ASBMB today

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THE SECOND INSTALLMENT IN THE ESSAY SERIES:

From Sierra Leone to New York City

American Society for Biochemistry and Molecular Biology

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Research Spotlight

In this month's Q&A, Tiffany Oliver, an assistant professor in the biology department at Spelman College in Atlanta, talks about how the Minority Access to Research Careers program and practicing grantsmanship at the predoctoral and postdoctoral levels influenced the trajectory of her career. She offers this bit of wisdom to young people considering careers in science: "My persistence has gotten me much further in life than my intellect. So my advice is to keep pressing on: Even when your knowledge fails you, persistence will kick in and help you achieve your goals." **Read more at www.asbmb.org/asbmbtoday.**

Sweet on science

The ASBMB crew showed its love for the biosciences on Twitter on Valentine's. Make sure to check out a roundup of the most popular #mybiovalentine tweets. Among our favorites: "Let's ditch these chaperone proteins and see what unfolds." **See more at wildtypes.wordpress.com.**

A new mechanism for cell death

Heart failure, brain ischemia and strokes have one thing in common: an intracellular overload of calcium. In a recent Paper of the Week in the Journal of Biological Chemistry, researchers described how this calcium overload comes about and leads to cell death. **Listen to a podcast about the paper at jbc.org/site/podcast or read more at wildtypes.wordpress.com.**

president's message

New meets old

The many applications of biochemistry and molecular biology

BY JEREMY BERG

Biochemistry and molecular biology are tremendously applicable to medicine. It is easy to lose sight of the fact that our sciences also underlie important applications in other fields. Much of this applicability stems from the tremendous similarity, at the molecular level, of all organisms, even those that on a macroscopic or even cell biological level seem quite disparate. This insight appears to have been articulated first in 1926 by the Dutch microbiologist A.J. Kluyver and his assistant H.J.L. Donker in their paper "Die Enheit in der Biochemie" ("The Unity of Biochemistry") (1). This paper posited that all life forms depend on shared metabolic needs and processes. The subsequent elucidation of key common biochemical pathways, including the urea cycle (1932), the citric acid cycle (1937) and the glycolytic pathway (1940), revealed the power of this insight clearly. Our understanding of this commonality was amplified greatly by the discovery of the DNA double helix by James Watson and Francis Crick in 1953 (based largely on data collected by Rosalind Franklin). French biochemist (and one of the other founders of molecular biology) Jacques Monod summarized biochemical unity concisely in 1954 by saying, "What is true for E. coli is true for the elephant."

The unity of all forms of life at the level of biochemistry and molecular biology is one of the most powerful insights in the history of human knowledge. This insight has enabled scientists to obtain results relevant to human biology and biomedicine from studies of model organisms including bacteria, yeast, worms, and mammals such as mice, although full translation of these results to humans is still challenging. Importantly, biochemical unity has tremendous implications for other fields of great importance, including energy, food and materials science. I will consider examples from each of these fields.

One of the great challenges of our time is finding sustainable sources of energy. The Earth is constantly bathed in light from the sun, and this presents both challenges and opportunities. One challenge takes the form of global warming caused by increasing concentrations of carbon dioxide and other greenhouse gases in the atmosphere that trap energy from the sun in the form of heat. How can carbon dioxide be removed from the atmosphere? Plants and some microorganisms use an intricate biochemical pathway to fix carbon dioxide from the atmosphere, presenting an opportunity for a solution. This pathway is initiated by the enzyme ribulose-1, 5-bisphosphate carboxylase/oxygenase, or RuBisCO, which couples carbon dioxide to ribulose 1,5-bisphosphate to form two molecules of 3-phosphoglycerate. The ultimate products of the Calvin cycle are carbohydrates that can be utilized for a variety of purposes. Some potential methods to reduce greenhouse gases involve using plants or devices based on RuBisCO (ideally with improved catalytic efficiency derived through molecular biology techniques) to capture carbon dioxide.

Another energy challenge is developing sources of energy that are economically viable and do not produce large quantities of greenhouse gases. Again, observations in plants and microorganisms provide some key opportunities. The energy needed to drive the Calvin cycle (in the form of ATP and NADPH) is provided by the light reactions of photosynthesis. The most essential step in these reactions is a photo-induced electron-transfer reaction that converts absorbed light energy into oxidized and reduced species that then can be used to drive other reactions. Understanding this process has stimulated much research on solar-energy conversion, and the principles of biological electron transfer that have come out of studies of photosynthesis have had great effects of many aspects of chemistry and biochemistry.

Photosynthetic organisms also play a major role in most solutions related to increasing the available food supply as the human population continues to grow, because these organisms can use energy from the sun to produce carbohydrates. Of course, carbohydrates are not the only components needed for food; nitrogen-rich compounds such as proteins also are required. Fortunately, some plants, such as soybeans and other legumes, have evolved symbiotic relationships with nitrogen-fixing bacteria in the soil. Such bacteria produce the enzyme nitrogenase, which catalyzes the remarkable cleavage of the triple bond in nitrogen gas to produce two molecules

of ammonia. The partnership between plant and bacterium depends on a complicated biochemical conversation featuring flavonoids secreted by the plants and lipochitooligosaccharide nodulation factors produced by the bacteria. This is but one example of the intricate chemical interactions and negotiations that take place throughout the microbial world.

Our world has been transformed by microprocessors and other devices produced by forming structural features on micrometer or submicrometer scales within macroscopic materials such as silicon wafers. The top-down approach for materials construction can be complemented through a bottom-up approach in which individual molecules are designed and constructed so that they self-assemble into desired shapes on the scale of tens to hundreds of nanometers. The concept of molecular nanotechnology has been articulated for more than 30 years (2), but recently some of the key steps in this process have been realized after decades of detailed studies of protein structure and folding. Individual proteins with preselected structures have been designed, synthesized and characterized (3) as have self-assembling protein oligomers (4). Molecular nanotechnology is still in its infancy, and it will be exciting to watch the anticipated developments as biochemists and other scientists push this frontier forward.

The unity of biochemistry first articulated nearly a century ago formed the basis for "A New Biology for the 21st Century," a report from the National Research Council released in 2009 (5). This report explored how biology, unified by commonalities at the level of biochemistry and molecular biology and the associated analytical and synthetic methods that underpin these studies, could be harnessed to address sustainable food production, ecosystem restoration, optimized biofuel production and improvement in human health. The report calls for greater integration across traditionally separate disciplines within biology as well as close collaborations with physical, computational and earth scientists and with mathematicians and engineers. Because of the central role of biochemistry and molecular biology, American Society for Biochemistry and Molecular Biology members in particular are well-positioned to contribute to and, indeed, lead these crucial efforts. The "New Biology" report did not lead to much action, in large part because its publication coincided with the financial crisis. However, as we move forward, we should be sure to articulate the wide range of important societal issues that could benefit from biochemical and molecular biological insights and technologies.

Jeremy Berg (jberg@pitt.edu) is the associate senior vice-chancellor for science strategy and planning in the health sciences and a professor in the computational and systems biology department at the University of Pittsburgh.

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Proposed immigration reforms could benefit scientists

BY BENJAMIN CORB

Since the 2012 election, several issues that Congress had been reluctant to spend time deliberating have come into the political limelight. Most of these issues (entitlement reform, tax reform, gun control) have no real bearing on the scientific community. However, the recent bipartisan support for reforming the nation's immigration system may have long-term effects on laboratories across the country as politicians discuss how America can be a magnet for the world's top scientists, mathematicians and engineers.

Immigration reform is an issue with which many of you are familiar already. I have heard countless anecdotes about the trials of studying in the U.S. on temporary student visas. For example, some students are prevented from attending international conferences even after being invited to present their work due to the restrictive nature of student visas. Meanwhile, we see America as a clear leader in education, with students flocking to American universities by the thousands – only to return to their countries to conduct research or start businesses that directly compete with American ones.

Last month, President Obama gave a broad speech on immigration to an audience in Las Vegas. The president connected studying for degrees in science and technology fields with American jobs. "If you're a foreign student who wants to pursue a career in science or technology or a foreign entrepreneur who wants to start a business with the backing of American investors, we should help you do that here," said Obama. "Because, if you succeed, you'll create American businesses and American jobs. You'll help us grow our economy."

Days before the president's speech, U.S. Senate leaders like Charles Schumer, D-N.Y., and John McCain, R-Ariz., made similar statements about the need to overhaul the American immigration system. Then, in late January, a bipartisan group of senators introduced the Immigration Innovation, or I-Squared, Act of 2013. This act would increase the number of work visas available for people in science, technology, engineering and math fields and for students graduating with advanced STEM degrees. Additionally, a portion of the fees collected from work visa applications would fund federal STEM education programs. The changes to the visa system and fee structure would allow us to fill many of the vacant high-tech positions around the nation, thereby boosting productivity and economic growth while paying for improvements to the American STEM education system. As John Doerr of the venture capital firm Kleiner Perkins Caufield & Byers said in a statement to TechNet, "The positive impact that immigrant entrepreneurs and engineers have had on our economy is profound. They establish one-quarter of U.S. technology startup companies and the jobs that come with this growth. They are critical for U.S. competitiveness in the global economy."

American Society for Biochemistry and Molecular Biology President Jeremy Berg agreed, saying, "Efforts to reform immigration like the Immigration Innovation Act are essential to keeping America a global leader for innovation, which benefits the U.S. through ensuring a strong, healthy economy and a strong, healthy populace." The ASBMB supports the I-Squared Act, which mirrors many of the president's proposed immigration changes. Giving the best and brightest in every field the opportunity to stay and work in the U.S. as opposed to returning to their home countries to compete against us is essential for thriving in a global economy.

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

Do you have a story from your lab that highlights the need for immigration reform?
We want to hear it!

Send your anecdotes to publicaffairs@asbmb.org.

National Academy of Sciences honors three ASBMB members for major contributions


GORDON


ORKIN


SNYDER

The National Academy of Sciences announced awards for 18 researchers earlier this year; three of those honored are members of the American Society for Biochemistry and Molecular Biology.

Jeffrey I. Gordon of the Center for Genome Sciences and Systems Biology at Washington University in St. Louis won the Selman A. Waksman Award in Microbiology for his pioneering studies characterizing the human gut microbiome and the genomic and metabolic foundations of its impact on health and disease. The $5,000 award, given every two years, is funded by the Foundation for Microbiology.

Stuart H. Orkin of Harvard Medical School and the Dana Farber Cancer Institute won the Jessie Stevenson Kovalenko Medal for his pioneering work determining the molecular bases of blood disorders and their molecular mechanisms, work that has yielded strategies for new therapies for hematologic diseases. The award consists of a $25,000 prize and a medal.

Solomon H. Snyder of the Johns Hopkins University School of Medicine won the NAS Award in the Neurosciences for his groundbreaking work on opiate receptors and various other contributions to our library of knowledge about neurotransmitter-receptor interactions. The neuroscience award, issued only every three years, is worth $25,000.

All 18 recipients of awards will be honored during the NAS annual meeting April 28.

Berg to lead new personalized medicine institute


BERG

ASBMB President Jeremy Berg was named the founding director of the University of Pittsburgh's Institute for Personalized Medicine. In a statement, Arthur S. Levine, senior vice chancellor for the health sciences, called the institute "one of our most far-reaching basic and clinically applicable research efforts," adding that Berg's leadership "will undoubtedly make the most of our strengths in identifying individual factors that influence disease and tailoring care." Berg, the associate senior vice chancellor for science strategy and planning in the health sciences and a professor in the computational and systems biology department, said that though we are armed with many powerful tools that can help us understand disease susceptibility and treatment response, "our challenge is to integrate the tremendous complexity revealed by these tools to improve human health." Berg continued: "We are in the early stages of one of the most important journeys in modern medicine."

