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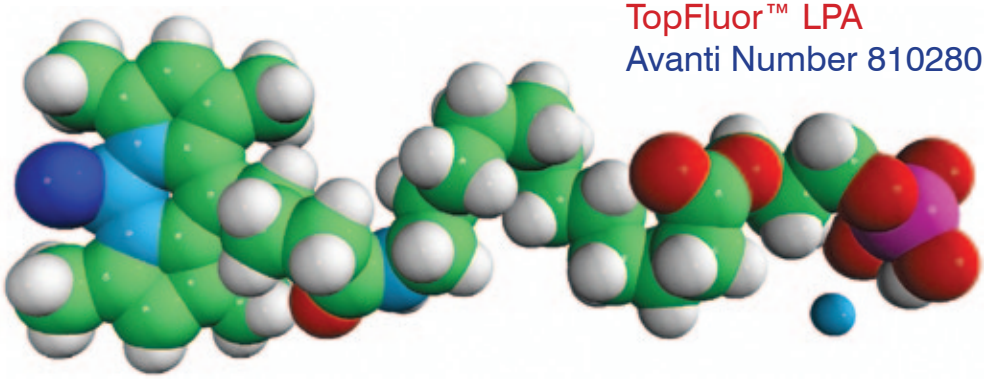

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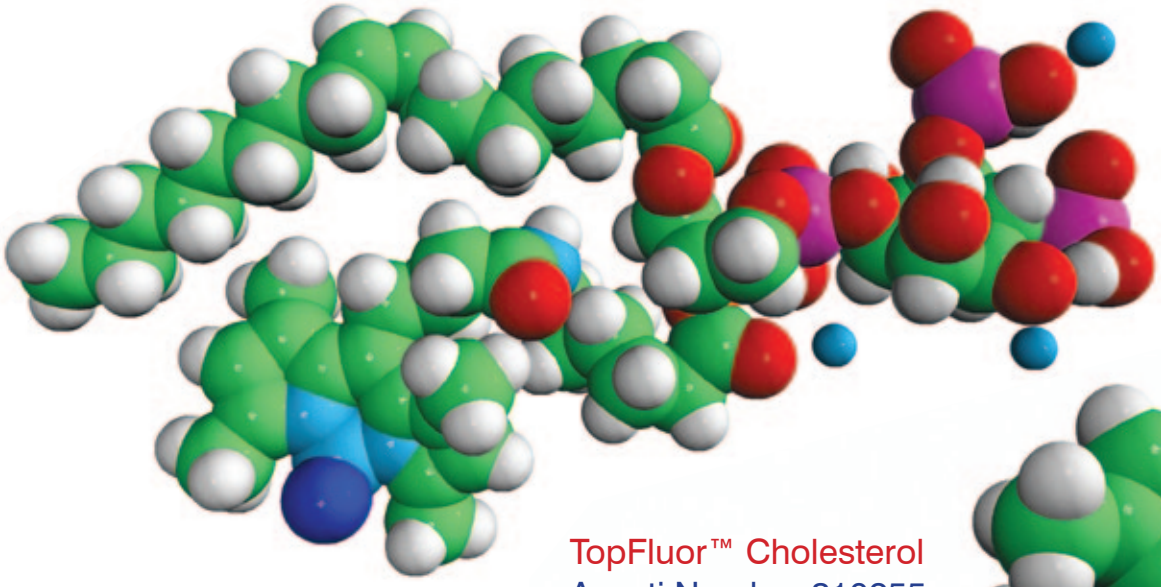

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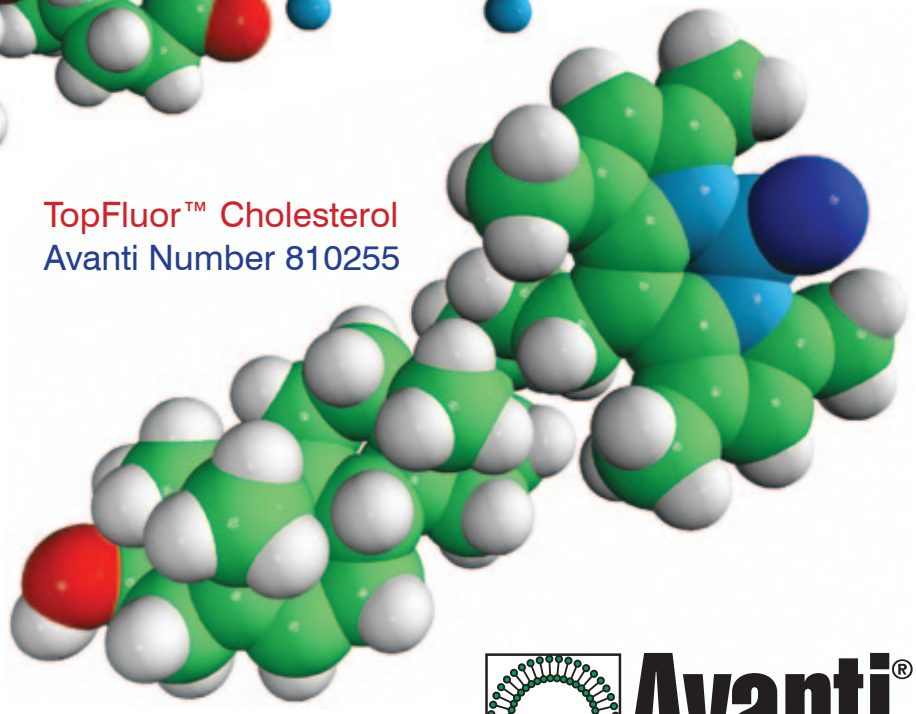

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PHOTO BY DAN KVITKA

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asbmb today online

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2008 APEX® AWARDS FOR PUBLICATION EXCELLENCE

president's message

Impact factors — what the H?

BY SUZANNE PFEFFER

In many parts of the world, faculty appointments, promotions and grant evaluations are based on the number of papers a scientist has published combined with the impact factor of the journals in which the work appeared. A journal's impact factor is the average number of citations per paper published in that journal during the two preceding years. Journals that publish few papers, of relatively high impact, have high impact factors. But not every paper in a high-impact journal is itself of high impact, and the publication of article retractions actually enhances a journal's impact factor.

There are other easy ways for a journal to manipulate its impact factor (1, 2). For example, well-written, timely review articles are widely cited, and journals such as the Annual Review of Biochemistry and Nature Reviews Molecular and Cellular Biology have some of the highest impact factors. (Now I better understand why an editor once encouraged me to cite previous reviews in the same review series when drafting my own review article.) In addition, Nature "News and Views" pieces are wonderful for readers, but they also are wonderful for editors, because they can count toward citations (when cited) but don't count toward the total-number-of-papers-published denominator. "News and Views" pieces always include citations of other articles within a given issue, further increasing the impact factor. Finally, a blockbuster paper can skew a journal's impact factor significantly: In 2008, a single paper in Acta Crystallographica was cited more than 6,600 times, raising the journal's impact factor from approximately two to a value of 49.926 — higher than that of Nature or Science.

Some search committees use the H index to compare the scientific impact of a candidate's research (3, 4). According to Wikipedia, "The H index is based on the set of the scientist's most cited papers and the number of citations that they have received in other people's publications… a scholar with an index of *h* has published h papers each of which has been cited by others at least *h* times." Another impact metric! Wouldn't it be great if a simple algorithm could simplify comparison of scientific impact and stature? If only it were that simple.

Like the sizes of our noses and ears, H values reflect longevity as much as quality and can never decrease with age, even if an individual leaves science (3). Younger scientists are at an instant disadvantage because the total number of papers influences the value. H indices for female scientists also suffer in comparison with those for males because they apparently publish fewer papers during their careers than their male counterparts (4). In addition, the H index of a mechanistic enzymologist could be very different from that of a molecular cell biologist because of differences in what types of papers are published in a given subfield and how often a group of researchers cites each other's papers. If I happened to work in a smaller field, my findings might lead to the rewriting of textbooks without needing many citations. And now in the age of online libraries, fewer authors seem to be citing original articles and often rely on review article citations instead.

In 2007, the European Association of Science Editors issued a statement (5) recommending that journal impact factors be used "only — and cautiously — for measuring and comparing the influence of entire journals, but not for the assessment of single papers, and certainly not for the assessment of researchers or research programs either directly or as a surrogate." This is an important document and has led to changes in Europe and elsewhere.

Earlier this year, the German funding agency Deutsche Forschungsgemeinschaft limited applicants to citing only particularly significant publications to reduce the importance placed on publication lists and numerical indices. The U.S. National Institutes of Health guidelines also have changed: NIH now encourages applicants to limit the list of selected peer-reviewed publications to no more than 15 based on importance to the field and/or relevance to the proposed research. Let us hope that similar policies that emphasize quality rather than quantity soon will be adopted worldwide.

Students and postdoctoral fellows still feel that publishing in one of the very elite journals is essential to their success. Why is this so? It's primarily because scientists who sit on funding and hiring panels are easily wowed by candidates who do publish in the top journals. Looking at the name of a journal gives panel members an excuse to be lazy and not read the paper itself. Each of us has to be the judge of scientific significance, and we must not forget that elite journals tend to seek out trendy science — and simply refuse to make additional space for the broad array of elegant analysis and the diversity of outstanding discoveries that might be submitted to them. That's OK; trendy science sells magazines, but a lot of excellence can be found elsewhere.

Attention evaluators: When you are reading a curriculum vitae, do not rely solely on journal names; please look more closely at the work and judge its impact for yourself. Hiring and grant panelists often are asked to evaluate science (or scientists) outside of their particular research areas. Authors and applicants always must make especially clear why their findings are important both to those working within a particular area and to all biochemists and molecular biologists. How did this work change thinking in the field or answer a longstanding question? At every opportunity, we must all explain, with clarity, the importance of our science. The simple act of highlighting a project's significance will guide our focus toward the most important questions that need to be addressed in biochemistry, molecular biology and biomedical research.

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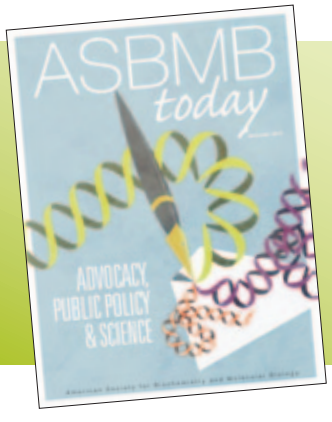
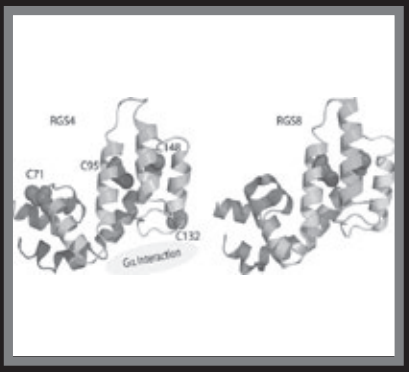


In good company

Several of our sharp-eyed readers noticed that the cover of the November 2010 issue contained a left-handed double helix rather than the more common right-handed one. Apparently, we are in good company — check out the Left Handed DNA Hall of Fame: **http://bit.ly/LeftDNA**.



RGS & AGS Proteins in Physiology & Disease Colloquium

April 13-14, 2011, Washington, D.C.

Chairs: John R. Hepler, Emory Univ & Venetia Zachariou, Univ of Crete
This is a Satellite Meeting to Experimental Biology 2011

RGS/AGS Proteins in Physiology & Disease

Visual System

RGS9 Regulation of ON-Bipolar Cells *(T. Wensel, Baylor College of Medicine)*
AGS/PcP2/Go Signaling in Retina *(N. Vardi, Univ of Pennsylvania)*

Inflammation and Cardiovascular Disease

RGS in Bronchial Smooth Muscle/Asthma *(K. Druey, NIAID/NIH)*
RGS Modulation of Myocyte Stress Responses in Heart Disease *(D. Kass, Johns Hopkins Univ)*
RGS Proteins in Cardiovascular Function *(S. Heximer, Univ of Toronto)*

Cancer and Neoplastic Disease

RGS Proteins in Breast Cancer *(S. Hooks, Univ of Georgia)*
AGS3 & Polycystic Kidney Disease *(P. Jackson, Genentech)*
AGS Protein Pins in Asymmetric Cell Division *(K. Prehoda, Univ of Oregon)*

CNS Disorders

RGS4 in Bipolar Disorders/Schizophrenia *(A. Hedge, Wake Forest Univ)*
RGS10 in Microglia & CNS Inflammation *(M. Tansey, Emory Univ)*

RGS & AGS Proteins & Their Partners as Drug Targets

The RGS/AGS/G Protein Interface as Drug Targets

RGS Proteins as Drug Targets *(R. Neubig, Univ of Michigan)*
Structure/Function of RGS & AGS Proteins *(D. Siderovski, Univ of North Carolina-Chapel Hill)*

Genetic Systems and Structure/Function

Genetic Studies of AGS3 in *c. elegans* *(M. Koelle, Yale Univ)*
Structural Analysis of RGS Protein Interactions *(J. Tesmer, Univ of Michigan)*

RGS/AGS Binding Partners and Signaling Complexes

Ric8A Regulation of AGS/G Protein Complexes *(G. Tall, Univ of Rochester)*
Coupling of RGS & AGS Proteins with GPCRs *(J. Blumer, Medical Univ of South Carolina)*

Attendees are invited to submit a poster for presentation on Wednesday evening and Thursday morning. Several short talks will be selected from the contributed posters. Poster titles and abstracts must be emailed to araptakis@aspet.org, no later than March 1, 2011.

For more information and to register, visit:
http://www.aspet.org/Meetings/RGS_AGS_Proteins/

New year, new Congress, same concerns

BY BENJAMIN W. CORB

As the book opens on 2011, many of us use this time to reflect on the year that was and set lofty New Year's resolutions. For some of us, it's to lose that 10 pounds from the holidays; for others, it's to read that book or spend more time with our families; and, for a select few, it is to cut all non-defense discretionary funding in the federal government by 18 percent.

That's right — new year, new Congress, new majority, new priorities. At the end of last year, House Republicans met and chose the incoming leaders for House committees, ushering in a new era of leadership and leaving the scientific community wondering exactly what these leadership changes will mean to the nation's scientific enterprise.

