ASBMB today

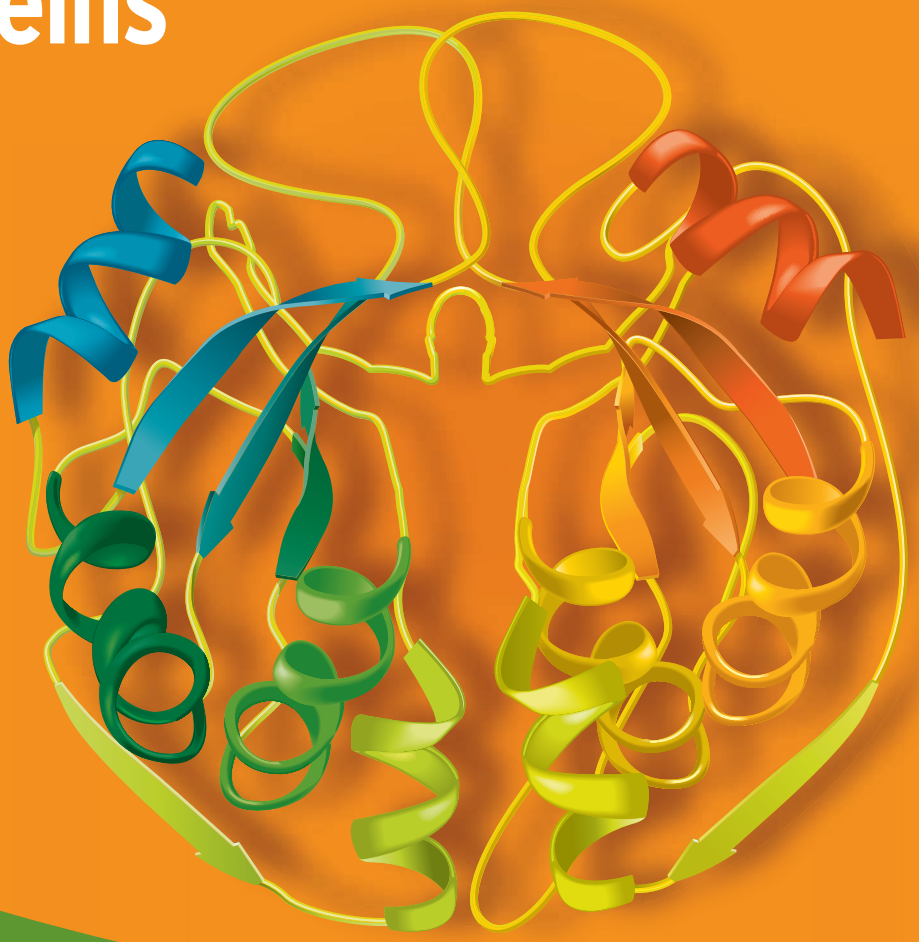
July 2012

MOM and iPOP

American Society for Biochemistry and Molecular Biology

7,000 Recombinant Human Proteins

More Assays! Better Assays!



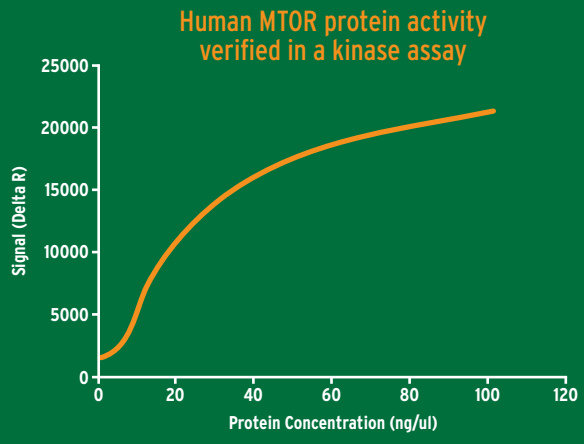
The Largest Collection of Mammalian Cell-Derived Proteins

Protein functional studies

Compound screening

Immunogens for antibody production

Assay standards: ELISA, Mass Spec, and more



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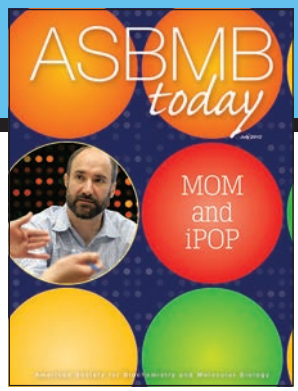
contents



JULY 2012

On the cover:
ASBMB Today science writer Rajendrani Mukhopadhyay profiles Stanford University's Michael Snyder. 16

news

3 **President's Message**
From zinc fingers to ASBMB

5 **News from the Hill**
100 meetings: Become a science advocate

6 **Member Update**

features

10 **Q&A with new ASBMB President Jeremy Berg**

13 **Meet Nick Davidson, JLR associate editor**

16 **Mom and iPOP: a profile of Michael Snyder**

essay

23 **'I didn't even know what skills I needed for a career in science policy'**

departments

25 **Lipid News**
TGF-β regulated brown adipocyte induction in white adipose tissue