Messing joins UT–Austin as vice provost


MESSING

Robert O. Messing in January joined The University of Texas at Austin as vice provost for biomedical sciences to help develop the new Dell School of Medicine. Messing, who spent more than two decades on the faculty of the University of California, San Francisco, and more than half of that time as an administrator at the Ernest Gallo Clinic and Research Center, will serve as a co-chair of the steering committee for the medical school. Messing "brings considerable expertise in building consensus across scientific disciplines," said UT-Austin Provost and Executive Vice President Steven Leslie. "These are strengths we will need as we build synergies across our existing schools and colleges to create a medical school of the first class that addresses the health care needs of the 21st century." Messing, a neurologist and neuroscientist, also will have an appointment at the university's College of Pharmacy and serve as associate director of the Waggoner Center for Alcohol and Addiction Research.

New members of the National Academy of Inventors

The National Academy of Inventors earlier this year granted 101 innovators NAI Charter Fellow status. Nine ASBMB members were among those inducted by U.S. Commissioner for Patents Margaret A. Focarino during the academy's annual meeting in Tampa:

- Roger J. Davis, University of Massachusetts Medical School
- Sandra J. F. Degen, University of Cincinnati
- Hector F. DeLuca, University of Wisconsin–Madison
- Leroy E. Hood, Institute for Systems Biology
- John J. Kopchick, Ohio University
- Robert S. Langer, Massachusetts Institute of Technology
- Virginia M.-Y. Lee, University of Pennsylvania
- Solomon H. Snyder, Johns Hopkins University
- Herbert Weissbach, Florida Atlantic University

Please submit member-related news and accolades to asbmbtoday@asbmb.org.

Retrospective

Kuan-Teh Jeang, 1958 – 2013

BY BEN BERKHOUT

Our loyal friend, Kuan-Teh Jeang, "Teh" for friends and colleagues, passed away unexpectedly at the age of 54 on the evening of Jan. 27. Great shock and sorrow were apparent in the avalanche of email messages from the very many international colleagues with whom Teh interacted over the years. Many of us came to know Teh as an energetic and gifted scientist for whom we had much respect and affection.

Teh was born in 1958 in Taichung, Taiwan, and had two older brothers. Teh spent his childhood in Libya and came to the U.S. in 1970. At age 16, he went to college at the Massachusetts Institute of Technology and, after just two years, started medical school at Johns Hopkins University, receiving both an M.D. and a Ph.D. by age 25. His Ph.D. thesis was on the regulation of gene expression in cytomegalovirus with Gary S. Hayward as his adviser. At Hopkins, Teh met his wife, Diane, a graduate student in the same laboratory. They married in 1984 in Iowa, where Teh completed his medical internship. The next year, Teh started his postdoctoral work at the National Institutes of Health in the laboratory of George Khoury at the National Cancer Institute. Khoury died much too early at the age of 43 in 1987, but he was Teh's role model and greatly influenced him in his professional life. In recognition of his scientific achievements, Teh recently was selected to deliver the 2012 George Khoury Lecture at the NIH on cellular transformation by the human T-cell leukemia virus, or HTLV-I.

Teh worked at the NIH in Bethesda for 27 years, exactly half of his life, and at the time of his death was chief of the Molecular Virology Section in the Laboratory of Molecular Microbiology. His major research interest was the human immunodeficiency virus and HTLV-I, with an abundant production of more than 300 scientific publications on the molecular details of virus replication and the disease-causing mechanisms. Teh was a true experimentalist with an interest in the implementation of new technologies to get to the next level of understanding of the biology of human pathogenic viruses. He stopped bench work in 2004 only to serve as editor-in-chief of the journal Retrovirology.

HTLV-1 is linked to the development of adult T-cell leukemia and a variety of inflammatory manifestations, including HTLV-1-associated myelopathy. Teh was the first to show that HTLV-1 transcription is regulated through the cAMP signaling pathway, implicating roles for CREB and CBP before these proteins were identified clearly and cloned. His research team also contributed to our understanding of how the viral Tax oncoprotein activates the pro-inflammatory factor NF-κB. More recently, he proposed a role for deubiquitinases in the

Teh was the first to show that HTLV-1 transcription is regulated through the cAMP signaling pathway, implicating roles for CREB and CBP before these proteins were identified clearly and cloned

regulation of TRAF6-mediated NF-κB signaling.

Teh's work also has advanced our understanding of genetic damage in virus–cellular transformation. In 1990, he first reported that the HTLV-1 Tax oncoprotein repressed DNA repair. Thereafter, he characterized the important roles of dysregulated mitotic checkpoint and AKT activation in cellular transformation. His work contributed to the elucidation of the role played by the spindle assembly checkpoint in oncogenesis, helping to explain how the loss of multiple checkpoints alters cancer tropism in vivo.

Teh had a longstanding interest in understanding the viral and cellular factors that govern HIV-1 gene expression in infected human cells. In the late 1980s, his lab showed that HIV-1 uses an unprecedented mechanism of transcription that is dictated by an RNA-binding protein, Tat, which binds a nascent viral RNA target, TAR, the first RNA enhancer element described. Subsequently, his group characterized cellular RNA-binding proteins that regulate HIV-1 replication, including the TAR RNA-binding protein, or TRBP, that later became known as an important factor of the cellular RNA interference machinery.

His lab recently completed a genomewide screening for human cell factors needed for HIV-1 replication. Using novel technology, Teh extended his interests in RNA biology through the identification of small RNAs (i.e., siRNAs and miRNAs) that have biologically important roles in viral infection, cellular metabolism and virus-induced pathogenesis.

Despite all these accomplishments, one could argue that Teh's biggest contribution to science probably lies in his role as mentor for young scientists. Teh trained 37 international postdoctoral fellows, and seven more are in his group at the NIH today. He was a fantastic mentor of young scientists who have since spread across the globe. Many flew into Washington to attend the funeral ceremony Feb. 9. Teh was attentive, supportive and gentle but at the same time demanding of his postdocs. Importantly, he positioned himself as an unselfish role model for them, working essentially 12-hour days, seven days a week. During the evening and night, one never had to wait long for reply emails. His mentoring commitment also was reflected in his many professional and society services. For instance, Teh was a standing member of the AIDS Molecular and Cellular Biology Study Section, where he had a reputation for being strongly supportive of new investigators.

Teh always had a special interest in the area of scientific publication. For instance, in 1994 he joined the editorial board of the Journal of Biomedical Science of the National Science Council of his native Taiwan. He was an avid advocate for ways to improve the journal's impact factor. He left the journal in 2004 for an important new activity: the launch of the journal Retrovirology, which he co-founded. Since the early years, he had been an advocate of the open-access publishing format. His talent to kick off new initiatives paid off, and Retrovirology, in less than 10 years, became among the most-cited journals in the field. In addition, he served on the editorial boards of numerous journals, including the Journal of Virology and the Journal of Biological Chemistry.

Teh was a scientist with a vision and a broad interest in all aspects of scientific endeavors. He also was a true scientific leader, starting scientific debate, writing editorials, sitting on many committees, orchestrating new book volumes and organizing international meetings on diverse topics. He was president of the Society of Chinese Bioscientists in America in 2010 and voiced strong support for increasing the representation of Asian-American scientists in leadership positions.

He was the recipient of an extraordinary number of awards, most recently the International Retrovirology Association's Dale McFarlin Award in 2011, Biomed Central's Open Access Editor of the Year award in 2010 and the John's Hopkins University Woodrow Wilson Award in 2009. Teh was elected to prestigious societies, including Academia Sinica in Taiwan.

Teh had an infectious enthusiasm and winner's mentality both at work and at play. He was a skilled tennis player and chess player, a gifted writer and a great debater with strong opinions on nearly all subjects of science and life in general. Additionally, he had a passion for current events and a love of travel, movies, food and music.

Teh's death is a blow to the retrovirus research community, and we sorely will miss his scientific leadership. He has been central to much of what we have done together as well as being a supportive and generous friend to many of us individually. Teh's life was much too short, but his legacy and our memories of him will last forever. Our hearts and condolences are with his wife, Diane, and his three children, David, 23, Diana, 20, and John, 15.

Ben Berkhout (b.berkhout@amc.uva.nl) is a professor at the University of Amsterdam. He worked as visiting research associate in the Jeang lab from 1988 to 1990. Since then, he and Jeang worked together in various capacities, including the launch of the Retrovirology journal.

Now accepting nominations for the 2014 awards!

Deadline: **June 3** • *Visit:* **www.asbmb.org/awards/2014/**

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HERBERT TABOR RESEARCH AWARD

Hartl, Horwich share Tabor Research Award for work with chaperone proteins

BY SARAH GOODWIN

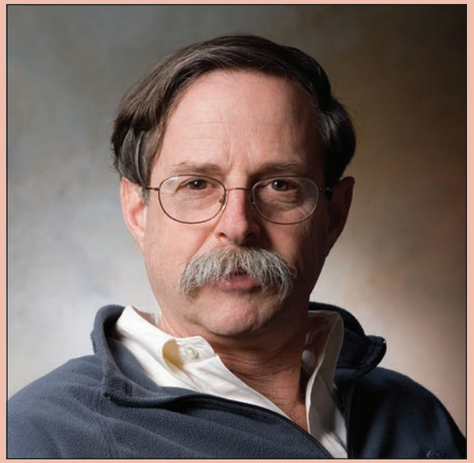
F. Ulrich Hartl of the Max Planck Institute for Biochemistry and Arthur Horwich of the Yale School of Medicine have won the American Society for Biochemistry and Molecular Biology's Herbert Tabor Research Award for pioneering work in the field of protein folding.

This award is given for excellence in biological chemistry and molecular biology research in honor of the many contributions of Tabor to both the ASBMB and the Journal of Biological Chemistry, for which he served as editor for more than four decades.

Hartl and Horwich identified and characterized a group of proteins known as chaperones, which are molecular machines that aid the process of protein folding. "These machines and their mechanics were illuminated primarily through the pioneering work by the Hartl and Horwich laboratories," Alexander Varshavsky explained in nominating the pair for the award. "Their contributions are numerous, crucial and profoundly complementary. Moreover, some of their most important early discoveries stemmed from their direct collaboration."

The discovery of chaperone-assisted protein folding began while Horwich was a young independent investigator at Yale University studying the machinery that imports proteins, which are imported in an unfolded state, into the mitochondria. Horwich identified a mutant where a target protein was imported properly but remained unfolded. Horwich teamed up with Hartl, an expert in mitochondrial import biochemistry who was then at the University of Munich, and they determined that the mutant lacked a protein called Hsp60. Together, they demonstrated that Hsp60 was a multisubunit 14-mer molecular machine that aided the process of protein folding in an ATP-dependent manner. They later jointly determined that Hsp60 also prevents protein aggregation by binding pre-existing proteins that are unfolded due to stress.

Although Hartl and Horwich continued to investigate the chaperones independently, their laboratories, using different but complementary methodologies, uncovered the reaction cycle for the Hsp60 homolog in prokaryotes, GroEL-GroES. Using biochemical and structural studies, they determined that the unfolded polypeptide first binds



"We are deeply honored to receive this award named after Herbert Tabor, a scientist and colleague we so highly respect. It is wonderful that our work on chaperone-assisted protein folding is recognized by the large community of biochemists and molecular biologists represented by ASBMB."

– F. ULRICH HARTL AND ARTHUR HORWICH

to GroEL and then undergoes a complex reaction. First, the GroES subunit displaces the unfolded polypeptide from its initial GroEL binding sites, which sequesters the unfolded polypeptide in a central cavity in GroEL. Here, the protein remains encapsulated and free to fold, unimpaired by aggregation. ATP hydrolysis in the folding-active ring followed by ATP binding to the opposite ring of GroEL then induces release of both GroES and the polypeptide. Substrate that has not yet folded to completion rebinds to GroEL for another folding attempt.