U.S. Rep. Harold "Hal" Rogers, R-Ky., will be responsible for cutting federal spending as he takes over as chairman of the House Appropriations Committee. Having beaten out out appropriations committee veteran Jerry Lewis, R-Calif., Rogers will play a key role in delivering on House Republicans' goals of cutting federal spending and is already on record as supporting an 18 percent cut in nondefense discretionary spending for fiscal 2011, bringing funding to most agencies back to pre-2008 (and pre-American Recovery and Reinvestment Act) levels. Rogers said in a prepared statement that he looks forward to "fighting for serious reforms of the committee, bringing fiscal sanity back to our budgeting process, performing vigorous oversight of the failed job-creation policies of the Obama administration and moving our nation forward." Rogers will have some work to do to prove his fortitude to cut spending, especially with an incoming freshman class of Republicans who are aggressive on cutting spending and ending Washington establishment practices like earmarks. However, Rogers was the 10th-most prolific user of earmarks out of the 435 House members. One is left to wonder if he will be able to overcome this addiction in his new role as chairman.

The House Energy and Commerce Committee (important because of its jurisdiction over health-care reform issues) will be chaired by 13-term Republican Fred Upton from Michigan. In a prepared statement, Upton listed some of his party's priorities that were key planks in its November election platform when it took control of the House. "Republicans were swept into the majority with a clear mandate from the American people: repeal Obamacare, cut the size of government, reduce out-of-control spending, reverse burdensome, job-killing regulations and help put folks back to work. Under my watch, these will be the committee's very top priorities."

At the helm of the science committee, 16-year veteran Ralph Hall, R-Texas, is expected to be at the forefront of Republican efforts to probe the Obama administration's climate policies next year. Hall has said he's not a climate skeptic. "If they quote me correctly, I've never said it's outrageous to even think about global warming. I want some proof," he said. "If I get the chair and have the gavel, I'm going to subpoena people from both sides and try to put them under oath and try to find out what the real facts are." Hall is a longtime member of the science committee, known by most on Capitol Hill as one of the most bipartisan committees in all of the Congress.

What do these changes mean for the American Society for Biochemistry and Molecular Biology and the scientific community? It is a foregone conclusion that increases in federal investment in biomedical research will be few and far between. It falls upon the community of researchers, universities and societies to educate the new Congress on the importance of robust and reliable funding for biomedical research and to identify ways in which more research can be squeezed out of limited resources. Why not make one of your New Year's resolutions this year to get more involved and dedicate a small portion of your time to being an advocate for your field?

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

Meet the new JBC editor, Marty Fedor

BY ANGELA HOPP

Last month, the Journal of Biological Chemistry named Martha Fedor, a faculty member at The Scripps Research Institute in La Jolla, Calif., the journal's next editor-in-chief. Her five-year term began Jan. 1. Fedor succeeds Herbert Tabor, a distinguished researcher at the National Institutes of Health who steered the highly cited journal for the past four decades. She is the first female leader in the journal's 106-year history, and she already has in mind a number of initiatives aimed at maintaining the journal's prestige while keeping it positioned on the leading edge of biochemistry.

ASBMB: ***For readers not familiar with your work, what do you do, in a nutshell?***

FEDOR: We study RNA folding and catalysis. In a nutshell, we use biochemical and biophysical approaches to explore how RNA enzymes catalyze biological reactions. We also exploit the self-cleaving activity of small catalytic RNAs to learn how RNAs fold into the precise three-dimensional structures that are needed to perform biological functions in vivo.

ASBMB: ***You initially were trained as a molecular biologist and have been called a biological chemistry convert. Do you think this makes you an interesting choice for JBC editor?***

FEDOR: My introduction to mechanistic enzymology occurred when I was a postdoc in Olke Uhlenbeck's lab in Colorado in the same year that Tom Cech and Sid Altman were awarded the Nobel Prize for their discovery of RNA catalysis. Seeing the value of a quantitative, mechanistic framework for rigorous analyses of RNA catalysis truly changed my approach to science forever. I believe that using the same kind of logical framework to gain a deeper understanding of biological processes as they occur inside living cells is one of the most exciting scientific frontiers.

ASBMB: ***What do you see as the JBC's core strengths?***

FEDOR: It has a lot of strengths. Its greatest, I'd say, is its distinctive focus on biological processes — in contrast with descriptive, methodological or clinical studies — that sets it apart from other journals. When a paper is published in the JBC, people know that it presents a significant advance in understanding the molecular and cellular basis of a biological process. A second major strength is its emphasis on service to the community, which is reflected in constructive reviews, rapid turnaround times, same-day publication, educational tools and other content, such as Reviews and Reflections, that places current research results in a broader scientific context.

ASBMB: ***What about weaknesses that you intend to address?***

FEDOR: The journal has been slowly adapting to the changing frontiers in science and the changing composition of the scientific community, but there's still more work to do if we're going to capture emerging areas and draw in the international scientific community. Regular consultations with international leaders outside our conventional base would help us identify emerging areas and maintain an international perspective. Also, guest editors who personify the cutting edge in emerging areas would bring new expertise to the editorial process and generally serve as emissaries to extend our reach into new scientific communities.

ASBMB: ***You've said before that you want to enhance the JBC's service to authors. What do you have in mind?***

FEDOR: I'd like to look at the entire manuscript submission and review process to see how we can optimize authors' experiences and better evaluate our performance. To reassure authors that their manuscripts will be reviewed fairly and efficiently, I would encourage authors to suggest outside referees if necessary. We also should consider facilitating authors' access to more information about editorial board members' expertise through links to their websites and/or PubMed records.

ASBMB: ***You've been described as a role model and a dedicated mentor, particularly for female students at your institution. Have you thought much about what it means to be the JBC's first female editor-in-chief?***

FEDOR: I have been struck by evidence that simply seeing a woman perform as a competent scientist, mathematician or engineer can have profound effects on a child's perception of her own potential. Outstanding women scientists have been so

important throughout my own career — they know who they are! I relish the opportunity to encourage the next generation of women scientists.

ASBMB: *Herb Tabor is downright legendary. How intimidating is it to be his successor?*

FEDOR: No words are adequate to express the respect and admiration I feel for Herb Tabor. Part of his magical way with people is to make them believe they are capable of doing whatever he asks. Part of that magic must be in play here, and I do have his promise to work with me as co-editor during this transition. Of course, Herb is one of a kind, and no single person could ever fill his shoes. Fortunately for me, he has assembled a terrific team of associate editors, board members and front office staff to help me bring the journal into this new era.

ASBMB: *When you're not in the classroom or lab or reviewing manuscripts, how do you like to spend your free time?*

FEDOR: I will let you know when I have some. Seriously, I'm lucky to have had the chance to live in and visit some of the most beautiful places in the world, and I love throwing myself into outdoor activities — bodysurfing in the ocean, hiking in the mountains and deserts. I'm also attracted to the technical and creative aspects of photography, and I'm trying to develop some skill as an amateur photographer.

Angela Hopp (ahopp@asbmb.org) is managing editor for special projects at ASBMB.

About Marty Fedor

- **Appointments:** The Scripps Research Institute department of chemical physiology, The Skaggs Institute for Chemical Biology, Kellogg School of Science and Technology
- **Education:** Ph.D. in molecular biology from the University of California, Berkeley in 1982; B.S. in zoology from the University of Michigan in 1976
- **Research focus:** Mechanisms of RNA assembly and catalysis
- **More information:** Find out more about Fedor's research by visiting her lab's website at www.scripps.edu/chemphys/fedor.

HERBERT TABOR/JOURNAL OF BIOLOGICAL CHEMISTRY LECTURESHIP

George R. Stark to give 2011 annual meeting opening lecture

BY NICK ZAGORSKI

The American Society for Biochemistry and Molecular Biology has announced that George R. Stark, the distinguished scientist of the Cleveland Clinic's Lerner Research Institute and emeritus professor of genetics at Case Western Reserve University, is the recipient of the society's 2011 Herbert Tabor/Journal of Biological Chemistry lectureship.

"It is a very special honor to receive any award named for Herb Tabor. I feel privileged, but also humbled, to join the outstanding group of biochemists who have received the Tabor award previously."

GEORGE R. STARK

The lectureship recognizes outstanding lifetime scientific achievements and was established to honor the many contributions of Herbert Tabor to both the society and the journal, for which he has served as editor for nearly 40 years.

Stark will be the eighth person so honored, joining a luminous group of recipients that includes the 2010 awardee, Nobel laureate Phillip A. Sharp.

"George Stark has been a leader and pioneer in basic and applied research," said Charles E. Samuel, the Charles A. Storke II professor of biochemistry and virology at the University of California, Santa Barbara, and a longtime colleague of Stark's. "He has been a superb scientist personifying many of the characteristics of Herb Tabor. Recognition with our lectureship would be a most fitting tribute to Stark's numerous seminal contributions."

Those contributions span many fields, influencing the understanding not only of basic biochemistry but also the specialized fields of gene regulation and cell signaling, which have further implications for immunity and cancer. Those landmark discoveries began during his early work on enzyme mechanisms and protein chemistry, at which time he developed the foundational Northern and Western techniques that detect specific nucleic acids and proteins, respectively.

Although initially designed for his particular studies, the techniques are now used worldwide in research and clinical scenarios. More recently, Stark co-discovered gene amplification in mammalian cells and the Jak-Stat signaling cascade, a major pathway that mediates cellular responses to signals sent by the immune system.

A native of New York City, Stark earned his doctorate in chemistry from Columbia University in 1959. He then served as a research associate and assistant professor at Rockefeller University alongside renowned biochemists William Stein and Sanford Moore. After moving to Stanford University in 1963, he became a full professor in 1971. From 1983 to 1992, he worked at the Imperial Cancer Research Fund in London (now Cancer Research UK) as a senior scientist and later as the associate director of research. In 1992, he relocated to the Cleveland Clinic, where he continues his research today.

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

About the award

The Herbert Tabor/Journal of Biological Chemistry Lectureship was established by the American Society for Biochemistry and Molecular Biology to recognize the many contributions of Herbert Tabor to the Journal of Biological Chemistry and the society. Stark will present his award lecture, titled "Genetic Analysis of Signaling Pathways in Human Cells," at 6 p.m. on April 9 at the 2011 annual meeting in Washington, D.C.

AWARD FOR EXEMPLARY CONTRIBUTIONS TO EDUCATION

ASBMB education award goes to Cheryl A. Kerfeld

BY ANGELA HOPP

Cheryl A. Kerfeld, a structural biologist and the head of the U.S. Department of Energy Joint Genome Institute's Education and Structural Genomics Programs, has won the American Society for Biochemistry and Molecular Biology's Award for Exemplary Contributions to Education.

"The integration of bona fide research and development of critical thinking skills into undergraduate education has no greater or more effective advocate than Cheryl Kerfeld," said Kathleen Scott, an associate professor at the University of South Florida, who supported Kerfeld's nomination for the award.

Colleagues underscore that Kerfeld has pushed the envelope for education both in the classroom and on the national scale.

"She is tireless in providing opportunities for authentic research projects with genomics in silico and wet lab projects," said Cheryl P. Bailey, assistant professor at the University of Nebraska-Lincoln, "and she continues to advance the field of structural genomics."

Kerfeld, who has bachelor's degrees in biology and English, a master's degree in English and a doctorate in biology, developed and directed the University of California, Los Angeles Undergraduate Genomics Research Initiative.

"Cheryl has overcome the intimidating nature of DNA sequencing and genome annotation using the how-to-eat-an-elephant strategy," explained Christopher Kvaal, an associate professor at Saint Cloud State University in Minnesota and one of Kerfeld's nominators. "In the case of DNA sequencing of the Ammonifex degensii genome at UCLA, Cheryl broke up the work into different undergraduate classes that fed each other: One course isolated DNA, another cloned fragments of the genome, and another performed the (polymerase chain reaction) and operated the DNA analyzer."

Today, Kerfeld leads the JGI's effort to develop educational programs and tools centered on large-scale DNA sequencing and its bioinformatic analysis and serves as an adjunct professor at the University of California, Berkeley.

"New technologies are catalyzing the convergence of teaching and research experience like never before. It's a great honor to be able to help so many talented and dedicated educators find ways to incorporate genomics and bioinformatics into their courses and their undergraduate research programs."

CHERYL A. KERFELD

At the JGI, she conceived of and oversaw the development of an electronic resource and website for use by undergraduates annotating genomes. The Integrated Microbial Genomes Annotation Collaboration Toolkit, or IMG-ACT, is now being used at more than 65 educational institutions.

"Based on her own research, Cheryl knows that genome annotations are only as good as the experiments they inspire to test bioinformatics predictions. The holy grail is a national undergraduate effort to connect sequence annotation to functional genomics, and Cheryl is the leader to make it happen," said Brad Goodner, a professor of biology at Hiram College in Ohio.

Angela Hopp (ahopp@asbmb.org) is managing editor for special projects at ASBMB.

About the award

The ASBMB Award for Exemplary Contributions to Education is given annually to a scientist who encourages effective teaching and learning of biochemistry and molecular biology through his or her own teaching, leadership in education, writing, educational research, mentoring or public enlightenment. Kerfeld will present her award lecture, titled "Sequence and Consequence," at 12:30 p.m. on April 10 at the 2011 annual meeting in Washington, D.C.

Retrospective: Britton Chance (1913 – 2010)

BY ANGELO AZZI AND NICOLE KRESGE

Molecular biologist Britton Chance, whose multifaceted research advanced the understanding of biology, instrumentation and medicine, passed away on Nov. 16. He was 97.

Chance was born in Wilkes-Barre, Pennsylvania in 1913. He spent many summers during his youth sailing, and his love of the sea was the catalyst for his first significant contribution to science and technology. When he was just a teenager, Chance invented an autosteering device that detected deviations in a ship's course and generated a feedback signal to redirect the ship's steering mechanisms. Later in life, his love of sailing and intense competitive spirit landed him a spot on the U.S. yacht Olympic team, where he won a gold medal in the 1952 Olympics.

Chance received his bachelor's degree (1935) and his doctorate in physical chemistry (1941) from the University of Pennsylvania and his doctorate in physiology from Cambridge University (1943).

In 1938, while still a graduate student at the University of Pennsylvania, Chance started constructing a microflow apparatus. He completed the instrument by 1939 and did some initial studies on luciferase-O_2 reactions. Several years later, using a new version of his rapid-flow instrument, he elucidated the peroxidase enzyme-substrate reactions, providing the first direct evidence of the correctness of the Michaelis-Menten theory.

