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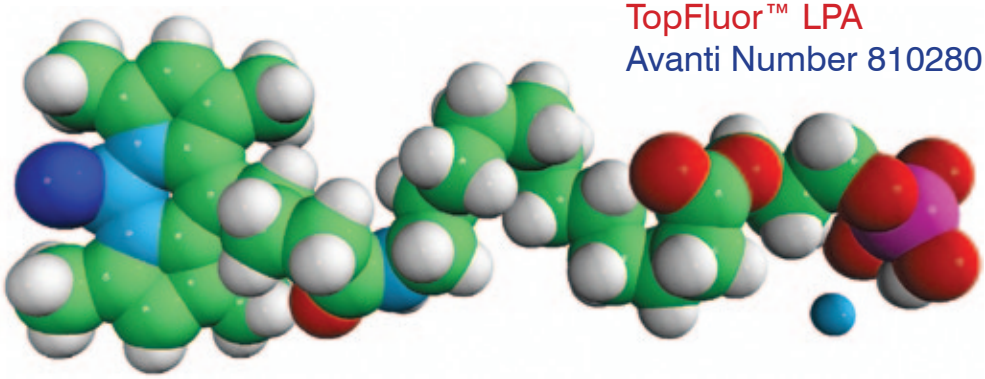

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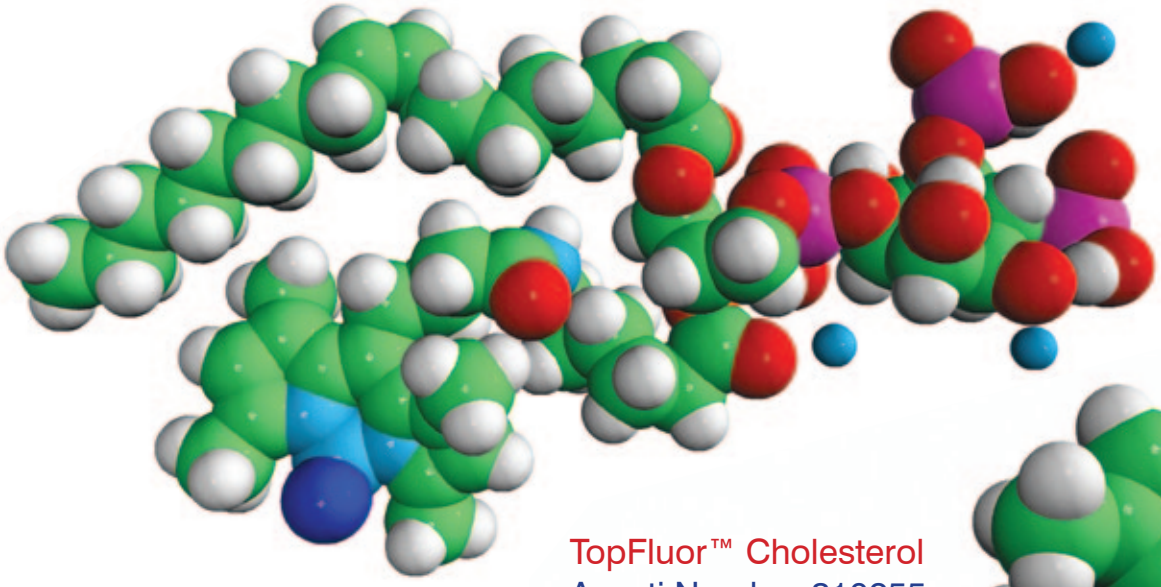

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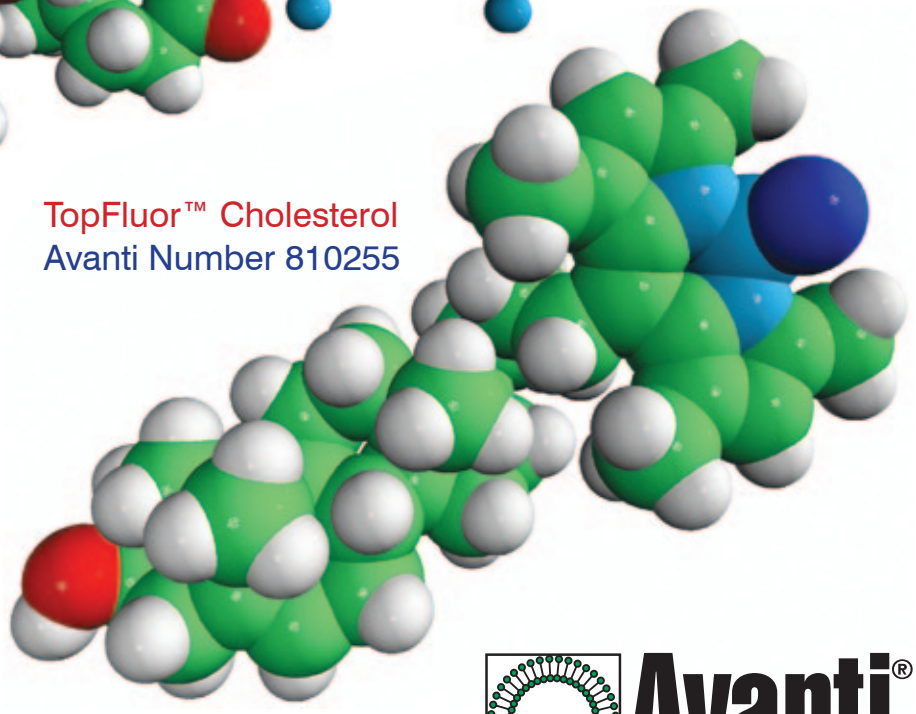

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To read these and other online articles, go to www.asbmb.org/asbmbtoday.

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2008 APEX® AWARDS FOR PUBLICATION EXCELLENCE

letters to the editor

Dear Editor,

The September 2010 president's message poses the question and attempts to provide practical answers to the perceived abundance of people enrolling to obtain Ph.D.s and lack of capacity in the research sector to provide them with life-long careers. The president offers various interesting suggestions, however, before we seriously start considering any of them and altering a tradition that goes back centuries, we may wish to take a step back and identify the "mission statement" of the degree under discussion and contemplate what it is for. I will restrict the discussion to scientific research, although the arguments apply equally to the humanities.

Although an ancient, formal, degree, "philosophiae doctor" gained a foothold in the 19th century. The gradual increase in its bestowment reflects the popularization and institutionalization of scientific research. Practitioners of research were required to have this necessary "training" to achieve the "license" to conduct research. Like any examination or apprenticeship, the degree serves the dual purpose of regulating numbers and maintaining standards. This followed the trends in other ancient "professions" such as medicine, law or theology.

Today, a major proportion of scientific research is conducted at universities. To be able to participate in this endeavor, it is necessary to obtain a Ph. D. Original scientific research is mainly about questioning, doubting, experimenting and discovering, using questions and problems that apparently do not have any immediate "relevance." In defense of research, G. H. Hardy, in "A Mathematicians Apology," proclaimed that the first reason for researchers to do what they do is intellectual curiosity and a desire to know the truth. A Ph.D. is, therefore, a necessity for those whom the president describes in her message as "individuals with burning desire to do research, who are willing to chance the perils of academia."

I agree with the president that we should not cap numbers of students who may wish to pursue a postgraduate degree and that Ph.D.s should contribute more to the promotion and public understanding of science. I further agree that prospective students should be informed, in very clear terms, of the realities of an academic research career, of lower pay, job insecurity, long hours in the laboratory and a lifetime of writing grant applications to obtain funds to do their research. We should also inform them of the joys and tribulations of teaching undergraduates and training postgraduate students. This, to some extent, will guarantee that only those with a genuine desire and yearning for what Richard Feynman described as "the pleasure of finding things out" will enroll to do a Ph.D. It is the pursuit of this pleasure that not only advances our knowledge of the universe and ourselves but yields unpredictable and unquantifiable benefits to mankind.

Ph.D.s can, and do, contribute, immensely, to the various professions they join after dabbling in research. What we must refrain from doing is attempting to alter the nature of philosophiae doctor into a faddish, "marketable" and "transferrable" skills course. If a Ph.D. student decides to pursue another career, they should do this as a matter of personal choice. If they indeed wish to become lawyers or teachers after they obtain their Ph.D., they should pursue these by engaging in numerous well-established courses and qualifications traditionally available for these professions.

Yours sincerely,
Aamir Ahmed

Honoring Jeremy Berg

BY SUZANNE PFEFFER

On Sept. 20, the American Society for Biochemistry and Molecular Biology presented the 2011 Howard K. Schachman Public Service Award to Jeremy Berg, director of the National Institute of General Medical Sciences. Established in 2001, the Schachman Award is the highest honor given by ASBMB to acknowledge exemplary dedication to public service in support of biomedical science. Previous recipients include U.S. Sens. Arlen Specter and Tom Harkin; former U.S. Reps. John Porter and Robert Michel; the National Institutes of Health's Ruth Kirschstein; philanthropist John Whitehead and the Research!America organization. The ASBMB Public Affairs Advisory Committee selected Berg because of his tireless advocacy in support of investigator-initiated research and the fundamental research that is dear to the hearts of every ASBMB member.

Howard K. Schachman is a former president of ASBMB (1987) and former president of the Federation of American Societies for Experimental Biology (1988) who chaired ASBMB's Public Affairs Advisory Committee from 1989 to 2000 (1, 2). As a young faculty member, Schachman spoke out vociferously against an anti-Communist loyalty oath imposed in 1949 by the Regents of the University of California (3). A pioneer in the field of analytical ultracentrifugation (2, 4), Schachman devoted an enormous amount of time advocating for the importance of federally funded basic research. He worked as an adviser to former NIH Director Harold Varmus, as NIH ombudsman in the basic sciences and sat in on many study-section meetings to obtain insight on how to improve the peer-review process. In all of his public service activities, Schachman helped to formulate positions that he hoped represented the working scientist's point of view.

Given this background, Jeremy Berg is an especially appropriate recipient of this award. Prior to his appointment as NIGMS director, Berg was a faculty member and director of both the department of biophysics and biophysical chemistry and the Institute for Basic Biomedical Sciences at the Johns Hopkins University School of Medicine in Baltimore. He also directed the Markey Center for Macromolecular Structure and Function and co-directed the W.M. Keck Center for the Rational Design of Biologically Active Molecules at Hopkins. Berg continues to direct an active research lab that focuses on the structural and functional roles of zinc-finger proteins and zinc-binding domains and on the properties of receptors involved in intracellular protein targeting. He certainly is a working scientist and a card-carrying biochemist.

ASBMB President Suzanne Pfeffer gives the Howard K. Schachman Public Service Award to Jeremy Berg.

Many may recognize his name from the textbook, "Biochemistry," which he co-authored with Tymoczko and Stryer (5). His involvement as lead author of this textbook evolved from his research experiences in Lubert Stryer's laboratory as an undergraduate at Stanford University. Berg's deep and broad knowledge of biochemistry is, in part, why he frequently is sought after by the press to explain the underlying discoveries that lead to Nobel prizes and other awards.

As director of NIGMS, Berg oversees a $2 billion budget that funds basic research in cell biology, biophysics, genetics, developmental biology, pharmacology, physiology, biological chemistry, bioinformatics and computational biology. The institute supports more than 4,000 research grants — about 10 percent of all NIH grants — as well as a variety of programs designed

to increase the diversity of the biomedical research work force.

A major challenge faced by every NIH institute director is how to accomplish the most with the limited research dollars that currently are available. Under Berg's leadership, NIGMS has trimmed budgets wherever possible to be able to fund the maximum number of R01 awards. Although no one enjoys getting the phone call that says, "your grant will be funded, but the budget has been cut," this approach is being taken in an attempt to sustain our field in challenging times. When dispersing research dollars, NIGMS gives special consideration to new investigators and also to the total resources available to a given lab to carry out the proposed research. The rules followed for funding allocations can be found online (6) and are helping sustain the total number of investigator-initiated applications that get paid.

ASBMB Past-president Howard K. Schachman.

At NIGMS, Berg has provided a level of transparency that is rare for any government agency. His institute publishes a blog (NIGMS Feedback Loop, https://loop.nigms.nih.gov), and he has been unusually responsive to his constituents, recently providing detailed data on funding probabilities as a function of priority scores for submitted applications. Berg also is proud of his role overseeing the NIH director's Pioneer Award program (since its second year) and the new NIH director's New Innovator Award program, specifically designed to support unusually creative new investigators when they may lack the preliminary data required for an R01 grant. The NIH has long had the reputation of funding projects that are guaranteed to work, and these programs are designed to encourage as much innovation as possible. Berg's institute also developed the EUREKA program, a specialized R01 program targeted to higher risk, potentially high-impact research (7).

Congress wants cures for major diseases, and it is our job to explain how basic science has, and will, continue to lead to those cures. In his testimony for the House Appropriations Subcommittee earlier this year (8), Berg described "Good Science for Better Health." As an example of the major impact of basic science on clinical therapies, he noted, "…Studies by the NIH Pharmacogenetics Research Network (PGRN) have shown that genetic information can help predict how heart drugs, cancer medicines, nicotine patches and a range of other treatments will work in a particular person. This research is contributing to personalized approaches to health care." We need to keep telling these stories.

There currently are strong pressures to carry out translational research, and there are so many examples of translational breakthroughs that could never have been anticipated without fundamental, basic research groundwork. The Journal of Biological Chemistry is considering initiating a series of articles providing the background biochemistry that led to new approaches to disease therapies. These will be useful in teaching and can provide a framework for more streamlined versions to be widely shared with the public. We need to enlist all of our members, textbook authors (including NIH institute directors) and biochemistry teachers to rephrase these success stories for public (and congressional) education.

During his tenure as chairman of ASBMB's Public Affairs Committee, Schachman became involved in a variety of heated policy discussions on topics such as indirect cost rates, fraud in science and even age-based, mandatory faculty retirement. In 1990, he filed an age-discrimination complaint with the California Department of Fair Employment and Housing that later was upheld by the State of California: from that day forward, age-based mandatory retirement of faculty was rescinded. A significant fear at the time of this decision was that the average age of faculty would increase and faculty billets might not be available to permit hiring of new, energetic, more junior colleagues. Although there is no doubt that this certainly has occurred, the recent challenge of obtaining and sustaining research funding is encouraging new retirements at an increasing rate.

Join me in thanking Jeremy Berg for doing all that he can to stretch research dollars when funds have to go further. He is working for all of us, to help us discover the molecular basis of many life processes that provide the underpinnings for future advances in health and medicine.

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Fate of Federal Funding for Stem Cell Research Remains Uncertain

BY JENNIFER A. HOBIN

The research community breathed a collective sigh of relief in September when the U.S. Court of Appeals for the D.C. Circuit ruled that the National Institutes of Health could continue to fund human embryonic stem cell research. The ruling was one of several procedural decisions in the complicated case unfolding simultaneously in the appeals court and the U.S. District Court for the District of Columbia. The recent legal maneuvers follow an Aug. 23 preliminary injunction issued by District Court Judge Royce C. Lamberth that prohibited federal funding for hESC research.