It is now understood that there are two classes of chaperones, the Hsp70/DnaK family and the Hsp60/GroES–GroEL family (also known as chaperonins).

Hartl and his team found that protein folding utilizes both classes of chaperones. For example, in bacteria DnaK stabilizes unfolded polypeptides, promotes the folding of some and transfers others to GroEL. Hartl researched the types of unfolded polypeptides that interact with GroEL and found that they often have complex α/β domain topologies, such as the TIM barrel fold. Additionally, in eukaryotes, proteins with multiple domains benefited from sequential and co-translational folding by Hsp70 and other chaperones, including the eukaryotic homolog of GroEL. Hartl also has studied how the Hsp70 family of proteins prevents the aggregation of proteins, specifically the toxic polyglutamine protein aggregates that are the hallmarks of neurodegenerative disease.

Horwich, in collaboration with the late Paul Sigler, determined the crystal structures of GroEL and the GroEL–GroES complex. They found that GroEL consists of three domains, a large equatorial domain that contains the ATP-binding pocket, an apical domain that forms the opening of the central GroEL channel and is thought to bind unfolded proteins and GroES, and an intermediate domain that connects the equatorial and apical domains. These structural studies, in addition to helping to elucidate the chaperone reaction cycle described above, revealed the major conformational changes that accompany chaperone-mediated protein folding.

"Owing to the work by these nominees, the previously obscure process of protein-assisted protein folding — its complexity was underestimated by early researchers — is now one of the most beautiful and important chapters of the contemporary molecular biology," Varshavsky said.

Both of the winners have received multiple awards for their work. They shared the 2011 Albert Lasker Basic Medical Research Award, the Shaw Prize in Life Science and Medicine in 2012, the Louisa Gross Horwitz Prize for Biology or Biochemistry in 2008, and the Lewis S. Rosenstiel Award for Distinguished Work in Basic Medical Science and the Wiley Prize in Biomedical Science, both in 2007. Horwich, a Howard Hughes Medical Institute investigator, has been a member of the National Academy of Sciences since 2003. In 2011, Hartl was elected into the academy as a foreign associate.

Hartl and Horwich will receive their award during the Experimental Biology 2013 conference in Boston, where they will deliver award lectures. The presentation will take place at 6 p.m. April 20 in the Boston Convention and Exposition Center.

Sarah Goodwin (sgoodwin@alumni.middlebury.edu) is director of the iBioSeminars project (ibioseminars.org).

RUTH KIRSCHSTEIN DIVERSITY IN SCIENCE AWARD

Blumberg wins diversity award for work with the hearing impaired

BY ANNA SHIPMAN

The American Society for Biochemistry and Molecular Biology has named Peter M. Blumberg of the National Institutes of Health the winner of the 2013 Ruth Kirschstein Diversity in Science Award. The award recognizes outstanding scientists who show a strong commitment to mentoring and encouraging underrepresented minorities to enter the sciences. Blumberg has earned this award by reaching out to the deaf community and recruiting deaf students into his lab to train them for scientific careers.

Blumberg noticed that at scientific meetings there was an absence of interpreters for the hearing impaired and decided there should be a change to promote the inclusion of this underrepresented group in the sciences. He taught himself American Sign Language and recruited deaf and hearing-impaired students from Gallaudet University, the only four-year college in the world focused on deaf education, for research positions in his lab.

Blumberg also arranges for interpreters to be present at all events his students attend and collaborates with Derek Braun, who did a postdoctoral fellowship in his lab and now has his own lab at Gallaudet. Within his own lab, Blumberg encourages students who are not hearing impaired to learn ASL and other ways to communicate with deaf and hearing-impaired lab members to facilitate a nurturing learning environment for everyone.

"The disabled are the minority that includes all of us, regardless of our race or ethnic group. But, ironically, it is the group that defines no one, because each of us, regardless of label, brings a mixture of strengths and weaknesses. It is only the team of individuals that may be strong everywhere."

– PETER M. BLUMBERG

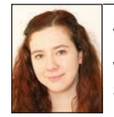
Q. Jane Wang, a former research associate, says of Blumberg, "He is not only a world-renowned leading scientist in the field of diacylglycerol/protein kinase C signaling but also an exceptional mentor that has taught and encouraged many underrepresented minorities to enter the scientific enterprise and pursue a successful career in science."

Blumberg has mentored 15 deaf and hearing-impaired students and has assisted in the publication of 54 papers by hearing-impaired scientists.

"Dr. Blumberg's work with deaf scientists and their outstanding achievements have produced crucial role models for the deaf community and have shown them and the hearing world that the deaf can go far beyond what is typically imagined," says Stuart H. Yuspa, chief of the Laboratory of Cancer Biology and Genetics at the National Cancer Institute.

Blumberg received his Ph.D. from Harvard University in 1974. He took a postdoctoral fellowship in the laboratory of Phillip W. Robbins at the Massachusetts Institute of Technology in 1974 and in 1975 joined Harvard Medical School as an assistant professor. In 1981, he became chief of the Molecular Mechanisms of Tumor Progression section of the Laboratory of Cancer Biology and Genetics at the NIH, where he has remained since.

Blumberg will receive his award during the Experimental Biology 2013 conference in Boston, where he will deliver an award lecture. The presentation will take place at 9:05 a.m. April 21 in the Boston Convention Center.



Anna Shipman (alsnpc@mail.umkc.edu) received her B.S. in biology and biotechnology from Missouri Western State University and is a Ph.D. student in the School of Biological Sciences at the University of Missouri–Kansas City.

AVANTI AWARD IN LIPIDS

Henry wins the Avanti award for use of yeast genetics in lipid research

BY ANNA SHIPMAN

The American Society for Biochemistry and Molecular Biology has named Susan A. Henry, professor and dean emerita at Cornell University, winner of the 2013 Avanti Award in Lipids. Henry is being recognized for her contributions outlining the genetics of control of phospholipid metabolism in yeast.

Henry's work with lipids combines genetic and biochemical approaches. "Dr. Henry has been among the pioneers of applying genetic approaches to the study of lipid metabolism using yeast as the model of choice. This has turned out to be a very powerful and enabling approach that allowed important discoveries in the study of lipid metabolism, regulation and function," says Yusuf A. Hannun, director of the Stony Brook Cancer Center and a past recipient of the award.

Henry's lab was the first to show that inositol, an essential precursor of phosphatidylinositol, plays a key role in regulation of phospholipid metabolism in yeast by identifying inositol-requiring mutant strains of yeast defective for INO1, a structural gene encoding inositol 3-phosphate synthase, and INO2 and INO4, regulatory genes that control phospholipid synthesis.

Identification of overproduction of inositol, or Opi$^-$, mutants led to the identification of the OPI1 gene, encoding the repressor of phospholipid biosynthetic genes and the OPI3 gene encoding a phospholipid-N-methyltransferase, involved in phosphatidylcholine biosynthesis. This work led to the understanding that expression of nearly all phospholipid biosynthesis enzymes is regulated by inositol and that this regulation also requires ongoing phosphatidylcholine synthesis. More recent work from the lab has shown there is a link between inositol-containing sphingolipid synthesis and protein kinase C activation in response to low inositol levels.

Michael R. Culbertson of the University of Wisconsin–Madison, Henry's first graduate student, says, "Because she has brought fresh thinking to the field of lipid research and because she has very likely influenced others to expand their way of thinking about this field, I believe Susan's work is worthy of recognition."

Henry received her Ph.D. in 1971 from the University of California, Berkeley. She did a postdoctoral fellowship sponsored by H. O. Halvorson at the Rosenstiel Basic Medical Sciences Research Center at Brandeis University and then took a position at Albert Einstein College of Medicine in 1978. In 1987, Henry moved to Carnegie Mellon University, where she served as a professor, head of the department of biological sciences from 1987 to 1991, and dean of the Mellon College of Science from 1991 to 2000. In 2000, she moved to Cornell University, where she is a professor of molecular biology and genetics and has served as dean for the College of Agriculture and Life Sciences. Henry's work has been supported continuously by the National Institutes of Health, and she has been a recipient of the NIH MERIT award.

Henry will receive her award during the Experimental Biology 2013 conference in Boston, where she will deliver an award lecture. The presentation will take place at 8:30 a.m. April 21 in the Boston Convention Center.

Anna Shipman (alsnpc@mail.umkc.edu) received her B.S. in biology and biotechnology from Missouri Western State University and is a Ph.D. student in the School of Biological Sciences at the University of Missouri–Kansas City.

"I am deeply honored to receive to receive the Avanti Award, which has become the most significant award in lipid research due to the significant achievements and contributions of past awardees as well as the fact that it is supported by Avanti Polar Lipids, an organization whose quality products have enabled outstanding research in this field."

– SUSAN A. HENRY

FRITZ LIPMANN LECTURESHIP AWARD

Renowned researcher Uhlenbeck honored for work on RNA biochemistry

BY MARK STEWART

The American Society for Biochemistry and Molecular Biology has awarded Olke Uhlenbeck, an emeritus professor at Northwestern University, the Fritz Lipmann Lectureship. Awarded every two years, this lectureship recognizes investigators who contribute to the conceptual advancements of biochemistry, bioenergetics and molecular biology.

Uhlenbeck has made pivotal contributions to our understanding of RNA biochemistry. He began to define the energetics of RNA secondary structure formation as a postdoc with Nacho Tinoco at the University of California, Berkeley. His recognition that one could systematically study the effects of sequence on duplex stability led, ultimately, to "nearest neighbor" rules. This allows researchers across biology to accurately predict the stability of a given RNA duplex. Uhlenbeck further recognized that the major limitation in understanding RNA was technical — the ability to make and manipulate these molecules. In subsequent work, over the next decades, Uhlenbeck continued to innovate, providing simple and powerful solutions to these problems, solutions that were adopted by virtually every lab studying RNA. At the same time, he carried out seminal work in ribozyme catalysis and tRNA function, culminating in ground-breaking work revealing an unexpected interplay between the amino acid portion of amino-acyl tRNAs and the ribosome during protein synthesis.

OLKE UHLENBECK

In a joint nomination, Daniel Herschlag of Stanford University and Rachel Green of the Johns Hopkins University School of Medicine lauded Uhlenbeck and said that many consider him "the father of RNA."

"Olke is a rare scientist who is equally excited about the results of others as he is about his own," wrote Herschlag and Green in their nomination letter. "He has a remarkable perspective on the scientific enterprise."

Herschlag notes that "Olke is a person you call when you have a new exciting result — to both have someone to share that enthusiasm and to find out if someone else already found that out and you missed it. The number of phone calls that Olke would get from prominent scientists — at least in the days before email — must must have been remarkable."

After completing his undergraduate studies at the University of Michigan at Ann Arbor, Uhlenbeck pursued a Ph.D. in biophysics at Harvard University in the laboratory of Paul Doty.

Thereafter, he joined the faculties of the University of Illinois in 1971 and the University of Colorado in 1986. Currently, he is the Board of Trustees professor of chemistry and molecular biosciences at Northwestern University and a member of the National Academy of Sciences.

The Fritz Lipmann Lectureship provides a plaque, a $3,000 prize, and transportation and expenses to the Experimental Biology 2013 conference in Boston to present a lecture. The lecture will take place at 2:55 p.m. April 23 at the Boston Convention Center.

Mark Stewart (mdstew@uab.edu) is a Ph.D. student in the University of Alabama at Birmingham's cancer biology program and works in the pathology department.

ASBMB–MERCK AWARD

Malhotra recognized for work with Golgi, membrane trafficking

BY LAUREN AMABLE

Vivek Malhotra, chairman of the cell and developmental biology program at the Centre for Genomic Regulation in Barcelona, has been named the winner of the 2013 American Society for Biochemistry and Molecular Biology–Merck Award for his studies in understanding the mechanisms and machinery of membrane trafficking and Golgi function and biogenesis.