During World War II, Chance was recruited to the Massachusetts Institute of Technology Radiation Laboratory to work on radar systems. After the war, he went to Stockholm on a two-year Guggenheim Fellowship to work with Hugo Theorell. He and Theorell used another version of the stop-flow apparatus to study the kinetics of NAD in alcohol-aldehyde interconversion and found that product release was rate-determining. This is now called the Theorell-Chance mechanism.

Chance returned to the University of Pennsylvania after his fellowship was over and became a professor of biophysics and physical biochemistry and director of the Johnson Foundation. In the early 1950s, he shifted his focus to biological phenomena and studied the control of oxidative phosphorylation in mitochondria and revealed the role of ADP in respiratory control.

Chance, along with Henry Lardy and later Ron Williams, worked out methods to separate mitochondria from cells and preserve their metabolic activity in vitro and invented the dual wavelength spectrophotometer to analyze mitochondrial electron transport coupled to ATP synthesis. He later developed methods for using optical spectroscopy to study living tissues. In the late 1970s, he was the first to use magnetic resonance spectroscopy on a whole organ, the excised brain of a hedgehog.

After his retirement in 1983, Chance became director of the Institute for Biophysical and Biomedical Research, part of the University City Science Center, as well as president of the Medical Diagnostic Research Foundation in Philadelphia.

Angelo Azzi (angelo.azzi@tufts.edu) is a senior scientist at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University. Nicole Kresge (nkresge@asbmb.org) is the editor of ASBMB Today.

IMAGE COURTESY OF THE UNIVERSITY OF PENNSYLVANIA ARCHIVES.

To read more online:

- Remembrances from Chance's friends and colleagues: http://bit.ly/ATodayChance.
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Retrospective: Harvey A. Itano (1920 – 2010)

BY NICOLE KRESGE

Harvey Akio Itano, University of California, San Diego emeritus professor of pathology, died this past May at age 89. Itano was best known for his work, with Linus Pauling, on the molecular basis of sickle cell anemia.

"Harvey Itano was one of the most illustrious, well-known and influential faculty on the entire UC San Diego campus," said David N. Bailey, distinguished research professor of pathology at UC San Diego. "Despite this, he was extremely modest and humble. His dedication to research and teaching was his raison d'être. He enriched the lives of innumerable faculty, staff and students."

Itano was born in Sacramento, Calif., in 1920. He graduated from the University of California, Berkeley, in 1942 with highest honors in chemistry. However, he was unable to attend his graduation ceremony because he and his family were sent to the Tule Lake internment camp in Northern California in early 1942 after the Japanese bombed Pearl Harbor. Despite this, in recognition of his outstanding achievements as a student (he earned the highest academic record in his class), then-UC President Robert Gordon Sproul personally awarded him the University Medal during his internment.

Itano was released from the camp on July 4, 1942, the first of the Nisei (second-generation Japanese-Americans) to be released to attend colleges and universities. He enrolled at the St. Louis School of Medicine and earned his medical degree in 1945. Then he went to the California Institute of Technology for graduate school, where he worked with Nobel laureate Linus Pauling using electrophoresis to identify the differences between the hemoglobin in normal red blood cells and those afflicted with sickle cell anemia.

Itano and his colleagues were able to show that the disease's hallmark sickling of blood cells was caused by a mutation in a single amino acid in hemoglobin. His finding, published in the journal Science in 1949 (1), was the first demonstration that a disease could be caused by a singular molecular defect. Itano received the Eli Lilly Award in Biological Chemistry in 1954 in recognition of this work.

"Although I did not know Dr. Itano personally, his work on the biochemistry of hemoglobin and hemoglobinopathies helped form the foundation for the practice of modern hematopathology today," said Steven Gonias, professor and current chair of pathology at UC San Diego.

Itano earned his doctoral degree in chemistry and physics in 1950, after which he joined the U.S. Public Health Service as a senior assistant surgeon. Ultimately, he became chief of the section on chemical genetics in the Laboratory of Molecular Biology at the National Institute of Arthritis and Metabolic Diseases and medical director of USPHS in Bethesda, Md. Itano held these positions until 1970, when he was recruited to the faculty of the UC San Diego School of Medicine. There he continued his work in sickle cell disease and abnormal blood cells until his retirement in 1988.

Itano was the recipient of many awards and honors, including the Martin Luther King Jr. Medical Achievement Award from the Southern Christian Leadership Conference in 1972 for his work unraveling a disease that primarily affected African-Americans. He was elected to the National Academy of Sciences and the American Academy of Arts and Sciences. He also was named the Japanese American of the Biennium in the field of medical science by the Japanese American Citizens League.

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

REFERENCE

1. Pauling, L., Itano, H. A., Singer, S. J., and Wells, I. C. (1949) Sickle cell anemia: a molecular disease. *Science* **110**, 543 – 548.

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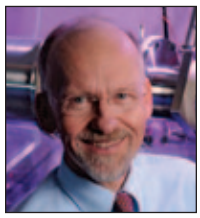
asbmb member update


KARGER


GOULD


SMITH

Herovsky Medal goes to Karger

Barry L. Karger, director of the Barnett Institute and James L. Waters professor of analytical chemistry at Northeastern University, is the recipient of the Herovsky Gold Medal for Merit in the Chemical Sciences, awarded by the Czech Academy of Sciences.

Karger's research focuses on the development and application of microscale separations and mass spectrometry analysis to problems of biological relevance.

Karger also recently was awarded the inaugural Csaba Horvath Memorial Lectureship, sponsored by the American Chemical Society International Chemical Sciences chapter in Hungary.

Gould to be director of international scholar program

Kathleen Gould, professor of cell and developmental biology at Vanderbilt University and a Howard Hughes Medical Institute investigator, has been selected as the first director of a new Vanderbilt program aimed at attracting the best and brightest biomedical graduate students from around the world.

The Vanderbilt International Scholar Program in Biomedical Research, which began this past summer, will cover the first two years of tuition and stipends for selected scholars who maintain good academic standing. According to Gould, the goal is to make Vanderbilt "a more attractive place for them to consider coming to because there would not be any limitations on exploring their passion in science."

"To be a truly great international university, Vanderbilt needs to continue to grow a diverse community of scholars," said Susan Wente, associate vice chancellor for research and senior associate dean for biomedical sciences at Vanderbilt University Medical Center, who spearheaded the program.

VISP already is attracting interest from universities around the world — 12 scholars from Cameroon, China, India, Korea and Vietnam were selected this summer to participate in the first year of the program.

Smith named R&D Scientist of the Year

Richard D. Smith, director of the National Institutes of Health Biomedical Technology Resource Center for Integrative Biology and the U.S. Department of Energy High Throughput Proteomics Facility at the Pacific Northwest National Laboratory, has been named a 2010 Scientist of the Year by R&D Magazine.

Smith's research has contributed numerous fundamental advances to mass spectrometry and proteomics. He helped introduce advanced microanalytical separations and accurate MS instrumentation and techniques for quantitative, ultra-sensitive, high-resolution rapid measurements of proteins and other biomolecules in complex biological systems. Smith's work has addressed Parkinson's disease, cancer and biofuels production, and during the past five years, his contributions to proteomics measurements have laid critical groundwork for breakthrough advances in systems biology.

Most recently, Smith developed a next-generation proteomics measurement platform that utilizes ion mobility separations to reduce proteome analysis times from several hours to several minutes.

"I'm surprised and pleased at the honor, and happy to be in such great company," said Smith in a news release. "And I'm especially grateful to the incredibly talented team of researchers at the lab who I have been able to work with."

IN MEMORIAM:

Philip Person

American Society for Biochemistry and Molecular biology member Philip Person passed away on Sept. 16, 2010.

Person was born in Brooklyn, N.Y., in 1919. He attended Boy's High School in Brooklyn and graduated with a degree in chemistry from the City College of New York in 1940. After obtaining his dental degree from New York University, he earned his doctorate in biochemistry with Walter Wainio at Rutgers University.

Person served in the U.S. Armed Forces at Edgewood Arsenal during World War II and as a research scientist at Walter Reed Army Hospital during the Korean War. He spent his career as chief of the Special Research Laboratory for Oral Metabolism at the Brooklyn VA Hospital and served on the dental school faculties of New York University and the Hebrew University in Jerusalem. He served as a consultant to the World Health Organization of the United Nations. Person also was a summer scientist at Woods Hole Marine Biological Laboratory, conducting research there for more than 50 years.

After retiring from the Veteran's Administration in 1985, Person became a biomedical consultant.

Massagué and Sharp named Rock Stars of Science

Joan Massagué, chairman of the cancer biology and genetics program at Memorial Sloan-Kettering Cancer Center, and Phillip A. Sharp, institute professor at the Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology, have been named 2010 Rock Stars of Science.

The two scientists join 15 of the nation's top medical researchers and eight celebrity musicians — rock icons Debbie Harry (Blondie), Bret Michaels, Timbaland, Keri Hilson, Heart (Anne and Nancy Wilson), Jay Sean and B.o.B — in a special six-page public service campaign that appears in GQ Magazine's December "Men of the Year" edition. Each photo set is a tribute to scientific heroes in fields like translational cancer research, Alzheimer's/neuro-imaging/prevention trials, heart disease/integrative medicine, autism, rare diseases, stem cell research, global health and space age research.

The campaign, now in its second year, is sponsored by Geoffrey Beene Gives Back®, GQ Magazine and the Entertainment Industry Foundation/SU2C.

"The RSOS campaign shines the spotlight on this critical national issue," said G. Thompson Hutton, CEO and trustee of the Geoffrey Beene Foundation, in a press release. "If we invest in research, we will save lives now and trillions of dollars later."

"Scientists must venture outside their comfort zones to show the public how cool — and how important — their work really is," said Francis Collins, director of the National Institutes of Health and one of the 2009 Rock Stars of Science. "I'm thrilled to see all of these big-name musicians using their star power to shine a spotlight on science. However, it is only the beginning. I urge every scientist to get into the act by telling friends, neighbors, community leaders and elected officials about his or her research and what it means for our nation's health. Imagine how powerful that would be."

To read more about the scientists and to celebrate your own "Rock Doc," go to the Rock Stars of Science website at www.rockstarsofscience.org.

IN MEMORIAM:

Marie W. Wooten

Marie W. Wooten, former editorial board member for the Journal of Biological Chemistry, passed away on Nov. 5, 2010 after being struck by a vehicle.

Wooten earned her bachelor's degree in microbiology from the University of Memphis in 1979 and her doctorate in cell and molecular biosciences from Texas Women's University in 1983. She completed her postdoctoral training at the Medical College of Georgia, Cold Spring Harbor Laboratory in New York and the University of Alabama-Birmingham. She joined Auburn University in 1987 as a faculty member in the department of biological sciences in the College of Sciences and Mathematics. She served as head of the department from 1995 —1997 and in 2000 became associate dean of research for the college, a position she held until becoming dean in 2010. She also was the recipient of the Scharnagel professorship at AU.

In her role as associate dean of research, Wooten guided the creation of multiple innovative programs, enhanced interdisciplinary research, developed strategic partnerships and sought to diversify the college's research portfolio. Widely recognized for her contributions as a mentor, scientist, scholar and academic administrator, Wooten was committed to student training and outreach. She was cofounder of the Institute for Women in Sciences and Engineering and also a member of the National Science Foundation ADVANCE program, which focuses on enhancing diversity in STEM fields.

Wooten's research interests included cellular and molecular developmental neurobiology and neurodegeneration. In a study that had entered its second decade, Wooten discovered a protein molecule in the brain that could prove to be a key in the search for a cure for Alzheimers disease.

Potent science

BY NICK ZAGORSKI

Whether employed for attack, defense or a little bit of both, biological toxins have evolved throughout the plant, animal and microbial kingdoms. These deadly compounds have been the subject of scientific inquiry for centuries and remain so to this day. In particular, venoms produced by numerous animal species are a subject of great interest. These biological cocktails contain proteins and peptides with exceptionally enhanced activity designed to do a specific job and do it well. Given such potent biochemistry, it certainly makes sense that many American Society for Biochemistry and Molecular Biology members have taken an interest in venom proteins, whether as models for mammalian systems, as diagnostic tools in the lab or even as potential therapeutic agents. Included below are just a handful of our society's members who brave these venomous waters in their research.

Jay Fox

Professor and Assistant Dean of Research Support of Microbiology University of Virginia Medical School, Charlottesville

Back in the day, working in Jay Fox's lab was quite an adventure. "We used to house live venomous snakes in our lab, and that typically kept my graduate students on edge," he says.

These days, most of the venom peptides he needs easily can be synthesized or purchased, so current students don't need to worry about any slithery companions. However, Fox believes that doesn't make his research into the molecular biology and proteomics of snake venom any less exciting.

Fox got his first sip of the venom cocktail during his graduate studies with fellow ASBMB member Anthony Tu at Colorado State University, where he used approaches like Raman spectroscopy to identify the toxins present in various snake venoms.

He continued his work in the field of toxinology when he set up his own lab and managed to identify some unusual zinc proteases among the peptides of several crotalid (rattlesnakes and their relatives) venoms. These proteases, termed reprolysins, could break down collagen and other extracellular matrix components and likely are responsible for the hemorrhaging associated with snakebites.

Of course, Fox did realize that his snake venom studies would likely require some applicability for long-term success. "Snakebites are really quite rare, so they're not perceived as a significant health problem that requires tremendous resources," he says.

That applicability soon arrived when it was found that the reprolysins were part of a protease subgroup called "a disintegrin and metalloproteinase with thrombospondin

motifs." The multidomain ADAMTS proteases were generating quite a bit of research interest, since many of them were implicated in inflammation, atherosclerosis and cancer.

Since then, Fox and his lab have spent a lot of time in cancer research (although he still makes time for numerous side projects and collaborations in toxinology), particularly examining how cells, the surrounding extracellular matrix and proteases interact in promoting the invasion and metastasis of cancer cells. He's shown, for example, that melanoma cells can influence the gene expression of nearby fibroblasts in the stromal tissue to produce a more invasion-friendly microenvironment.

"Of course, our studies are just one example of a significant element regarding the repertoire of proteins in snake and other venoms," Fox says. "Namely that nearly all venom peptides identified to date have human orthologs. The venomous versions are just slightly modified to give them a pronounced effect."

And that pronounced effect has led to significant payoffs both in research, where venom biology has led the way to understanding the role of certain proteins in mammals, and in medicine, as more than 20 venom-derived drugs and diagnostics have been approved or are in development.