27 **Journal News**

27 JBC: Thematic minireview series highlights metals in biology

28 JBC: Crystal structure of bacterial enzyme reveals a potential target for new antibiotics

28 JLR: The function of lipid droplets remarkably has stayed the same

29 MCP: Testing drug toxicity earlier in the process

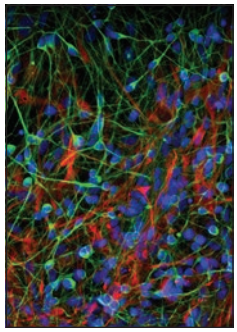
31 **Education**
What's up with accreditation: a progress report

32 **Minority Affairs**
Remembering Tuskegee

34 **Outreach**
Get up, get into it, get involved

35 **Open Channels**

New ASBMB President Jeremy Berg reflects on how he got here and what's to come. 3



Two ASBMB members were on teams with winning images in FASEB's 2012 Bio-Art contest. 8

Fred Guengerich's most recent minireview series on metals in biology appears in the Journal of Biological Chemistry. 27

Social-media highlights from the World Science Festival in New York last month. 26

ASBMB today

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ASBMB Today

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Nature's Pathways: an introduction

There's only one thing Shannadora Hollis enjoys as much as science, and that's food. In her new online-only column, "Nature's Pathways," she explores the scientific literature that has revealed the molecular mechanisms of herbs that have been used for centuries and ones that only recently have been found to have therapeutic potential. Do you have an herb of interest? Email her at sdhollis@gmail.com.

Members in transition

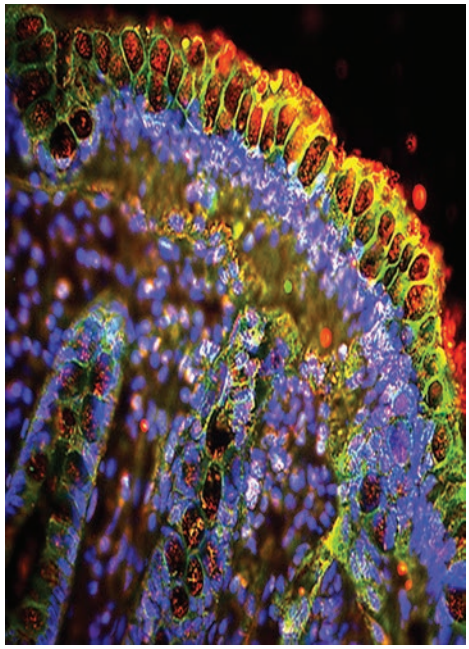
On our website, you will find links to the obituaries for several society members. Feel free to share your recollections in the comments section.

Science outreach in action

ASBMB Today contributor Pumtiwitt McCarthy this month profiles Geoff Hunt, the society's outreach coordinator. You'll also find on our website a Storify that Hunt compiled after attending the World Science Festival in New York in June. See some highlights from the festival and some reactions on social media on Page 36.

2012 BIO-ART WINNERS

In the "FASEB Update" on Page 8, you'll see two of the winning entries for the 2012 Bio-Art competition. Online, we offer a slideshow of all the winning images.



From zinc fingers to ASBMB

BY JEREMY BERG

Biochemistry and molecular biology and related disciplines are thriving. Our growing body of knowledge and powerful technologies and concepts are driving these fields forward into a range of areas, including biomedicine but also the generation of sustainable energy and food sources, forensics, anthropology and many other disparate fields.

I am pleased to introduce myself as the 83rd president of the American Society for Biochemistry and Molecular Biology. My formal training is primarily in chemistry, although my research interests shifted toward biochemistry and molecular biology early in my career. As someone trained in inorganic chemistry studying the structures of DNA-binding proteins as a postdoctoral fellow, the proposal that certain eukaryotic DNA-binding proteins contained zinc fingers, structural domains organized around bound zinc ions, captured my attention, and much of my early independent research was devoted to understanding the structures and the metal- and nucleic-acid-binding properties of zinc-finger domains. These studies expanded in many directions, including the use of protein-sequence databases for detecting structural domains, the thermodynamics of protein folding and secondary structure preferences, and protein design. In addition to studying zinc-binding domains involved in a range of macromolecular interactions, my research also has involved intracellular targeting processes, particularly to peroxisomes, and the uses of proteins constructed from all D amino acids.

I had a tremendous opportunity early in my career to become involved in administration and leadership when I became director of the biophysics and biophysical chemistry department at the Johns Hopkins University School of Medicine. My primary goal as director was to build up a strong department from a small but solid core. I am very proud of the accomplishments of both the faculty members who already were present and the newer recruits who have developed into outstanding independent scientists and educators. In my role as director, I also had opportunities to participate in schoolwide activities, including serving as chair of the Professorial Promotions Committee and as an adviser to the newly formed Johns Hopkins Postdoctoral Association. These experiences broadened my appreciation for the lives and challenges of the diverse people who drive the research enterprise. Throughout my time at Johns Hopkins, I was deeply involved in teaching, first with undergraduates and graduate students when I was in the chemistry department and then with graduate students and medical students when I moved to the School of Medicine. I always found teaching to be a satisfying and rewarding experience. Courtesy of my undergraduate research experiences at Stanford University in Lubert Stryer's laboratory, I also had an opportunity to contribute to the education of students in a different way when I took over as the lead author on Stryer's textbook "Biochemistry."