The National Institutes of Health immediately shut down its intramural hESC research program and stopped funding new and continuing hESC grants in response to the injunction. Shortly after, HHS challenged the ruling on two fronts: The department asked Judge Lamberth to stay, or suspend, his decision and also appealed to the higher court to overturn it. Judge Lamberth rejected the motion for a stay, a move anticipated by legal experts. Fortunately, the Court of Appeals responded more favorably. It issued an "administrative stay" on Sept. 9 that temporarily suspended the injunction; just over two weeks later, the court extended its suspension pending a final determination in the appeal. That extension came on the heels of oral arguments before the court during which U.S. Department of Justice attorneys representing the NIH argued that resuming the ban would "irreparably" harm researchers.

The Coalition for the Advancement of Medical Research, a collection of patient organizations, universities and scientific societies, including the Federation of American Societies for Experimental Biology, filed an "amicus curiae" brief supporting the government's appeal. The University of California went a step further, petitioning the court to become a party in the lawsuit. It argued that the ban would have a profoundly negative impact on research and education in the UC system and that its interests are not represented by any of the parties in the case. The appeals court rejected the motion but did grant the university permission to submit its own amicus. How the appeals court ultimately will rule is anyone's guess. It has, however, signaled that it will expedite the proceedings.

Meanwhile, the lower court is moving ahead with the original lawsuit challenging the legality of hESC research. The plaintiffs have asked Judge Lamberth to rule in their favor without a hearing. The government objected and filed a cross-motion for a speedy decision in its favor, a move supported by CAMR in a separate amicus. It is not clear whether or not Judge Lamberth will make a quick decision or how he will decide the case. If he ultimately rules for the plaintiffs, it would close the door on promising stem cell science once again.

While the legal wrangling continues, pressure has been mounting for lawmakers to develop a "legislative fix." FASEB issued an action alert asking scientists to contact their members of Congress to urge them to approve legislation that will continue federal support for hESC research. Over 4,000 e-mails have been sent to senators and representatives as a result of the FASEB call-to-action. Since the alert was issued, support for stem cell research has gained momentum: U.S. Rep. Diana DeGette, D-Colo., has secured 16 additional co-sponsors for the "Stem Cell Research Advancement Act of 2009," and Sens. Arlen Specter, D-Penn., Barbara Boxer, D-Calif., and Dianne Feinstein, D-Calif., introduced the "Stem Cell Research Advancement Act of 2010." Both bills would codify the HHS "Guidelines for Human Stem Cell Research," effectively expanding the scope of federally funded hESC research beyond what was permissible under President Bush.

Jennifer A. Hobin (jhobin@faseb.org) is director of science policy for the Office of Public Affairs at FASEB.

For more information:

For background information on stem cells see Geoffrey Hunt's article (http://bit.ly/cVt27H) in the October issue of the magazine.

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Functional Consequences of Structural Variation in The Genome (A1), Steamboat Springs, Colorado, USA

Frontiers of NMR in Biology (A3), Big Sky, Montana, USA

NK and NKT Cell Biology: Specificity and Redundancy (A4), Breckenridge, Colorado, USA

Adult Neurogenesis (A5), Taos, New Mexico, USA

Histone Code: Fact or Fiction? (A6), Midway, Utah, USA

Type 2 Diabetes, Insulin Resistance and Metabolic Dysfunction (J1), joint with **Obesity (J2)**, Keystone, Colorado, USA

Tuberculosis: Immunology, Cell Biology and Novel Vaccination Strategies (J3) joint with **Mycobacteria: Physiology, Metabolism and Pathogenesis – Back to the Basics (J4)**, Vancouver, British Columbia, Canada

Plant Abiotic Stress Tolerance Mechanisms, Water and Global Agriculture (A7), Keystone, Colorado, USA

Epithelial Plasticity and Epithelial to Mesenchymal Transition (A8), Vancouver, British Columbia, Canada

Transmembrane Signaling by GPCRs and Channels (B1), Taos, New Mexico, USA

Extracellular Matrix and Cardiovascular Remodeling (B2), Tahoe City, California, USA

The Evolution of Protein Phosphorylation (F1), Keystone, Colorado, USA

Stem Cells in Development, Tissue Homeostasis and Disease (B3), Santa Fe, New Mexico, USA

Genomic Instability and DNA Repair (B4), Keystone, Colorado, USA

FEBRUARY 2011

Lung Development and Repair (B5), Santa Fe, New Mexico, USA

Immunologic Memory, Persisting Microbes and Chronic Disease (B6), Banff, Alberta, Canada

Antibodies as Drugs (B7), Keystone, Colorado, USA

MicroRNAs and Non-Coding RNAs and Cancer (J5) joint with **MicroRNAs and Human Disease (J6)**, Banff, Alberta, Canada

Dendritic Cells and the Initiation of Adaptive Immunity (J7) joint with **Cancer Control by Tumor Suppressors and Immune Effectors (J8)**, Santa Fe, New Mexico, USA

Inositide Signaling in Pharmacology and Disease (X1) joint with **PI 3-Kinase Signaling Pathways (X2)**, Keystone, Colorado, USA

Genetics, Immunology and Repair in Multiple Sclerosis (B8), Taos, New Mexico, USA

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FEBRUARY 2011 (continued)

Mechanisms of Cardiac Growth, Death and Regeneration (X3) joint with **Molecular Cardiology: Disease Mechanisms and Experimental Therapeutics (X4)**, Keystone, Colorado, USA

Mucosal Biology: A Fine Balance Between Tolerance and Autoimmunity (X5) joint with **Immunity in the Respiratory Tract: Challenges of the Lung Environment (X6)**, Vancouver, British Columbia, Canada

Evolutionary Developmental Biology (C1), Tahoe City, California, USA

DNA Replication and Recombination (C2), Keystone, Colorado, USA

MARCH 2011

Biofuels (C3), Singapore, Singapore

Stem Cells, Cancer and Metastasis (C4), Keystone, Colorado, USA

New Frontiers at the Interface of Immunity and Glycobiology (C5), Lake Louise, Alberta, Canada

AAA and Related ATP-Driven Protein Machines (C6), Tahoe City, California, USA

Mechanism and Biology of Silencing (C7), Monterey, California, USA

HIV Evolution, Genomics and Pathogenesis (X7) joint with **Protection from HIV: Targeted Intervention Strategies (X8)**, Whistler, British Columbia, Canada

Microbial Communities as Drivers of Ecosystem Complexity (C8), Breckenridge, Colorado, USA

Autophagy (D1), Whistler, British Columbia, Canada

Hematopoiesis (D2), Big Sky, Montana, USA

Environmental Epigenomics and Disease Susceptibility (D3), Asheville, North Carolina, USA

APRIL 2011

Metabolic Responses to Extreme Conditions (D4), Big Sky, Montana, USA

Immunoregulatory Networks (D5), Breckenridge, Colorado, USA

Drugs from Bugs: The Anti-Inflammatory Drugs of Tomorrow (Z1) joint with **Evolving Approaches to Early-Stage Drug Discovery (Z2)**, Snowbird, Utah, USA

B Cells: New Insights into Normal versus Dysregulated Function (D6), Whistler, British Columbia, Canada

MAY 2011

Omics Meets Cell Biology (E1), Alpbach, Austria

Lipid Biology and Lipotoxicity (E2), Killarney, County Kerry, Ireland

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Legislative Update

BY BENJAMIN W. CORB

Before packing their bags and heading home for their October recess, members of Congress were busy debating federal budgets, discussing federal funding for stem cell research and naming officials to key posts within the Obama administration. What follows is a synopsis of their activities in the past few weeks.

Congress Passes a Continuing Resolution

Before departing for the month of October in advance of the November elections, Congress passed a continuing resolution, which will keep federal agencies opened and operating at fiscal 2010 budget levels through Dec. 3. The CR accomplishes two important goals. Most importantly, it keeps the federal government operating and researchers researching. Also, with a December expiration date, the resolution allows the time necessary for the legislative wrangling to take place after the election, as a "lame-duck" Congress returns to establish a budget for fiscal 2011.

What does this mean for the biomedical research community? More business as usual, as the National Institutes of Health, the National Science Foundation, the U.S. Food and Drug Administration and all other agencies will be operating with the same budget they've spent most of the year with. There is, however, cause for concern. The biomedical research community (including the American Society for Biochemistry and Molecular Biology) has spent much of the summer of 2010 negotiating with appropriators for a 3 percent increase in funding at the NIH, raising the funding level to nearly $32 billion for fiscal 2011. This increase was accepted widely by lawmakers, and the community was beginning to feel optimistic in its passage for fiscal 2011. With a CR, and potentially a new Congress after the election, there no longer may be the political willingness to accept increases in discretionary spending. If the debate in Congress in advance of passage of the CR is any indication, 2011 may be a difficult year. Senators successfully defeated two separate amendments to the CR which called for an across-the-board 5 percent cut to discretionary funding for the length of the CR.

New Director of Public Affairs

Benjamin W. Corb is the new ASBMB director of public affairs. He replaces longtime ASBMB public affairs chief Peter Farnham who retires at the end of this year. Corb has spent the past two years as director of public affairs at the Washington, D.C.-based American Institute for Medical and Biological Engineering, serving as the chief public face of the organization before institute partners, the White House and Congress. Before that, he served as a senior technical coordinator for the Next Generation Air Transportation System Institute, a government affairs representative for the American Institute of Aeronautics and Astronautics and a management analyst for the U.S. Department of Veteran Affairs.

New Director for the NSF

The U.S. Senate has confirmed Subra Suresh, President Barack Obama's nominee for director of the National Science Foundation, for a six-year term.

Suresh, 54, served as dean of the engineering school and as Vannevar Bush professor of engineering at the Massachusetts Institute of Technology. A mechanical engineer who later became interested in materials science and biology, Suresh has done pioneering work studying the biomechanics of blood cells under the influence of diseases such as malaria.

From 2000 to 2006, Suresh served as the head of the MIT department of materials science and engineering. He joined MIT in 1993 as the R. P. Simmons professor of materials science and engineering and held joint faculty appointments in the departments of mechanical engineering and biological engineering, as well as the division of health sciences and technology.

Suresh holds a bachelor's degree from the Indian Institute of Technology in Madras, a master's degree from Iowa State University and a doctor of science degree from MIT in 1981.

NSF's budget for 2010 is $6.9 billion. The agency's budget request for 2011 is $7.4 billion, an 8 percent increase over 2010, which supports the President's goal of increasing the nation's total public and private investment in research and development to at least 3 percent of the gross domestic product.

Benjamin W. Corb (bcorb@asbmb.org) is director of public affairs at ASBMB.

Retrospective: Dale J. Benos (1950–2010)

BY CATHY M. FULLER

Dale J. Benos, who died suddenly Oct. 7, a week after his 60th birthday, was born in Cleveland, Ohio. His father, who had mixed Greek and Czech heritage, was a railroad worker, whereas his mother, whose family was of Italian ancestry, was a beautician.

After briefly considering a career as a professional baseball player, Dale elected for the decidedly less glamorous path of a physiologist, a choice that nonetheless yielded significant prominence.

After parochial school, Dale attended Case Western Reserve University, where he carried out laboratory research as an undergraduate, bringing him and another student, Pete Cala, to the lab of Bodil Schmidt-Nielsen, the daughter of August Krogh and one of the great comparative physiologists of the 20th century.

Under Bodil's guidance, and that of postdoctoral fellow Robert Prusch, Dale embarked on his first formal scientific research: studying osmoregulation in freshwater hydra. That work, and a summer fellowship in 1972 with Bodil at Mount Desert Island Biological Laboratory in Maine, resulted in a lifelong interest in the mechanisms underlying whole body salt and water homeostasis. This led Dale, by degrees, from studies in erythrocytes, frog skin, blastocysts and principal cells of the renal collecting duct to his most recent work on the ion-transport pathways involved in migration and proliferation of glioma cells.

At MDIBL, Dale met Dan Tosteson, who became his doctoral adviser at Duke University. The early 1970s at Duke were remarkable for the collection of young, enthusiastic scientists involved in physiological research, including Sid Simon, Ramon Latorre, George Somjen, Toshio Narahashi, Bob Gunn, Clint Joiner, Bob Balaban, Dave Shoemaker and Peter Lauf, along with John Parker, Art Finn and Luis Reuss just up the road at the University of North Carolina at Chapel Hill. Added slightly later to the mix was Dale's friend from Case, Pete, who was a postdoc in Tosteson's lab.

Tosteson, who could reduce students and postdocs and, as Dale later said, even long-established chairs of physiology departments to quivering masses of jelly by the pure force of his intellect, jointly supervised Dale and Pete, although he passed on responsibility later to Laz Mandel, who became one of Dale's lifelong mentors and friends.

During this period, Dale published the first of numerous studies on the effect of the diuretic amiloride on sodium transport after being prompted to do the experiments by Sid Simon, who had attended a seminar on the drug. Inhibition of transport by this compound has since become one of the hallmarks used to characterize voltage-insensitive sodium channels.

In 1978, Dale joined Harvard Medical School as an Andrew W. Mellon scholar in reproductive biology, and his work focused on the mammalian blastocyst; although his research into sodium transport in frog skin and erythrocytes continued, the latter was something of a personal achievement for someone who hated the sight of blood!

The preimplantation rabbit blastocyst undergoes dramatic changes in Na^+ permeability and volume during development, and elucidating the mechanisms involved in this process occupied Dale and colleague Bob Balaban for most of the early 1980s. Dale then began to focus on the Na^+ channel itself.

With Sarah Sariban, Latorre, Mo Burg and Lori Olans, Dale isolated the amiloride-sensitive Na^+ channel from an amphibian renal cell line A6. Incorporation of the purified protein into a lipid bilayer and the demonstration that this protein formed an amiloride-sensitive Na^+ channel resulted in the 1984 publication of a seminal paper in Nature. Subsequent papers in the Proceedings of the National Acad-

emy of Sciences, Biochemistry and the Journal of Biological Chemistry, as well as a landmark review co-authored with Haim Garty, described the isolation and characterization of a mammalian Na^+ channel complex.

At Harvard, Dale recruited his first graduate student, Juan Reyes, to work on metabolism and transport in spermatozoa. Their finding that gossypol, a component of cottonseed oil, could block oxidative phosphorylation in spermatozoa, and the potential role of gossypol as a male contraceptive, led to an article by Good Housekeeping magazine, an achievement of which Dale was quite proud!

In 1985, he joined the University of Alabama at Birmingham as an associate professor and remained there the rest of his career. He was appointed full professor in 1987 and chairman of the department of physiology and biophysics in 1996.

He continued work on the mammalian Na^+ channel and later on ENaC, using bilayers, patch clamp and biochemical approaches. This expanded to include studies of epithelial chloride and sodium transport in the airways, of the effects of the HIV envelope protein gp120 on function of the Na^+/H^+ exchanger and of the role that glutamate efflux from astrocytes might have on neuronal death and cognitive deficits in AIDS patients. His recent research focused on the role of Na^+ transport in glioma cells and was spurred, in part, by illness in his family and the death from a stage IV brain tumor of his friend and mentor Mandel.

A committed and proud member of the American Physiological Society, he served as president in 2006. He continued to be heavily involved in the APS until his death.

Dale had a passion for teaching, a legacy from Tosteson, an inspiring, if slightly terrifying, teacher who instilled the importance of lifelong learning, reiterating earlier advice from Dale's parents and grandparents.