Fox believes that these drugs represent just a fraction of venom's potential in biomedicine. "I consider venoms to be great natural products libraries (the venom of a single snake can contain up to 50 different proteins and peptides) that probably still hide many secrets," he says. "We know most of the protein components by now, but what isn't known is the overall activity profile."

Once identified, venom peptides usually are assayed for a single, pre-defined toxic activity, whether it's blocking an ion channel or inducing blood coagulation.

To this end, Fox also has become involved in using proteomic approaches to look into the functionality of venom peptides, such as analyzing post-translational modifications or proteolytic processing. He believes that by using such emerging technologies, researchers can uncover new activities in venom, and that will lead to new drugs.

JBC HIGHLIGHT:

Serrano, S. M. T., Kim, J., Wang, D., Dragulev, B., Shannon, J. D., Mann, H. H., Veit, G., Wagener, R., Koch, M., and Fox, J. W. (2006) The cysteine-rich domain of snake venom metalloproteinases is a ligand for von Willebrand factor A domains: role in substrate targeting. *J. Biol. Chem.* **281**, 39746–39756.

Michael H. Gelb

Harry and Catherine Jaynne Boand Endowed Professor of Chemistry
University of Washington, Seattle

Snakes may elicit a lot of fear due to their venomous nature, but in fact, the innocuous-looking honeybee kills more people each year in the U.S.

Of course, the threat of a bee sting is not the toxins themselves but rather the allergic reaction (anaphylaxis) that can occur following injection. This is due in large part to the presence of significant amounts of the allergen phospholipase A2, an enzyme that breaks down phospholipids found on cell membranes.

Over the years, bee venom has been a favorite system for allergy research, and scientists have made strides in adapting bee venom as an immunotherapy agent for insect stings and other immune conditions like arthritis.

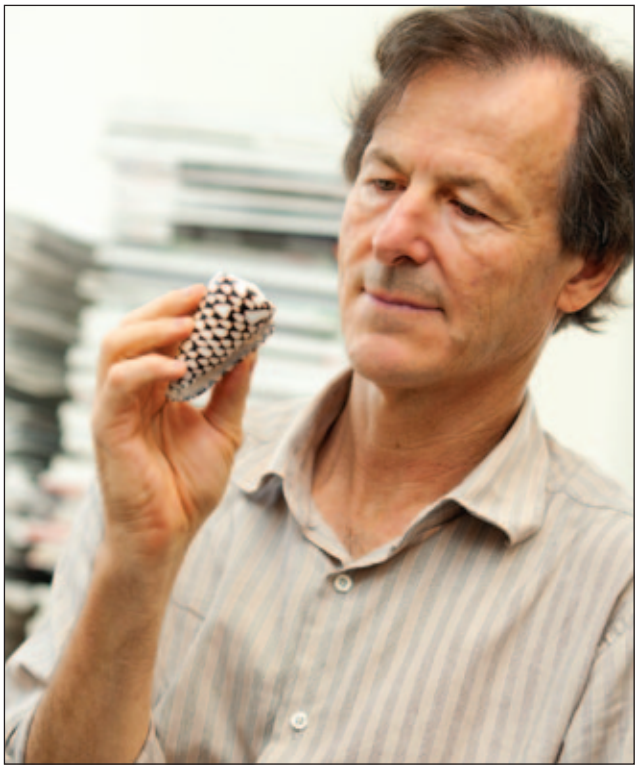
However, it was in the 1980s, when researchers had found evidence that mammalian secreted phospholipases A2 might be involved in producing arachidonic acid, the precursor to prostaglandins and other eicosanoids (key inflammatory agents), that even more people took notice, including Michael H. Gelb.

Gelb, whose multifaceted interests include medicinal enzymology, drug design and protein prenylation, was interested in the link to inflammation and decided to use bee phospholipase as a model of the mammalian enzymes.

The initial choice was a pragmatic one. "Back then it was quite a challenge to engineer to express these proteins because of their many disulfide bonds," he says. "But we were able to express the bee PLA2 in E. coli and so we went with that, even though the enzyme is more distant to humans than

PLA2 found in snakes."

The choice proved to be quite fruitful, and since his first experiments some 20 years ago, Gelb's group has discovered numerous insights into phospholipase biochemistry with the help of the bee model. This work has included structural studies on the enzyme (with renowned structural biologist Paul Sigler of Yale University), which revealed that PLA2 has distinct lipid binding and active sites and that catalysis likely occurs through diffusion of a single phospholipid substrate into the active site slot without a conformational change to the PLA2 upon binding to the membrane surface. His group also has identified mechanisms underlying both membrane binding and antibody binding.



With that fundamental knowledge in hand, Gelb now has turned his attention to understanding the function and regulation of human PLA2 enzymes in the eicosanoid pathway. Together with Gerard Lambeau of IPMC-CNRS in Valbonne, France, he has identified and characterized a number of new and unusual PLA2 proteins, including a catalytically inactive variant that may act as a receptor ligand instead of an enzyme. He's also taken an interest in the cytosolic phospholipase enzymes and how they interact with the secreted enzymes in various processes.

Some of these novel proteins could hold therapeutic promise, including one (sPLA2-X) that participates in the synthesis of asthma-inducing leukotrienes and another (sPLA2-IIa) that is involved in rheumatoid arthritis.

"We've got some exciting results, though it hasn't been quite enough yet for pharmaceutical companies to take notice," says Gelb. "I guess they're being a little cautious these days."

It's no big deal, though; with nine different phospholipase A2 groups in humans, along with several variants in each group, Gelb has plenty of work to keep him busy until that day comes along.

JBC HIGHLIGHT:

Valentin, E., Ghomashchi, F., Gelb, M. H., Lazdunski, M., and Lambeau, G. (2000) Novel human secreted phospholipase A2 with homology to the group III bee venom enzyme. *J. Biol. Chem.* **275**, 7492–7496.

Richard Lewis

Professor, Chemistry and Structural Biology Division Institute of Biomedicine, University of Queensland, Australia

While the United States may not be a major hub for venom studies, it probably comes as no surprise that Australia is an important center for venom research.

As Richard Lewis notes, it's logical given the abundant source material. "Australia has some of the deadliest spiders, snakes, fish and jellyfish in the world," he says. "I think the only venomous animal for which we're not at the top of the list is our scorpions."

Understanding this deadly fauna has been of great interest to Australian researchers for years, and the country has been a pioneer in areas like developing antivenoms and using compression bandages to treat snakebites.

Now, researchers like Lewis are combining new technologies with established approaches to gain even more insight into the pharmacology of the varied venoms and other bioactive compounds present in the surrounding environment.

Lewis got his own introduction to this field in his doctoral research, where he studied ciguatoxin, a chemical produced by certain dinoflagellates that can accumulate in fish and cause ciguatera, a type of food poisoning. He then spent a few years in industry, working on ways to manage ciguatoxin poisoning, before taking a faculty position at the University of Queensland in 2000.

In his lab, Lewis has turned most of his attention to cone snails, remarkable predatory mollusks that have evolved a diverse set of toxin peptides that typically range from 10 to 30 amino acids long and are stabilized through disulfide bonds (though there are outliers, including a massive 11,000-kd dimer).

"Baldomero Olivera really helped break this field open in the early 1980s when he first isolated some of these peptides and assigned functions to them, and obviously, it would be difficult to compete with him," Lewis says. "But I thought if I focused on some of our distinct Australian cone

sail species, our group could make a unique contribution."

That certainly has been the case; while most characterized conotoxins have roles in blocking ion channel activity, Lewis' team has found some more unusual inhibitors, such as peptides that block a G-protein coupled receptor and the norepinephrine (noradrenaline) transporter.

The latter peptide, part of a new family called chi-conopeptides, was particularly exciting. "Norepinephrine is involved in one of the key analgesic pathways in the spinal cord known as descending inhibition," Lewis notes. "And when we did test the peptide in animals we found that it had some dramatic pain-relieving effects in models of neuropathic pain, which is exciting since neuropathic pain remains poorly treated in humans."

Along with some colleagues, Lewis spun his discoveries into a startup biotech called Xenome, which is hoping to take his chi-conopeptide (Xen2174) into the clinic along with other leads like new calcium channel-blocking omega-conopeptides recently discovered through a National Health and Medical Research Council program grant. These new omegas have strong analgesic properties but none of the side effects typically seen in this class of peptides.

Recently, Lewis has been looking into integrating mass spectrometry technology and deep sequencing to probe cone snail peptides in even greater detail.

"We've been using Edman sequencing to map the amino acid composition of our peptides, but these new approaches have the potential to transform the way we do venom research," he says. "Each cone snail species has over a thousand unique peptides, not to mention a host of protein machinery that makes and modifies these peptides, and these new technologies are going to be essential in helping us uncover all variations that occur in this amazing group of molecules and give us clues to how they first evolved."

JBC HIGHLIGHT:

Sharpe, I. A., Palant, E., Schroeder, C. I., Kaye, D. M., Adams, D. J., Alewood, P. F., and Lewis, R. J. (2003) Inhibition of the norepinephrine transporter by the venom peptide χ-MrIA: site of action, Na+ dependence and structure-activity relationship. *J. Biol. Chem.* **278**, 40317–40323.

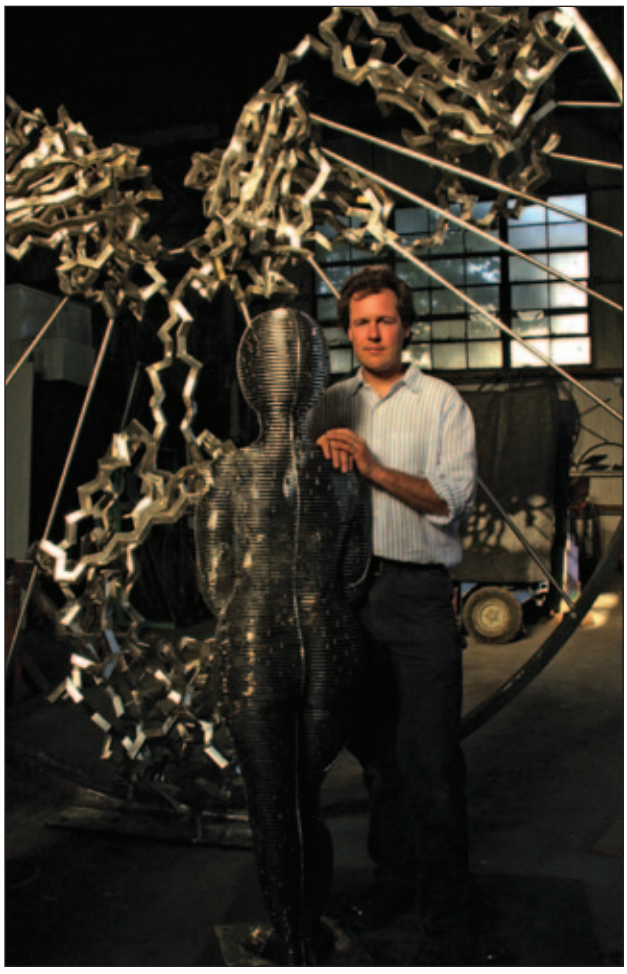
Nick Zagorski (nzagorski@asbmb.org) is a science writer at ASBMB.

Science in art and art in science: an interview with Julian Voss-Andreae

BY ROZA SELIMYAN

The idea of dualism was first conceived when ancient philosophers attempted to decipher human nature in terms of the relationship between the human body and mind. Through the centuries, it gained much wider usage, spreading to nearly all fields of knowledge — politics, religion, ethics, psychology, literature and science. It has become so widespread that often any opposition is seen as dualistic. This notion is arguable though, because oppositions are not always unsolvable. Sometimes, on second glance, opposites can overlap so much that it is difficult to view them as contraries. One such example is science and art — two seemingly different and uncooperative disciplines. However, if we think about Michelangelo, for example, the division between art and science fades. Julian Voss-Andreae also blurs this division. Sometimes when looking at his works, it becomes almost impossible to say where the art ends and the science begins and vice versa.

Voss-Andreae is a German-born sculptor whose works are strongly influenced by science. Having started as a painter, he changed course in his early twenties and studied physics and quantum physics at the universities of Berlin, Edinburgh and Vienna. He then moved to the United States (Portland, Ore.) where he decided to pursue his passion for art and graduated from the Pacific Northwest College of Art in 2004. His recent commissions include a large-scale outdoor piece for the Scripps Research Institute in Florida and a sculpture for Nobel laureate Roderick MacKinnon at the Rockefeller University in New York City. ASBMB Today caught up with Voss-Andreae and asked him about his work.



Julian Voss-Andreae in his studio.

ASBMB: ***Your professional niche is so specific. How did you arrive at it?***

VOSS-ANDREAE: It does look specific from the outside. But for me it actually feels quite broad. It is similar to a scientist's research interest: every outsider would think that this person is involved in a really tiny niche, but he or she feels it is a whole universe they are interested in. I am interested in many things and that resulted paradoxically in the specificity of my niche. But I don't let this confine my work. If I make works that don't fit into that niche, so be it.

ASBMB: ***What came first: fascination with art or with science?***

VOSS-ANDREAE: As a child there was no distinction for me between art and science. I loved building LEGO blocks. It is artlike in that it serves a decorative purpose and the imagination runs wild while building structures and then playing with them. But it is very scientific as well: I was always striving to create something that is satisfying in the same sense as a great engineering solution is satisfying or even elegant. Later I added electronics, chemistry and computer programming to my hobbies but did painting and pottery at the same time. I approached all those hobbies in a very sensual, kind of pleasure-driven way, not very systematic or intellectual.

Steel Jellyfish (Green Fluorescent Protein), 2006. Stainless steel, height 55 inches (1.40 meters). Collection of the Friday Harbor Laboratories, University of Washington.

ASBMB: *Which scientific areas interest you the most?*

VOSS-ANDREAE: I love quantum physics. I love the mathematics used there and that it forces you to discover that our prejudices about the workings of the universe are largely false (as John Archibald Wheeler roughly puts it). It forces us to develop completely new intuitions. Most of classical physics is really beautiful, too. Areas such as electrodynamics or fluid dynamics reveal their beauty much more because we can solve the differential equations on computers now. In biology I am obviously interested in structural aspects of biochemistry and generally in organic structures. I am very interested in research that combines quantum physics with biology, for example work that looks at light emission and absorption in and between living cells. Such biophotons might be an important means of communication between cells or even between organisms. This research is associated with names like Fritz A. Popp, and it is currently moving slowly toward scientific mainstream. And I just came across some exciting work by a researcher in London, Mae-Wan Ho. Her research points at the possibility that living beings are in a state of quantum coherence, which I feel is really fitting to our experience of being alive.