After 13 years as department director, I had another great opportunity, this time to become the director of the National Institute of General Medical Sciences at the National Institutes of Health. NIGMS is the institute at NIH that is most focused on the fundamental mechanisms that underlie life processes, including many aspects of biochemistry and molecular biology. NIGMS had supported my research throughout my career as a graduate student, postdoctoral fellow and faculty member. In my role as NIGMS director, I had a great vantage point from which to view the biomedical research enterprise, from the most basic studies through a range of clinical and translational investigations. I also led efforts to examine key aspects of training and student development; NIGMS plays a leading role in promoting research training through a range of institutional programs, including the combined M.D./Ph.D. Medical Scientist Training Program and a variety of programs intended to increase the diversity of the biomedical work force. I also participated in key NIH-wide activities, including the Enhancing Peer Review initiative and the Women in Biomedical Careers working group. As

someone who went into the NIH from the outside, from where I saw the NIH largely as a black box, I worked on improving transparency and communication between NIGMS and members of the scientific community, including through the first blog written by an NIH institute director, the NIGMS Feedback Loop. About one year ago, I moved with my wife, Wendie, and the youngest of our three children to join the University of Pittsburgh, where I am now the associate senior vice-chancellor for science strategy and planning in the health sciences and a faculty member in the computational and systems biology department.

Being elected to serve as president of the ASBMB presents another great opportunity for me. Biochemistry and molecular biology and related disciplines are thriving. Our growing body of knowledge and powerful technologies and concepts are driving these fields forward into a range of areas, including biomedicine but also the generation of sustainable energy and food sources, forensics, anthropology and many other disparate fields.

The society is also in excellent shape due to the work of its strong professional staff, adept leadership from previous presidents – including, most recently, Suzanne Pfeffer – and the hard work of the members who actively participate in society activities. I, along with those of you who were able to attend, witnessed this directly at the annual meeting in April in San Diego.

Nonetheless, these are challenging times for members of the society. Appropriations for the NIH have been below inflation for nearly a decade, leading to substantial decreases in buying power for funded researchers. Appropriations for the National Science Foundation have been increasing, but the competition for these funds across fields of science is fierce. These relatively flat budgets and other factors connected to the economic downturn and slow recovery are revealing that there are not currently enough sources of financial support available for the number of scientists competing for resources and being trained. These are fundamentally systems problems, and many groups must contribute to finding sensible and effective approaches for dealing with them. As ASBMB members, we must engage among ourselves and with other groups to work on these issues. I hope that you will feel free to share your thoughts on these and other issues with me as we move forward together.

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

100 meetings

Become a science advocate

BY ASBMB PUBLIC AFFAIRS STAFF

In last month's News from the Hill column, we presented the "100 Meeting Challenge," which urged members of the American Society for Biochemistry and Molecular Biology to schedule 100 meetings with their members of Congress over the summer while they will be campaigning at home.

We know 100 meetings is a tall order. That's why we're calling it a challenge! We understand that many ASBMB members have never met with their elected officials and are unsure about how to set up and execute such meetings. We also understand that, while writing grants, running experiments and managing a lab, you don't exactly have the time to become the next Wolf Blitzer.

Fortunately, the ASBMB public affairs staff is here to help you in your advocacy journey. Over the next few months, we will be hosting a series of webinars on advocacy training so that you will be fully prepared to meet with your member of Congress and discuss the groundbreaking research happening in your lab and at your institution thanks to federal funding.

Why advocacy is important

Tune in to the first webinar at 2 p.m. EST on July 11 to hear ASBMB President Jeremy Berg talk about the importance of advocacy and the vital role you can play in letting Congress know the value of basic research. ASBMB Director of Public Affairs Ben Corb will outline the political and budgetary landscape that Congress faces and describe the ASBMB advocacy strategy. Don't know the difference between the executive and the legislative branches? That's OK. We'll give you a crash course on the federal budget process, explaining from where the National Institutes of Health receives its funding and how to advocate for it most effectively.

Setting up your meeting

In our second webinar, we'll give you all the tools you need to schedule and execute a meeting with your member of Congress. From your initial meeting request to the thank-you letter you should send after you've met, we'll let you know what to expect at each step along the way. Once you've scheduled your meeting, we'll give you the talking points you'll want to emphasize. The ASBMB's science policy fellow, Julie McClure, will go over the state- and district-specific data you can use in your meeting to show your member of Congress exactly what kind of economic impact National Institutes of Health funding has in your community. Finally, we'll discuss how to foster your relationship with your member of Congress by continuing your communication and even inviting him or her to tour your lab.

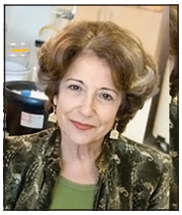
Getting the most out of your meeting

In the final webinar, we'll lay out some tips for making your meeting as effective as possible. Learn the 17 cardinal rules of science advocacy and how to apply them. Hear from congressional staff members on the dos and don'ts of meeting with Congress, and learn what kind of information truly resonates with them. You'll even get to practice your advocacy elevator pitch and get feedback on how best to communicate your research to a nonscientific audience.