Dale could make the somewhat dry topic of membrane biophysics interesting and fun, enlivening lectures with videos, demonstrations and interviews with notable physicians and scientists, jokes and, occasionally, cookies. He recently invited students to use Twitter during class to ask him questions or make comments. He also gave out pens advertising the UAB Center of Clinical and Translational Science, for which he served as director of educational programs. This had an unexpected effect on his 60th birthday, when his freshman medical school class tweeted him birthday wishes and presented him with numerous pens. His teaching ability was naturally recognized by multiple university- and student-based awards.

He also advocated for scientific communication, serving as editor of the American Journal of Physiology – Cell Physiology for six years, starting in 1990, and later as chairman of the APS publications committee from 1999 to 2004. He joined the Journal of Biological Chemistry's editorial board in 1989 and became an associate editor in 2006. He was justifiably proud of this appointment and encouraged everyone to submit their best work to the journals with which he was involved.

Dale was also a fierce athletic competitor, occasionally deserting houseguests early in the morning to play pick-up games of basketball; on finding himself on the wrong side of a best-of-three challenge, his fellow players would be dismayed to find that the game had suddenly changed to a best-of-five or, worse, a best-of-seven competition. He played fast-pitch softball and was pleased when, on a departmental outing to a Birmingham Barons game, he was asked to throw the first pitch, and one of the pro players noted the ball had "popped."

He also was a fan of Formula One racing; his Italian heritage and admiration for innate ability led him to support the Ferrari of Michael Schumacher. One of his fondest office accessories was a scale model of Schumacher's car picked up on one of his trips to the U.S. Grand Prix.

Meanwhile, Dale also found time to coach his daughters' softball teams and, once they entered high school, to help with their cheerleading squads. Without question, his greatest passion was for his wife, Kim, and his daughters, Kaitie and Emilee. He is survived by them and his two brothers, Wayne and Rick. He also is survived by an extended scientific family who grieves the loss of an outstanding colleague, mentor and dear friend.

Cathy M. Fuller (cfuller@uab.edu) is an associate professor at the University of Alabama-Birmingham and a member of the Journal of Biological Chemistry editorial board.

To read more online:

To read thoughts and reflections from several of Dale's friends and colleagues, go to http://bit.ly/cmNcbt.

IN MEMORIAM

Donations can be made to the Dale J. Benos Research Fund, c/o UAB Gift Records, 1530 Third Ave. S., AB1230, Birmingham, AL, 35294.

Campbell Honored with McIntyre Award

Kevin P. Campbell, Roy J. Carver professor of physiology and biophysics and neurology at the University of Iowa Roy J. and Lucille A. Carver College of Medicine, received the A. Ross McIntyre Award from the University of Nebraska Medical Center.

The award, given for contributions to the study of medicine or medical education, is named for A. Ross McIntyre, who was chairman of the University of Nebraska Medical Center department of physiology and pharmacology from 1935 to 1967.

Campbell is a Howard Hughes Medical Institute investigator as well as director of the Wellstone Muscular Dystrophy Cooperative Research Center and chairman of the department of molecular physiology and biophysics at the University of Iowa. 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 include investigating the molecular pathogenesis of disorders of the dystrophin-glycoprotein complex, looking at the mechanistic basis of maintaining muscle membrane integrity and investigating the structural basis of dystroglycan function as a basement membrane receptor.

Coleman and Friedman Receive Lasker Award

COLEMAN

FRIEDMAN

Douglas Coleman and Jeffrey M. Friedman received the 2010 Albert Lasker Basic Medical Research Award for their discovery of leptin, a hormone that regulates appetite and body weight.

Coleman, an emeritus senior staff scientist at The Jackson Laboratory, established that an appetite-suppressing substance circulates in the bloodstream and signals a second molecule to curb hunger. Friedman, a Howard Hughes Medical Institute investigator and the Marilyn M. Simpson professor and head of the Laboratory of Molecular Genetics at Rockefeller University, isolated the gene that encodes the appetite suppressant and showed that fat cells release it. Their studies and subsequent findings demonstrated that the chemical leptin plays the central role in a self-regulating circuit: As fat accumulates, it exudes leptin, which binds to a receptor in the brain that quells the desire to eat.

Now in its 65th year, the Lasker Award is the nation's most distinguished honor for outstanding contributions to basic and clinical medical research. As many as 79 Lasker laureates also have received the Nobel Prize, including 30 in the past two decades.

Elgin Wins Teaching Award

Sarah C. R. Elgin, the Viktor Hamburger professor in arts and sciences at Washington University in St. Louis, won the 2010 Janet Anderseon Lecture Award from the Midstates Consortium for Math and Science for her mentoring of undergraduates. The annual award is named for Janet Andersen, a faculty member in the Hope College mathematics department who served as the Midstates Consortium director for five years before she died in an automobile accident in 2005.

Elgin has been an active proponent of science education at the K-12 level. In the early 1990s, she initiated a science education partnership between Washington University and the public schools in her St. Louis community to implement a novel "hands-on" science curriculum for grades K-8 and to bring hands-on DNA science to the high school genetics curriculum. Elgin also was awarded a Howard Hughes Medical Institute Professorship in 2002, which she used to develop a course that couples the expertise of Washington University's world-renowned Genome Center with the enthusiasm and interest of undergraduates for the field of genomics.

PHOTOGRAPH COURTESY OF WASHINGTON UNIVERSITY IN ST. LOUIS.

Engelman and Lippincott-Schwartz Named Biophysical Society Fellows

ENGELMAN

LIPPINCOTT-SCHWARTZ

Donald M. Engelman, Eugene Higgins professor of molecular biophysics and biochemistry at Yale University, and Jennifer Lippincott-Schwartz, of the Eunice Kennedy Shriver National Institute of Child Health and Human Development at the National Institutes of Health, recently were named fellows of the Biophysical Society. Society fellows are chosen based on their demonstrated excellence in science, contributions to the expansion of the field of biophysics and support of the Biophysical Society. The 2011 fellows will be honored at an awards ceremony during the Biophysical Society's 55th annual meeting this spring.

According to the Biophysical Society, Engelman was selected "for his substantial and highly influential contributions to the field of membrane structure and the interactions of lipid bilayers with proteins," whereas Lippincott-Schwartz was honored "for her ground-breaking advances in optical highlighter fluorescent protein technology and impact on the field of super-resolution microscopy."

The Biophysical Society, founded in 1956, is a professional scientific society established to encourage development and dissemination of knowledge in biophysics.

Piomelli Garners Award for Innovative Medication Development Research

Daniele Piomelli, Louise Turner Arnold chair in neurosciences and professor of pharmacology at the University of California, Irvine, is the recipient of one of the first-ever National Institute on Drug Abuse Avant-Garde Awards for Innovative Medication Development Research. Piomelli will receive $500,000 per year for five years to support his research.

Piomelli plans to use the award to pursue a medication for smoking cessation using a novel approach of targeting the endogenous cannabinoid system. He will identify and optimize compounds that inhibit an enzyme called fatty acid-amide hydrolase, which degrades the endocannabinoid anandamide. Animal studies have shown that blocking FAAH reduces nicotine self-administration and prevents nicotine-induced reinstatement, a model of relapse.

"Science has clearly shown that drug addiction results from profound disruptions in brain structure and function, presenting numerous potential targets for medications development — yet, few medications have come to fruition," said NIDA Director Nora D. Volkow. "The array of creative problem-solving approaches submitted by the awardees could help us quicken the pace to find urgently needed medications for addiction."

PHOTO CREDIT: UNIVERSITY OF CALIFORNIA, IRVINE.

Tabak Named Principal Deputy Director at NIH

National Institutes of Health Director Francis S. Collins announced the appointment of Lawrence A. Tabak as principal deputy director of the National Institutes of Health.

Tabak assumes the position held by Raynard Kington, who served as NIH deputy director since 2003, as well as acting NIH director from October 2008 to August 2009. Kington is leaving the NIH to become the president of Grinnell College.

"I am delighted to have Dr. Tabak as deputy director during this critical time for biomedical research," said Collins. "His outstanding service in numerous activities across the NIH and combination of skills and experience will help the NIH move forward in these revolutionary times for the biomedical sciences."

Tabak has served as the director of the National Institute of Dental and Craniofacial Research since September 2000. He served as acting NIH deputy director in 2009 and, most recently, as the acting director of the Division of Program Coordination, Planning and Strategic Initiative.

Tabak's major research focus has been on the biosynthesis and function of mucin-glycoproteins, molecules that are decorated heavily with sugars and help form the coating that protects the delicate inner soft (mucosal) tissues of the body.

Van der Donk Receives Knowles Award

Wilfred A. van der Donk, Howard Hughes Medical Institute investigator and Richard E. Heckert endowed chairman in chemistry at the University of Illinois at Urbana-Champaign, was awarded the 2010 Jeremy Knowles Award from the Royal Society of Chemistry. He received the honor for his interdisciplinary work on the discovery and development of new antibiotics, the mechanism of fatty acid oxidation by cyclo-oxygenase and lipoxygenases and the development of new biocatalysts for use in the pharmaceutical industry.

The award itself consists of 2,000 British pounds and a medal that was presented at van der Donk's award this past September at the RSC conference in Durham, UK. As part of the award, van der Donk also will be delivering a lectureship at UK universities in March 2011.

Van der Donk's research focuses on using organic chemistry and molecular biology to gain a better understanding of the molecular mechanisms of enzyme catalysis. His group also is exploring the utility of enzymes in organic chemistry. A particular focus has been enzymatic reactions in the biosynthesis of antibiotics, and radical chemistry in proteins such as cyclo-oxygenase and lipoxygenase. His group also has investigated unusual enzymatic reactions involving reduced phosphorus compounds such as phosphite dehydrogenase and 2-hydroxy ethylphosphonate dioxygenase.

Ware Joins Sanford-Burnham

Carl Ware has been appointed director of the Infectious and Inflammatory Disease Center at Sanford-Burnham Medical Research Institute. Prior to joining Sanford-Burnham, Ware headed the division of molecular immunology at the La Jolla Institute for Allergy and Immunology.

As director of the center, Ware will oversee the institute's work on conditions such as HIV, influenza, anthrax, rheumatoid arthritis, Crohn's disease, autoimmune disorders and many other conditions. He plans to build the institute's ability to combat viral diseases and create partnerships with pharmaceutical and biotech companies to find new treatments for immune-based conditions, such as rheumatoid arthritis, lupus and lymphoma.

Ware's research is directed at understanding the structure-function, signaling pathways and clinical utility of cytokines of the tumor necrosis factor superfamily.

"We are very pleased that Carl has joined us at Sanford-Burnham," said CEO John Reed, professor and Donald Bren chief executive chair. "His insights into immune signaling and inflammation and his proven track record of translating basic research findings into new treatments will make a significant impact on our work in autoimmune, inflammatory, infectious and other diseases."

What Is Science Policy?

BY GEOFFREY HUNT

Telling someone that you work in science policy inevitably leads to the same response: "What does that mean?" You try to explain that it involves some vague combination of science writing, communication and advocacy, but that just leads to blank stares and sympathetic head-nodding. The truth is, there is no good, short response that adequately can answer the question. Fortunately, the long answer is much more interesting.

Most people assume policymakers spend all of their time furtively hammering out laws in back rooms. In reality, those working in science policy have the opposite job: They take what is happening on the bench and bring it to the light of day. One of the best-selling points for science is showing how discoveries inside the lab will benefit everyone outside of it. This means saving lives, creating jobs and promoting education. Science policy experts thus serve as the bridge between researchers and the public, using their talents to find ways to translate esoteric, often highly technical scientific issues into something that can be sold as good policy. Some people who do science policy have advanced degrees in their fields; some are just really good at advocating for a topic that they believe in. What all science policy experts have in common is literacy in science, economics and politics.

Policy is a two-way street between the government and the public, and policymakers can work at either end, either directly for legislators or for societies like the American Society for Biochemistry and Molecular Biology. Congressional members employ people who are experts in the scientific field and who serve as conduits between the legislators and their scientifically focused constituents. In this situation, science policymakers are responsible for formalizing the members' stance on a particular scientific topic, drafting legislation that addresses relevant issues and helping them determine how to vote on certain bills. On the other hand, policymakers working at scientific nonprofits promote positions on behalf of their societies' interests. Workers on both sides are well-acquainted with each other and use these personal connections to help formulate policies that are mutually beneficial, while still appeasing their own constituencies.

In addition to their own staff members, politicians often rely on outside policymakers and analysts to interpret the laws and bills that they draft. For example, congressional committees often reach out to societies like ASBMB for expert opinions on scientific topics. Sometimes, the societies' recommendations even make it to the actual bill, as evidenced when a recent U.S. Senate appropriations bill contained language put forth by FASEB in its fiscal 2011 National Institutes of Health budget recommendation to Congress. Policymakers also put together unsolicited proposals and position statements that are aimed at broad audiences (for example, ASBMB's recent statement on stem cells).

Another side of science policy is the production and analysis of scientific reports in response to directives from lawmakers. Government agencies and self-contained offices are filled with science policy experts to handle such issues. Outside of the government, the various institutions within the National Academies produce a constant stream of reports analyzing policies on topics ranging from natural disaster preparedness to patent regulations. One of the most prominent recent reports was the National Academies' "Rising above the Gathering Storm," which analyzed the state of American science education and competitiveness. The conclusions reached by the authors led to passage of the America COMPETES Act in 2007, which aimed to increase scientific literacy and productiveness through stronger education.

With people coming from many different backgrounds to work in science policy, it is clear that there is no single way to enter the field. Several societies offer science policy fellowships that allow recent doctoral graduates the opportunity to work in the field, either for the society (e.g., the National Academies' "Christine Mirzayan Science and Technology Policy Graduate Fellowship Program") or within the government (the American Association for the Advancement of Science "Science and Technology Policy Fellowships"). Mid-career scientists also can get involved in science policy through a professional society, for example, by joining the ASBMB Public Affairs Advisory Committee. Although each opportunity provides experience from a unique perspective, they all rely on a healthy dose of scientific expertise combined with a passion for advocacy. In these uncertain economic conditions, there never has been a better time to promote the benefits of science.

Geoffrey Hunt (ghunt@asbmb.org) is an ASBMB science policy fellow.

The ASBMB PAAC

What Are We Doing for You?

BY WILLIAM C. MERRICK

The American Society for Biochemistry and Molecular Biology Public Affairs Advisory Committee is one of the society's standing committees. It is comprised of 15 elected members serving overlapping three-year terms, as well as the ASBMB public affairs staff. In the simplest terms, the PAAC's goal is to enhance the ability of ASBMB members to do the innovative, ground-breaking research that will lead to a greater understanding of the molecular basis of life and ultimately improve the overall quality of life for society. To accomplish this goal, the PAAC utilizes the collective strength of the ASBMB community to embolden its ongoing advocacy efforts at the national, state and local levels. In other words, the PAAC works for you.

But how do we do this? PAAC members are in constant communication with each other, brainstorming and developing strategies on how best to advocate for increased support of biomedical research. We meet with members of Congress to lobby for sustained funding for federal agencies such as the National Institutes of Health, presenting sound arguments for the support of basic and translational research. We also visit the NIH campus several times a year to maintain a constant dialogue with institute directors and staff members, a dialogue we hope leads to increased support for individual investigators.