Malhotra began his research as a postdoctoral fellow in the lab of James Rothman, where he provided insight into the NSF protein in vesicle fusion and isolated the famous COPI-coated vesicles. In his nomination letter for Malhotra, Rothman said, "Malhotra is a very prominent senior cell biologist whose many contributions stand out not only in their substance but also because they are characterized by bold imagination and the development of new concepts."

For the next 18 years, Malhotra was a professor at the University of California, San Diego. There he contributed numerous discoveries to the field. He identified a natural product from sponges called ilimaquinone, or IQ, which triggers the disruption of Golgi organization. These discoveries led to the establishment of the involvement of

VIVEK MALHOTRA

heterotrimeric G proteins, protein kinase D and diacylglycerol in vesicle formation and cell-surface transportation.

Malhotra's research addressed the controversy of Golgi membrane fate during mitosis and identified a new cell-cycle checkpoint. He demonstrated that fragmentation of Golgi membranes is required for mitosis entry. The fragmented Golgi membranes then serve as templates for the formation of Golgi stacks in daughter cells.

Finally, Malhotra identified novel components in secretion after performing a genomewide screen in Drosophila. From that, he discovered a set of components necessary for Golgi structure and function. These novel genes were labeled transport and Golgi complex organization genes, or TANGOs. Aiding to the understanding of trafficking, Malhotra and colleagues recently reported unconventional protein secretion that bypasses the Golgi. This mode of secretion is mediated by autophagosome-like vesicles forming compartments called CUPS, for compartment for unconventional protein secretion.

Ari Helenius of the Institute of Biochemistry at the Swiss Federal Institute of Technology in Zurich, in his letter of support for Malhotra's nomination, called him "an undisputed conceptual leader in the field of membrane transport." Helenius continued: "In addition, he has been a pioneer in introducing new methodologies and experimental approaches."

Malhotra will receive his award during the 2013 Experimental Biology conference in Boston, where he will deliver an award lecture. The presentation will take place at 9:05 a.m. April 22 at the Boston Convention and Exposition Center.

The ASBMB–Merck Award recognizes scientists with outstanding contributions to biochemistry and molecular biology research. It provides a plaque and $5,000 and covers transportation and expenses to attend the ASBMB annual meeting to present a lecture.

Lauren Amable (lauren.amable@nih.gov) is a staff scientist at the National Institute on Minority Health and Health Disparities.

WILLIAM C. ROSE AWARD

Dikic honored for his 'unselfish commitment to training and to the advancement of the scientific community'

BY MARK STEWART

Ivan Dikic, professor and chairman of the Institute of Biochemistry II at Goethe University, is the winner of the American Society for Biochemistry and Molecular Biology's William C. Rose Award this year.

This award seeks to recognize individuals who have made significant contributions to our scientific understanding of biochemical and molecular biology and who have demonstrated a commitment to the training of young researchers.

"Ivan revolutionized our understanding of protein modification by ubiquitination," writes John D. Scott of the University of Washington, who nominated Dikic for this award. "Ivan's original work unequivocally defined the molecular basis of ubiquitin decoding. He has earned the highest regards from colleagues."

Dikic is being honored for his seminal work in decrypting the ubiquitin code and his energetic training and education of young scientists. Dikic's work demonstrates that modifications of proteins by ubiquitin or ubiquitinlike proteins regulate their activities in many different types of signaling pathways. This has led to a greater understanding of complex diseases, such as cancer and autoimmune diseases.

Dikic also initiated and organized the Dubrovnik Conference on Molecular Signaling, which has allowed students and researchers to interact with eminent scientists from around the world.

In his nomination letter, Mark A. Lemmon of the University of Pennsylvania School of Medicine said that Dikic possesses an "active and unselfish commitment to training and to the advancement of the scientific community."

Dikic earned his medical degree from the University of Zagreb Medical School. He later earned a Ph.D. in molecular biology at the New York University School of Medicine under the supervision of Joseph Schlessinger. After conducting two years of postdoctoral work at New York University, he began work at the Ludwig Institute for Cancer Research in Uppsala, Sweden. Today, he holds professorships at Goethe University and at the School of Medicine in the University of Split, located in his home country of Croatia.

"It is a great honor and a personal joy to be a recipient of the ASBMB award that carries the name of one of the most accomplished biochemists and educators, William C. Rose. For me, the curiosity to discover and the passion to educate go hand in hand in furthering our understanding and inspiring future generations. I wish to share these feelings with students and colleagues in Boston."

– IVAN DIKIC

The award consists of a plaque, a $3,000 prize and transportation to the Experimental Biology 2013 conference in Boston to present a lecture.

Dikic will present his lecture at the Experimental Biology 2013 conference in Boston at 2:55 p.m. April 21.

Mark Stewart (mdstew@uab.edu) is a Ph.D. student in the University of Alabama at Birmingham's cancer biology program and works in the pathology department.

EARL AND THRESSA STADTMAN DISTINGUISHED SCIENTIST AWARD

Kobilka lauded for Nobel-winning studies of GPCRs

BY HEATHER DORAN

Nobel laureate Brian Kobilka, professor and chairman of the molecular and cellular physiology department at Stanford University School of Medicine, won the 2013 Earl and Thressa Stadtman Distinguished Scientist Award from the American Society for Biochemistry and Molecular Biology.

Kobilka's work has been a pivotal in the discovery and understanding of G-protein–coupled receptor structures and functions. GPCRs are the largest family of proteins in the human genome and important drug targets — with about 40 percent of all medications targeting these types of receptors. However, their three-dimensional structure and conformation is notoriously difficult to uncover and study due to their large size, high complexity and instability. Kobilka's original and creative approaches have allowed him to overcome many technical challenges that previously have obstructed progress in this area of science, and his work has revolutionized the study of GPCRs at the atomic level.

Kobilka was nominated for the Stadtman award by his Nobel Prize-winning partner Robert J. Lefkowitz at the Duke University Medical Center.

Lefkowitz said of Kobilka, "The talents that allowed Brian to achieve his recent successes in crystallizing GPCRs as well as the β2-adrenergic receptor-Gs complex were already apparent in the earliest stages of his career

"It's a great honor to be the second recipient of the ASBMB Stadtman Award."

– BRIAN KOBILKA

in my lab almost 30 years ago. These include remarkable technical creativity applied to seemingly intractable problems, persistence in the face of failure and a seemingly unlimited tolerance for risk in the projects that he undertakes."

Kobilka's lab at Stanford has developed spectroscopic methods that allow the study of GPCR structure and the changes in the receptor that occur when a ligand binds in real time. Through wide collaboration with a large, diverse group of scientists from across the globe, Kobilka has driven the field forward. In his letter of support for Kobilka's nomination for the award, Martin Caffrey from Trinity College Dublin described one of Kobilka's achievements as the "holy grail of GPCR science": the structure of the activated β2-adrenergic receptor in complex with its G protein. Kobilka has identified the structure of several other GPCRs as well.

Originally from Little Falls, Minn., Kobilka studied biology and chemistry at the University of Minnesota, Duluth, before training in medicine at the Yale University School of Medicine. After completing his residency at Barnes Hospital, Washington University School of Medicine, Kobilka joined Lefkowitz's lab there for a postdoctoral project. It was there that their collaboration and Kobilka's first work on GPCR structure began. In 1990, Kobilka moved to the Stanford University School of Medicine as an assistant professor, and he has remained there. Kobilka has continued to collaborate with Lefkowitz and has developed partnerships and strong working relationships with a number of other researchers across the world.

The Earl and Thressa Stadtman Scholar Award was established by the Stadtmans' friends and colleagues to preserve their legacies as scientists and mentors. It is awarded to a scientist with 10 years or less of post-postdoctoral experience, including medical residency and fellowship.

Kobilka will receive his award during the Experimental Biology 2013 conference in Boston, where he will deliver an award lecture. The presentation will take place at 9:05 a.m. April 23 in the Boston Convention Center.

Heather Doran (heather.doran@dunelm.org.uk) is a Ph.D. student in molecular pharmacology and a project officer for the University of Aberdeen Public Engagement with Research Unit. She is also a blogger at http://sciencehastheanswer.blogspot.com.

New award established in memory of Bert and N. Kuggie Vallee

BY ANGELA HOPP

The American Society for Biochemistry and Molecular Biology is now accepting nominations for a new annual award: the Bert and N. Kuggie Vallee Award in Biomedical Science.

The $10,000 award, which will recognize outstanding accomplishments in basic biomedical research, is supported by the Vallee Foundation, established in 1996 by biochemist Bert Vallee and his wife, Natalie, who was better known as Kuggie.

The late Bert Vallee was born in Germany and immigrated to the U.S. in 1938. He studied primarily zinc enzymology and was known by many in the scientific community as the father of metallobiochemistry, but his research interests were broad, and the technologies he developed affected many areas of study.

"Vallee and I shared a common passion, our favorite element, zinc. He was one of the fathers of zinc biochemistry, having discovered the second known zinc enzyme," says Jeremy Berg, president of the ASBMB. "Vallee and his co-workers developed many of the techniques used to this day to characterize zinc proteins. I greatly admired the interdisciplinary approach he took, well before it was fashionable."

Vallee's work garnered him many awards, including the ASBMB's William C. Rose Award in 1980, and honorary degrees from institutions across the globe. When he died at age 90 in May 2010, Vallee held the Paul C. Cabot professorship of biological chemistry at Harvard Medical School.

"Bert was an outstanding biochemist. He was also a very generous person — very helpful to many people," says Gordon Hammes, vice president and secretary of the Vallee Foundation and professor emeritus at Duke University. "He was all about basic research in the biomedical sciences and trying to eventually apply this to clinical situations. He had a number of patents, and he was particularly interested in alcoholism and, later, angiogenesis."

The Vallee Foundation is perhaps best known for its visiting professorship program, which allows senior scientists to spend four weeks in other labs. "Bert was very interested in promoting interdisciplinary research throughout the world," Hammes says. "If you look at the list of people who've benefitted from the foundation, they're from all over the world."

Dozens of researchers, about a third of them ASBMB members, have won Vallee professorships.

"First there was a restricted number of labs (the winners could visit) because Bert wanted a lot of them to come to Harvard so he could interact with them!" Hammes says. "But gradually it expanded, and basically it's now any good lab they want to visit. It's a great program."

Hammes, who was friends with Vallee for some 50-odd years and who is now retired and living in Florida, knows firsthand what a gift the Vallee professorships can be. After several successful decades at the bench, he closed his lab and served for 12 years as a university administrator, primarily as vice-chancellor for academic affairs at the Duke University Medical Center. "When I wanted to quit that job and go back into research, Bert offered me one of those fellowships. So I came to Harvard and started research in an entirely new field," he recalls.

Kuggie Vallee also was a strong supporter of science, Hammes says. The Pennsylvania native taught biology at Lesley College in Cambridge, Mass., for 27 years. She then took an appointment at Harvard University, where she remained until her retirement in 2002. She died in November 2011.

While the traditional Vallee professorships are geared toward senior scientists, the award to be issued by the ASBMB has few requirements. The Vallees "were dedicated to science and to helping the people who do it," Hammes says. "All the board wants is someone who is really outstanding, carrying out basic research in the biomedical sciences, from anywhere and of any age."

Hammes says the foundation chose the ASBMB to administer the award because it has a solid track record of selecting exceptional award recipients. He notes that the foundation also is developing programs for young investigators. For more information about its various initiatives, visit www.thevalleefoundation.org.

Angela Hopp (ahopp@asbmb.org) is editor of ASBMB Today.