We can't emphasize enough just how critical it is for you to participate in local advocacy efforts over the next few months. America faces an unprecedented federal deficit and a struggling economy. There are many in Washington who believe the only way to address these issues is through massive cuts to federal spending. Even those who aren't considering a slash-and-burn approach will have to make very tough choices about where federal funds should go. That's why it's imperative that we let members of Congress know that cuts to federal funding for research cannot be an option and that, in fact, investments in research can be a vital source of growth that can help to turn our economy around. Be a voice for science!

Email Corb at bcorb@asbmb.org today to volunteer to meet with your members of Congress.

asbmb member update


BISSELL


MERCHANT


HANNUN


OLSON


GREIDER


DIXON

AACR honors Bissell with award lectureship about her breast cancer research

The American Association for Cancer Research named Mina J. Bissell of the Lawrence Berkeley Laboratory the recipient of the organization's 2012 Distinguished Lectureship in Breast Cancer Research, supported by Bristol-Myers Squibb. In a statement, Bissell said she was grateful for the recognition: "For years my research focus was very different from what many others were excited about. I feel my being honored with such high-profile awards shows that my ideas are being accepted and signals to young researchers that, if they are passionate about their work, they should persist, following their intuition and results wherever these may take them, not necessarily where the current thinking dictates." Bissell, a world-recognized researcher of the role of extracellular matrix, will deliver an award lecture in December at the association's annual meeting in San Antonio, Texas, and receive a $10,000 honorarium.

Merchant wins lifetime achievement award from German foundation

Sabeeha Merchant of the University of California, Los Angeles, won a Humboldt Research Award, a lifetime achievement award issued by the Alexander von Humboldt Foundation in Germany. Academics from outside of Germany are nominated by academics in Germany, and Merchant's nominator was scientist Ralph Bock of the Max Planck Institute of Molecular Plant Physiology. Up to 100 awards in all areas of science are issued each year, and winners are invited to do research projects that involve German collaborators. Each award is worth about $75,000. Merchant's research program focuses on trace metal metabolism using Chlamydomonas as a reference organism. She and her team are using high-throughput genetics, transcriptomics and proteomics to understand fundamental biochemical mechanisms.

Hannun named director of Stony Brook University Cancer Center

Yusuf Hannun has been chosen to become the next director of Stony Brook University Cancer Center in New York. Hannun spent more than a decade as a professor and department chairman at the Medical University of South Carolina in Charleston, S.C., and as deputy director of the Hollings Cancer Center at the MUSC, which he helped to get designated as an official center of the National Cancer Institute. Hannun has said gaining that designation for the Stony Brook cancer center is a priority, along with building the university's research enterprise, improving patient care and mentoring young scientists. Hannun was the 2011 winner of the American Society for Biochemistry and Molecular Biology's Avanti Award in Lipids in recognition of his work on bioactive sphingolipids, a class of lipids that have emerged as critical regulators of a multitude of cell functions and, when defective, can cause disorders with significant medical effects.

UT-Southwestern's Olson wins Steven C. Beering award for muscle research

Eric N. Olson, the founding chairman of the molecular biology department of the University of Texas Southwestern Medical Center at Dallas, won the 2012 Steven C. Beering Award, an honor bestowed by the Indiana University School of Medicine to recognize outstanding advancements in biomedical or clinical sciences. Olson researches muscle differentiation and has identified major genetic pathways controlling the development of the heart and other muscles. Olson will give his award lecture in October in Indianapolis. The award includes a medal and a $25,000 prize. Earlier this year, Olson won the 2012 Passano Award.

Nobel laureate Greider appointed to the National Medal of Science committee

President Obama appointed Carol Greider of Johns Hopkins University to the Committee on the National Medal of Science. In naming Greider and 11 others to the panel that evaluates nominees for the presidential award, Obama said, "I am honored that these talented individuals have decided to join this administration and serve our country. I look forward to working with them in the months and years to come." Greider shared the 2009 Nobel Prize in physiology or medicine for the discov-

ery of telomerase. Stephen Desiderio, director of the Johns Hopkins Institute for Basic Biomedical Sciences, said of Greider: "Carol is a dedicated advocate of discovery-based science. I can think of no one better suited to help our president celebrate the essential contributions of scientific discovery." The National Medal of Science was established in 1959, during the Eisenhower administration, to recognize "outstanding contributions to knowledge in the physical, biological, mathematical or engineering sciences." Social and behavioral sciences were added to the mission by Congress in 1980.

Dixon, former ASBMB president, named foreign member of the Royal Society

Jack E. Dixon was named one of eight new foreign members of the Royal Society. Dixon, who is a professor at the University of California, San Diego, and the outgoing vice president and chief scientific officer of the Howard Hughes Medical Institute, was granted lifetime membership for his "elegant studies (that) have radically advanced our understanding of cell signaling and the molecular basis of pathogenesis," the society said in a statement. Early in his career, Dixon was a leader in research on the biosynthesis and post-translational processing of polypeptide hormones. He subsequently became a pioneer in the structure and function of the protein tyrosine phosphatases and their roles in cellular signaling, and his group found that the bacterium Yersinia pestis harbors the most active PTPase known. He is a member of the National Academy of Sciences and served as president of the American Society for Biochemistry and Molecular Biology in 1996.