ASBMB: *What are you currently working on?*

VOSS-ANDREAE: I just finished writing a new paper about my protein sculptures, to be published in the art/science magazine Leonardo. Now I've started working on a larger, privately commissioned bronze piece. At the same time I am working on a project that has kept me busy for some years now. I am basically attempting to recreate the shape of a human body as a cellular network of foam bubbles, which I want to conform to the body's shape. That latter part is really tricky, and I am currently developing a third approach after a purely experimental one (with balloons as bubbles in a human mold) and a purely computational approach (where I minimized the soap film area while enforcing the boundary conditions). Right now I am in the process of turning many gigabytes of data into what will hopefully eventually become a sculpture.

ASBMB: *Would you like to share your next plans?*

VOSS-ANDREAE: I am incorporating the human being more into my work, and I have plans to have a whole exhibition devoted to that idea. This interest has two aspects: On one side, I find myself referencing the human body more and more, and on the other side, I am interested in allowing more of the human complexity, the miraculous, non-conscious creative powers to enter into my work. In painting that happened automatically: I would get into a meditative, all-observing state of mind and the information flowing into my eyes would get transformed and flowed out of my hand to create a painting in an almost completely non-conscious way. Despite or maybe because of this non-conscious filtering, the arising image often had new and unexpected features, and at the same time a degree of meaning and coherence that I find astonishing. In sculpture, and especially in larger-scale pieces, this openness to that kind of creativity is very hard to achieve because of the need to plan ahead to conform to the many restrictions imposed by reality, such as rain or gravity, or technical feasibility.

Roza Selimyan (selimyanr@grc.nia.nih.gov) is a research scientist at the National Institute on Aging.

For more information:

To see a video interview with Voss-Andreae, go to http://bit.ly/ATodayVoss-Andreae

Giving students endurance in the graduate-school marathon

BY MARINA PAZIN

According to the data collected by the National Science Foundation, men consistently have outnumbered women when it comes to enrolling in graduate programs in the science and engineering fields. In 2007 alone, entering male graduate students (including those pursuing graduate studies part-time, regardless of citizenship status) outnumbered women by about 30 percent in S&E content areas (1). Under the broad S&E umbrella, the specific areas pursued by graduate students are partitioned by gender barriers as well, as women continue to be underrepresented in engineering, physics, astronomy, mathematics and other computation-oriented fields.

With this in mind, Bianca Bernstein, a counseling psychologist at Arizona State University, created *Career*WISE, an online tool for women in S&E doctoral programs. The site provides support for building successful partnerships with graduate advisers, balancing life in and out of the graduate program, and overcoming unanticipated hurdles to graduation in S&E fields in which women traditionally have shown a higher dropout rate than men. Partnering with the NSF, whose major interest is to expand participant numbers among minorities and women in all S&E fields, Bernstein's research team officially launched *Career*WISE on Nov. 4, 2010.

According to the *Career*WISE team, "The site is built on an extensive foundation of theory and research of psychological processes, environmental context and personal behaviors that contribute to women's experiences in academic and career paths." Their goals are to help women in S&E graduate programs find ways to better manage their immediate environments and to provide a long-term resource for overcoming barriers and expanding personal support in careers.

The site contains more than 300 pages of content, all easily accessible from a map provided on the homepage. The resource is organized around four key areas: relationships with advisers, work-life balance, unwelcoming academic environments and hurdles to overcome. As stated directly on the homepage, "*Career*WISE skills modules help you understand yourself better, analyze your environment, and learn strategies to stay motivated, expand your personal support, and overcome any barriers you may encounter." Based on this premise, the modules developed by Bernstein and her team encourage coping with challenges encountered in graduate school through a four-step approach that consists of assessing the problem, outlining a likely outcome, strategizing actions to arrive at the outcome and, finally, executing and evaluating the designed plan.

*Career*WISE also prominently features more than 180 video clips of women, all of whom have obtained their doctorate degrees and have transitioned successfully into the workforce, sharing their own experiences as students. This provides an atmosphere of positive psychology in which users can refer to content without having to reveal personal concerns.

A Facebook page also is being set up for graduate students who wish to come together to discuss content from the site. And simulations of critical situations are being developed with co-investigators Robert Atkinson and Jennifer Bekki as part of a recent grant from the NSF.

Materials offered through *Career*WISE will be updated constantly with the hope of making it a source for graduate students not just within the United States but globally.

Summarizing the mission statement on the homepage, *Career*WISE is "your personal, expert, and confidential coach," assisting doctoral candidates during the marathon that is the graduate school experience. The resource is freely available to anyone who registers at http://careerwise.asu.edu.

Marina Pazin (marinapazin@gmail.com) is a graduate student at Northwestern University.

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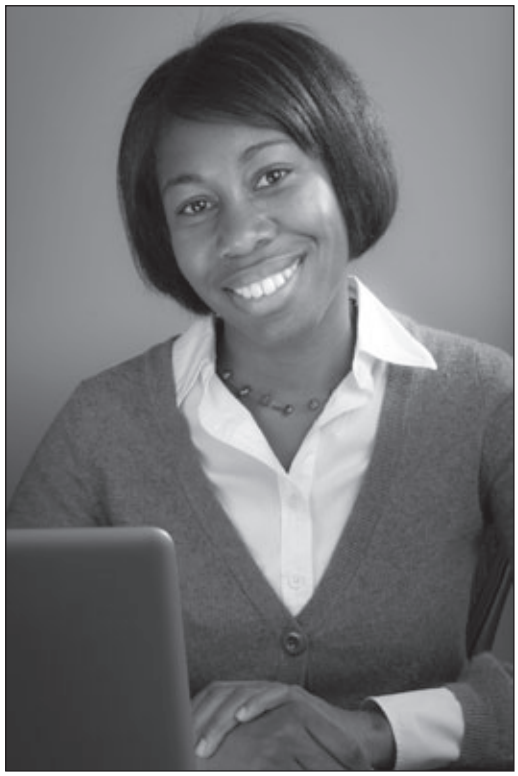
An interview with Heather Pinkett

BY THE ASBMB MINORITY AFFAIRS COMMITTEE

Below, Heather Pinkett, an assistant professor in the department of molecular biosciences at Northwestern University, talks about her research and interests and shares some of the challenges she's faced in her scientific development.

ASBMB: ***Tell us about your current position.***

PINKETT: I am an assistant professor in the department of molecular biosciences at Northwestern University. In 2008, I joined the faculty at NU after doing a postdoctoral fellowship at the California Institute of Technology in the laboratory of Douglas Rees. In addition to running a research group, my role as assistant professor includes teaching and advising graduate students. My research group consist of undergraduates and grad students all working on different projects that relate to the mechanism of transport. My lab is interested in how compounds are transported into and out of the cell, especially toxins, so we study membrane-bound molecular pumps called ATP binding cassette transporters to understand this mechanism.



Normally, proteins that bind small molecules recognize the shape of only one compound or the common features of a few related compounds. By contrast, several members of the ABC transporter family can induce multidrug resistance by recognizing and exporting a large number of unrelated compounds. For cancer patients undergoing chemotherapy who develop multidrug resistance, expulsion of cytotoxins means that tumor cells are never completely eradicated. In MDR, patients who are on medication eventually develop resistance to not only the drugs they are taking but to several different types of drugs. Because all ABC transporters utilize ATP as an energy source for transport, basic mechanistic information that can be gleaned from structures may help us understand how this superfamily of proteins functions.

ASBMB: ***How did you first become interested in science?***

PINKETT: My "aha" moment occurred during my first year in college. Originally, I thought I wanted to be a child psychiatrist; I had even volunteered at Bellevue Hospital in Manhattan for a summer. When I went off to college, I majored in biochemistry and minored in psychology. Sitting in my psychology classes, I found I was fascinated not only by the discussions of behavior associated with mental disorders but also by our discussions on neurotransmitters. I wanted to know more. I would carry these psychology discussions into my biology classes, inquiring about research on norepinephrine and serotonin levels in the brain. Making connections between my psychology and biology studies kick-started my search to find a lab in which I could gain experience doing research.

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

PINKETT: My mother has been a great role model. When I was younger, she spent nights and weekends studying for exams that she always aced. She taught me always to show up prepared. Starting with my undergraduate research experience, I also have benefitted from scientists who believed in my potential and gave me an opportunity. From gas phase kinetics to my research experience at NIH, I was given an opportunity to work on something that was completely outside my field. My grad school and postdoctoral advisers continue to be supportive of my career path.

For more information:

To read more from the interview with Pinkett, go to http://bit.ly/ATodayPinkett.

Submitting a special symposium proposal? Get the inside scoop

BY JLYNN J. FRAZIER

The American Society for Biochemistry and Molecular Biology is now accepting proposals for 2012 Special Symposia series topics. All proposals initially are reviewed by the Small Meetings Committee, chaired by Ali Shilatifard (Stowers Institute for Medical Research), and then sent to the Meetings Committee for a second round of review and approval. If you're planning on submitting a proposal, here are some hints for creating a successful symposium.

Propose a catchy title

Your title should make clear what the meeting is about but should also draw the attention of the reviewers and, once your proposal is approved, your potential attendees. Come up with a couple of ideas and provide them in your proposal. The reviewers also may make suggestions.

Clearly define the meeting description

Your meeting description should be specific about what aspects of the proposed topic will be covered. If possible, try to identify the three or four key questions that will serve as the framework for the meeting. This will be helpful to the reviewers and also aid in soliciting participation from speakers and poster presenters. It also is essential to include your vision for the meeting format — explain how you will organize the meeting to provide adequate networking time and a variety of presentations that incorporate emerging areas in the field.

Emphasize the impact statement

An impact statement places the proposed meeting within a larger scientific context and points out the timeliness and unique aspects of the particular topic. Ask yourself: Why this topic and at this time? Within this statement, you should identify the potential impact this meeting will have for ASBMB members and the larger scientific community.

Determine the people and place

An excellent meeting topic leads to a successful meeting when you bring a community of people to the right place at the same time. Begin by identifying who you want to attend the meeting. Now that you have your outline of topics and have defined the questions, identify approximately 10 speakers you intend to invite. For each speaker, briefly state a topic and how that speaker can provide a unique perspective by sharing new data. Then identify the specific target audience(s) for this meeting. Ask yourself what types of scientists might be interested in attending the meeting. Once you have identified the key speakers and the target audience, consider the best time and place for the meeting. For instance, would an East Coast or a West Coast meeting be better suited for the attendees? Or perhaps your institution would be an ideal location to host the meeting. Finally, identify potential meetings that might be competing for the same attendees. For example, we all know that the ASBMB annual meeting is in April, so avoid that time of year.

Identify opportunities for support

Once a proposal is accepted, ASBMB provides seed money to support the meeting. Meeting organizers also are required to raise additional funds. Sponsors take many forms, including corporate sponsorships, donations for best poster awards, travel and meeting grants or joint sponsorships with other societies. A list of potential sponsors should be included. If you have had initial conversations with potential sponsors, include that information too.

Meeting proposals for the 2012 Special Symposia series are being accepted through March 1. To learn more about the meetings or to submit a proposal, visit www.asbmb.org/specialsymposia.

Jlynn J. Frazier (jfrazier@asbmb.org) is conference manager at ASBMB.

Your input wanted

We want to hear from you! Not sure that you want to organize a meeting but have suggestions for topics you would like to see become part of the 2012 Special Symposia series? To share your ideas with us, please send an e-mail titled "Special Symposia Topics" to meetings@asbmb.org.

UNESCO releases 2010 science report

Report on R&D shows newcomers are gaining ground fast on traditional science powers

BY NICK ZAGORSKI

Like the tectonic plates that comprise our planet, the global science landscape is constantly shifting. On Nov. 10, the United Nations Educational, Scientific and Cultural Organization published its most recent global science report to examine these dramatic shifts in detail.

Composed by a team of independent experts who cover all corners of the global scientific community, the UNESCO Science Report 2010 analyzes the trends and developments that have shaped scientific research, education and industry during the past five years, including taking stock of how the recent global economic recession has affected research and development.

The 2010 report offers many insights, though one of the main findings crystallizes what many in the science world already have known: that the United States, European Union and Japan, which have dominated research and development during the past few decades, had better start looking over their shoulders.

For example, since the last UNESCO report in 2005, China's number of scientific publications has more than doubled, going to 10.6 percent from a 5.2 percent share – overtaking Japan (whose publication share dropped to 7.6 percent from 10.0 percent) in the process.

And, although China has played a significant role in Asia's growing scientific influence, it is not alone in trending upward; other emerging nations, including India, Brazil, Mexico, South Africa and Turkey, also experienced increases in key parameters, such as publications, total number of researchers and gross domestic expenditure on R&D. Iran, for example, experienced a five-fold increase in science publications.

The report notes that the expansion of the Internet this past decade has been one key element in these countries' growth; more researchers than ever are connecting to the online world, creating new networks, collaborations and partnerships.

But, when some go up, others must come down, and, indeed, the power trio of the U.S., EU and Japan is seeing its overall shares decrease. And, while the emergence of developing nations is creating a more diverse and competitive scientific atmosphere, there is cause for worry among highly developed nations in this tough economic market.

Global comparison of the share of gross domestic expenditure toward research and development in 2007 versus 2002 (2002 within parentheses). © UNESCO Science Report 2010/UNESCO Institute for Statistics.

Interestingly, though, some of the new powers may step in to help; the report noted that China and India, for instance, have been using their newfound economic might to invest in high-tech companies in Europe and elsewhere to acquire additional technological expertise, thus maintaining a circulation of scientific resources.

At nearly 400 pages, the UNESCO Science Report 2010 offers something for everyone, from dedicated scientific analysts to curious researchers who want to see how their countries stack up globally. The report features a general introduction that goes over the main developments in science since the previous report in 2005 and then follows with sections that offer detailed regional perspectives.

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

For more information:

Want to learn more? Download and read the full UNESCO report at http://bit.ly/UNESCOreport.