BERT AND N. KUGGIE VALLEE

Meet Santa J. Ono

BY WEIYI ZHAO

Santa Jeremy Ono became president of the University of Cincinnati in late October after previously serving as interim president, as senior vice president for academic affairs and as provost. He's a professor of pediatrics at the College of Medicine and a research faculty member at Cincinnati Children's Hospital Medical Center. Before arriving at UC, Ono was part of the administration at Emory University and a faculty member at Emory's medical school. Ono has served on the editorial board of the Journal of Biological Chemistry. In this quick Q&A with ASBMB's education and professional development manager, Weiyi Zhao, Ono talks about his career path and the inspiration for it.

Tell us about your current career position.

After two years of serving as the provost of the University of Cincinnati, I was selected to serve as UC's 28th president. As the university's chief executive, I head a top-25 public research university that enrolls approximately 42,000 students and employs about 10,000 faculty and staff members. UC has a budget of $1 billion, is completing a $1 billion fund-raising campaign and has endowment assets of nearly $1 billion.

What are the key experiences and decisions you made that have helped you reach your current position?

I have served in a variety of academic and administrative positions over the past 21 years that have given me a wide-ranging foundation as a research scientist, a teacher, an administrator and a fund-raiser. My career has taken me to Johns Hopkins University, Harvard (University), University College London and Emory. All along the way, I have drawn energy from my interaction with students, and I remain very focused on students even today.

How did you first become interested in science?

My interest in science began while I was a freshman at Towson High School in Maryland. My high-school science teacher led some experiments that caught my interest. At that time, a revolution was occurring in molecular biology. I read a book about the double helix by James Watson and heard a presentation by Johns Hopkins researcher Donald Coffey, and I was absolutely enthralled by the concept of genes turning on and off during development from two cells to a full-blown person.

Were there times when you failed at something you felt was critical to your path? If so, how did you regroup and get back on track?

Being a scientist, you fail all the time. Not all experiments work the way you think they might. There have been dark moments when progress seemed slow or almost nonexistent. I sometimes wondered if I had what it really takes to be scientist. But I persisted with the support of my family, mentors and friends.

What advice would you give to young people from under-represented backgrounds who want to pursue careers in science similar to yours?

I had wonderful mentors who helped me all along the way, so I would encourage all young people with an interest in science – or any field, for that matter – not to be shy about seeking the advice and guidance of seasoned scholars. Do not think of science as a solitary endeavor that you have to pursue on your own. Like most things in life, you will need the help and support of others.

Do you have any heroes, heroines or role models? If so, describe how they have influenced you.

I have several heroes and role models. One of them is Neil Armstrong, who was a faculty member at UC after he stepped down from NASA. Neil's reluctance to take the spotlight following the historic moon walk is a reminder to us all that most accomplishments are not solo feats. They are the result of team efforts. He also inspired hundreds who came after him to pursue careers in science and technology, and I count myself among them. I also respect and am inspired by the work and courage of Rosalind Franklin, whose X-ray ultimately revealed the structure of DNA and provided the images that James Watson and Frances Crick used to complete their model of DNA. Franklin died of cancer at age 37, not fully knowing the impact that her photograph would have and not sharing in the Nobel Prize that Watson and Crick would share. Her hard work played a pivotal role in our understanding of DNA.

What are your hobbies?

I like music. Although I am not as talented as my brother, who is a concert pianist, I do enjoy playing the cello. I also like to sing and learned more about singing from a student at Emory. I like to attend concerts and musical theater shows. I also am a sports nut. I follow professional and college sports, and I play sports with my daughters in the backyard or at the Cincinnati Sports Center.

What was the last book you read?

"The Language of God: A Scientist Presents Evidence for Belief" by Frances Collins was a book that was meaningful to me because it talks about the reconciliation of one's faith with the empirical nature of science.

Weiyi Zhao (wzhao@asbmb.org) is the ASBMB manager of education and professional development.

ASBMB career symposium in Cincinnati

Network with fellow scientists, learn about traditional and nontraditional career options, and discuss related topics March 19 at the University of Cincinnati. For more information and to register, visit http://www.asbmb.org/careersymposia.aspx.

FROM SIERRA LEONE TO NEW YORK CITY

BY MARTHA LEWIS

The brutalities that I witnessed during my youth in Sierra Leone could have propelled me toward a downward-spiraling path. My homeland was ravaged with violence and inhumane treatment as civil war broke out in 1999. Murder, rape and amputations were among the countless heinous crimes that I witnessed as an 11-year-old; these memories will haunt me forever.

Many families were torn apart. My family was not left unscathed by the violence, as my older sister was among the many girls who were kidnapped. After being raped and left to die, she somehow managed to survive but later developed a cardiac problem due to poor living conditions and unmet physiological needs. Witnessing such atrocity and my sister's suffering, I knew even then that I wanted to become a medical doctor.

Through divine intervention and good fortune, the rest of my family escaped to Guinea and eventually relocated to Germany. The move uprooted me from all that I was accustomed to: Everything was alien to me. I had to face fresh challenges like language and culture, and I knew that in order to succeed in this new place, I had to adjust quickly. Though I was very young, I faced these obstacles squarely, learning the language within six months. Also, to better adapt to the German culture, I pushed myself to join a variety of extracurricular activities, including the basketball team, the track and field team, and the singing club.

After I graduated from high school with high academic standing, I continued nursing my passion to pursue a medical career by enrolling in a medical assistant program as well as interning at a private clinic. Unfortunately, I had to relocate again before I was able to complete the program.

In 2005, I moved to the United States with only $750. I did not know what obstacles and challenges awaited me as I navigated the busiest streets in New York City. Six months later, while staying with one of my elder sisters in the Bronx, I was fortunate to get a job as a waitress and bartender at a restaurant in Brooklyn. Two years later, I worked out my immigration situation and enrolled at a community college, where I obtained an associate's degree as a medical assistant and graduated summa cum laude in 2009.

In 2010, I enrolled at Long Island University to pursue my bachelor's degree in biology and a minor in chemistry. During my junior year, I encountered some difficulties in one of my classes; nonetheless, I worked hard on a daily basis, because success is when a person fails and is able to bounce back up and do it again. My grade point average improved considerably the following year.

At LIU Brooklyn, I have been a member of the Minority Biomedical Research Support/Research Initiative for Scientific Enhancement, which enables me to conduct numerous research projects in various areas of study. The MBRS/RISE program is designed to target minority students who show an interest in biomedical research. My LIU research has been featured on the local television and in publications from New York to Africa.

I am working with my mentor, Dong Kwon, at my home institution. My role in that research project is to examine the effects of polyamines on β-lactam antibiotics in Pseudomonas aeruginosa, a gram-negative, opportunistic bacterium that causes severe nosocomial infections in healthcare settings. This is an ongoing project that will be published early this year, and I will continue experimenting during my senior year.

In addition, under the excellent mentorship of Lisa Shantz at the Penn State Milton S. Hershey Medical Center, I participated for 10 weeks in the 2012 Summer Undergraduate Research Intensive Program. My project entailed investigating the mammalian target of rapamycin, or mTOR, which plays an important role in cell proliferation and survival. Based on previous research, we hypothesized that mTOR is a useful target in the prevention and treatment of nonmelanoma skin cancer. My aim was to test the effects of another drug, called Torin-2. While rapamycin inhibits only mTORC1, Torin-2 can inhibit both mTORC1 and mTORC2. Therefore, I examined the effects of Torin-2, and through extensive research, our lab was able to make significant breakthroughs, which are in the process of being published.

My strong interest in medicine has directed me in eagerly pursuing a combined degree that will enable me to achieve my unshakable goals of practicing medicine and conducting research. The ability of the scientific world to discover and make progress through research experiments that eventually lead to the development of new treatments in vast areas of science has fortified my desire to pursue a career as a physician–scientist.

Though I'm a full-time student, I also have two jobs to support my family in Africa and maintain a decent life here in New York. I am working as a medical assistant and as a restaurant manager. Being a medical assistant at a private clinic and working at a research lab has made me appreciative of both medicine and biomedical research. Conducting office procedures and assisting the doctor as well as interacting with patients and performing research experiments has left within me a deeper desire to pursue the combined degree. I have acquired a deeper understanding of medicine through scientific discovery. Through this academic journey, I've learned that scientific research is bigger than just the lab; it's about making your contribution to the world so that the people of tomorrow can live better lives.

Though I'm a full-time student, I also have two jobs to support my family in Africa and maintain a decent life here in New York. I am working as a medical assistant and as a restaurant manager.

All the trials and tribulations that I went through have made me stronger and have encouraged me to make a difference in the world.

Martha Lewis (marthalewis1985@yahoo.com) is an undergraduate at Long Island University Brooklyn.

Undergraduate-driven science outreach

University of Arizona program shows high-school students that high-tech degrees actually are not beyond their reach

The University of Arizona's Visiting Scholars Program, established in 2011, sends undergraduates out into Tucson-area high-school biology and chemistry classes to discuss their research projects and talk about university life. On most outings, one student gives a presentation about his or her work, and the other takes photos and helps answer questions. The following are brief reflections, edited for length and style, from members of the American Society for Biochemistry and Molecular Biology's Undergraduate Affiliate Network who are participating in the program and from their adviser, James T. Hazzard.

JAMES T. HAZZARD, PROGRAM ADVISER

One of the joys of being a faculty adviser for a UAN chapter is working closely with undergraduates to establish beneficial and viable outreach activities, like the VSP, in which students discuss their research — a requirement for all the biochemistry majors at our institution — and engage the high-school students in a dialogue about the college experience.

The inspiration for the VSP came primarily from two observations. First, since the inception of our annual undergraduate research conference, a number of high-school students have presented very sophisticated posters describing their research, which is often being done on our campus. Second, for a number of years our department hosted a one-day event in which high-school students from across Arizona were invited to a series of presentations and visits to research laboratories … I noted that high-school students were reluctant to ask an older faculty member, such as me, questions about preparing for and surviving college. My suspicions were also strengthened by seeing the inhibitory effects of the cool factor in two teenage granddaughters. Dutifully taking a scientific approach to this problem, we developed a working hypothesis that the high-school students would be much more willing to engage openly in conversations with UA students. Fortunately, not all hypotheses are disproved!

Now that our fall semester has ended, we are reflecting on how to continue to improve the VSP. As a faculty adviser, a serious concern for such an outreach activity is its future viability. Although the present group of students has engaged in the activity enthusiastically, there is no guarantee that volunteers will continue to step forth consistently. Therefore, we have begun to convert our all-volunteer activity into a formal class for academic credit — always a good carrot.

Our model for this transition is the outstanding outreach program* established by Hannah Alexander of the University of Missouri. Whereas Science and Me targets an older audience, we will continue to engage high-school students, especially those likely to be the first in their families to attend college, let alone pursue careers in the science, technology, engineering and math disciplines.

Additionally, calling upon the diverse nature of research in which our biochemistry students are engaged, we will shift the focus of attention of our talks away from the specific details of the students' research, which often exceed high-school students' background knowledge, to topics of more general public interest. Finally, we plan on offering formal training in effective public speaking practices to the undergraduate participants as well as designing more sophisticated assessment tools.

As we continue to refine and develop our outreach activity, we are confident that the VSP is a worthy project that benefits not only the target audience but also the undergraduates. Putting together a talk about topics that are often scientifically quite sophisticated in a manner that people with a smaller degree of technical expertise can understand requires a great deal of thought and careful planning. Hopefully, participation in the program enables our outstanding students to speak professionally and eloquently to the general public.