Kelvin J. A. Davies of the University of Southern California, Davis, was knighted in May under the National Order of Merit, which recognizes French nationals and citizens of other countries, at the Residence de France in Beverly Hills, Calif., in a ceremony conducted by French Consul General M. David Martignon. "I was raised on the legends of the French knight Sir Lancelot du Lac, who traveled to England to join King Arthur's Round Table," Davies later said. "In a sense, therefore, this is the fulfillment of a childhood dream." Davies will travel in September to Paris, where his honor will be confirmed at a ceremony at the Luxembourg Palace.

Honor Society Inductees

The ASBMB Undergraduate Affiliate Network is pleased to introduce the newest members to the ASBMB national honor society. These outstanding students have been selected based on their academic success, research achievements and commitment to science outreach. The 2012 Chi Omega Lambda inductees are:

Meryl Brune
Drake University

Dan DuBreuil
Otterbein University

Amanda Fisher
Rochester Institute of Technology

Lee Gottesdiener
Wesleyan University

Nisan Hubbard
Virginia Commonwealth University

Emerson Khost
Marymount Manhattan College

Sophia Levan
Wesleyan University

Justin McNally
SUNY Potsdam

Meagan Montesion
College of Holy Cross

Alejandra Olvera
Wesleyan University

Emily Roblee
Providence College

Sarah Russell
Drake University

Rachel Schmidt
Rochester Institute of Technology

John Schmietzel
Vassar College

Johnna Sizemore
Eastern Kentucky University

Joy Snyder
Rochester Institute of Technology

Rosalie Sterner
Drake University

Julie Truong
Ramapo College of New Jersey

FASEB celebrates 100 years of advancing the life sciences

BY JENNIFER HOBIN, JENNIFER ZEITZER AND KAREN MOWRER

In celebration of its 100th anniversary, the Federation of American Societies for Experimental Biology is increasing its focus on legislative advocacy. On May 16, the federation held its largest ever Capitol Hill Day, which brought 43 scientists to Washington to advocate for research funding. FASEB's delegation, which included the American Society for Biochemistry and Molecular Biology members Margaret Offermann, Judith Bond and Bettie Sue Masters, visited 70 congressional offices carrying the message that investment in science is the foundation for improvements in health, economic prosperity and technological innovation. FASEB scientists urged their representatives to support FASEB's fiscal 2013 budget recommendations of $32 billion for the National Institutes of Health and $7.3 billion for the National Science Foundation. In each meeting, they presented information demonstrating how research funding benefits the local economy and describing the impact that sequestration-triggered spending cuts would have on the research enterprise. FASEB's message was well received, and nearly all of the congressional staff FASEB met with expressed an appreciation for biomedical research.

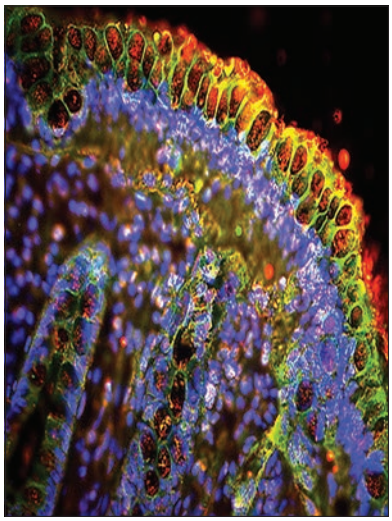
FASEB President Judy Bond shows off her vanity license plate.

Celebrating basic science

Following a successful advocacy day, FASEB hosted a reception on Capitol Hill that brought together more than 200 scientists, policymakers and research advocates to celebrate FASEB's centennial and the National Institute of General Medical Science's 50th anniversary. The event highlighted advances in biomedical research that were made possible through federal investment in basic science. In his opening remarks, FASEB President Joseph C. LaManna reflected on the many outstanding accomplishments of biomedical research, noting that when FASEB was formed penicillin and other antibiotics had not been developed, insulin was unknown and the polio virus had not been isolated.

U.S. Sen. Bob Casey, D-Pa., the leader of a bipartisan effort to prevent cuts to NIH funding, discussed the importance of research to the economy and the role of the life sciences industry in promoting economic growth in the United States. U.S. Rep. Christopher Van Hollen, D-Md., thanked NIGMS and the federation for their efforts to keep members of Congress informed about the concerns of scientists and stated that he looked forward to providing increased funding for the NIH in FY13. NIH Director Francis Collins offered his perspective on scientific advancements that have improved our understanding of basic science and discussed the importance of NIH funding for investigator-initiated research. Noting that the theme of NIGMS's 50th anniversary is "investigate, innovate, inspire," NIGMS Acting Director Judith Greenberg spoke about the need to attract and train the best scientific minds to maintain our global competitiveness.

Three Nobel laureates reflected on what it meant to them to receive NIGMS funding early in their careers. Thomas R. Cech, who shared the 1989 Nobel Prize in chemistry for discoveries regarding the catalytic properties of RNA and whose first NIGMS grant was funded at the 35th percentile, noted that improvements in our



This winning image was submitted by a group that included ASBMB member Xiaoxia Li of the Cleveland Clinic Foundation.

health today are the result of investments in basic research made more than three decades ago. Andrew Fire, co-recipient of the 2006 Nobel Prize in physiology or medicine, reflected on how his discovery of RNA interference was made possible, in part, by NIGMS's willingness to support fundamental science. Co-winner of the 2003 Nobel Prize in chemistry Roderick MacKinnon thanked NIGMS for providing his first NIH grant and explained how that led to his research using scorpion venom to understand how potassium channels work.