The committee also responds to current public controversies. Our response to the recent flare-up regarding stem cells (see the October issue of ASBMB Today) is a particularly poignant example. But our efforts are not limited to broad issues that dominate the national news; local issues also are on our radar. Often these issues end up with national implications. What might seem like an isolated local issue (e.g., board of education rulings on what ought to be in a high school science textbook) actually is a common problem in multiple communities throughout the country.

Other issues close to home include impending changes in the Medical College Admission Test and the United States Medical Licensing exams, conflict of interest, difficulties with animal rights activists, regulatory burden in the grant process, the role of internal review boards in both safety and in education and efforts to educate the public. As should be evident, the PAAC attempts to deal with a large number of issues, with the overarching theme of focusing on what we can do to ensure that current and future generations of scientists will be able to productively do research.

BUT, this only is part of what the PAAC does. For all of these activities, input from the membership is needed. In plain language, this means you! After all, we are representing YOU in a variety of venues, and we very much value your input (to make sure we're doing it right). Furthermore, your ideas and contributions are vital, as the 15-member committee likely has overlooked certain points of view.

So, what can you do? To start, become an active part of the process. Visit your local rotary club or church forum and tell folks what science really is and what its benefits can be. Visit your congressional representative at home, or set up a visit in Washington, D.C. during the 2011 ASBMB annual meeting.

The true strength of the society lies in the willingness of its members to participate in all facets of the scientific process, either as reviewers for the society's journals, panel members for NIH study sections or as participants on the various ASBMB committees. The ASBMB PAAC is dedicated to representing the best interests of ASBMB members. It is through these efforts that we seek to make ASBMB your society, and to make it better every year.

William C. Merrick (wcm2@case.edu) is a professor of biochemistry at Case Western Reserve University. He also is chairman of the ASBMB Public Affairs Advisory Committee.

For more information:

You can check out the advocacy resources on our website at http://bit.ly/cKkbiJ, where you also can find information on how to communicate directly with the PAAC, either through its members or by contacting the ASBMB public affairs staff — Benjamin W. Corb (bcorb@asbmb.org) and Geoffrey Hunt (ghunt@asbmb.org).

ASBMB Holds Second Annual Graduate Student/Postdoc Hill Day

Young researchers join ASBMB to stress the importance of biomedical science to our elected officials

BY NICK ZAGORSKI

After the tremendous positive feedback that was received in September 2009, when the American Society for Biochemistry and Molecular Biology Public Affairs Advisory Committee brought graduate students and postdoctoral fellows to one of its scheduled visits to Capitol Hill, the committee and society took a page from the Hollywood playbook.

In entertainment, a successful movie invariably will spawn a sequel; why shouldn't a successful policy event try the same?

So, Sept. 21, 2010 witnessed the return of the ASBMB "Student/Postdoc Hill Day." Ten young scientists from across the United States joined the PAAC and ASBMB's policy team to help convey the importance of strong and continued funding of basic biomedical research.

Together, this diverse group spent an extremely busy day traveling through the U.S. House and Senate office buildings, meeting with 25 senators and representatives and/or their staff members from the states and districts from which the ASBMB delegation hailed.

As in the previous year, the young researchers who accompanied the more seasoned policy members provided a human face to a numbers problem. As new ASBMB policy fellow Geoff Hunt noted, "Often you can sell an idea to Congress better with a story than just stats, and having these students talk about how their work and future was being impacted by changes in funding or the stem cell ruling really helped deliver our message."

Specifically, the Hill Day attendees reinforced their position that Congress should, at a minimum, stick with the $32 billion National Institutes of Health 2011 budget recently approved by the House and Senate appropriations committees and, more importantly, ensure funding in future years sees some consistent, and sustainable, growth. With the research boost that was driven by the stimulus package just about finished, this latter point was particularly emphasized.

In addition to making their policy requests, the ASBMB delegation offered up the society's services in helping any Congress member advocate on the behalf of science; this

ASBMB 2010 Hill Day participants included, from left, Ratika Krishnamurty, Stacey Barnaby, Sloan Warren, Fred Cheng-Chia Wu, Lauren Amable, Sarah Bergeron, Carrie Chambers, William Shadrick, Selena Gell and Jessica Slater Jutzy.

included providing scientific data, expertise from a member or even access to students or a lab for a good photo-op.

As expected, given the current economic climate and the uncertainties surrounding a lame-duck Congress that might receive a significant facelift come January, the responses and promises provided by the congressional staff were restrained. However, many of the individuals visited by ASBMB this Hill Day have been staunch advocates for biomedical research, and they understood the importance of supporting science in the short and long terms.

Nevertheless, the overall report card for the second installment of Hill Day would be a solid "A." All of the students, postdocs and ASBMB team members involved praised the organization and execution of this event: "I feel really lucky to have been part of such a unique experience," noted Ratika Krishnamurty, a fourth-year graduate student at the University of Washington in Seattle. "And, more so, I definitely learned many new things and met some great people."

Such sentiments certainly were echoed by the other participants, which highlight another benefit of getting students and postdocs involved.

"Not only does it afford us an opportunity to talk with our elected representatives in Congress, which itself is critically important," said PAAC member Thomas O. Baldwin, dean of the College of Natural and Agricultural Sciences at the University of California, Riverside, "but engaging young scientists in the process of public debate will pay dividends to the science community for years to come. These are our future scientific leaders."

With such positive feedback, it seems certain that the Hollywood story will continue and that Hill Day will go from sequel to trilogy.

Nick Zagorski (nzagorski@asbmb.org) is a science writer at ASBMB.

Go to the online version of this article at http://bit.ly/csPbcj to see a slideshow of Hill Day.

Hill Day attendee Sarah Bergeron visits with Sen. Tom Harkin, D-Iowa.

The Senators and Representatives Visited for Hill Day

Rep. Jo Bonner, R-Ala.
Sen. Barbara Boxer, D-Calif.
Sen. Maria E. Cantwell, D-Wash.
Rep. Rosa L. DeLauro, D-Conn.
Sen. Christopher J. Dodd, D-Conn.
Sen. Richard J. Durbin, D-Ill.
Sen. Russ Feingold, D-Wis.
Sen. Kirsten Gillibrand, D-N.Y.
Sen. Tom Harkin, D-Iowa
Rep. Patrick Kennedy, D-R.I.
Sen. Herb Kohl, D-Wis.
Sen. Joseph Lieberman, I-Conn.
Rep. David Loebasck, D-Iowa
Rep. Nita M. Lowey, D-N.Y.
Rep. Jim McDermott, D-Wash.
Sen. Jeff Merkley, D-Ore.
Sen. Barbara Mikulski, D-Md.
Rep. Gwen Moore, D-Wis.
Sen. Patty Murray, D-Wash.
Rep. David R. Obey, D-Wis.
Sen. Jack Reed, D-R.I.
Sen. Charles E. Schumer, D-N.Y.
Rep. José E. Serrano, D-N.Y.
Rep. Paul D. Tonko, D-N.Y.
Sen. Sheldon Whitehouse, D-R.I.

National Institutes of Health Visit

Prior to Hill Day, the American Society for Biochemistry and Molecular Biology Public Affairs Advisory Committee took another of its customary trips to the National Institutes of Health campus to meet with the directors and deputy directors of various offices and institutes. Much like the subsequent visit to Capitol Hill, concerns about funding in tough economic times was a common talking point, but there was a general consensus among all parties that greater financial support of researchers is a priority; this led to a good deal of back and forth regarding the best strategies for increasing support. In addition, there was a fair amount of optimism that the appointments of Francis Collins to head the NIH and Harold Varmus to head the National Cancer Institute (the largest of NIH's 27 components), both of whom have strong basic research backgrounds, was a positive turn for ensuring the NIH maintains a strong basic science commitment.

Meet the ASBMB Hill Day Attendees

BY NICOLE KRESGE

We asked our American Society for Biochemistry and Molecular Biology student/postdoc Hill Day attendees to answer some questions so we could learn a little more about them.

Lauren Amable

Postdoctoral Fellow
University of South Alabama
Mitchell Cancer Institute

RESEARCH FOCUS: My research focuses on understanding chemotherapeutic-drug resistance in cancer cells. Basically, our goal is to identify the molecular mechanisms in drug resistance to develop alternative cancer treatments, resulting in a higher cure rate.

POLITICAL EXPERIENCE: I have not had the opportunity to discuss policy before with a member of Congress. However, I have had the opportunity to discuss the importance of research with high school students and members of the community, in various forms.

FUTURE: I plan to remain in academia with a future goal to head my own lab.

Stacey Barnaby

Undergraduate Student
Fordham University

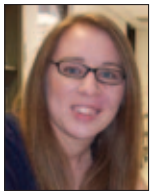
RESEARCH FOCUS: The focus of our research group is bionanotechnology. In particular, we are investigating the supramolecular assembly of a wide range of biopolymers and functionalizing them for the development of nanomaterials for wound healing, drug delivery and tissue engineering. We also are examining the in vitro cell-adhesion ability of those materials and their antioxidant properties.

POLITICAL EXPERIENCE: None.

FUTURE: My career plans are to pursue a doctoral degree in biochemistry/bionanotechnology. In the long term, I would like to work in academia or at a research center and continue my research in bionanotechnology.

Sarah Bergeron

Graduate Student
University of Iowa



RESEARCH FOCUS: My research focuses on investigating the effects on actin function of actin mutations that lead to heart disease and deafness. The results will provide insight into the molecular basis of heart disease and deafness that these mutations cause, as well as provide insight into the molecular mechanisms that govern normal heart and hearing function in humans.

POLITICAL EXPERIENCE: I have never participated in any program like this.

FUTURE: My research thus far has led me to conclude that I would like to follow one of two different career plans, either as a project leader in industry or as an outreach scientist bridging the gap between the public and the scientific community. Both career paths would allow me to further develop my teaching skills and to maintain my drive to progress scientific research to the benefit of society.

Carrie Chambers

Graduate Student
Wichita State University

RESEARCH FOCUS: My research focus is on the molecular mechanisms behind glycosylation of human follicle-stimulating hormone. We are investigating a potential regulatory mechanism believed to influence the relative concentration of a more biologically potent form of hFSH, and, by extension, may possibly influence the onset of menopause.

POLITICAL EXPERIENCE: I went to the state capitol to present my graduate research to state officials with other students from universities in Kansas.

FUTURE: I would like to go into academia. I can see myself as a professor at a university overseeing my own laboratory.

Selena Gell

Graduate Student
Brown University

RESEARCH FOCUS: My work focuses on a case when this normal Mendelian inheritance is disrupted by a "selfish" genetic element, known as "segregation distorter." In Drosophila melanogaster, when a chromosome carrying Sd is heterozygous with a second chromosome carrying a "responder" allele, males pass the Sd-bearing chromosome to almost 100 percent of their progeny. Preliminary

data suggests that this deviation from the normal Mendelian 50:50 ratio is mediated by a class of proteins, known as the argonauts, involved in gene silencing via the small interfering RNA, piwi-interacting RNA and micro RNA pathways. I'm hoping to establish the role of these proteins in facilitating the loss of the Rsp-bearing chromosomes in Drosophila spermatogenesis.

POLITICAL EXPERIENCE: None.

FUTURE: My current plan is to pursue an academic position in which I can participate in both research and teaching.

Ratika Krishnamurty
Graduate Student
University of Washington

RESEARCH FOCUS: My research focuses on the synthesis of small molecules to use as tools to interrogate protein kinase function in cells; protein kinases are major drug targets in the treatment of cancer, diabetes and chronic inflammation.

POLITICAL EXPERIENCE: This will be my first time doing anything like this; I am looking forward to the opportunity.

FUTURE: Currently, I am unsure of the direction in which I'd like to take my career after completing my doctoral degree.

William Shadrick
Postdoctoral Fellow
University of Wisconsin-Milwaukee

RESEARCH FOCUS: I am currently evaluating small molecules for inhibition of hepatitis C virus NS3 helicase.

FUTURE: I am interested in a career in scientific management. I will pursue my goal in the direction of either government or industry.

Jessica Slater Jutzy
M.D./Ph.D. Student
Loma Linda University

RESEARCH FOCUS: The interaction between the tumor-released protein survivin and the immune system.

POLITICAL EXPERIENCE: I participated in the ASBMB Student Hill Day in 2009.

FUTURE: I plan to pursue a career in academia as a physician researcher in hematological oncology.

Sloan Warren
Graduate Student
Yale University

RESEARCH FOCUS: My research focuses on understanding the mechanisms that underlie neuronal synapse stability and how they contribute to the pathology of neurodegenerative disorders such as Alzheimer's disease.

POLITICAL EXPERIENCE: None.

FUTURE: I plan on continuing in academia and running my own research group.

Fred Cheng-Chia Wu
M.D./Ph.D. Student
New York Medical College

RESEARCH FOCUS: The topic of my research is the role of 20-hydroxyeicosatetraenoic acid in androgen-induced hypertension. Our goal is to study how 20-HETE mediates hypertension that is driven by androgen, which occurs in gender differences in the incidence of high blood pressure, post-menopausal women and polycystic ovary syndrome. By better understanding the signaling mechanisms of 20-HETE, we can develop new pharmacological agents.

POLITICAL EXPERIENCE: I have never done anything like this before, although I am very excited and honored to have the opportunity to represent the scientific community and young researchers in the field.

FUTURE: My current interests are cardiovascular disease and cancer. I haven't decided what field I would like to go into; however, I know that I would love to stay in academia.

Nicole Kresge (nkresge@asbmb.org) is the editor of ASBMB Today.

2009 Hill Day Participants: *Where Are They Now?*

In September 2009, the American Society for Biochemistry and Molecular Biology brought nine students and postdoctoral fellows to Washington, D.C. for its first-ever "Student/Postdoc Hill Day." A year later, we contacted some past attendees to see what they are up to and how their experience affected them. To read their responses, go to http://bit.ly/do6514.

In Their Words: Important Political Issues

We asked our 2010 student Hill Day attendees to tell us why they think scientists should be involved in politics and what they think is the most important issue in science policy. Here are some of their answers.

• • •

When it comes to writing policies and allocating funds to scientific research, I believe that there should be an ongoing conversation between policymakers, scientists and the general public. The term "scientific research" often can sound very abstract to both policymakers and the public. When scientists get involved in this conversation, they are able to educate policymakers and the public on the advancements made and how this research benefits our population and planet, thereby providing everyone involved with a more concrete understanding. As a result, politicians are necessarily more informed when they enforce policies or allocate funds. Hill Day provides graduate students and postdoctoral fellows with an opportunity to participate in this conversation face-to-face, so that we can emphasize not only the importance of research but of scientific education as well. From my point of view, I believe that science is not a partisan issue and that policies and funding that are strongly based on the data provided by scientific research are the most beneficial.

➤ **Ratika Krishnamurty, University of Washington**

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Our representatives in government should have the best information available when making any decision that affects the lives of citizens. Many of the hot-button topics handled in the realm of politics are scientific in nature. Cleaning up the gulf oil spill, determining permissible emission levels for power plants and establishing sound management policies for the wolves of Yellowstone all are problems that require the input of science to make a sound decision.