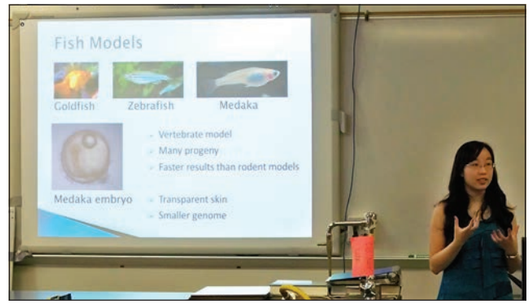
ANGELA SCHLEGEL, VSP PARTICIPANT

As a senior biochemistry major, one thing I have been able to do through the VSP and other outreach programs is to give back for all the help and opportunities I've received. As a high-school student at Tucson Magnet High School, part of my motivation for choosing to pursue a career in science came from the opportunities I had to conduct lab experiments through my school's Research Methods program. It piqued my fascination with research at the UA. I benefited from the mentorship of both the UA students and faculty. The VSP has allowed me to take on mentor roles at local high schools.

The reception of VSP has undeniably been positive, with many enthusiastic responses from both students and teachers. For the students, we have been able to answer many questions ranging from "Can I study the brain in college?" to "Do you have to study a lot in college?" and "How much does college cost? And how do I pay for it?" Additionally, we have been able to inform students and teachers about research internships … That each of us in the VSP has been a part of all of these internships, which have been instrumental to our current successes, and that we are all Tucson natives allows the students to see firsthand that such programs are within their reach.

SHIANA FERNG, VSP PARTICIPANT

For me, most impressive was the large number of detailed, thoughtful questions the students had about my translational research on Parkinson's disease. In the second of the two classes I presented to, I did not finish my presentation because of the number of great questions the students had; when the bell rang for lunch, several of the students immediately clamored for permission to stay longer so I could



finish. After I finished my presentation, a group of students wanted to take a closer look at the research poster that I presented at last April's ASBMB annual meeting, giving me the opportunity to explain the poster-making process. At the end of the visit, the teacher whose biology class we visited expressed a strong interest in having us return to give more presentations in the future and even asked about scheduling a lab tour or activity for his biology students.

JOEY QUIROZ, MEMBER OF THE INAUGURAL VSP COHORT

Our program aims to visit numerous high schools in the Tucson area, including those with large populations of underrepresented minorities in science. While visiting Flowing Wells High School, which has a diverse student body and a large Hispanic student population, I asked each student what his or her plans were after college; the majority of the students answered that they wanted to work in construction or as salesmen or were undecided. Not one of the students was interested in or even knew about careers in science. Fortunately, when my question-and-answer session ended, a young man came up to thank me and said, "I didn't know there was so much one could do in science."

** See the December 2011 issue of ASBMB Today for a feature by contributor Melody Kroll on the University of Missouri's Science and Me program.*

WHY YOU SHOULD JUDGE POSTERS AT THE ASBMB ANNUAL MEETING

BY PAUL A. CRAIG AND JOHN T. TANSEY

Your abstract for the American Society for Biochemistry and Molecular Biology annual meeting is in, and you're starting to put together your poster or presentation. You've made your travel arrangements and are about to get back to preparing for this afternoon's lab when you notice an email inviting you to serve as a judge for the undergraduate poster competition. We're hoping to convince you to join us by telling you how the process works and about the benefits that we have received by participating.

THE CATEGORIES

- **Cell Signaling**
- **Nucleic Acids**
- **Proteins & Enzymes**
- **Systems Biology**

When any judge finds a really exceptional poster, he or she records the poster number in the judge's lounge. Other judges for that category then go back and review the posters marked as exceptional.

THE PROCESS

11 A.M. SATURDAY: ORIENTATION
Meet the other members of your group, and get a packet of abstracts and scoring sheets for five to six students.

SESSION 1: 1.5 HOURS LONG
First half of the posters are judged.

SESSION 2: 1.5 HOURS LONG
Second half of the posters are judged.

4:30 P.M.: WINNER SELECTION
Judges select the prize winner and four honorable mentions for each category. Selection is complicated because not everyone viewed every poster.

THE RUBRIC

- quality of scientific content
- poster quality
- presentation quality
- ownership of the research
- ability to answer questions

NOTE

Each poster is judged at least twice. There are three to four lead judges for each category who make sure that every poster is judged and who recruit additional judges if some of the folks who signed up could not make it.

SPECIAL CIRCUMSTANCES

Picking the winners can be challenging. In the Systems Biology category last year, we used a matrix approach. We asked each pair of judges to add up the points from the scoring rubrics for each poster.

- When we totaled the points, we were concerned about inherent bias. (Students with more generous judges would receive more points, for example). To cope with this, we asked each judge to select his or her top five posters.
- We then considered the posters that had received the highest point totals and asked how many of the judges had viewed a specific poster and determined what percentage of judges had that poster among their top-five list.
- This was followed by further discussion in which the judges assigned to each of the top posters were asked to advocate for their posters. We went around the circle until all posters that were considered exceptional had been discussed.

This was somewhat like a study section, in that posters received preliminary scores and were then defended by those who viewed them. It was an interesting negotiation. In the end, we arrived at a consensus for the winning poster and the four honorable mentions. Even with the time limitations, we were confident that each award winner had done a superb job.

THE BENEFITS

- **Students** gain experience presenting to professionals in their field, meet a network of peers from other institutions, and encounter new perspectives and new knowledge for their ongoing research. In addition they get to compete with their peers from across the country and have their work evaluated by experts from outside of their home institutions. They get to meet graduate-school recruiters and may encounter potential future mentors.
- Undergraduate **advisers** receive outside perspectives on the work their labs are conducting. While this does not always yield useful information, in more than one instance students have received feedback that has been used in directing new research questions.
- **Judges** meet and offer advice to new students. In addition, judges learn how to assess scientific research (especially good for those early in their careers), learn how others judge scientific research (helpful for preparing grants), see new educational and research approaches, build relationships with each other and with students, and support the ASBMB.

SUMMARY

Judging posters requires a few hours of extra work, but it can be very rewarding. You should participate if your students are presenting, but you also should consider participating any time you attend a meeting. It also leads to new collaborations and friendships — the authors of this article met at the 2012 competition.

TIPS FOR POSTER-MAKERS

1. Make sure the text and figures are easily viewed from 3 to 5 feet away.

2. Fonts matter. The smallest font size should be 24 points, but try to use fonts larger than 32 points. Titles should be 72 points or 96 points. Use only one font on your entire poster. And don't make it Comic Sans MS – you want people to take your science seriously.

3. Use figures with clearly labeled axes. Tables are a second choice. Neither figures nor tables should be overly complicated.

4. This is a poster – not a paper. Use text effectively and sparingly.

5. Simplicity is good. Use white space to guide the reader's eyes. Colored background images look clever but can be very distracting.

OVERHEARD AT PAST POSTER COMPETITIONS

"I was pleasantly surprised at the level of sophistication of many of the students."

"I was impressed by the way the student presenter described how the positive and negative controls established the validity of the experimental results."

"They tried to cram too much into their poster. Even standing only a couple of feet away, I strained to read the small font they used."

"I really liked the way the poster was organized, with a brief introduction stating the objectives of their project, a clear description of the design and rationale for each experiment, and a nice summary at the end."

"The students had a clear grasp of the strengths and weaknesses of the experimental approach."

"It was obvious that the student owned the project and had a deep understanding of the central question being asked."

"The student conducted all of the experiments discussed and was able to tell me details of each technique."

"The student presenting the poster on PKC isoforms was working for a postdoc and of the data presented had performed only one Western blot."

"The student had a well-thought-out line of investigation. I could follow how one experiment led into the next one."

"Have you considered applying to grad school?"

jbc THE JOURNAL OF BIOLOGICAL CHEMISTRY

Getting Abl

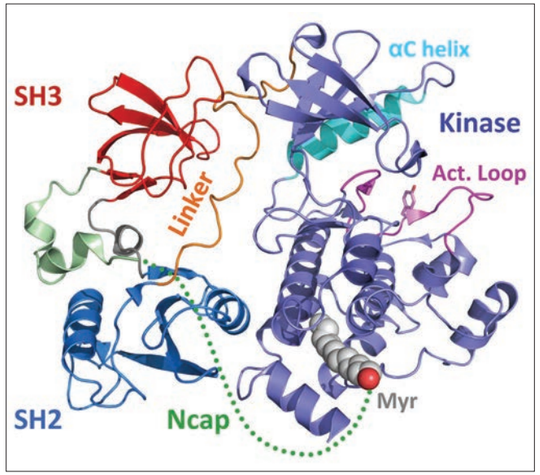
Determining the structure and regulation of Abl kinases

BY KYEORDA KEMP

Tyrosine kinases function in a number of processes and pathways in the body and are responsible for regulating numerous cellular functions such as growth, development, signaling and activation. Mutations that leave these kinases constitutively active are associated with various types of cancer; indeed, clinical research over the past 20 years has shown targeting rogue kinases to be beneficial in the fight against cancer. To target these kinases effectively, researchers have focused on understanding the structure and regulation of the various families of tyrosine kinases.

The active forms of Abl family tyrosine kinases play a role in the development and progression of a number of human leukemias, leading researchers to explore how Abl kinases are regulated to develop effective cancer drug treatments. This has led to the development of several pharmacological inhibitors of Bcr-Abl, which have been remarkably successful in the treatment of chronic myelogenous leukemia.

In a recent minireview in the Journal of Biological Chemistry, Shoghag Panjarian and Thomas E. Smithgall at the University of Pittsburgh School of Medicine and Roxana E. Iacob, Shugui Chen and John R. Engen at Northeastern University discuss how the structure and regulation of Abl kinases influence inhibitor compatibility. This minireview explores how the Ncap region and the SH2 and SH3 domains function to regulate Abl kinase activity, the kinase domain and how its interaction with other proteins is controlled, and the conformational changes that the kinase undergoes upon activation or inhibition. The authors also discuss how the lessons learned about the Abl family from structural studies can be applied to the oncogenic fusion protein Bcr-Abl; it lacks the Ncap regulatory region and possesses a coiled-coil domain at the N- terminus that is believed to play a role in activation.



"Future drug-discovery efforts targeting allosteric mechanisms unique to this kinase system may provide a path to exceptional inhibitor sensitivity," the authors write in the minireview, titled "Structure and dynamic regulation of Abl kinases."

Kyeorda Kemp (kyeordakemp2010@u.northwestern.edu) is a postdoctoral researcher at Northwestern University.

MCP MOLECULAR & CELLULAR PROTEOMICS

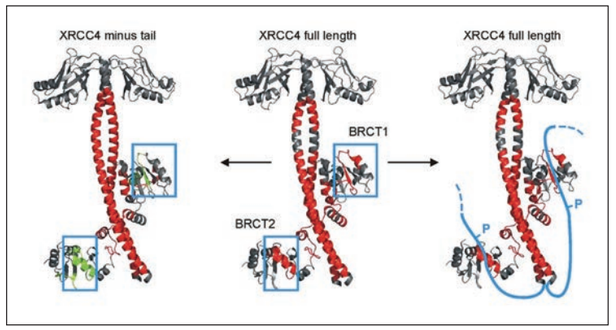
A monkey cup protease for hydrogen-deuterium exchange mass spec

BY RAJENDRANI MUKHOPADHYAY

How can monkey cups help proteomics? A recent paper in Molecular & Cellular Proteomics describes a special protease derived from this leaf of a carnivorous plant. The protease may be useful for determining protein structures and mapping protein interactions, particular those of intrinsically disordered proteins.

Monkey cups are special leaves on an insect-eating plant called nepenthes. These leaves catch water to drown insects. Once a victim has been caught in a cup, the plant secretes digestive juices, which include the protease, into the water to break down the insect and absorb its nutrients. However, rainforest monkeys have caught on that these leaves can work as water reservoirs and drink out them, hence the name "monkey cups."