Celebrating science through art

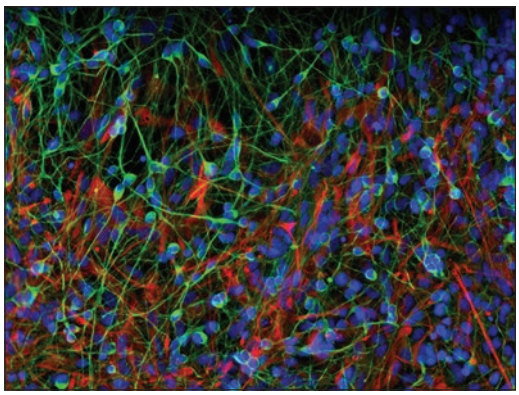
Art also had its place in this celebration of science. Winning entries for Bio-Art, FASEB's first biomedical image competition, were displayed during the reception. Entrants were asked to submit striking scientific images and illustrations depicting the cutting edge of 21st-century biomedical research. Among the winners were two ASBMB members: Xiaoxia Li was part of a team that submitted an image of biopsied colon tissue showing receptors critical to the control of inflammatory responses in the intestinal lining, and Stuart Scahreiber's team submitted an image of differentiated neuronal cells and neural progenitor cells studied as part of a project investigating the role of induced pluripotent stem cells in psychiatric disorders.

Celebrating the NSF

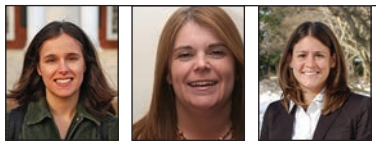
The federation also has been working to boost support for the NSF on Capitol Hill. On May 15, two members of FASEB's board of directors participated in the 18th Annual Coalition for National Science Funding Exhibition and Reception, "STEM Research and Education: Underpinning American Innovation," which brought together 32 scientific organizations and academic institutions to present posters on NSF-funded research and education projects. Held primarily to inform members of Congress and their staff members about the importance of NSF funding, the exhibition attracted 270 attendees, including U.S. Reps. Lois Capps, D-Calif., Hansen Clarke, D-Mich., Colleen Hanabusa, D-Hawaii, Rush Holt, D-N.J., and Lamar Smith, R-Texas.

Looking ahead

The first half of FASEB's centennial year has been a tremendous success, but the federation is not stopping there. As President-elect Bond stated, "FASEB will continue its advocacy with our champions in Congress and the Obama administration over the remainder of the year to achieve our goal of stable and predictable funding for biomedical research." FASEB looks forward to working with the ASBMB community toward this goal.



This winning image was submitted by a group that included ASBMB member Stuart L. Schreiber of Harvard University.



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Q&A with new ASBMB President Jeremy Berg

BY RAJENDRANI MUKHOPADHYAY

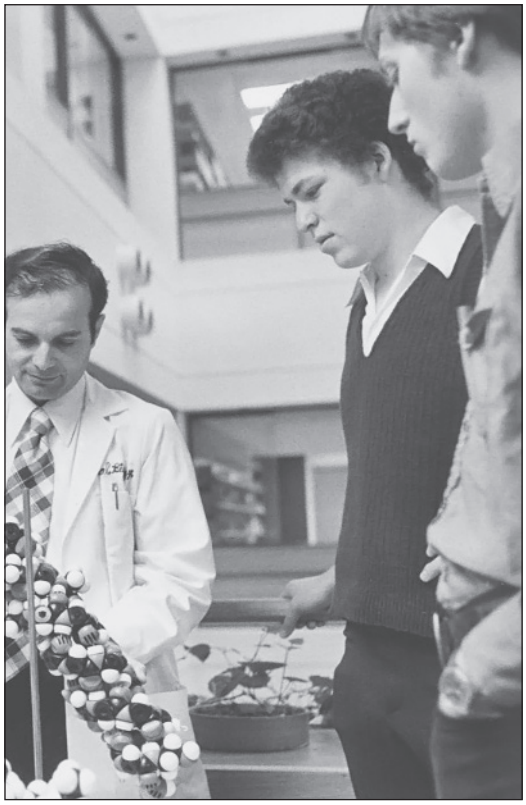
Jeremy Berg has kicked off his tenure as the 83rd president of the American Society for Biochemistry and Molecular Biology. Berg's career has straddled academia and government. He began his independent research career in the department of chemistry at Johns Hopkins University working on zinc-finger proteins. At the age of 32, he was appointed director of the department of biophysics and biophysical chemistry at the Johns Hopkins School of Medicine, making him one of youngest department chairs in the university's history. In 2003, Elias Zerhouni, then the director of the National Institutes of Health, tapped Berg to head the National Institute of General Medical Sciences, which he did for eight years. Berg has been at the University of Pittsburgh for a year now, a move he famously made as the "trailing spouse" to support his wife's career. He is the university's associate senior vice-chancellor of science strategy and planning and holds a faculty position in the department of computational and systems biology. Berg spoke with ASBMB Today about his current research interests; the influence of his wife, radiologist Wendie Berg, on his work; and his view of the current scientific landscape. Below are excerpts from the interview, edited for length and clarity.