Effective letters of evaluation: what to leave in, what to leave out and how best to prepare

BY JOSEPH PROVOST AND PETER KENNELLY

It is the end of a long day with an even longer list of deadlines looming: grants to review, papers to write and a dissertation whose editing can no longer be put off. Just as you are about to make a clean getaway for home, you hear a timid knock on your door. You know what time of year it is, but you answer anyway. "Hey, Doc," says the bright-eyed young student in the doorway, "can you write a letter of support for my application?" Knowing that this is a good student about whom you have plenty to write, you smile, sigh a bit inside, nod yes and add the letter to your to-do list.

Preparing letters of evaluation constitutes an important professional responsibility, one that takes a considerable amount of time — especially when there can be so many requests. Since many of the applicants to graduate school, medical school or entry-level jobs will possess comparable numeric credentials, letters of evaluation often serve as the tie-breaker that determines who will be selected. Perhaps even more importantly, your letter can make the case for that good student whose grades and scores for whatever reason fail to reflect his or her accomplishments and future potential.

Although students generally will request that you write a letter of recommendation, in most instances the recipient is expecting a letter of evaluation. The former implies an expectation of unequivocal support, whereas the latter is more candid. The advantages of a letter of evaluation for those reviewing an applicant are obvious. What students often fail to appreciate is that, when dealing with an experienced reader, a balanced letter frequently yields greater benefits for the candidate than one whose unqualified praise may undermine the writer's credibility. Asking whether the recipient is expecting a letter of recommendation or a letter of evaluation is a simple and direct way to educate a student as to the difference and to insure that requestor and writer share common expectations.

In order to write an informed letter, the author needs complete and accurate information about the candidate's qualifications and goals as well as the nature of the position to which he or she is applying. Experienced letter writers often present students with a set of instructions for listing the information needed. Common items include the full, legal name of the requestor; the correct name and address of the recipient; the student's GPA, grades in key courses, or a transcript; GRE or MCAT scores; undergraduate or other research experience (including publications, abstracts and presentations); and awards. Other potentially useful information includes a copy of the job description or a link to the program or investigator to which the candidate is applying, a statement from the candidate as to why he or she wants the position, and examples of relevant experience or skills. Often, faculty members will set up a web page where student requestors can enter this information and answer questions. The more specific and detailed the information the letter writer gathers up front, the easier it will be to write a letter of evaluation that exhibits the substance and depth that will establish the credibility of the writer and his or her overall recommendation.

Writing the letter

Now that you've gathered your information about the candidate and sequestered yourself away from interruptions, it's time to get started on the letter. Introduce yourself and describe how you came to know the candidate. This informs the reviewer of how long you have known and how well you know the applicant, helping them to determine how much depth to expect regarding specific topics and how much weight they should place on the letter as a whole. Many evaluators, particularly when writing about a student whose candidacy they strongly support, will try to set the tone for the letter by offering a sentence or two summarizing the bottom line:

- X is a highly self-motivated student who will do what it takes to succeed in graduate school.
- X is an exceptional trainee with the potential to develop into an outstanding principal investigator.

The next three or four paragraphs should discuss specifically the qualities of the candidate, starting with his or her strengths. In general, it is best to start with what you consider to be the candidate's greatest strength. If you start with "intrinsically curious and highly-self motivated," this implies a much, much higher upside than "knows the literature well." Qualities commonly addressed in a letter of evaluation include academic potential and acumen, motivation and work ethic, maturity and commitment, critical thinking and problem solving ability, communication skills, ability to deal with challenges and disappointment, and ability to work with others. When selecting the strengths to be emphasized, it may be helpful to consider the interests of the readers. Medical school admissions personnel frequently look for evidence of leadership, empathy and a patient-centered view. Graduate programs and industrial managers value independence and hands-on experience.

Where possible, animate your descriptors using anecdotes that relate specific examples of the quality in question. Lack of such supporting evidence can create doubt in the reader's mind as to the writer's depth of knowledge or objectivity regarding the candidate, particularly if the author's descriptors are stridently superlative and evidence a surfeit of emotional empathy. At the other end of the spectrum, an accurate but coldly impersonal list of strengths that lacks supporting anecdotes may leave the reader questioning whether the writer's enthusiasm is genuine.

After highlighting his or her major strengths, a few words about any significant weaknesses in the candidate generally are in order. Some writers may feel that any mention of a weakness will hurt the requestor. However, experienced readers generally perceive the overall assessment provided by a balanced letter as more objective, reliable and complete. Moreover, it is not necessary to use stark and irredeemable terms such as "weakness," "flaw" or "shortcoming." Instead, present these as areas where the candidate "would benefit from improvement," "has made recent strides" or "is a work in progress." Examples of the candidate's progress in these areas or efforts at improvement can be used to place these issues in a proper perspective. It also is important at this juncture to explain any perceived disconnects between the strength of your recommendation and the data contained in the candidate's resume.

Your letter's closing is important. Restate and, if possible, provide a final example of the candidate's best attribute. Many reviewers will take their cue from certain key phrases commonly found in a concluding sentence, such as "the highest enthusiasm," "no hesitation" or "the candidate's strengths far outweigh the weaknesses apparent in his or her C.V."

The nuts and bolts

A final few comments on the nuts and bolts of writing letters of evaluation. One of the most important issues you should be concerned with is establishing your long-term credibility with the institutions to which your students generally apply. Never forget that you will be writing for many years. During that time, you will come across many students who you wish to honestly advocate as being better than they look on paper. While writing a stronger letter than the candidate deserves may appear to be a kindness, a pattern of unrealistic letters will soon curtail your ability to influence the reader. Don't compromise your credibility by being nice or overly emotional in your letters of evaluation.

Be alert to protect against bias. Letters of evaluation are, by nature, subjective. Even the most well-intentioned letter writer may allow implicit or unconscious cultural and gender biases to slip through. A recent study (1) screened the types of words written in support of men versus women in academic applications. Many more communal descriptors demonstrating emotive characteristics were ascribed to women than men. On the other hand, aggressive descriptors, such as "ambitious," "daring" and "outstanding" were used more for men. A review of 886 letters of recommendation for biochemistry and chemistry faculty positions conducted by the department of psychology at the University of Arizona (2) found more similarities

than differences in qualification and positive statements between genders. These letters showed no significant differences in the language used to describe ability and work ethic, however. There was, however, a slight bias for male applicants receiving more standout adjectives including "most," "best" or "star."

Writers must be careful to confine themselves to the candidate's professional experience and expertise. Information about an applicant's marital status, family situation or health — even when presented to highlight a candidate's good character or to provide a benign explanation for some aspect of his or her record — can have a deleterious effect. For example, revealing that a job candidate is part of a dual-career partnership can lead to the application being downgraded by evaluators wishing, perhaps unconsciously, to avoid the complications of dealing with a "trailing spouse." When in doubt, consult with the candidate about whether and what they feel comfortable revealing.

So the next time you hear that knock at the door or open the e-mail asking for a letter of evaluation, the time you invest in planning your letter will reduce the time and stress it takes to write these important communications.

Joseph Provost (provost@mnstate.edu) is a professor of chemistry at Minnesota State University Moorhead and Peter J. Kennelly (pjkennel@vt.edu) is a professor of biochemistry at Virginia Polytechnic Institute and State University.

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Tips for students

1. **A letter of evaluation is a privilege, not a right.** Never list someone as an evaluator unless they have given you permission to do so. Faculty members are not obligated to write a letter of evaluation simply because a student requests one. Moreover, students do not have the right to demand that their letters be positive. In general, faculty members will gladly write a letter on behalf of any student with whom they are reasonably familiar and for whom they hold a generally positive opinion. However, they may refuse or voice great reluctance to do so if they feel that their knowledge of the requestor is too superficial to write a substantive letter or if they feel the student is unqualified for the position in question.
2. **Select qualified evaluators.** Your letters of evaluation should be provided by people familiar with your potential and ability as a scientist or physician and, perhaps, your work ethic and history. Thus, in general, each of your letters should be authored by an experienced faculty member or physician, with at most one letter from a nonacademic work supervisor. Your minister may be able to provide great insight into your character and morals, but he or she will not be viewed as a credible evaluator of your potential to succeed in graduate or medical school. Similarly, while you may forge an excellent relationship with a graduate student or postdoctoral trainee in the laboratory in which you performed undergraduate research, only the faculty member who leads the laboratory group will be perceived as having the experience necessary to offer an accurate assessment.
3. **It is important to build relationships with faculty or supervisors to enable them to write informed, credible letters of evaluation on your behalf.** This can be accomplished by simply being an active participant in your classes. Join in classroom discussions. When attending a review session, don't sit and hope someone else asks your question(s). Put your hand up, be recognized and ask it yourself. Don't send your partner to talk to the instructor when you have a question in your laboratory course or when doing a team project; take the initiative and ask him or her yourself. Go see the instructor if you are struggling with some concept or homework question. Meet with your faculty adviser every semester even if you can register for classes online.
4. **Keep in touch with your evaluators.** You likely will require letters of evaluation on many future occasions. It is therefore a good idea occasionally to contact reviewers from college as you move forward in your career to help maintain and refresh your relationship. A card around the holiday season, particularly New Year's Day, offers a simple and unobtrusive way to maintain contact and perhaps relay something about how your career is progressing. Then, when you need to ask for a letter, the person won't think "they only contact me when they need something."
5. **Finally, when it comes time to ask for letters of evaluation, prepare a packet for your writers.** Put together a well-organized folder with due dates, descriptions of schools, GPA, transcripts, addresses and names of where the letters should go, a short autobiography of yourself, and information about why you want this position. Include more than one example of how you have prepared yourself for this position and why you would be good in that position or career choice. Even if the applications are online, remember that your professor is likely to have many other letters to write, so a well-supported request will go a long way toward that writer taking the extra time you want.

Undergraduates receive ASBMB support for summer research projects

BY BEN CALDWELL

This past summer, eight undergraduate students from six colleges and universities were awarded Undergraduate Research Awards from the American Society for Biochemistry and Molecular Biology's Undergraduate Affiliate Network. This is the second year the awards have been offered by the UAN. Unlike some programs, such as the National Science Foundation's Research Experience for Undergraduates, where students travel to large research universities, most of the UAN-supported projects were conducted at smaller institutions.

The student awardees and their projects are as follows:

Mike Milligan (University of Michigan-Dearborn): Expression of affinity-tagged riboflavin binding protein to examine copper binding at the protein's active site,

Matt King and **Hillary Turner** (Missouri Western State University): Kinetic studies of albumin esterase activity,

Ray Romano (Marymount Manhattan College): Insulin production in cells undergoing differentiation,

Kevin Stebbings (Duquesne University): Generation of anti-malarial peptides by proteolysis,

Kelsey Tyssowski (Wesleyan University): Expression and purification of G-protein coupled receptors for ligand binding screening and crystallization,

Giuseppe Staltari (Duquesne University): Examination of cytosine methylation and gene silencing in maize,

James McDermott (University of Wisconsin-La Crosse): Hemolysin A as a model for protein folding during template-assisted hemolysis.

To apply for the Undergraduate Research Awards, the students submitted proposals for summer research projects to be conducted with guidance and supervision by an ASBMB faculty sponsor. Applications were reviewed and ranked by a panel of UAN regional directors. Awardees received $1,000 for supplies, equipment or reagents to support their projects and will present their results at the ASBMB annual meeting in Washington, D.C. this spring. During the meeting, they also will compete in the Undergraduate Poster Competition.

Several of the student researchers included comments on the impact of their experiences in their progress reports:

"The experience was invaluable because, until I actually started research, I couldn't have appreciated the hard work that goes into every breakthrough." —MIKE MILLIGAN

"It is exciting to look back on all of the work we have accomplished this summer, and I am thankful for having been given this opportunity to be a part of it." —HILLARY TURNER

"I had the time to research techniques and protocols and be fully engaged in research in ways that are not possible during the academic year. This experience has helped me to confirm my decision to attend graduate school in science." —KEVIN STEBBINGS

"I have developed a great relationship with my mentor who has helped me pursue any idea that I have. The opportunity afforded me by this grant made me become a true member of the scientific community." —RAY RAMANO

As is typical in research, students faced a variety of challenges. When the centrifuge at Missouri Western broke down early in the summer, Matt King and Hillary Turner were forced to alter their original research plan. They submitted an alternate proposal to the UAN and moved forward from there. King said, "I was disappointed that we had to discontinue the first project, but the esterase experiments that replaced it were just as interesting."

Faculty advisers also praised their students' efforts. Rich Olson (Wesleyan University) said, "This past year, Kelsey has worked very hard, and, due to her maturity and ambitious nature, I sometimes forget that she is only an undergraduate and not a graduate student. I look forward to seeing her realize her goals and develop her interests in science."

Ben Caldwell (caldwell@missouriwestern.edu) is a professor and chairman of the department of chemistry at Missouri Western State University. He also is a regional director of the UAN.

For more information:

To apply for an Undergraduate Research Award for the upcoming summer, students should submit a project description and budget along with an application form and a letter of support from an ASBMB faculty sponsor. Applications are due March 15 and should to be sent to the student's regional UAN director or to the ASBMB office. Complete instructions for submitting project proposals, along with a list of award and scholarship opportunities for undergraduates, can be found at www.asbmb.org/uanawards.

Looking back on the ASBMB undergraduate poster competition

BY TODD WEAVER AND DAVID BEVAN

The American Society for Biochemistry and Molecular Biology Undergraduate Affiliate Network will host its 15th annual Undergraduate Student Research Poster Competition in Washington, D.C. on April 9. The competition has grown from just under 50 participants in 1997 to almost 180 in 2010. To celebrate this anniversary, we interviewed a number of former poster competition award winners to learn how ASBMB has affected their scientific careers.

HECTOR H. HERNANDEZ

Hector H. Hernandez won a poster competition award in 1999 for his poster titled "Modeling the cytochrome C reductase domain of spinach nitrate reductase." That year, the society's annual meeting was held in the Moscone Center in San Francisco, Calif. Hector recalls being amazed by the number and diversity of the participants: "I remember walking into the assembly hall in the Moscone Center in San Francisco and being struck by how many people were there. It was like a coming home to me. These individuals were like me, thought like me and approached unknown questions in a systematic manner looking for answers that push our understanding of the world around us. The other thing that struck me was the diversity of the members of the scientific community. Although the people there spoke many languages and were from diverse backgrounds, the common language of science united them."