I believe the most important issue in science policy today is the matter of elementary-level science education. When I was in elementary school, many of the teachers believed that science was "difficult," and thus, they spent little time discussing it. I believe this causes the children taught by these teachers to avoid science. Added up over many years, this causes fewer and fewer people to want a degree in the sciences, which will have dire consequences for our nation in the long term.

➤ **William Shadrick, University of Wisconsin- Milwaukee**

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As scientists, the majority of our funding comes from government entities such as the National Institutes of Health and the National Science Foundation. The budgets of these entities are dependent on the political atmosphere and the importance the public places on research. By keeping the importance of research and scientific and medical discovery at the forefront of the public's and our representatives' minds, we help to ensure funding for scientists of today and tomorrow.

➤ **Jessica Slater Jutzy, Loma Linda University**

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As a publically funded scientist, it's important that I give back to the system that makes my work possible. I feel extremely fortunate to be given this opportunity; as scientists, we are uniquely suited to help inform those who will make policy decisions that will affect both the scientific community and the future of the country. Every scientist has a responsibility to share his or her work with the larger audience, whether through publishing his or her results in journals, giving seminars at conferences or meeting with policymakers on Capitol Hill.

To me, the most pressing issue in science policy is the state of elementary science education. As a former science educator, I understand that every student has an intrinsic desire to learn about the world around them, and I feel that it is our responsibility to ensure that they are given the opportunity to do so. Increased funding for elementary science education would give more students that opportunity and would better prepare students for the increasingly high tech workplace. If America wants to remain on the forefront of scientific innovation and stay competitive in the global economy, we must renew our commitment to making sure that every student is given the highest quality of science education, starting at the primary school levels.

➤ **Sloan Warren, Yale University**

For more "In Their Words"

To read more from our 2010 Hill Day attendees, go to the online version of this article at http://bit.ly/bleGNf.

The FDA versus Personal Genetics Firms

The Battles That Surround the Personal Genomics Industry

BY LOLA OLUFEMI

The Human Genome Project resulted in the identification and mapping of approximately 24,000 genes. This laid the foundation for genetic testing as we know it today. Within years of the project's completion, personal genomics firms sprouted up across the world, offering customers the opportunity to get their entire genome, or portions of it, sequenced for a price. Companies like Pathway Genomics, 23andMe, Navigenics and deCODEme, offer genome-sequencing tests directly to consumers over the internet, allowing them to gain information about their predisposition to certain diseases or conditions, pharmacogenomics, ancestral background, features and characteristics.

Medical Benefits of Personal Genomics

There is no doubt that the information from personal genome sequencing is priceless. For a few hundred to several thousand dollars and a vial of saliva, consumers get the opportunity to be more hands-on about their health. The data provided through these tests can inform people about genetic variations that could put them at risk for Alzheimer's disease, Parkinson's disease, breast cancer, muscular dystrophy and a slew of other conditions. It also can allow physicians to effectively tailor treatment plans based on pharmacogenomic assessments that give details about a patient's ability to metabolize certain medications. The benefits of such genetic tests are innumerable.

Issues Surrounding the Industry

The opportunities and innovations offered by personal genomics come coupled with legitimate apprehension. For example, are there standards in place to protect the consumer and ensure the analytical and clinical validity of the data provided? Are the tests strictly informative and recreational, or are they medical devices? If these genetic screens are considered medical devices, should they be marketed over the internet directly to consumers or should this process require the involvement of a physician or a genetics expert?

Sparked by these issues and Pathway Genomics' decision to begin selling saliva test kits right off the shelves of Walgreens stores, the U.S. Food and Drug Administration wrote letters to several personal genomics firms requiring premarket clearance of the genetic tests they provide because they are considered to be medical devices. By the FDA's definition, a medical device is something that is "intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease." Based on this definition, the FDA is requiring that the tests be subject to regulation.

The FDA also held a public meeting on "Oversight of Laboratory Developed Tests." Based on transcripts of the two-day meeting, the agency appeared dedicated to being open, transparent and interested in the opinion of the public and vested in protecting consumers. Although the issues that are more pertinent to the direct-to-consumer personal genomics industry were not the general focus, several issues such as clinical validity and utility of LDTs, consumer privacy and consent were discussed.

Among the concerns mentioned was the direct access consumers have to genetic tests. Some argued that access should require the involvement of physicians or health care providers, suggesting that, without the involvement of physicians, consumers run the risk of making harmful, misinformed decisions. On the other side of the spectrum, heads of these firms argued that limiting consumer access by requiring the involvement of physicians would deprive customers of their right to know about their genetics and to become involved in their health.

Shortly after the meeting, the U.S. Congress also held a hearing with personal genetic firms that discussed "Direct-to-Consumer Genetic Testing and the Consequences to the Public Health." In this meeting, the U.S. Government Accountability Office (GAO) presented evidence from a year-long undercover investigation of several personal genomics companies. The GAO suggested the tests were "misleading and of no practical use," pointing out that identical samples from one individual produced varied, and often conflicting,

continued on page 23

Bracing for the Revolution: The Institute for Genome Sciences and Policy at Duke University

BY NICK ZAGORSKI

Huntington F. Willard, the Nanaline H. Duke professor of genome sciences at Duke University, notes that genetics holds a certain kind of mystique for people that most other sciences do not have.

"I describe it as being similar to an expecting parent seeing their first ultrasound," he says. "It's just a fuzzy image, but it immediately evokes a sense of wonder about life. Genetics is like that; if I hand you a copy of your genome, you can look at it much like that developing baby. That's your code; your characteristics and traits, not to mention a snapshot of both your past and future — that's very powerful stuff."

And, in today's world, the idea of looking over your genetic makeup is not a far-fetched one. With advances in computing and sequencing technology, science has been riding the wave of the Human Genome Project, ushering in a new era where genetic information will greatly impact science, medicine and perhaps, most importantly in Willard's eyes, society.

Anticipating this new era, Duke University developed a unique response to the Genome Age: The Institute for Genome Sciences and Policy.

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Willard, who moved to Duke in 2003 as the founding director of the institute, recalls an unusual moment back in his undergraduate days at Harvard in the early 1970s that set the tone for his future career. He was taking the biochemistry class that originally had been developed by James Watson. It was the usual hard slog for both premeds and pre-science majors, but what was unusual was that halfway through the semester, they suddenly stopped learning just hard-core science and instead read two novels: "The Double Helix" by Watson and "Arrowsmith" by Sinclair Lewis (about the life's journey of an up-and-coming scientist).

"It took me for a loop at first, but later, it really helped me put the science I was learning in the bigger context of what it meant to be a scientist, both in the world of science and in the world of society," he says. He kept that broader view throughout his career, as perhaps unconsciously reflected on his office shelves by a host of books on scientific ethics and philosophy that he has read over the years.

Therefore, he immediately was intrigued when he was approached by Duke almost nine years ago to head its new and unique vision for an interdisciplinary campus-wide institute that would bridge science and society.

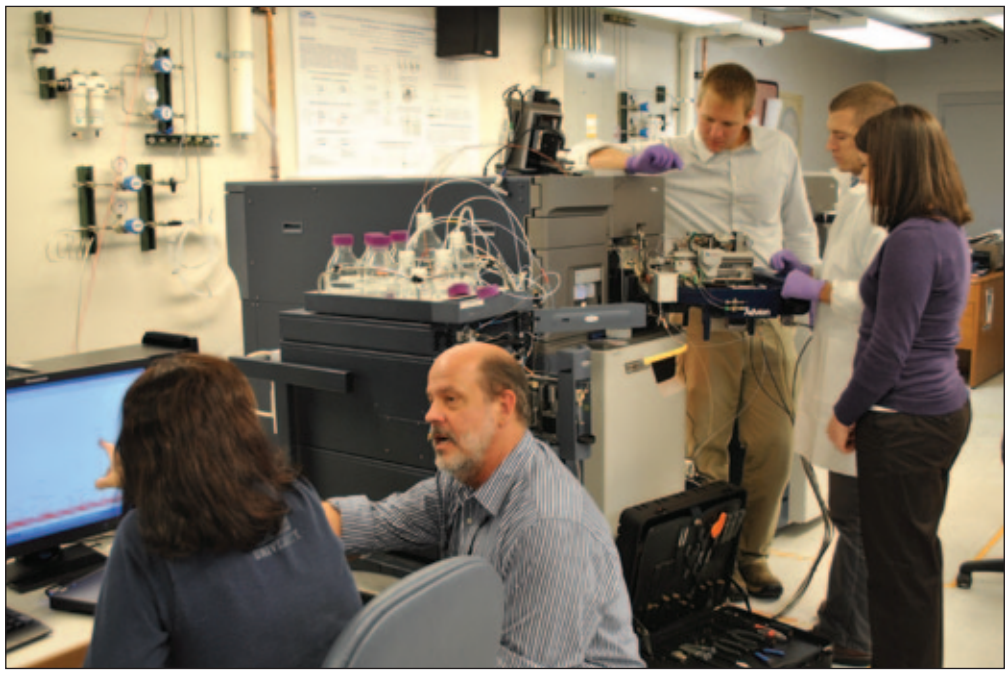
"They basically gave me a blank piece of paper to work with and a license to be a bit schizophrenic, going back and forth between these two worlds," he says, "and I went for it."

And today, the IGSP has grown to include nearly 100 affiliated faculty members across the university, spanning virtually every sector of the campus. In addition to individuals in various science, engineering and medical departments, the

Institute for Genome Sciences and Policy Director Huntington F. Willard.

IGSP boasts members from the departments of African and African American studies, philosophy, English and mathematics as well as the schools of business, law and public policy. This extremely diverse group works together under a tri-fold mission: to uncover the biology and evolution of our genome, to reflect on its meaning for individuals and to push that knowledge to the front steps of both medicine and social policy.

It's a steady climb that can be attributed to both nature and nurture.



Proteomics Core Director M. Arthur Moseley and his team hard at work helping the IGSP mission.

Part of the ability for the IGSP to work, Willard notes, lies in Duke's DNA. It's a nationally and internationally known academic institution that has a strong academic reputation in multiple schools like arts and sciences, medicine, law and business, all nicely contained within a fairly compact campus where different disciplines spill over freely. "You have to look pretty hard to find boundaries here," Willard says.

At the same time, Willard has been instrumental in bringing the right personalities along for the ride for the past several years, whether they were pre-existing faculty or new hires.

"Sometimes, I've had to be blunt to prospective faculty," he says. "They had great credentials and skills but also had that tunnel vision about their own research, which wasn't the kind of personality we look for at IGSP. So, I'd tell them that I knew they would succeed in their career; it just wouldn't be here."

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Assistant professor Laura Rusche is one of the scientists who took the IGSP bait; in fact, she was one of the trailblazers, arriving in 2003 as one of the IGSPs first external recruits following her postdoctoral fellowship with Jasper Rine at the University of California, Berkeley.

As she talks about her own work using yeast models to understand how DNA and various proteins assemble into discrete active and silenced chromatin domains, the view from her office provides a sense of the wide breadth of IGSP's scientific enterprise, which encompasses six component centers that study and teach genes and genomes from the molecular to the population level: genomic medicine, systems biology, evolutionary genomics, computational biology, applied genomics and technology and genome ethics, law and policy.

Directly across lies Linchong You, a biomedical engineer who designs synthetic gene circuits in bacteria to try to program specific cellular behaviors, while nearby sits the office of Greg Crawford, who has developed bioinformatics technologies that can identify DNase I hypersensitive sites (an indicator of an active DNA regulatory element) from potentially any species and cell type with a sequenced genome.

"It can be a little bit of a struggle for us to all come together because the perspectives of our members are so different — and we're all pretty busy — but we definitely have the opportunities and desire to forge strong and diverse relationships."

The opportunities arise from regular seminars, journal clubs and meetings that cover the wide breadth of this institute, not to mention the dozens of potential research collaborations. (And, if all else fails, Willard has been known to host dinners to directly introduce investigators who might need to get acquainted.)

Rusche has taken full advantage of this great environment in her own research. As a postdoc, she had worked with an unusual gene called SUM1, which coded for a promoter-specific repressor, and found that a single amino acid change

created a mutant that could silence new and different regions.

"And, that got me thinking about where new protein function comes from," she says. "After I came here, I started talking with an IGSP colleague, Fred Dietrich, whom I was introduced to by Hunt over dinner during my interview. He has been characterizing the genomes of various fungi related to traditional yeast, spanning hundreds of millions of years of evolution. And, with that information, I've started looking at the evolution of Sir2 histone deacetylases, to see how function has changed over time."

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Evolution is a vital component of the IGSP as well; even though the institute has grown to a sizable and sustainable level, Willard notes it's not a time to rest on one's laurels. "The genome sciences continue to advance at a rapid pace, and we have to move as well because if we're not climbing that mountain, we're rolling down the hill."

Keeping the momentum involves placing future bets and thinking ahead. That includes a strong emphasis on education, and, as such, the IGSP offers a number of options at the student level, from introductory courses for incoming freshmen to undergraduate summer fellowships featuring mentored research and engaging activities, to a certificate-level program, equivalent to a minor degree in genome sciences and policy (a comparable graduate level certificate currently is in the works, to broaden and connect the two doctoral programs the institute already offers).

On the research end, one of the most recent initiatives has been setting up a top-level proteomics facility, a commitment that reflects Willard's broad view that the genome sciences are much more than "just" DNA.

American Society for Biochemistry and Molecular Biology member M. Arthur Moseley, brought into the IGSP in 2007 to head the new proteomics facility, compares this view with shining light through a diamond. "Depending on which facet of the diamond you look through, you'll see a different image," he says. "You need to see all of them to get a complete picture."

"Likewise, genes are only what might happen; messenger RNA is what is trying to happen; and proteins are what does happen. Only by looking at all the '-omic' technologies can we understand mother nature's subtleties."

In just three years, Moseley has built his core from the ground up — "literally," he says, "when I arrived, I didn't have a floor or walls or anything" — to feature six state-of-the-art tandem mass spectrometers and a dedicated team that now has supported more than 80 investigators (in the IGSP and Duke University at-large) and 180 projects.

The proteomics core is just one of several technology platforms established within the IGSP to expedite the genome-related research efforts of the institute. Under the astute operational eye of technology manager and fellow ASBMB member Thomas Burke, whom Moseley describes as the glue that holds the diverse IGSP platform technologies together, the institute offers services for DNA microarrays, genome sequencing, RNA interference screening and an extensive fluid and tissue biospecimen facility.

"The IGSP is the ideal environment for platform technologies at Duke," Moseley says. "Hunt created the infrastructure required to successfully deploy them to studies in basic and translational sciences, including a major investment in specialized IT infrastructure that enables user-friendly access to all the technologies."

And, although the various technology cores primarily are service facilities, they contribute much more than just running samples. "We provide opportunities for all the core directors to apply their interests to various research projects," Burke says. "We encourage them to meet with faculty, sit in on lab meetings and help implement methods or strategies to problems. We want our technology members to feel involved in the institute's mission."

A view of the Fitzpatrick building that houses many of the IGSP labs and offices.