Q: Your research at the University of Pittsburgh is focused on peroxisomes. How did you get interested in them?

Berg: It's a project my lab (at Hopkins) started over a decade ago. It was brought to my lab by an M.D./Ph.D. student who had done a rotation in a cell biology lab that was working on peroxisomes. He was interested in trying to understand the structural basis for targeting signal recognition. The molecules that were involved in the process had been identified, and the question was, "What's the structural basis for the recognition?" We solved the structure of the complex between the receptor protein and the targeting peptide over 10 years ago and have been working on it pretty much ever since. At Pitt, I'm mostly focused on using computational methods to understand a lot of the data that we've accumulated over the years. We're working on why particular peptides bind more tightly than others and testing state-of-the-art methods for calculating binding affinities from structures.

Q: What have you found?

Berg: We have looked at all the proteins in the human proteome that have the most



Jeremy Berg, center, as a college freshman at Stanford University in the laboratory of Lubert Stryer, left, in 1977. At right is Alex Wlodawer, then a postdoctoral fellow working with Keith Hodgson. Wlodawer is now a laboratory chief at the National Cancer Institute.

common type of targeting signal. There are approximately 50 different proteins. We found the affinities ranged over almost four orders of magnitude. We discovered there was a very suggestive correlation between the affinity of targeting signal and the abundance of the mRNA. The more abundant proteins have lower-affinity targeting signals, and less abundant proteins have higher-affinity targeting signals. It makes sense from a chemical and biochemical point of view.

Q: How do you see the landscape of biochemistry and molecular biology now?

Berg: It's now possible, both technically and intellectually, to think not just about one protein and one ligand at a time but to think about a whole system. We can really understand how the pieces compete with each other and fit together. We can connect the individual molecular interactions with biochemistry and physiology.

Q: How would you say science has evolved over the course of your career?

Berg: When I was first starting out, there were completely unknown classes of proteins that are now well characterized and contain large numbers. I started off my independent career working on zinc-finger proteins after the first of those proteins was discovered in frogs. Within the first year or so, it became clear that there were members of the same family in other organisms, such as Drosophila, yeast and humans. Within a few years, it was clear it was one of the largest, if not the largest, family of proteins in many eukaryotic organisms. Those sorts of trends have occurred across many different fields.

Another big change is it used to be that biochemistry was much more of a data-gathering problem. These days, with a lot of new technology, data gathering is much more straightforward. People are generating vastly more data than they have time or ability to analyze. That's one of the reasons why I ended up going to a department of computational and systems biology. There are so many data out there waiting for new tools to be analyzed.

Q: What would you say were the turning points in your career and life?

Berg: On the professional front, I decided after I finished my Ph.D. to do my postdoctoral training in something very different. I changed fields almost completely, away from pure chemistry and into biochemistry. At that point, it just was an exploration, but it turned out to be an irreversible change. That has had a huge impact on what I've ended up doing throughout my career. I also decided, after much thought, to take an opportunity to become a department chair at a time when it was pretty scary to be taking on extra responsibilities. But it turned out to be something that I really enjoyed and was good at. Once I got into administration, I got a taste for it and took advantage of opportunities to get involved in bigger issues. I've enjoyed that.

On the personal side, my postdoc coincided with getting back together with my old college girlfriend, who has been my wife for almost 28 years now. She's an M.D./Ph.D. In addition to our lives and family together, she has a big influence on the breadth of my scientific and medical knowledge. She does

patient care and clinical research. Because of that, we have frequent conversations about research and how to make a difference in the lives of people.

Q: What's the one piece of advice you wish you had been given when you were younger?

Berg: Don't be afraid to explore ideas that are pretty far away from your comfort zone. It's something that I ended up doing but in a much more haphazard method than driven by advice.

Q: You and your wife have successful careers as well as a family of three children. How do you balance the demands of work and family?

Berg: It's been a combination of things. When we first married, we decided that we would have kids and then build our lives around them. When you have children to deal with, you can't worry and plan. You just go through (each day). The other thing was we were lucky that Wendie's mother had just retired when our first son was born. She came out to help for the first few weeks after he was born and ended up staying with us for about 13 years, although this arrangement was not without its tensions. She's now 92 and just moved with us to Pittsburgh from Maryland so that we can help take care of her. She's been part of our (household) more than 25 years now.

There were certainly compromises when you have young children and a wife with clinical responsibilities where there isn't much flexibility. I didn't spend as much time in the lab as I probably would have otherwise. The upside of that was I spent more time thinking rather than doing. I think there's a big lesson in that. Rather than doing the next experiment, it's better to take some time and really digest what you're doing, think about strategy and how to approach the problem, instead of just charging ahead enthusiastically without doing the same amount of thinking.

Q: What's your advice to postdocs and graduate students?

Berg: There's a myth that most postdocs and graduate students go into academic careers. The reality is that they go off and do lots of other different things. Some go into academia. Some go into biotechnology or pharmaceutical companies, policy or writing. Certainly, my own students and postdocs have done a wide range of things. I think it's a good thing for all concerned. The question is how to prepare yourself. I think it's fairly simple. The skills that you need are critical thinking, writing, expressing yourself and organizing your time. Those skills help you in academia or whatever you do. Be broadminded about what the options might be, do a fair bit of self-examination, and think through your priorities and what you want. That way, you are prepared to make decisions about how to pursue your career when an opportunity or challenge presents itself.