Hector started his professional science career at Valencia Community College in Orlando, Fla., where he became involved in the National Institutes of Health Bridges to the Baccalaureate program. The program offered him the opportunity to conduct summer research in Michael Barber's laboratory in the College of Medicine at the University of South Florida. While at USF, Hector presented his award-winning poster at the San Francisco ASBMB meeting and met his future graduate advisor. Hector's research in the Barber lab also led to a peer-reviewed publication in the Archives of Biochemistry and Biophysics (1). After graduating, Hector continued on to the Massachusetts Institute of Technology for both graduate school and postdoctoral experience in the labs of Catherine L. Drennan and Janelle R. Thompson. Currently, Hector studies how microbes adapt to extreme environments as the Dr. Martin Luther King Jr. Scholar in the department of civil and environmental engineering at MIT.

"The ASBMB-UAN experience gave me the opportunity to go and experience an international scientific conference," says Hector. "Before that, my only contact was with my lab and department members at my academic institution. I do not want to diminish these experiences, but the ASBMB-UAN experience opened up a whole different world to me. I enjoyed seeing how old friends met and caught up on science and life during the conference. These interactions confirmed that being a scientist is a fruitful and rewarding life. It was great to see how scientists who do not always agree on an interpretation of a fact could still be civil and even friendly to each other."

Attending the annual meeting and participating in the poster competition also had a major impact on Hector's career path. He explains, "The ASBMB conference was where I met my Ph.D. advisor. If it were not for that interaction, I do not believe that I would have had the opportunity to pursue a Ph.D. in chemistry at MIT. I do not think I could emphasize enough the impact that interaction has made on my life. It is these fortuitous encounters that are possible at a poster session or in short talks that can present opportunities that go far beyond the ability of an undergraduate to comprehend at the time. It is only long after the event that you begin to comprehend and appreciate the significance of that interaction."

SADIE BARTHOLOMEW

Sadie Bartholomew was a poster award winner in the biogenesis, transport and compartmentalization of lipids category in 2007. Her poster was titled "Expression of PAT-1/MLDP increases triacylglycerol stores and promotes changes in lipid droplet morphology in a CHO cell model." Sadie conducted her undergraduate research with John Tansey at Otterbein College, where she explored the role of a novel lipid storage droplet protein (PAT-1/MLDP) in cellular lipid content and stores with the long-term goal of understanding its role in lipid biogenesis, storage and metabolism. Her work with John at Otterbein led to a peer-reviewed publication in Biotechnology and Bioengineering (2).

Sadie feels that the ASBMB-UAN had an impact on her undergraduate career in two main ways: "First, it connected me to a number of leading researchers in my field from across the globe. Those whose names I had only read in the literature were actually chatting with me about my project— that was incredible and truly solidified my pursuit of a career in science. Second, the ASBMB-UAN enabled me to attend an ASBMB Lipid Droplet meeting in Vermont the summer following the national ASBMB meeting. Not only did I meet the organizers of the Lipid Droplet conference who personally invited me to attend, but the prize I won in the ASBMB-UAN poster competition helped to fund the Vermont trip. The experience at the Lipid Droplet meeting was beyond words for an aspiring young scientist— stimulating, engaging and reaffirming my passion for scientific endeavors."

Sadie currently is a graduate student in the biochemistry department at Stanford University, working with James Spudich.

PATRICK KNERR

Patrick Knerr won his poster award in 2008 for a poster titled "Metal-triggered hydrogelation of self-assembling β-hairpin peptides." Patrick conducted his undergraduate research with Joel Schneider at the University of Delaware, where he explored the design of peptides that can be triggered by environmental stimuli, such as pH, temperature and ionic strength, to self-assemble into rigid hydrogel materials from aqueous solutions. These materials can be useful in a variety of applications, including tissue engineering and microfluidics. Patrick sought to use the binding of metal ions as the environmental trigger, a principle that potentially could be applied in the design of metal sensing or bioremediation systems. He and his colleagues found that incorporation of cysteine residues into the peptide sequence yielded sensitivity to a variety of metal ions, including zinc, arsenic and mercury. The metal-triggered hydrogels possessed similar mechanical and structural properties to peptide hydrogels previously studied in the lab.

Patrick found the opportunity to attend the annual meeting and present in the ASBMB-UAN poster competition to be an invaluable experience. He also enjoyed being part of the local UAN at the University of Delaware, which gave him the opportunity to socialize with other biology and chemistry majors.

Patrick currently is a graduate student in the chemistry department and a chemical and biology interface trainee at the University of Illinois at Urbana-Champaign. He is designing enzymatic and chemical means to synthesize potent cyclic antimicrobial peptides in Wilfred van der Donk's laboratory.

Todd Weaver (weaver.todd@uwlax.edu) is a professor of chemistry at the University of Wisconsin-La Crosse, and David Bevan (drbevan@vt.edu) is an associate professor of biochemistry at Virginia Polytechnic Institute and State University.

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jbc THE JOURNAL OF BIOLOGICAL CHEMISTRY

JBC Reflections looks at breakthroughs in Gaucher disease

While medical breakthroughs generate tremendous news, little thought is given to the countless basic discoveries that provide the foundations for that clinical endpoint. In a new Journal of Biological Chemistry "Reflections" article, Roscoe O. Brady, a scientist emeritus at the National Institutes of Health, offers some perspective about this long and sometimes arduous journey.

In Brady's case, he details his work in studying the synthesis and metabolism of long-chain fatty acids. Over the course of many years, a few simple questions, experiments and observations would eventually lead to the discovery of the enzyme glucocerebrosidase (which cleaves glucose head groups off cerebroside lipids) and its deficiency as the underlying cause of Gaucher disease.

This key scientific moment would lead not only to uncovering the defects in other inherited metabolic storage disorders, such as Fabry or Tay-Sachs disease, but also to the development of enzyme replacement therapy, which was approved for Gaucher disease in 1991 and has since helped treat thousands of Gaucher patients.

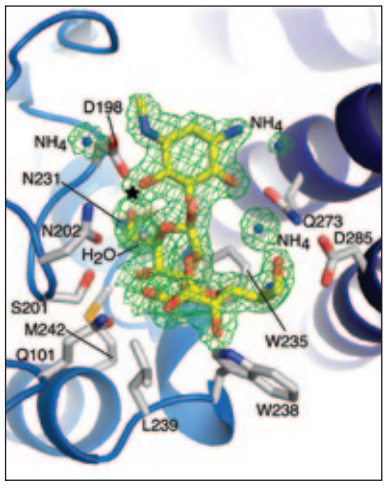
Benefits from unearthing "a biochemical Rosetta stone" Roscoe O. Brady

J. Biol. Chem., published online Nov. 9

Roscoe O. Brady in 1986 administering macrophage-targeted glucocerebrosidase to a young patient with Gaucher disease.

New tricks for an old antibiotic

In the non-stop fight against infectious agents, many researchers have foregone searching for new antibiotics and instead have turned to older antibiotics that never reached the clinic for one reason or another. The hope is that modern laboratory techniques can convert these existing compounds into more effective drugs. Such a strategy will require a better understanding of the molecular mechanisms of antibiotic resistance, so in this study, the researchers solved the crystal structure of the resistance enzyme aminoglycoside phosphotransferase (4)-Ia in complex with the aminoglycoside hygromycin B at 1.95 Å resolution.



Close-up of hygB (yellow sticks) bound to APH(4)-Ia, showing the high numbers of H-bonds and van der Waals interactions.

The APH(4)-Ia enzyme hydrogen bonded with hygB through several polar and acidic side chains, and individual alanine substitutions of these residues did not significantly affect APH(4)-Ia activity, indicating that binding affinity is spread across a distributed network. The binding architecture suggests restricted substrate specificity, and indeed, in a test of 14 aminoglycoside compounds, hygB was the only recognized substrate. The researchers also found that APH(4)-Ia was able to utilize either ATP or GTP for phosphoryl transfer.

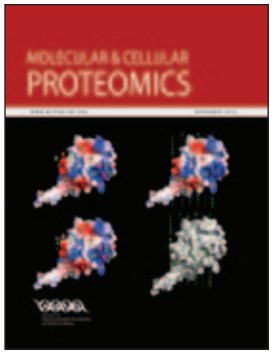
Together, the tightly-defined hygB interactions and ATP/GTP promiscuity could be exploited in the design of new aminoglycoside antibiotics.

Structure and function of APH(4)-Ia, a hygromycin B resistance enzyme Peter J. Stogios, Tushar Shakya, Elena Evdokimova, Alexei Savchenko, and Gerard D. Wright

J. Biol. Chem., published online Nov. 17

MCP **MOLECULAR AND CELLULAR PROTEOMICS**

New manuscript type



In an effort to keep expanding the scope of research covered by Molecular and Cellular Proteomics and ensure that the journal continues to receive the highest quality manuscripts at the forefront of proteomics, the editors of MCP have added a new manuscript type — Technological Innovation and Resources. This category encompasses original research papers on technological developments from instrumentation to computational algorithms as well as datasets that constitute a valuable new resource to other researchers.

An editorial highlighting the new addition appeared in the November 2010 issue of the journal and explains the importance of the new manuscript type in the context of MCP's overall mission. As the editorial states, "the importance of technological advances and software development have never been stronger and the growth in public databases and the ability to interrogate information placed in them suggests … [the new category] … is indeed timely."

Now, when authors submit a manuscript to the journal, they have two options for their original research: Research Paper or Technological Innovation and Resources. Details about the new category can be found on MCP's website at www.mcponline.org.

The new category nicely complements the recent changes in the journal's requirements for data deposition. Recognizing the fundamental importance of data access and transparency in data analysis for the advancement of the field, a requirement for the deposition of raw data from large-scale mass spectrometric analyses whose principal findings were reported in MCP was instituted this past May. The raw data must be deposited in a publicly available database so other researchers can access it, and identifying information to retrieve the data has to be included in the article itself.

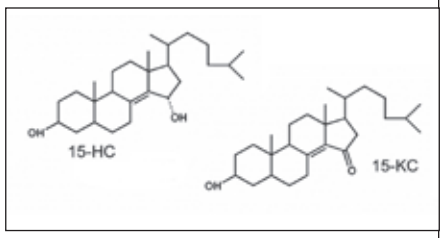
The overarching goal of these changes, both the raw data deposition policy and the new manuscript type, is to maintain the journal's position as a responsive and dynamic leader in the field of proteomics and to continue providing a venue for reporting top-tier proteomics research across a broad range of research areas.

JLR **THE JOURNAL OF LIPID RESEARCH**

15-oxysterols not associated with multiple sclerosis

Oxysterols, oxidized cholesterol derivatives, are a subject of much discussion and controversy; while some in vitro experiments have suggested that oxysterols are biologically important, they only are present in trace amounts in the plasma, and no in vivo studies have shown a definitive role. Therefore, there was great interest when a recent study reported that two oxysterol species, 15HC and 15KC, were increased more than three-fold in the blood of multiple sclerosis patients, suggesting a potential use for these oxysterols as diagnostic biomarkers.

In this Journal of Lipid Research study, the researchers performed their own analysis of blood samples using gas chromatography-mass spectrometry to validate these exciting findings; however, despite numerous efforts, the researchers failed to find any significant 15HC or 15KC levels in blood of either healthy individuals or MS patients. To validate their protocol, the team also tested samples with pre-loaded oxysterols and recovered almost 100 percent of the loaded amount, confirming that the oxysterols were not being lost somewhere along the experimental process.



Oxysterols 15HC and 15KC.

Given the conflicting results of these two recent studies, the potential role of oxysterols in MS needs to be reconsidered.

High levels of 15-oxygenated steroids in circulation of patients with multiple sclerosis: Fact or fiction? Ingemar Bjorkhem, Anita Lovgren-Sandblom, Fredrik Piehl, Mohsen Khademi, Hanna Petersson, Valerio Leoni, Tomas Olsson, and Ulf Diczfalusy

J. Lipid Res., published online Oct. 7

Companion editorial: Are 15-oxygenated sterols present in the human circulation? William Griffiths and Yuqin Wang

J. Lipid Res., published online Oct. 18

A career in academic research — what does it take to succeed?

BY BARBARA M. SANBORN

It is important to recognize that academic research positions are not all the same and that institutions differ widely in what they require of faculty members. There is a broad spectrum with respect to the amount and type of teaching expected as well as the amount of protected time for research, start-up arrangements and additional resources available to faculty members. Therefore, you should have a pretty good idea of what fits your goals as you look at positions and the distribution of work that comes with them.

Research

In most cases, you will establish your own laboratory, recruit laboratory personnel and secure funding for your research. There is more to this than meets the eye, however, just as there is more to being a successful assistant professor than carrying out research. For starters, you need to have good instincts for selecting research projects of significant impact that have reasonable short-term goals and the potential to develop into long-term programmatic emphases. Your work should be in an area that will attract funding, ideally from more than one source. In a research-intensive environment, you should find senior faculty members who are willing to give you feedback on papers and grant applications. In fact, advice from colleagues can be valuable throughout your career no matter how senior you are.

It is important that you learn to speak and write well. Effective communication with your laboratory staff and students, your departmental and institutional colleagues, and your professional peer group establishes you as an independent investigator with your own ideas and research program. You also will need to learn to network and establish collaborations.

It also will be important for you to develop personnel and fiscal management skills in order to run your lab effectively and responsibly. Recruiting staff is a learned skill, and you probably will make some mistakes sooner or later — learn from them and choose as wisely as you can, as it is very time- and labor-intensive to train laboratory people.

Teaching

Depending on your position, you may be expected to teach undergraduates and train them in your laboratory, teach and sponsor graduate students, educate professional students, and train postdoctoral fellows. Perfecting a teaching style takes a lot of effort and practice at any level. To be successful, you have to want to convey information. There is both challenge and reward in putting things in such a way that your students have an "Aha!" moment. Regardless of how much or how little teaching you do, you should do it well. Take the time to make your presentations clear, level-appropriate and relevant. I taught biochemistry for many years in a medical school and found that consulting with clinical colleagues about relevant clinical illustrations of basic principles was time well spent. If you are willing to teach outside your area of expertise, all the better, as your value to your department will increase. Use student feedback to improve your

Barbara M. Sanborn received her doctorate in chemistry from Boston University. After postdoctoral training in biochemistry at Brandeis University and the University of Iowa, she was appointed to the faculty at the University of Texas Medical School in Houston, first in reproductive medicine and biology and later in the department of biochemistry and molecular biology. She subsequently assumed the position of head of the department of biomedical sciences at Colorado State University and just recently stepped down to return to her laboratory.

style, but do not get overly discouraged about student criticism. Also, seek the balanced perspective of a senior faculty member regarding your presentations.