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Robert Cook-Deegan, who heads up the institute's Center for Genome Ethics, Law and Policy (GELP), echoes Burke's assessment. "A lot of schools say they have interdisciplinary institutes," he says. "But, I think it's a testament to Hunt and Duke University that we really strive for that here."

Cook-Deegan, a former physician and molecular biologist who switched to a policy career after doing an American Association for the Advancement of Science science and technology policy fellowship, highlights his own center in those feelings; despite being somewhat different than the other five IGSP centers in that GELP's mission is not focused around laboratory work — though his center does carry out independent research projects — he feels that GELP is given equal status with the rest of IGSP.

And, this is important, because among all of IGSP's parts, GELP provides that extra spark that helps make IGSP a unique fixture among academic centers.

"Duke certainly wasn't alone last decade in seeing that genomics was the next big wave barreling in to shore," Willard points out. "But, most research places seemed fixated on the impact of genomics strictly from a health and medicine perspective."

"We weren't going to try to out-Broad the Broad Institute," he adds. "So, instead, Duke saw an opportunity to carve out a niche in merging the genome sciences with genome policy."

At GELP, Cook-Deegan and his colleagues, a group that includes individuals trained in policy, law, business, bioethics and genetic counseling, follow the IGSP motto of "Ask Big." Their goal is to analyze questions emerging from the world of genetics and genomics that matter in the real world — for example, how companies that offer direct-to-consumer genome sequencing should be regulated — to help people make better decisions. Given that genome policy falls under such a big umbrella, GELP has specialized in a few key topics such as intellectual property, informed consent and consumer genomics.

It's not a "think tank" per se, though Willard and Cook-Deegan hope that some of the research that comes out of GELP could be used positively by those in policymaking positions — and perhaps soon, for as big an impact as genomics has made the past few years, the next incoming wave is even bigger.

"As recently as a year ago, we only had a handful of complete human genomes sequenced," says Cook-Deegan, "but even now, scientists are sequencing hundreds every week, and all the speculation of the $1,000 genome is becoming reality."

"And, once that's completed, I think it will open the floodgates and completely change how we look at, interpret and value our genetic data."

Nick Zagorski (nzagorski@asbmb.org) is a science writer at ASBMB.

For more information:

For more on regulating direct-to-consumer genome sequencing, see "The FDA versus Personal Genetics Firms" on page 19.

The FDA versus Personal Genetics Firms *continued from page 19*

results across the four companies investigated. Claims ranged from blatant disregard for consumer consent, to lack of utility of the tests to deceptive marketing tactics.

The actual fallout of these meetings has not yet been fully articulated. What is definitive is that federal regulation is looming over the DTC genetic testing industry and that it will be designed to ensure that consumers are protected. This likely will include regulation that ensures validity, accuracy and utility of the genetic tests; consumer consent; consumer privacy and involvement of health care providers.

For Better or for Worse?

With the promise of premarket clearance of DTC genetic tests on the horizon comes the question of whether such guidelines ultimately will hamper the advances this industry promises. In the face of regulation, Pathway Genomics' partnership with Walgreens practically has dissolved. Both Pathway and Navigenics now require consumers to sign up through either their "physician or corporate wellness program." DeCODeme currently is not offering tests online that scan for cancer and cardiovascular conditions. Other firms might opt to move their businesses elsewhere, outside the borders of this country and federal regulation. As of 2007, 13 states prohibited direct-to-consumer genetic tests, whereas 25 states, plus the District of Columbia, permitted it. In light of everything that has occurred, it will be interesting to see how federal oversight ultimately will impact this industry.

Lola Olufemi (olufemi_lola@yahoo.com) is a doctoral candidate/NSF BRIDGE fellow at the Southern Illinois University School of Medicine.

This article describes one of the symposia that is part of the ASBMB annual meeting, which will be held April 9–13, 2011, in Washington, D.C.

Scientific Credibility, Politics and the Public

BY NICK ZAGORSKI

In a perfect world, science is a purely objective endeavor that only seeks to answer questions and uncover facts; it is a discipline that rises above contentious and divisive issues.

Unfortunately, as we know, we do not live in a perfect world.

Just in the past decade alone, science has been front-and-center in several controversial political, religious and socio-economic debates, including the accepted use of embryonic stem cells, the potential effects of genetically modified foods, the teaching of evolution in schools and the validity of climate change data.

However, the trend most troubling for many scientists, particularly evident in the latter two examples, is not only that science more frequently is being exploited and sensationalized, but that it often is misrepresented, misquoted and generally misunderstood.

It's an issue of incredible concern, and the reason why the American Society for Biochemistry and Molecular Biology will host a special symposium titled "Scientific Credibility and the Politicization of Science," sponsored by the society's Public Affairs Advisory Committee, at the 2011 annual meeting, April 9–13, 2011, in Washington, D.C.

One of the consequences of ignorance of the scientific process is its politicization by those who chose to misrepresent or misuse the results of these processes to their own ends. "The politicization of science is always going to be around to some degree," notes ASBMB Past-president Bettie Sue Masters, the Robert A. Welch distinguished professor in chemistry at the University of Texas Health Science Center at San Antonio. "But it's becoming more and more of a problem at the national and international levels that the credibility of science is being called into question." This is obvious particularly when certain issues, requiring scientific data and input, have potential political impact.

At least one possible remedy is increased involvement of the scientific community in communicating scientific processes and outcomes so that they are understood by the public at large and not considered diabolical or leading to ominous outcomes. This special symposium hopefully will spur some of that involvement.

Appropriately set within our nation's capital, this panel discussion will bring together three exemplary individuals who each will share his or her own unique perspective on how science, the media, politics and society interact, and how these different groups all have contributed to the current state of affairs.

Importantly, a discussion of what scientists can do to communicate their message more effectively and restore their credibility also will take place.

The panel will feature Elizabeth H. Blackburn, the Morris Herztein professor of biology and physiology in the department of biochemistry and biophysics at the University of California, San Francisco and the recipient of the 2009 Nobel Prize in Physiology or Medicine; James J. McCarthy, the Alexander Agassiz professor of biological oceanography at Harvard University and past-president of the American Association for the Advancement of Science and Michael Specter, an award-winning author and science, technology and public health writer for The New Yorker.

All three panelists have ample personal experience in various aspects of scientific credibility and the politicization of science, which should make for an exciting and thoughtful discussion. Blackburn, for example, was appointed by George W. Bush to his President's Council on Bioethics in 2001 but later was dismissed controversially in 2004, to the anger of many scientists, based on her support for embryonic stem cell research.

McCarthy also is no stranger to the world of policy, serving as chairman of the board for the Union of Concerned Scientists and having worked closely on two recent international panels dealing with climate change. For the past two decades, McCarthy has worked as an author, reviewer and as a co-chair on the Nobel Peace Prize-winning Intergovernmental Panel on Climate Change.

Specter is intimately familiar with the subject of people rejecting scientific truths in favor of comfortable fictions,

as it is the focus of his recent book, "Denialism: How Irrational Thinking Hinders Scientific Progress, Harms the Planet and Threatens Our Lives." In addition to his position at The New Yorker magazine, he has contributed to the New York Times and the Washington Post.

"All of us on the Public Affairs Advisory Committee are thrilled to have assembled such a great panel to discuss this timely topic at our meeting," says Masters. "We believe this special event can help get our members and other scientists more engaged in communicating their work to the public, so we would encourage everyone who is able to attend."

Nick Zagorski (nzagorski@asbmb.org) is a science writer at ASBMB.

For more...

For more 2011 annual meeting thematic overviews, go to http://bit.ly/aVBOLq.

Participate

With the American Society for Biochemistry and Molecular Biology annual meeting being held in Washington D.C. this year, there never has been a better time to participate in science advocacy. If you are planning on attending, be sure to get in touch with the ASBMB public affairs staff (ghunt@asbmb.org or bcorb@asbmb.org) to try and arrange a meeting with your congressional representatives. Congressmen always are interested in hearing from their constituents. Whether you want to spend a whole day or just a few minutes on Capitol Hill, your willingness to speak on behalf of science will provide volume to the community's collective voice, and will continue to strengthen our position in promoting scientific issues.

Mark your calendars!

Submit Your Annual Meeting Abstract!
Deadline: November 8, 2010

2011

ASBMB Annual Meeting

JOIN US AT THE ANNUAL MEETING TO EXPLORE

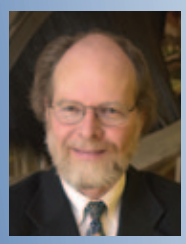
"Scientific Credibility and the Politicization of Science"

Sponsored by the ASBMB Public Affairs Advisory Committee

Scientists often have been viewed as objective purveyors of truth, but, as scientific issues dominate political discourse, both sides of prominent political debates claim to have "science" on their side. Whether the issue is global climate change, stem-cell research, energy policy or evolution education, politics is charged with "scientific" information.

Questions that speakers will address include: How does the use of science for political purposes affect the credibility of science? How does the political climate for science affect the public's trust in science and its findings? How can scientists communicate more effectively, promote accurate scientific information and reclaim their credibility?

Elizabeth H. Blackburn
2009 Nobel laureate in Physiology or Medicine
University of California San Francisco



James J. McCarthy
Alexander Agassiz professor of biological oceanography, Harvard University, Chairman of the Board: Union of Concerned Scientists and Co-chairman of the 2007 Nobel Peace Prize-awarded Intergovernmental Panel on Climate Change

Michael Specter
The New Yorker and author of "Denialism: How Irrational Thinking Hinders Scientific Progress, Harms the Planet, and Threatens Our Lives"

More information available at
www.asbmb.org/meeting2011

Preparing Our Tomorrow

Alternative Approaches to Increasing Minority Participation in STEM Areas

BY LOLA OLUFEMI

The Issue

The underrepresentation of minorities in science, technology, engineering and mathematics is an issue that continues to plague our scientific community. According to the National Science Foundation, of all the doctoral degrees awarded in science and engineering in 2006, 3 percent were earned by African-Americans, 4.9 percent by Hispanics and 0.1 percent by American Indians/Alaska Natives. Several federal agencies, scientific societies and organizations have approached this issue by funding awards to undergraduate and graduate-level students from under-represented backgrounds. As a product of one of these initiatives, I can attest that, beyond removing financial limitations, the programs prepare and encourage the growth of individuals from under-represented backgrounds, making them more competitive. The efforts have produced admirable results, increasing minority representation in government, academic and industry sectors. Unfortunately, such efforts cannot fully eliminate the disparity that exists in STEM areas.

In 2006, the Program for International Student Assessment revealed that high school teens in the U.S. were not competitive in comparison with their peers in other countries in science and math, ranking 17th in science and 24th in math of the 30 countries assessed. The assessment also revealed that African-Americans and Hispanics, on average, scored lower than their Caucasian and Asian counterparts. This assessment illustrates two unsettling points. First, the lack of student competitiveness and literacy in science and math is an issue that pervades race and extends throughout this generation of young people in our country. Second, the disparities in math and science do not start at the college level but much earlier, confirming the need for the implementation of programs that foster the interest and growth of students in these areas.

Alternative Approaches: Shifting Our Focus

Alleviating this disparity requires programs that foster the interest and growth of middle and high school students in STEM areas. An initiative that targets students at this level ensures that they will be equipped with the knowledge and tools required to excel in STEM areas. Shifting our focus to middle and high school students and monitoring their progress secures a steady pipeline of scientists starting from the middle school level up to higher education.

Recruitment and Retention

The strength of such initiatives needs to be the ability to effectively recruit and retain cohorts of students. Recruitment tactics should focus on rescuing those most at risk: under-represented students from disadvantaged backgrounds who are not receiving the funding or attention they need. This will require that programs are accessible and economically feasible to those targeted. Retention of participants relies heavily on the ability of administrators to remain committed to the progress of students and ensuring that the assistance needed for their advancement is provided. Such efforts would create a diverse group of students that serves as a support system for their peers, encouraging the matriculation of the cohort through the program and eventually into college. It also exposes participants to a network of peers nurtured in STEM areas.

Making Science Relatable

Initiatives targeted toward under-represented middle and high school students should include after-school and summer-enrichment programs. This ensures that students will be involved actively in their academic development throughout the year. Such programs should include curriculum that focuses exclusively on science, math and technology. Instead of employing school teachers as instructors, college seniors or graduate-level students in STEM areas from under-represented backgrounds should be used. These college mentors could teach the courses on a rotating basis, based on the subject matter being covered; this would ensure that students are given the correct information from someone who is passionate about the subject and has a desire to share it. This also would allow the college-level instructors gain experience in education and the students gain a mentor to whom they

can relate. The teacher becomes the tangible example of what is possible for students if they pursue an education in science. The college mentors also should be provided with curriculum that allows them to teach the subject matter in a way that is simple and applicable to the students' lives, using examples from everyday situations. Each lesson should be paired with hands-on lab sections in which the students can apply the lesson in a practical way.

Professional Development and Mentorship

Students also should gain professional development. Exposure to scientists from under-represented backgrounds, either by inviting speakers or through field trips to university laboratories, would reinforce the idea that succeeding in science is feasible. Interactions with scientists would show students how to interact in an academic or professional environment. The initiative also should include mentorship. This could be implemented by pairing high school students with undergraduate mentors who are committed to graduate studies. As the mentor matriculates through the ranks, the mentee follows close behind so as to benefit from immediate lessons at various stages. This guarantees each student is being directly advised and guided and also ensures that the students are surrounded not only by peers but also by mentors who can support them as they commence through the program.

How Can We Help?

Developing and implementing these programs can be initiated by individuals, communities, schools, organizations and federal agencies. Passionate individuals can start nonprofit organizations focused on mentoring, tutoring and exposing students to STEM areas. Local businesses, universities, museums and organizations can partner with middle and high schools to volunteer time or funding to develop STEM enrichment programs. A larger impact can be made if such initiatives are paired with existing federally funded programs at the college and graduate levels. Including a middle and high school component in grants that are designed to increase participation in STEM areas ensures that students can be further groomed and prepared at every level of their education.

I believe that if we can raise a generation of children who can master the technology of cell phones and computers, we can nurture the growth of these same students in science. As a society, we can't afford not to — its our obligation to invest in policies and initiatives that increase the numbers of minorities in STEM areas of research.

Lola Olufemi (olufemi_lola@yahoo.com) is a doctoral candidate/NSF BRIDGE fellow at the Southern Illinois University School of Medicine.

The Perils of Counter-dogmatism

BY PETER J. KENNELLY

How Go the Culture Wars?

The tension between science and authority, political or religious, is as old as science itself. It is inevitable in the course of scientific discovery that some popular ideas and legends will be proven erroneous or even fabricated. Long before the Scopes' Monkey Trial signaled the escalation of the ongoing debate over evolution, Socrates, Galileo, Copernicus and others had felt the scorn of state or church.

It is gratifying to know that science has persisted and even thrived despite periodic surges of public skepticism. However, one cannot help but wonder if the Internet age has so magnified the reach and influence of today's creationists as to render it possible that the scientific community may experience real pushback. The political power of religious fundamentalists can be seen in the attempts by elected school boards to mandate placing stickers on textbooks proclaiming that evolution is "just a theory," to teach creation (aka "creation science" or "intelligent design") in K-12 science classes, or — more recently — to dictate the content of science texts purchased by the state of Texas. Although the courts have thus far recognized and upheld the line between science and religious belief, the steady accumulation of culturally conservative judges may, sooner or later, allow the semantic legerdemain of the Intelligent Design Network and the Discovery Institute to win a place for intelligent design in science classrooms and textbooks.