David Schriemer's group at the University of Calgary came across the monkey cup protease when searching for an aspartic protease that was phylogenetically distant from the standard workhorse protease pepsin. The Schriemer group is interested in hydrogen-deuterium exchange mass spectrometry, because it has the potential to reveal high-resolution structural and temporal details about complex protein systems. Proteins can be thought of as breathing: They exchange their hydrogens for deuteriums when bathed in D_2O. The hydrogens that get switched for deuteriums help researchers figure out details of protein structure, folding and interactions.



Besides D_2O, the method also uses pepsin to cut proteins into manageable pieces. But pepsin has its drawbacks. It isn't always an efficient protease, and it doesn't consistently cut all proteins at the right spots. "We want 100 percent coverage so we can track exactly where the deuteriums go," says Schriemer.

So when the investigators came across the monkey cup protease called nepenthesin, they were intrigued by it, because it could perhaps overcome the drawbacks with pepsin. "We were surprised to find that nepenthes extracts are very poorly characterized, and only a handful of studies exist. What evidence there was suggested it was worth a look," says Schriemer.

The investigators grew a few nepenthes plants in their lab, fed them fruit flies to induce secretion of digestive juices, collected those juices, and isolated the protease.

Schriemer and colleagues then tested nepenthesin in the place of pepsin. They found they could "now look at larger protein complexes and expect to get better sequence coverage," says Schriemer. The protease "really extends the reach of the method and gets us closer to a proteomics-grade version of the technology."

In particular, nepenthesin can better handle intrinsically disordered proteins than pepsin, which doesn't deal well with the prolines and charged residues that often dominate these kinds of proteins.

Schriemer says the next step for the group is to scale up nepenthesin production. "We have many people asking for the enzyme!" says Schriemer.

Rajendrani Mukhopadhyay (rmukhopadhyay@asbmb.org) is the senior science writer for ASBMB Today and the technical editor for the Journal of Biological Chemistry. Follow her on Twitter at www.twitter.com/rajmukhop.

JLR THE JOURNAL OF LIPID RESEARCH

Fat-specific protein 27 and obesity, diabetes

BY MARY L. CHANG

In the March issue of the Journal of Lipid Research, two groups independently present research on fat-specific protein 27, or FSP27, which in mice plays a key role in lipid storage and mitochondrial activity in fat cells.

Localized to lipid droplets and highly expressed in adipose tissues, FSP27 is the mouse equivalent to the human cell-death-inducing DFFA-like effector c, or CIDEC. Mice with the gene for this protein knocked out expend energy faster and are resistant to both diabetes and obesity, even when fed a high-fat diet. Understanding how this protein's expression is controlled could lead to breakthroughs in preventing these often-deadly conditions in humans.

For the first JLR paper on this topic, Anna Vilá Brau and colleagues from the University of Barcelona studied the protein's activity in the liver and discovered that fasting could regulate the activity of its gene in a time-dependent manner. In the early stages of withholding food from the mice, Fsp27 gene expression increased, but as time went on, the expression decreased. They also showed that downregulation of the fatty-acid oxidation rate regulates Fsp27 expression.

While attempting to determine which transcriptional factor was controlling activation of the Fsp27 gene, they ruled out peroxisome proliferator-activated receptor α's (PPARα) involvement. Instead, they observed that cyclic adenosine monophosphate response element binding protein, or CREB, was the activator. Decreased Fsp27 expression also was linked to deactylator sirtuin 1, or SIRT1, and the researchers suggest SIRT1 also could mediate the effect of fatty-acid oxidation, which in turn regulates Fsp27 expression.

In an accompanying commentary, Vishwajeet Puri of the Boston University School of Medicine notes that PPAR-α's noninvolvement was a surprise, given that it is known as a master regulator of fasting in the liver. Puri explains that Vilá Brau et al.'s results support a new model: upregulation of Fsp27 by a CREB-dependent pathway, followed by fatty-acid oxidation increasing SIRT1 activity. When lipids are broken down, fatty-acid oxidation is enhanced; when fatty-acid oxidation is inhibited, FSP27 activity increases.

Continued on page 31

Controlling lipid synthesis to control cell growth?

Nongenomic regulation of lipid synthesis by the protein c-Fos

BY BEATRIZ L. CAPUTTO

Lipids – phospholipids, glycolipids, cholesterol and so forth – are the most abundant molecular species of every cell membrane. Consequently, it is expected that their synthesis be synchronized with the cell's diverse functional states.

In cells actively involved in proliferation or in plasma-membrane extension processes that demand massive membrane biogenesis, lipid biosynthesis rates must be higher than those rates in cells that are neither dividing nor actively growing. However, the nature of the regulatory events underlying such processes is poorly understood. We have shown that the protein c-Fos is actively involved in these regulatory events.

c-Fos was first described more than 15 years ago as a member of the AP-1 family of inducible transcription factors (1). c-Fos content is highly regulated in cells: It is at the limit of detection in quiescent cells, whereas its expression is induced rapidly and only transiently when cells are stimulated to re-enter the cell cycle (2).

It has been hypothesized that this AP-1 activity of c-Fos (forming dimers with other members of the AP-1 family of transcription factors) participates in transmitting short-term, growth-promoting cellular signals into longer lasting changes by regulating the expression of cell-growth-related genes (2).

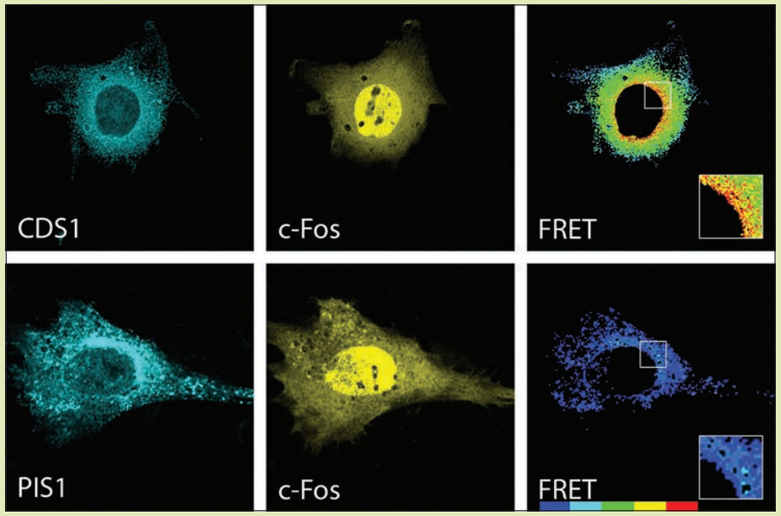
We have established that c-Fos is a moonlighting protein capable of regulating growth not only by its transcription-factor activity but also by its capacity to act as a cytoplasmic activator of the biosynthesis of lipids in normal and pathological cellular processes that demand high rates of membrane biogenesis. Such is the case in light-stimulated retina ganglion cells (3, 4), in growing NIH 3T3 cells (5), in PC12 cells induced to differentiate (6, 7) and in tumors of the central and peripheral nervous system (8, 9). Highlighting the importance of lipid-synthesis activation for these events is the observation that by specifically blocking c-Fos expression, or in c-Fos $^{-/-}$ mice, proliferation and growth of normal and tumor cells are slowed or halted without substantial changes in their AP-1 content (8).

Lipid synthesis is also regulated by the total amount of active c-Fos present in cells. Quiescent cells contain very low amounts of c-Fos, which is Tyr-phosphorylated, is not membrane bound and shows basal levels of phospholipid synthesis (10). However, inducing cells to grow promotes abundant c-Fos expression, and c-Fos is dephosphorylated by the phosphatase TC-PTP, enabling it to associate to the ER and to activate phospholipid synthesis (11).

Co-immunoprecipitation and fluorescence resonance energy transfer assays showed that lipid-synthesis activation by c-Fos is accomplished through a physical association between the N-terminal domain of c-Fos and the enzymes it modulates (12). However, an increase in the reaction rate is promoted through the basic 20-amino acid domain of c-Fos that spans from amino acid 139 to 159 (12). Only one other protein, Fra-1, was found that contains a c-Fos-homologous basic domain, and interestingly, when expressed, it also activates lipid synthesis in human breast tumors (13).

In light of the importance of c-Fos-activated lipid synthesis for normal and pathological cell growth and proliferation, we are studying which lipid synthesis pathways c-Fos regulates and the enzymes involved. Perhaps we will learn how to limit the unrestricted proliferation and growth of tumor cells.

Examination of the association of c-Fos with enzymes of the pathway of phospholipid synthesis by fluorescence resonance energy transfer microscopy



FRET measures molecular proximity of less than 10 nm, a range of distance that is typical of protein–protein interactions. In the micrographs, a pseudo colored cell in the upper row shows the association of co-expressed YFP-tagged c-Fos (c-Fos) with the CFP-tagged enzyme CDS1 (CDS1) at the perinuclear endoplasmic reticulum evidenced by FRET (red) between the fluorophores. The lower row shows a cell co-expressing the CFP-tagged enzyme PIS1 (PIS1) and YFP-tagged c-Fos. Note the absence of positive FRET values (blue) and hence the lack of association between c-Fos and PIS1.

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journal news continued

Continued from page 29

Puri suggests that the next big question is how fatty-acid oxidation induces SIRT1 activity.

In the other paper about FSP27, Masami Ueno and researchers from the Veterans Affairs Palo Alto Health Care System and Stanford University offer their findings on FSP27's role in lipid-droplet homeostasis. They used a yeast two-hybrid system, positively identifying a direct interaction between FSP27 and the N-terminus region of nuclear factor of activated T cells 5, or NFAT5, which turns on osmoprotective and inflammatory genes after the nuclear factor is transported to the nucleus. Through indirect immunofluorescence, the researchers showed that FSP27 can inhibit NFAT5's travel to the nucleus in a hypertonic environment.

Using a reporter-gene construct, they demonstrated that FSP27 negatively affects NFAT5's transcriptional activity, which is complementary to reverse transcription-polymerase chain reaction, or RT–PCR, results showing that Fsp27 overregulation inhibits endogenous chemokines that activate the immune response and tumor-necrosis factor-α. Obesity and type 2 diabetes have been linked to a chronic, low-grade inflammatory process in the body, and an increased amount of chemokines are expressed in adipose tissue of those with these conditions. So FSP27's activity and any abnormal process causing overexpression of its gene is of paramount importance to understanding what's happening when these conditions stress the body.

Mary L. Chang (mchang@asbmb.org) is managing editor of the Journal of Lipid Research and coordinating journal manager of Molecular and Cellular Proteomics.

There and back again

From scientist to CEO

BY ELIZABETH IORNS

Sometimes it's easy to forget that, although the fruits of research are universally applicable, the process often is locally constrained and determined. I discovered that fact firsthand when I moved from my doctoral work at the Institute for Cancer Research in London to a postdoctoral position at the University of Miami in Florida.

At the ICR, we had an incredibly integrated (and, I now realize, incredibly uncommon) group of scientists and facilities. If I was working on something that required medicinal chemistry or human pathology, I easily could find the right expertise in-house and hand off that component of my project. As a result, I witnessed work at the ICR proceed very quickly from laboratory discoveries to late-stage clinical trials, not realizing that is not how most of biomedical research operates.

As a postdoc in Miami, I was developing a mouse model of breast cancer metastasis in which I injected human breast cancer cells into immunodeficient mice. Because of their different cellular origins, I could analyze both the gene-expression profiles of the human tumor cells and the mouse tumor microenvironment, which provided some very interesting results. I wanted to follow up on some intriguing gene-expression differences with a straightforward tissue microarray analysis. This was a simple thing to have performed by an expert; the hard part was finding said expert. I tried going through my personal networks to find collaborators to no avail. I tried searching online but then had to follow up on the leads that Google produced through emails and phone calls to different service providers in a cumbersome, inefficient process of finding a match for my needs. And then, when I finally found a core facility at another institute to help, I discovered that it was no easy matter to pay them!

