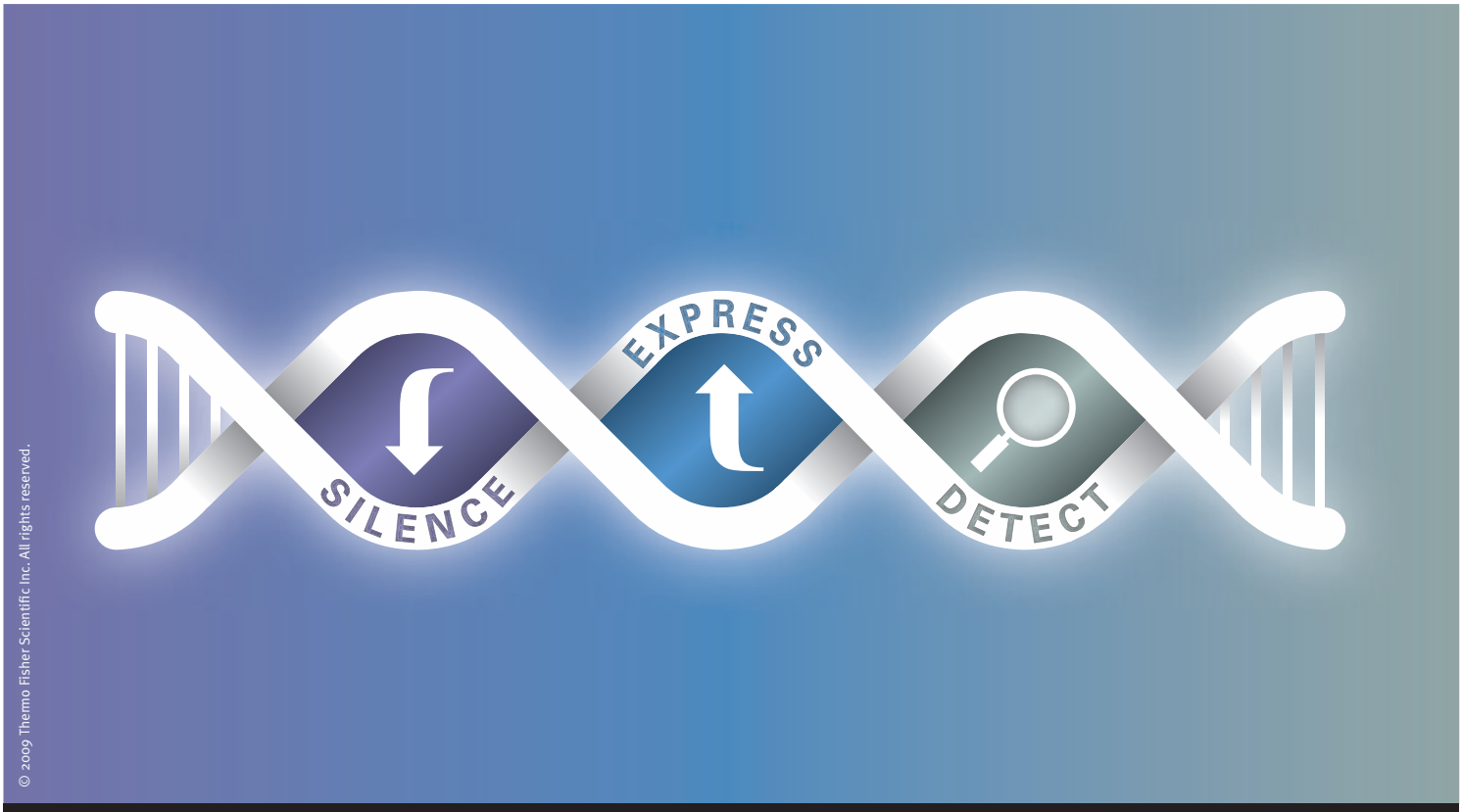
AUGUST 2010

9th International Mycological Congress (IMC9): The Biology of Fungi
AUGUST 1–6, 2010
EDINBURGH, UK
www.imc9.info

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

APRIL 2011

ASBMB Annual Meeting
APRIL 9–13, 2011
WASHINGTON, D.C.
www.asbmb.org/meetings.aspx

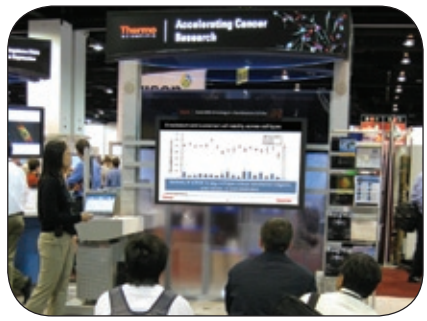


Innovative Solutions for Gene Analysis.

The success of your research is too important to leave to chance. When selecting an RNAi platform, consider our unparalleled record of peer-reviewed publications and products that have empowered RNAi research since 2002. The standards for excellence in RNAi, Gene Expression and Detection technologies come together with the Thermo Scientific Dharmacon, Open Biosystems and ABgene product lines.

- **Silencing** - The world leader in RNAi offering the most complete, technologically-advanced collections of siRNA, shRNA & microRNA
- **Expression** - The world's largest collections of full-length sequence-verified, cDNA and ORF clones for reliable gene over-expression
- **Detection** - High performance QPCR, PCR reagents & consumables with over 35,000 antibodies for consistently superior results

Discover our innovative solutions for gene function analysis at *www.thermo.com/gen*



Visit us at upcoming conferences
Find us at the International Society of Stem Cell Research July 8-11 in booth 73 & 75 located in Barcelona, Spain.

Moving science forward

Thermo SCIENTIFIC
Part of Thermo Fisher Scientific