To get creationism, however artfully labeled, into textbooks and classrooms, the scientific method itself must, inevitably, be devalued or distorted if this fallacy is to be maintained. Thus, the need for engaging the public is more acute than ever. Is the purpose of this article to reveal the secret for proving that evolution is right and intelligent design lacks scientific credibility? Unfortunately, no. Instead, my purpose is to raise awareness of some of the more counterproductive approaches we sometimes take in parrying the attacks of creationist culture warriors and to suggest some alternatives for your consideration.

Beware the Metaphor

If the scientific community is to rebuild and enlarge the bridges connecting it with the general public, those bridges cannot be one-way. This means rejecting the seductive metaphor of soldiers in a culture war, for the ways of war are not the ways of reason or respect but those of absolutism and polarization. Yet, many of our choices with regard to both goals and tactics betray the adversarial "us-or-them" mindset of a combat general.

Instead of working toward enhancing mutual understanding, all too often, our op-ed pieces and letters to the editor seek to somehow "win" the debate by exposing the fallacies of creationism and/or discrediting its adherents. All too often, we cast the debate in absolutist terms, seemingly designed to alienate rather than persuade. And, all too often, we portray the adherents of creationism and its derivatives as ignorant, intolerant and irrational.

Perhaps our most frequent error comes when we ascribe differences in viewpoint to differences in education and training: "If only you had the benefit of our advanced degrees and extensive scientific training, you, too, would realize the strength of the evidence on behalf of evolution." By suggesting that evolution and other scientific concepts lie beyond the understanding of "ordinary" people, we strip away everything about science that makes it stimulating, dynamic and rigorous — in other words, everything that might induce someone to examine it more closely or give it a second look. Instead of an exciting and challenging process of exploration, frequently we portray science as a static, dogmatic collection of facts, laws and theories generated and interpreted by qualified experts. Instead of highlighting the many ways in which ordinary people apply scientific tools and principles in their daily lives — quantitative measurement, logical deduction and experimental testing — we portray it as something distant and alien to persons lacking a doctoral degree.

What Is Our Objective?

If our objective is to convince the general public that evolution is "right" and creation science is "wrong," we have set a nearly impossible task. Having grown up in a city with two major league baseball teams, I can tell you that, despite years of vigorous debate, I have yet to see a Cubs fan convinced to become a White Sox fan, and vice versa. Point out that the White Sox won the World Series in 2005, whereas the Cubs have known nothing but frustration since 1908. So what? Point out that Wrigley Field is a thing of beauty, a landmark whose history and ambiance far outshine the modern sterility of U.S. Cellular Field. So

what? It is difficult to change long-held beliefs through logical debate. The more we press the issue, the more likely we are to slip into the kind of dogmatic language that alienates rather than illuminates.

So what should our goals be? To get students, friends, parents and teachers excited about science. To do so, we must show people that science is, at its core, a fundamentally human endeavor; that the scientific method was devised by people trying to satisfy our universal craving to know and understand. We need to illuminate for them the impact that science has on their daily lives. We must show how they use scientific methods and principles every day. And, we must demonstrate our respect for their choice of belief system. Not only must we cease denigrating Genesis, we must be careful to dispel the notion that we seek to silence their views altogether.

I expect few people to respond by either recanting their faith or rejecting the biblical story of creation. However, I do expect that people possessed of a basic appreciation and understanding of science will understand why, to be included in the biology curriculum, intelligent design must first be subject to scientific investigation. Note that I did not say that they would understand why intelligent design does not belong in the science text or classroom, because it is the nature of the evidence and not the nature of the subject that qualifies something as being scientific.

If You Can't Beat Them…

How often have you muttered, "How can we get our students interested in science?" or "How can we get them to understand the scientific method and its application?" One tried-and-true way to stir up interest is via controversy, and here is one ready-made. Imagine, for a moment, if the faculty members in a science department somewhere decided to take up the fundamentalists' call to "teach the controversy."

Imagine a series of classes and discussions leading students on a journey to where early man confronted his desire to make sense out of the world in which he lived, classes that would integrate the physical and natural sciences with history, philosophy, religion and sociology. When asked to imagine how primitive man might first began to apply the tools of science, perhaps students would describe keeping records of time to keep track of and predict the seasons and phases of the moon. Done in a dispassionate manner, away from television cameras and bombastic pundits, imagine what a rich learning experience this could be. Perhaps someday… ∿∿∿

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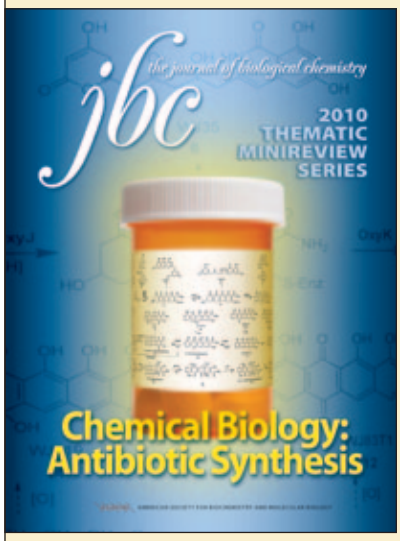
JBC Offers Two More Minireview Series

Antibacterial natural products not only have provided a bonanza of molecules for medicinal chemistry, but they also have played a pivotal role in the growth of biological chemistry as a discipline. Today, natural products continue to present fundamental and translational challenges at the chemistry-biology interface, such as in understanding the diverse nature of antibiotic synthesis. This theme is explored in a recent Journal of Biological Chemistry thematic minireview series that offers four reviews that discuss insights into the biosynthesis of four distinct antibiotics: daptomycin, oxytetracycline, erythromycin and thiopeptides. On the other side of the coin is the subject of a second JBC minireview series: influenza viruses. These viruses are grouped into three types, A, B and C, but within each group, specific virus strains still can run a broad spectrum in their virulence and pathogenicity. To fully understand what factors influence this spectrum, one needs detailed information about relevant viral and host protein machinery. The series explores this area, providing three minireviews that discuss the biochemical and structural properties of the viral hemagglutinin and neuraminidase membrane glycoproteins; the PA, PB1 and PB2 subunits of the viral RNA polymerase complex and the cellular MxA-GTPase that possesses antiviral activity against influenza.

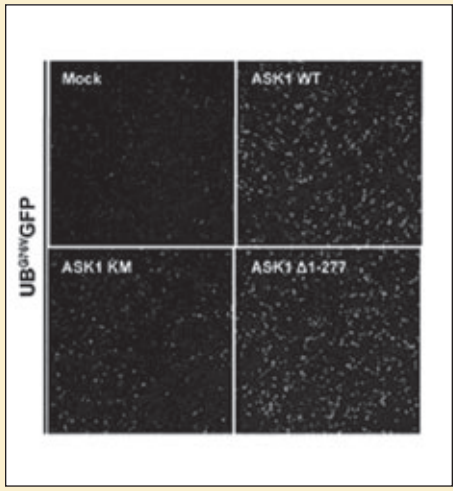


Chemical Biology: Antibiotic Synthesis
J. Biol. Chem. 285, 27499 – 27531,
published Sept. 3, 2010

Influenza Virus-Host Interaction
J. Biol. Chem. 285, 28399 – 28424,
published Sept. 10, 2010

Answers about ASK

The 26 S proteasome plays a central role in ubiquitin-dependent protein degradation, a process vital to the cell, yet the mechanisms underlying the regulation of 26 S activity remain elusive. In this article, the authors combined cell culture and in vitro assays to demonstrate a role for the apoptosis signal-regulating kinase 1, a member of the MAPK kinase kinase family, which is activated in response to stress and apoptotic stimuli. Western blot analyses revealed that ASK1 does not interact with the 20 S catalytic core of the proteasome but does interact with ATPases in the 19 S regulatory particle, which is responsible for recognizing tagged proteins, unfolding them and translocating them into the 20 S core. The authors then found that ASK1 phosphorylates the 19 S ATPase Rpt5, inhibiting its activity and thus negatively regulating 26 S activity as a whole. These findings are the first to tie in stress kinase activation to specific effects on 26 S proteasomal function through direct phosphorylation of the proteasome complex, which may offer new strategies for treating the numerous human diseases caused by proteasome malfunction.

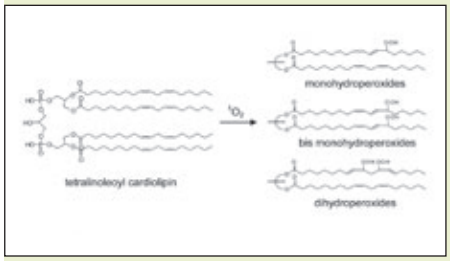


Fluorescence analysis of ubiquitinated GFP degradation in cells transfected with full-length ASK1 (WT), a kinase-inactive mutant (ASK1-KM) or a constitutive active mutant (Δ1-277-ASK1).

ASK1 Negatively Regulates the 26 S Proteasome
Ji Won Um, Eunju Im, Joongkyu Park, Yohan Oh, Boram Min, Hyun Jung Lee, Jong Bok Yoon and Kwang Chul Chung

J. Biol. Chem., published online
Sept. 15, 2010

Cardiolipin Oxidation Products



Representative structures of oxidized cardiolipin species produced by singlet oxygen, as seen by HPLC-MS/MS spectral data.

The phospholipid cardiolipin predominantly is found in the mitochondrial inner membrane, in association with the components of the electron transport chain. Because electron transport generates a large amount of reactive oxygen species, the proximity of the fatty acid chains of CL to the various ETC complexes make it a likely target of oxidative damage. Oxidized CL products, therefore, could serve as biomarkers for the presence of ROS. However, characterization of oxidized CL is highly challenging as major CL species have four unsaturated acyl chains, whereas other phospholipids usually only have one. In this study, the researchers exposed CL to either singlet oxygen ($^1O_2$), the radical initiator AAPH (2,2'-azobis(2-methylpropionamidine) dihydrochloride) or room air and characterized the resulting oxidized CL species using reversed-phase ion-pair high pressure liquid chromatography tandem mass spectrometry. With this combined approach, they could detect the distinctive fragment ions associated with specific oxidized species of similar mass and thus fully distinguish major and minor CL species. The results showed that monohydroperoxides and bismonohydroperoxides were generated under all three conditions, whereas dihydroperoxides were produced only by $^1O_2$. This suggests that singlet-oxygen mediated damage has a chemotype distinct from radical-mediated damage, offering more insight into the mechanisms of oxidative stress.

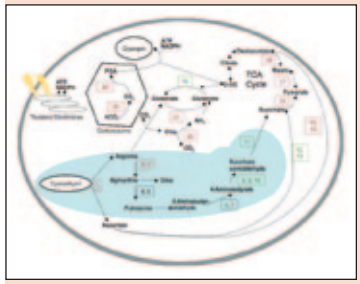
Cardiolipin: Characterization of Distinct Oxidized Molecular Species

Junhwan Kim, Paul E. Minkler, Robert G. Salomon, Vernon E. Anderson and Charles L. Hoppel

J. Lipid Res., published online Sept. 20, 2010

Analyzing Cyanobacterial Stress

Cyanobacteria are the only prokaryotes capable of oxygenic photosynthesis and thus play crucial roles in global carbon and nitrogen cycles. Cyanobacteria are present in a wide range of ecological niches and have developed a host of stress responses to accommodate changes in the environment. To gain a more detailed knowledge of these responses, the researchers in this study performed a large-scale proteomic analysis of the model cyanobacterium Synechocystis sp. PCC 6803 using 33 different environmental conditions (altered temperatures, nutrient depletion, etc.). They identified over 22,000 unique peptides corresponding to 1,955 proteins (covering 53 percent of the predicted proteome), of which 1,198 were differentially regulated in response to environmental stresses. Notably, they found that various perturbations resulted in the activation of atypical pathways for the acquisition of carbon and nitrogen from urea and arginine, suggesting that this could be a common stress response. This study provides the most comprehensive functional and quantitative catalog of the Synechocystis proteome to date and will be quite valuable for future experimental studies for this important group of organisms.



Global stress response of different cyanobacterial pathways; colors indicate either increased (red) or decreased (green) protein abundances under stress compared to control; black indicates that proteins are not observed in control sample.

Global Proteomics Reveal an Atypical Strategy for Carbon/Nitrogen Assimilation by a Cyanobacterium under Diverse Environmental Perturbations

Kimberly M. Wegener, Abhay K. Singh, Jon M. Jacobs, Thanura R. Elvitigala, Eric A. Welsh, Nir Keren, Marina A. Gritsenko, Bijoy K. Ghosh, David G. Camp II, Richard D. Smith and Himadri B. Pakrasi

Mol. Cell. Proteomics, published online Sept. 21, 2010

Dr. Brown Goes to Washington

BY KYLE M. BROWN

When I decided to major in both biology and government in college, people said to me, "That's a unique mix. What are you going to do with that?" I didn't have a good answer until I discovered science policy. So, as my doctorate began to wrap up, I decided to embrace my two passions.

Fortunately, science policy is a viable and vibrant career choice for academically trained scientists. After a year as the American Society for Biochemistry and Molecular Biology science policy fellow, I offer a few impressions about what scientists can expect from a Washington, D.C. experience.

Policies and Priorities

Politicians and scientists often assert that there is a scientifically correct solution to every policy problem. While sitting in congressional hearings, I have heard members of Congress say "we should do what the science tells us." Although scientific analysis is important for informing policy decisions, science is mute on which decisions are "best."

Fundamentally, policymaking is about priorities. There is never enough time or resources to ensure that every meritorious program receives what it needs. Furthermore, policymakers rarely share the same priorities. Congressmen from Wichita and Los Angeles are likely to champion vastly different issues. Even federal agencies pursue certain policies over others based on the political priorities of the current administration.

Our national science policy is rife with such prioritizations. For example, biomedical and ecological research each receive vastly different amounts of federal funding. Also, although many lawmakers would like to stop global climate change, the country needs cheap and reliable sources of energy.

At ASBMB, I helped to shape the policy priorities in Washington. In meetings with congressmen and their staff, ASBMB members and I emphasized how biomedical research saves lives, creates jobs and increases American competitiveness. Because "all politics is local," senators and representatives were keenly interested in the effects that research funding had on the economy and their districts.

But political realities and competing needs often trump ideal solutions. Every program has its advocates and opponents, and policymakers and politicians must weigh the costs and benefits of each decision. Because so many independent political actors are involved, policies always represent political compromises.

Hollywood for Ugly People

For the political junkie, working in Washington can be like standing outside of a Hollywood premiere. When I first started at ASBMB, I had a number of star-struck moments while walking the halls of Congress or attending briefings. Apparently, members of Congress not only talk on their Bluetooth headsets but also jog in Dupont Circle. As Us Weekly would say, "Senators: They're just like us!"