In talking with my friends and colleagues, I realized that the norm in these situations is either to do it yourself or move on to some other aspect of the study that you can do yourself. And that made no sense to me. Why shouldn't access to expert scientific services be as easy as access to reagents or instruments? Why should the progress of scientific research be dampened by the vagaries of local availability and informal networks rather than lifted by the global state of the art?

Frustrated, I talked over my problems with my husband, Dan Knox, who was an executive at a personalized news website. We realized that the problem I was experiencing was one that has been solved routinely for all kinds of goods and services that are readily available in online marketplaces. So we recruited a Web developer, Ryan Abbott, to our cause and launched Science Exchange. Science Exchange is an online marketplace for scientific experiments where researchers can order experimental services from specialist providers at more than 400 institutions, including the University of Southern California, Harvard University, Duke University and the University of California, Los Angeles. We moved across the country from Florida to California and were lucky enough to be accepted to the Y Combinator incubator program, which aids the development of technology startups by providing seed funding as well as advice and introductions to investors.

Science Exchange isn't even two years old yet, and we already have more than 1,000 scientific service providers from institutions around the world available on our site.

Science Exchange isn't even two years old yet, and we already have more than 1,000 scientific service providers from institutions around the world available on our site. It's free for providers to sign up and free for anyone to explore the available providers, services and pricing. We stay in business by charging a small transaction fee for services rendered through the site. We provide tools to service providers to track their transactions, and we provide an easy framework for collaboration.

Elizabeth Iorns

Now, instead of spending my days at the bench, I spend them with my small team of software developers and business developers in rented offices in Palo Alto — the heart of Silicon Valley. Instead of writing grant applications, I court investors and partners. But building a business is also about testing hypotheses: ideas about what our users need and want.

Our goal is to transform and accelerate the process of scientific research, and you could say that I am our first proof of concept. My most recent paper has just been published in PLoS ONE and is a result of a collaboration conducted through Science Exchange. There is no way I could be a chief executive officer and a scientist if I had to learn every standardized procedure required to advance my cancer research. I am still a scientist because I value the expertise of others, and I feel empowered rather than diminished by not conducting every experiment in my own laboratory.

Although the majority of our service providers are core facilities, there is no barrier for anyone with scientific expertise to become a service provider. Collaboration does not necessarily have to be about coauthorship, which can be fraught with its own dilemmas and inconsistencies; it also can be about a defined transaction based on expertise. For me, Science Exchange is not just a new online tool. My hope is that it will be part of a cultural shift that encourages more scientists to view progress in biomedical research as a joint venture rather than a lone pursuit. The results, after all, will be universally applicable and are eagerly awaited by the public who funds us.

Elizabeth Iorns (elizabeth@scienceexchange.com) is co-founder and chief executive officer of Science Exchange, an online marketplace for scientific experiments, and an adjunct professor at the University of Miami.

Are scientists with disabilities the forgotten underrepresented minority?

BY SQUIRE J. BOOKER

The U.S. has recognized that maintaining its status as a leader in innovation and discovery requires that it tap all potential educators and researchers in the science, technology, engineering and math disciplines. The diminishing employment opportunities in the once-strong manufacturing sector and the increasing number of opportunities in the technology sector suggest a vital need to support STEM training to maintain a robust workforce for continued economic growth and investment. Given that certain racial and ethnic minorities have been historically underrepresented in STEM, these groups have been targeted with strategies to increase their numbers. However, it is becoming increasingly apparent that the disabled are also a rich source of talent that has been underutilized.

The traditional definition of a disabled person referred to someone who required routine use of a wheelchair or who was visually or hearing impaired. Now the definition has been broadened to include people with learning disabilities and psychiatric disorders. A 2011 study by the National Science Foundation of students and employees in science and engineering showed that the disabled consistently have higher unemployment rates than those of the general population (1), and many leave the labor force prematurely. Furthermore, it is believed that disabilities are underreported for fear of discrimination.

Much of the past discrimination against the disabled in science has been rooted in misperceptions that they cannot work successfully in a lab environment. However, laws that ensure equal access for the disabled as well as advances in technology have enabled them to perform at the highest echelons of the scientific establishment. We marvel, for example, at the genius of Stephen Hawking, who has provided penetrating insight into the deepest workings of the cosmos despite having Lou Gehrig's disease. John W. Cornforth, who won the 1975 Nobel Prize in chemistry for his work on the stereochemistry of enzyme-catalyzed reactions, was deaf, as was the great American inventor Thomas Edison. In fact, It has been said that because people with disabilities have to come up quickly with creative approaches to navigate daily challenges, this creativity may make them particularly valuable for solving problems that require outside-the-box approaches. Although the Americans with Disabilities Act of 1990 has done much to break down barriers associated with equal access for people with disabilities, much more needs to be done to realize the full potential of this source of talent within the STEM disciplines.

Given that most disabled people were not born with their disabilities but acquired them at some point in their lives, it would be wasteful to have them leave the scientific labor force or STEM majors after many years of personal and societal investment in their education and training when adjustments can be made to accommodate them. Efforts must be continued to create welcoming and accessible environments for them. Scientific organizations, such as the American Society for Biochemistry and Molecular Biology, can play a role by facilitating networking opportunities for scientists with disabilities and by helping them to identify suitable mentors. Moreover, providing enhanced accessibility to scientific meetings and incentives to attend will allow the disabled to engage in the many professional-development activities provided at these events.

With this in mind, the ASBMB Minority Affairs Committee is delighted to have Peter Blumberg of the National Cancer Institute named the winner of this year's Ruth Kirschstein Diversity in Science Award. Blumberg is an internationally recognized expert in the field of cell signaling and has made an enormous commitment to the training and mentoring of scientists who are hearing impaired. To learn more about Blumberg, see page 12.

Squire J. Booker (sjb14@psu.edu) is associate professor of chemistry and associate professor of biochemistry and molecular biology at The Pennsylvania State University. He is also chairman of the ASBMB Minority Affairs Committee.

REFERENCE

1. http://www.nsf.gov/statistics/wmpd/pdf/nsf11309.pdf

Letter to the editor

I want to thank Fred Maxfield for his thoughtful mentoring column in the January issue about what we as individuals and what educational institutions can do to make science students aware of the many career options available to them. Clearly ASBMB has a role in this process as well. This month ASBMB is sponsoring two regional career symposia, one at Stony Brook University in New York and one at the University of Cincinnati in Ohio. Three more will be announced soon, and information on past events is available online as well. I encourage undergraduate and graduate students — and their advisers — in those regions to consider attending these symposia to broaden their professional networks and to hear from people with science backgrounds who are applying their skills and knowledge in various fields. We also encourage institutions to use information from past meetings as a source of topics and speakers to develop local meetings on their campuses. All ASBMB members can play a role and mentor local students and postdocs who apply to host ASBMB-sponsored career meetings in their areas in the next call for applications.

– TERRI GOSS KINZY, UNIVERSITY OF MEDICINE AND DENTISTRY OF NEW JERSEY ROBERT WOOD JOHNSON MEDICAL SCHOOL

MDEG hyperactivation and caspase-8 activation

Wei-Xing Zong of Stony Brook University talks about his group's Journal of Biological Chemistry Paper of the Week: "Hyperactivation of the mammalian degenerin MDEG promotes caspase-8 activation and apoptosis." The paper and interview investigate how misregulation of the degenerin family of ion channels leads to cell death.

Parkin deficiency and myocardial infarction

Åsa Gustafsson from the University of California, San Diego, talks about her JBC Paper of the Week, "Parkin Protein Deficiency Exacerbates Cardiac Injury and Reduces Survival following Myocardial Infarction." The paper delves into the cardiac defects brought on by a protein involved in Parkinson's disease.

Best of the JBC for 2012

Twenty-two JBC papers — out of the more than 4,000 published last year — won Best of 2012 designations. This podcast features a conversation between JBC Associate Editor Joel Gottesfeld of The Scripps Research Institute and John M. Denu of the University of Wisconsin-Madison, who authored two papers given the designation. All of the Best of 2012 papers are freely available at jbc.org.

ASBMB representing at #scio13

Geoff Hunt, ASBMB's public outreach coordinator, joined ASBMB Today science writer Rajendrani Mukhopadhyay at ScienceOnline 2013 last month. The seventh annual conference, which draws hundreds of researchers, teachers, bloggers, journalists and communicators to North Carolina's Research Triangle, provided an opportunity for Hunt to throw down a new science rap. (Maybe you've heard of his performance of "99 Problems and the Lab Ain't One" at a past ASBMB annual meeting?) Here, we reprint lyrics from his newest creation, a commentary – which he wrote on the train from D.C. to Raleigh – on the disparity between communicating in the real world and communicating in the virtual world. **You can watch his #scio2013 performance at http://bit.ly/12wRhIv.**

Poisoning with Words

Poison
Online they say no one knows you're a dog
Whether you tweet or post or comment or blog
Action so thick it all becomes a fog
Who are you, why you think that you're a vital cog?

Do you talk with facts?
Or just grind your ax?
Speak your mind?
Bust a rhyme?
Waste my time?
Join the slime

What I hear in my ear it don't sound too clear
This one says pray and that one says fear
You my peer? Far or near? Telling lies or sincere?
Is your story allegory or should I shed a tear?
All the words that you write will all disappear
Talk at me in circles and still I end up here
Poison

Internet shouter
Can't get no louder
Trust your router
Silence the doubter

Exclaim, emphasize, create, capitalize
Retweet, reply, shake your head, realize
Hashtags, dislikes, snark shown in all size
Come in peace, come in truth or just antagonize

The right to write whets your appetite
Pounding at the keys all day and night
Logic as a metaphor
Going to settle a score
I am right, you are wrong, repeat repeat
Yet from here in my seat it's all just empty heat
Poison

Got new toys to make signal from noise
Everyone's wired, all the girls and boys
iPhone, iPad, laptop, Android
So how's the real world supposed to be employed?

Online, you shine, might be a big star
But you know you only famous as an avatar
What happens if you meet
Your idol on the street?
Will it match your dream
Or leave you incomplete?

Are fact and fiction cool or do they spar?
Does what you say define who you are?
Sheltered from revenge, commenting from afar?
Verbal or physical, it leaves the same scar

So just remember when you trying to rally the herds
Comrades or crazies or jocks or nerds
How the virtual world makes reality blurred
And heed the danger of the poison of words
Poison

Boston

ASBMB ANNUAL MEETING

April 20–24, 2013

www.asbmb.org/meeting2013

HOUSING

DEADLINE: March 22, 2013

THEMATIC SESSIONS

Catalytic Mechanisms

Chemical and Systems Biology

Genome Replication and Repair

Glycan Regulation of Signaling Pathways
Lipids and Membranes

Mechanisms of Gene Transcription and Regulation

Mechanisms of Signal Transduction

Protein Modification, Trafficking and Degradation

RNA Function and Protein Synthesis

Transitions, Education and Professional Development

Triple Negative Breast Cancer

SPECIAL EVENTS

Professional Development for Graduate/Postdoctoral Trainees
Saturday, April 20

ASBMB Opening Reception
Saturday, April 20, immediately follows the Opening Lecture

Undergraduate Orientation: A Student's Guide to the ASBMB Annual Meeting
Saturday, April 20

17th Annual Undergraduate Student Research Poster Competition
Saturday, April 20

Beyond College: Coping with Some Common Challenges
Undergraduate workshop, Saturday, April 20

Undergraduate Breakfast with ASBMB Award Winners
Sunday, April 21, and Monday, April 22

ASBMB Welcome and Networking Reception
Sunday, April 21

ASBMB Thematic Fermentation Happy Hour
Monday, April 22

ASBMB Women Scientists Networking Event
Tuesday, April 23

Y.E.S. Mixer (Young Experimental Scientists)
Consult program for details