Training students

If you are like me, you will find helping the students in your laboratory develop their own skills at problem-solving, conducting research and writing very rewarding. This not only advances your research effort but creates new scientists, many of whom go on to productive careers and make contributions of which you will become increasingly proud. Nonetheless, realize that it is much more time-consuming to help a student develop independent skills than simply to dictate a research protocol to a technician. You will have to learn both patience and firmness as you develop the training style that works for you.

Service

To be a successful faculty member, you also will need to perform some service for your department, institution and profession in the form of manuscript reviews and participation in review panels and committees. Being active in professional societies has enhanced my career in many ways. Nonetheless, my advice is to phase into service slowly as your career takes off. These activities can be very satisfying, increase your scientific network and open up new collaborative opportunities as well as enhancing your recognition locally and at the national level in preparation for promotion and tenure. However, these activities also can be distractions that make you feel good and useful but divert your attention from your research and publications, which are the primary evidence of your success as a scientist. Balance is key, and your faculty mentors can help you here.

How do I prepare for this career?

All this sounds like a lot of work, and you definitely will have to develop the ability to wear multiple hats. However, those of us who are now senior faculty members all have managed to do it, learned from our mistakes and developed styles that work for us as individuals — and you can too. You can prepare for a position in academic research by developing good scientific skills and instincts. Having a strong publication record with a reasonable number of first-author publications is key to landing a position. Things that will set you apart include winning awards, participating in local or society organizations, and writing and receiving competitive research fellowships or starter grants.

“Savor your successes, learn to accept and benefit from criticism, and persevere and learn from your setbacks.”

Some other points to keep in mind

1. Life continues while you are in training and beyond. Your career path may take some twists, turns and even pauses as a result of personal or financial circumstances or other events beyond your control (for example, I took some detours as part of a two-career family, and the first department I joined was disbanded).
2. Develop the work ethic, skills and experience that make you marketable.
3. As much as your situation allows, be intentional about your career decisions. Always make the most of opportunities that present themselves, even if they do not seem to be getting you where you want to be — you cannot anticipate how they will benefit you later on.
4. Recognize that your research emphasis and career goals may change over time. Certainly your research approach and toolbox will change as you take advantage of new technologies. In addition, you may modify your goals at a later stage in your career. For example, I gradually developed an interest in administration in addition to research and teaching, but only after my research program was well established and my children mostly grown.

A few last bits of advice

Savor your successes, learn to accept and benefit from criticism, and persevere and learn from your setbacks. Do this, and you will develop confidence in your ability to survive whatever comes your way. Importantly, pay attention to your interests outside of science, as these will help you to balance your life and put your successes and setbacks in the lab into broader perspective. Most of all, enjoy the journey as much as the destination, as a career in academic research is rewarding and never boring! XXX

N-Acylethanolamine metabolism in plants — a regulatory pathway diverged from endocannabinoid signaling in mammals?

BY KENT D. CHAPMAN AND ELISON B. BLANCAFLOR

N-Acylethanolamines, or NAEs,* are fatty acid derivatives that are amide-linked to an ethanolamine moiety (Fig. 1). They differ in their acyl chain length and number of double bonds, and they are present at trace concentrations in organisms throughout the eukaryotic domain. These lipids have been shown to have potent biological activities in the plant and animal kingdoms, but much of what is known about them pertains to their regulation of animal physiology and behavior. Several NAE types act in the endocannabinoid signaling system of vertebrates by serving as endogenous ligands to the cannabinoid receptors (CB1 and CB2). Additional studies have shown that the complement of NAEs present in animal tissues, including those that are inactive as CB receptors, act either as entourage lipids or directly on targets other than CB receptors, such as vanilloid receptor ion channels and peroxisome proliferator activated receptor transcription factors (1). Regardless of NAE type, the bioactivity in mammalian systems appears to be terminated mostly through hydrolysis via fatty acid amide hydrolase, or FAAH (2).

The prevalence of NAEs in plant systems, particularly in seeds, has been recognized for many years. More recently it has become apparent that these NAEs are metabolized by a pathway analogous to that found in animal species. Furthermore, certain NAE types are known to have potent biological activities in plant cells at micromolar concentrations, prompting speculation that an NAE lipid mediator pathway may influence growth processes and stress responses in plants (3). Several years ago, a functional homologue of rat FAAH was identified in Arabidopsis and other plant species (4). Biochemical and molecular characterization of this enzyme from plants confirmed that it hydrolyzes NAEs, which supports the hypothesis that NAE lipid mediators and their metabolism by FAAH facilitate plant growth regulation (5), interaction with phytohormone signaling (6) and responses of plants to pathogens (7). While NAEs may not necessarily act in plants as ligands for G-protein coupled receptors like some do in animal systems, the evolutionary conservation of the occurrence of these lipid mediators and their metabolic machinery is striking (4). Furthermore, it is the arachidonic acid-containing NAE (anandamide), or NAE20:4 (Fig. 1), that functions as the endogenous NAE ligand for the CB receptors in neuronal and peripheral signaling, whereas the CB receptor inactive NAEs in animals seem to act through other means and overlap with the most abundant NAEs in eukaryotes in general (1). In other words, NAE metabolism itself may be more central (ancient) in eukaryotic biology, and the evolution of the endocannabinoid signaling system in verte-

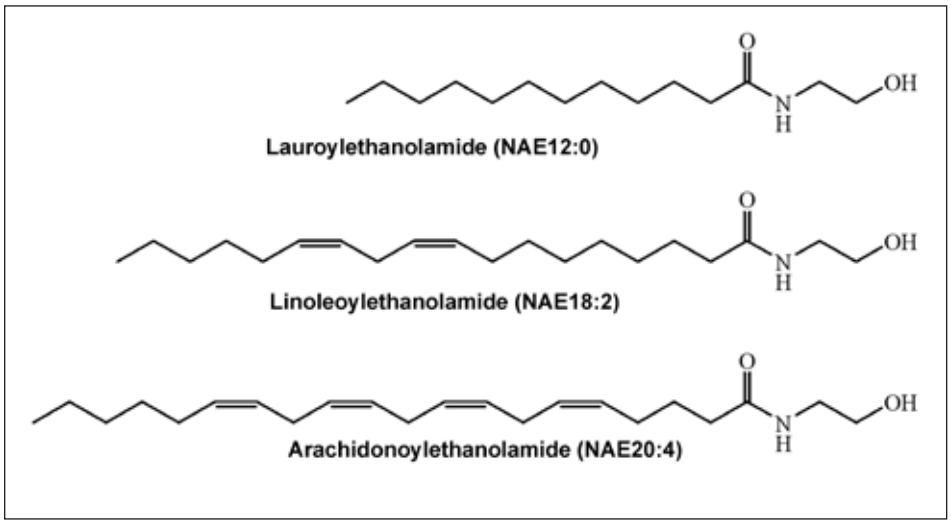


Fig. 1. Molecular structure of three NAEs. *Specific *N*-acylethanolamine types are identified by numerical designation of their acyl chain with number of carbons: number of double bonds.

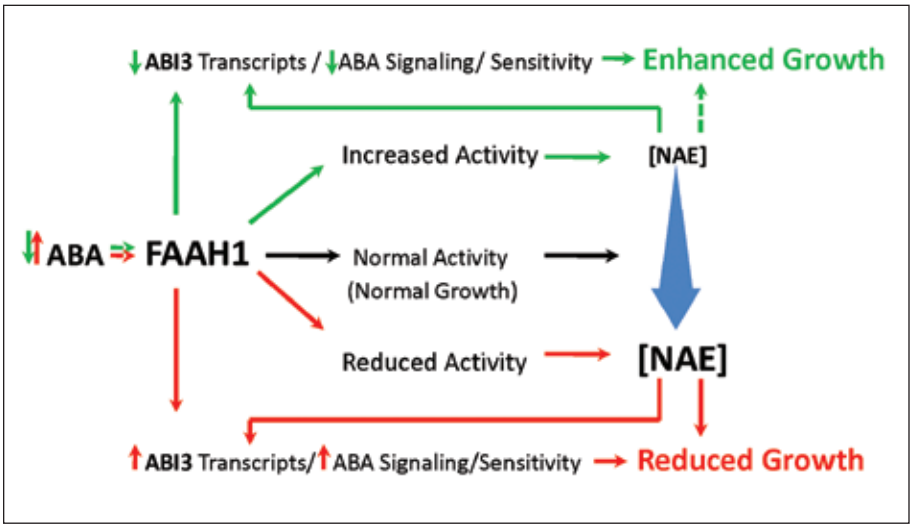


Fig. 2. Hypothetical model for the interaction of NAE metabolism with ABA signaling to regulate growth during Arabidopsis seedling establishment. The red arrows indicate negative regulation of growth, and the green arrows indicate conditions that lead to enhanced growth. The large blue arrow indicates changes in concentration of NAEs.

brates may have capitalized on this pathway and paralleled the development of arachidonic acid-based signaling and the expansion of sensory perception.

Studies of the NAE regulatory pathway in plants have begun to reveal how this lipid-based signaling pathway modulates plant growth and responses to the environment. Biochemical and genetic approaches have demonstrated that NAE metabolism interacts, at least partly, with abscisic acid signaling in plants (6). Overall, the experimental evidence suggests that the efficient depletion of both NAE and ABA is important for normal seedling establishment and that these two compounds can interact through the ABA signaling pathway to arrest normal seedling growth via modulation of ABI3 transcript levels (a key regulator of embryo-to-seedling transition).

Seedlings overexpressing AtFAAH exhibited enhanced growth under optimal conditions; however, they were exceptionally sensitive to biotic and abiotic stresses and the phytohormones known to be involved in these stresses (ABA and salicylic acid, or SA; 6,7), placing NAE metabolism and FAAH at a balance point between plant growth and responses to stress (4). Unexpectedly, active-site-directed mutations in AtFAAH that abolished catalytic activity in vitro toward all amide- and ester-linked fatty acids retained ABA hypersensitivity and compromised immunity but lost the capacity for enhanced growth (8). Hence, NAE hydrolysis by FAAH was important for enhancing seedling growth but not for influencing responses to ABA (or to SA and pathogens), demonstrating that the FAAH protein has bifurcating action, with discrete functions that are dependent and independent of its catalytic activity (4). In a proposed model (Fig. 2), FAAH itself acts to regulate seedling growth by pathways that depend on fluctuating NAE levels as well as pathways that are independent of NAE hydrolysis. This represents a significant departure from mammalian paradigms for endocannabinoid signaling in neurotransmission, in which the hydrolysis of anandamide modulates G-protein signaling via plasma membrane receptors. On the other hand, plant systems likely have evolved alternative strategies from animals for using NAE metabolism and FAAH to regulate various processes, and the NAE regulatory pathway may be far more central to the overall control of plant physiology than previously appreciated.

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Homepages — how you can benefit from a digital presence

BY NANCY VAN PROOYEN

The scientific world has embraced the internet as the modern form of communication. We no longer trek to the library and search through countless journals — instead, we access articles via searchable databases (such as PubMed, Web of Knowledge and Scopus) in a matter of seconds. Many institutions are streaming scientific presentations online, so now we don't even have to leave our offices to hear a talk. However, a single journal article or talk is just one story in an expanding body of work. Piecing together a scientist's publication record provides a snapshot of previous research but gives little information about current or future projects. This is where the laboratory homepage comes in.

The internet is a powerful tool for advancing information output, and a well-constructed personal homepage gives researchers a customizable platform for providing a comprehensive view of their work. A homepage can give useful background information to a general audience and technical detail to fellow specialists. Since research is not done alone, a homepage also can highlight work done by individual group members and collaborators. This is particularly important for attracting young scientists, who use homepages as an aid when deciding what lab to join for a summer internship or a graduate rotation. Even recent graduate students evaluate homepages when deciding what labs to apply to for postdoctoral positions.

So what makes a great science homepage? The information should be accurate and up-to-date. Once a website is up and running, regular maintenance is critical. For example, a website will work against you if the most recent paper in your list of publications was published several years ago. Broken links are frustrating and will turn people away. Your science is evolving, and new discoveries are being made; your website should reflect this.

A web page should be interactive, with several layers of organized information. The first level should provide contact information and an introduction to your research. Most people will find your homepage through search engines, especially since tracking down a researcher's website through his or her institution can be an unfruitful process. Thus, the first level of your homepage should incorporate searchable keywords. If your institution has a standard homepage, include a link to your more interactive lab website.

Secondary levels should be customized to cover the scope of your research and should include links to things like projects, publications, people and external resources. A well-designed website allows the viewer to quickly open each layer while easily returning to the main page. As in all forms of communication, keep your audience in mind. A large list of accomplishments is impressive, but information about what you currently are doing is much more useful.

Don't forget the internet is a visual landscape. A clean, simple design will prevent the viewer from being overwhelmed. Fonts should be large and easy to read. Images are essential. Cartoons and figures help explain your work. Photographs of the people involved in the research give a personal touch and are useful for identifying someone at a conference.

Establishing a web presence requires an investment of resources, including time and money. If done well, a homepage can bind the chapters of your research into a comprehensive novel. A website enables you to present your work to a wider audience and can raise your profile within your community. Once you fully utilize the internet as an additional tool to communicate your work, you will reap the benefits of the electronic information age by attracting the attention of the broader scientific community.

Nancy Van Prooyen (nancy.vanprooyen@ucsf.edu) is a postdoctoral fellow at the University of California, San Francisco.

Researching researchers

Do you know of a particularly good researcher homepage? Share it in the comment section for this article at http://bit.ly/SciComm0111.

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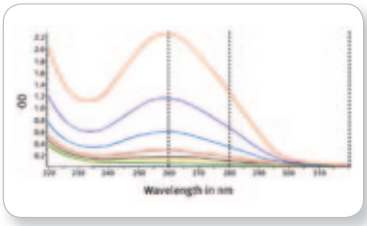

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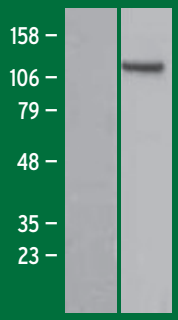

HEK293 were transfected with L) empty vector R) TrueORF for Myc/DDK-tagged hTERT(Cat# RC217436). The lysates were analyzed using anti-DDK antibody to show over-expression of hTERT. *DDK is the same as FLAG.

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