The connections between Hollywood and Washington are all too appropriate. Members of Congress live and die by their images. Long-serving senators can be tagged as "Washington insiders" and "pork-barrel" spenders, making them vulnerable to "virtuous" and ideologically pure challengers.

Kyle M. Brown received his bachelor of science from Georgetown University and his doctorate in evolutionary genetics from Harvard University. He served as the 2009-2010 ASBMB science policy fellow and currently is the genetics and public policy fellow for the American Society for Human Genetics and the National Human Genome Research Institute. In November 2010, he will continue his fellowship with the U.S. Senate Committee on Health, Education, Labor and Pensions.

For those interested in policy, appearances are as important as results. Great policy that is perceived poorly will go nowhere. In the recent New Yorker article "As the World Burns," Ryan Lizza details the U.S. Senate's negotiations of potential climate-change legislation. U.S. Sen. Lindsey Graham, R-S.C., led the initial negotiations but pulled his support after FOX News claimed he was proposing a widely unpopular "gas tax." Without Graham's support, the bill garnered no Republican support and was dead on arrival.

Policymakers cultivate their images on Washington's political stage. High-profile events draw attention to important issues and bring new information to the forefront. But equally important is how members appear to their constituents at those hearings. Offending CEOs who testify before Congress can expect an indignant public scolding from each member of Congress involved. For many members, portraying themselves as tough public servants is as important as any outcome from the actual hearing.

In short, the spin is as important as the content. Effective policymakers work within the system and use the theater to push their agendas forward.

Skills I Never Thought I'd Use

Academic-scientific training teaches critical thinking and research skills that translate well in policy fields. But other nontechnical skills, like writing and communicating well, are essential for nonacademic careers. Often, my "softer" skills have come from unexpected places.

Because I was interested in how science could be explained to the public, I took a course on "communicating science" while in graduate school. The course was taught by a journalist and focused heavily on journalistic writing. At the time, I thought, "This is fun, but I'll never be a journalist."

To my surprise, journalistic writing became an essential part of my daily work at ASBMB. Under the excellent mentorship of the society's public relations expert, Angela Hopp, my previous training blossomed. Monthly news stories for ASBMB Today quickly led to weekly pieces for the ASBMB Policy Blotter, the society's science policy blog. The lessons also served me well while preparing policy briefs and memos on important issues. A skill I never imagined using became an essential part of getting ASBMB's message out to members and policymakers.

My foray into journalism demonstrates that unlikely experiences can be an essential part of successfully transitioning into policy. Drawing upon all of your skills can help give you a head start in roles for which you haven't been specifically trained.

Marketing Yourself

In a town of spin doctors and lobbyists, the reserved and introverted scientist can feel overwhelmed. A scientist expects his or her curriculum vitae, with all of its degrees, honors and publications, to speak for itself. But selling yourself is part of the policy game, and a successful transition requires that you be your own best advocate.

First off, get out there and meet as many people as you can. Although you may have had a robust academic network, in the policy world, you likely are starting from scratch. I quickly lost track of how many receptions, happy hours and events I'd been to in Washington. But, they help you meet people and hone the "elevator speech" that describes you and your interests.

Of course, "networking" involves business cards. Lots of them. I carry them with me all the time, and I'm never shy about handing them out. If your school or organization doesn't print them for you, Internet-based companies will for a small fee. They are a great way to remember a conversation, and it's polite to exchange cards at the end of a talk or meeting.

In Washington, I quickly dispensed with my academic CV. Scientists like to list every award, publication, society and teaching position they have ever received. Most of that is irrelevant. Even when I listed my publications on my resume, no interviewer ever read them. I've now condensed my multipage academic monster to a clean 1 ½-page version that is adapted to the position for which I am applying.

When I interview for positions, I make sure to tailor my resume and my answers to the specific position. Employers want to hear how your skills and experiences will benefit their organizations. An interviewer definitely will notice if you highlight your experience with an issue in which he or she is interested.

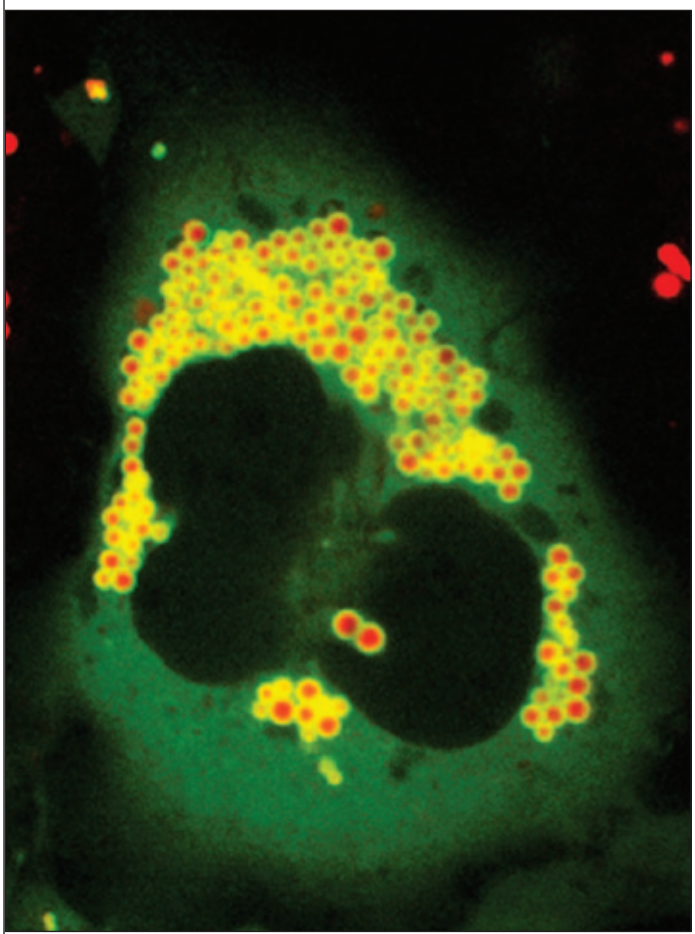
The Future

I learned a lot with ASBMB, but I'm just getting started. My new position allows me to contribute to policymaking from inside a federal agency and with a U.S. Senate committee. Although I'm still deciding where I'd like to end up in the long term, I can't think of anything more worthwhile than using my education for the public good.

From Lipolysis to the Lipolysome

BY RUDOLF ZECHNER

Fatty acids are essential in all organisms as precursors for lipids involved in the formation of biological membranes and in cell signaling processes. Additionally, FA are important energy substrates in animals, most insects and micro-organisms. However, increased cellular concentrations of FA are toxic. Due to their amphipatic nature, they form micelles, disrupt membrane architecture and affect the cellular acid/base homeostasis. To prevent increased cellular FA concentrations, essentially all cells "detoxify" FA by their esterification and storage as triacylglycerol in lipid droplets. In mammals, adipose tissue is the most efficient organ for fat storage. When needed, FA are released from TG by enzymatic hydrolysis mediated by lipases. This process commonly is called lipolysis.



Localization of ATGL on lipid droplets of cos-7 cells. Cellular localization of YFP-tagged ATGL (yellow) was determined by Nipkow®-based array confocal laser scanning microscopy. Neutral lipids in cells (red) were stained with Bodipy® 558/568 C12.

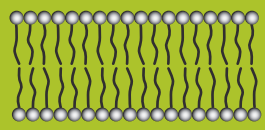
IMAGE COURTESY OF W. GRAIER, R. MALLI, AND M. SCHWEIGER

For decades, textbooks taught that two enzymes are responsible for the complete hydrolysis of TG, hormone-sensitive lipase and monoglyceride lipase, originally described by Steinberg and colleagues in 1964. Recently, lipolysis attracted renewed attention when the complexity and systemic physiological importance of this biochemical pathway became apparent.

The lipolytic pathway required the first revision in 2004 when three laboratories reported the discovery of a previously overlooked TG hydrolase (1-3). Due to its enzymatic function and its high abundance in adipose tissue, the enzyme was named adipose triglyceride lipase (2). The critical role of ATGL in fat catabolism became evident when ATGL-deficient mice accumulated massive amounts of fat in many tissues, including adipose, cardiac and skeletal, muscle, liver, kidney and testis. Soon after it was shown that ATGL activity is controlled by a mandatory co-activator (CGI-58) and a potent co-repressor (G0/G1 switch gene 2) (4, 5). The relevance for human physiology was established when mutations in ATGL and CGI-58 were found to be causative for two variants of a rare, autosomal hereditary disease called "neutral lipid storage disease" (6, 7).

In an early, ground-breaking observation, Londos, Greenberg and colleagues demonstrated that perilipin, the "prototype" of structural lipid droplet proteins, regulates HSL access to the TG substrate. On the basis of this finding, numerous proteins recently have been shown to act in a "gate-keeping" role for both HSL and ATGL. The list includes additional members of the perilipin family, members of the CideN family of proteins such as Fsp27 or pigment epithelium-derived factor. Additionally, specific vesicle transport systems (such as Arf1-COP1) also regulate the access of ATGL to lipid droplets by mechanisms that are understood insufficiently (8, 9). Although the list of regulatory factors affecting lipolysis still is incomplete, it is safe to say that lipolysis requires the large regulatory network of a "lipolysome" to function appropriately in various cell types.

Another recently emerging field of interest is the role of lipolysis in lipid-mediated cell signaling. The systemic effects of ATGL deficiency in tissues with relatively low FA oxidation rates suggest that lipase-generated products



and intermediates participate in the regulation of lipid and energy homeostasis. The crucial role of MGL in the inactivation of 2-arachidonylglycerol, the most abundant and potent endocannabinoid, became evident in MGL-deficient mice (10). Emerging evidence also indicates that FA or FA derivatives may regulate the activity of nuclear receptors. Similarly, it is conceivable that lipolytic diacylglycerols participate in protein kinase C activation. Future studies will need to address the question of whether the stereospecificity of ATGL supports the generation of bioactive 1,2-sn-DG and whether lipid droplet-derived DG can be translocated to the plasma membrane for PKC activation. Additionally, clarification is needed on whether the potent DG lipase activity of HSL contributes to the catabolism of signaling DG in the plasma membrane.

Taken together, (i) functional lipolysis is much more complex than originally anticipated and requires a regulatory network of a "lipolysome," (ii) lipolysis is not only important for the mobilization of fat in adipose tissue but has a crucial cell-autonomous function in many tissues and non-adipose cell types of the body and (iii) although lipolysis is essential for the provision of FA as energy substrate, it additionally produces lipolytic products and intermediates involved in the generation of lipid mediators that affect lipotoxicity, inflammation and gene regulation. Thus, lipid droplets could be seen as a metabolic platform that requires the "lipolysome" to control cellular homeostasis.

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Science Blog Roundup

BY GEOFFREY HUNT

Are you still getting your breaking science news from the front pages of Nature? That is so 1999. These days, scientists do what the rest of the world does: They turn to blogs. And, as with everything on the internet, science blogs exist in (over)abundance. Some are run by professional journalists at respected publications like Science and Nature, some are contributions from people working in a lab and some are just the musings of anonymous bloggers. So, which blogs should you add to your daily web-surfing routine? We've compiled a collection that we think is worth checking out.

A Blog Around the Clock
(http://blog.coturnix.org)
A site at the nexus of all things science — research, education and politics — A Blog Around the Clock also features a running interview series with bloggers discussing their trade.

ASBMB Policy Blotter
(http://asbmbpolicy.wordpress.com)
The American Society for Biochemistry and Molecular Biology's blog is written by the society's public affairs staff, who are on the ground and in the trenches keeping you updated on science policy-related happenings in and around Washington, D.C.

Babbage
(http://www.economist.com/blogs/babbage)
This is a broad science and technology blog hosted by The Economist that is as thorough and well-written as all of their articles.

Eye on FDA
(http://www.eyeonfda.com)
This blog contains exactly what its title says: coverage of the happenings at the U.S. Food and Drug Administration.

Health Blog
(http://blogs.wsj.com/health)
The Wall Street Journal's blog Health Blog offers news and analysis on health and the business of health.

Nature.com Blogs
(http://blogs.nature.com)
In addition to featuring its own science news blog called The Great Beyond (http://blogs.nature.com/news/thegreatbeyond), this website from Nature Publishing Group also compiles a list of third-party science blogs and ranks them by category (medicine, neuroscience, physics, etc.) and posting frequency.

Science Blog
(http://scienceblog.com)
More hard science than opinion, Science Blog features stories on lab breakthroughs and important studies that lay the groundwork for the headline-grabbing features you find on the covers of the big journals. Visit this site to read about the research behind the research.

ScienceBlogs
(http://scienceblogs.com)
A massive compendium of original material, ScienceBlogs has something for every kind of scientist. Written by journalists, grad students, professors and whoever else wants to contribute, the site is a mixed bag of scientific, legal and political posts. In particular, the science posts run the gamut from medical and life sciences to information science and humanities.

ScienceInsider
(http://news.sciencemag.org/scienceinsider)
This blog by Science magazine probably is the best general science site out there. It has a simple layout and straightforward, well-written posts, which contain actual sources and reporting.

The Daily Scan
(http://www.genomeweb.com/newsletter/daily-scan)
One of three blogs sponsored by GenomeWeb, The Daily Scan presents a combination of in-house posts and stories featured on other blogs. With the rest of the site focused on industry, the postings tend to be a bit more professional than on other blogs.

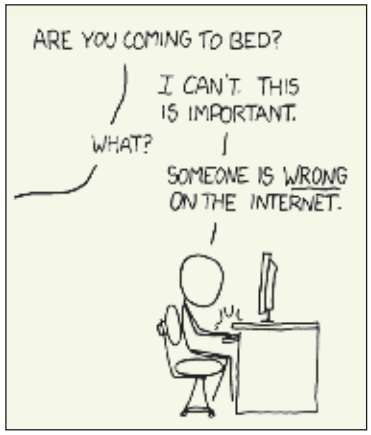

Image from xkcd.com.

Well
(http://well.blogs.nytimes.com)
This blog on the New York Times website "sifts through medical research and expert opinions for practical advice to help readers take control of their health and live well every day." The New York Times website also has an excellent Science section (http://www.nytimes.com/pages/science/index.html) that is updated daily.

Geoffrey Hunt (ghunt@asbmb.org) is an ASBMB science policy fellow.

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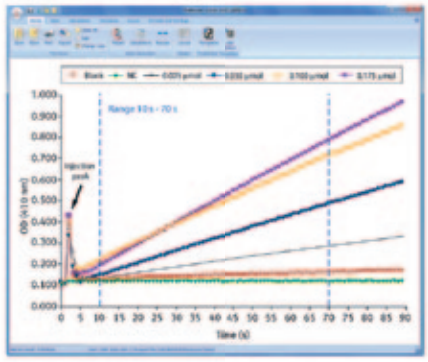

Overlay plot of esterase catalysed pNPA reactions at different concentrations.

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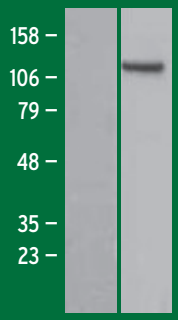

HEK293 were transfected with L) empty vector R) TrueORF for Myc/DDK-tagged hTERT(Cat# RC217436). The lysates were analyzed using anti-DDK antibody to show over-expression of hTERT. *DDK is the same as FLAG.

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