Q: How would you like to reach out to the community as ASBMB president?

Berg: I want to make it clear to the members of the society that I want to hear from them. I want to make sure I and other leaders of the society are aware of their issues and perspectives. I am sure there will be more structured opportunities for collecting that input as I go forward as president.

From my experience at NIGMS, it made my job as an institute director much easier when I had a better sense of the real concerns and priorities of the community rather than trying to guess them. It was also bidirectional. By allowing people to know what was going on at NIH, the conversations were richer and more substantial because they had the same background facts about what was happening. I hope to achieve the same sort of thing at ASBMB.

Q: What are your hobbies?

Berg: Certainly, work and family keep us pretty busy! I was always a bit of a news junkie, and that got worse when I was at the NIH and closer to the government. I do a fair bit of reading of news and analysis. I have a new home in Pittsburgh, so I am working on getting fully unpacked and the garden under control. I used to love to make molecular models and jewelry, particularly with Indian beads. Hopefully I will have time to get back to that before not too long. It's become much more challenging with aging eyes than when I was a teenager and could see everything!

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Meet Nick Davidson

BY MARY L. CHANG

Nicholas "Nick" O. Davidson is the division chief of gastroenterology at Washington University in St. Louis, where he has presided for more than a decade, and he has had professorships there in the departments of medicine, pharmacology and molecular biology, and developmental biology. He joined the associate editor ranks of the Journal of Lipid Research last summer and has been providing his expertise in gastroenterology and lipid-related liver conditions such as hepatic steatosis to the journal, which has, in turn, expanded its scope in that currently hot area of lipid research.

Davidson is a unique addition to the JLR leadership in that he is one of only a few associate editors who not only run their own laboratories but also are practicing physicians. In this interview, Davidson tells us about his career path, spanning from the early days as a bright-eyed student keen on biology in Liverpool, England, to the early days of his research career at Rockefeller University working with Dr. E.H. "Pete" Ahrens Jr., a founder of JLR, to the gene expression and regulation research he and his team are hard at work on now in St. Louis.

Q: You were born and grew up in Liverpool, England. What began your interest in science? Was there a defining moment in your childhood or young-adult life that made you decide on a career in science and medicine?

My father was a physician and encouraged my interest in science growing up. I had an inspirational biology teacher in high school, Frank Swallow, who helped develop an interest in developing experimental approaches to fundamental questions. A key moment was when the axolotl (a type of salamander) in the biology lab lost a limb and we got to observe its regeneration.

Q: What about gastroenterology intrigued you, and how did you come about choosing it as your specialty in medical school?

Gastroenterology is so engaging because the specialty encompasses an array of organ systems and pathophysiology. I was fortunate in medical school to have wonderful teachers and mentors, including Roger Williams, one of the founding fathers of liver transplantation. Dr. Williams' scientific investigation into the etiology and management of liver failure stimulated my interests in hepatic lipid metabolism.

Q: You received your medical degree at Kings College Hospital Medical School in London before coming to America and taking a position in the laboratory of cholesterol metabolism at The Rockefeller University in New York, working with Ahrens. Later, you completed your gastroenterology fellowship at Columbia–Presbyterian Medical Center. What helped you make the decision to leave England and continue your career in the U.S.?

I was extremely fortunate to find my way to Pete Ahrens' lab at Rockefeller. Dr. Ahrens was on sabbatical in Cambridge, and I wrote to him regarding my interests in understanding hepatic lipid metabolism. Dr. Ahrens wrote the original description of primary biliary cirrhosis, detailing the hepatic and serum lipid abnormalities accompanying cholestasis. We met, and he invited me to join his lab as a clinical scholar. I spent three years primarily engaged in clinical investigation of cholesterol absorption and bile acid metabolism using isotopic and balance methodology.

Davidson visits the Guggenheim Museum Bilbao, a museum of modern and contemporary art, in Spain in April.

Q: How would you describe the research focus of your lab?

We focus on two areas of biology. The first area is post-transcriptional regulation of gene expression, specifically RNA editing. We are very interested in the biology of mammalian C-to-U RNA editing and the targets of the enzymatic machinery that mediate cytidine deamination of the apolipoprotein B (apoB) transcript. The field of RNA editing is undergoing a renaissance with the introduction of massively parallel RNA sequencing technology, and we are excited to have new tools to explore this biology in more depth. We hope to identify new targets for C-to-U RNA editing and to understand the role of Apobec-1 and its partners in intestinal biology, including inflammation and cancer.

The second area concerns the regulation of intestinal and hepatic lipoprotein assembly and secretion, specifically the genetic restriction points in chylomicron and very low density lipoprotein production. We are interested in the metabolic compartmentalization of fatty acids and neutral lipid substrates and their trafficking into storage or secretion competent particles. Within the liver, a major focus is toward understanding the mechanisms for compartmentalization of cholesterol for trafficking to the basolateral versus canalicular membrane and the factors that influence the development of gallstone formation.

Q: For 12 years you were part of the faculty at the University of Chicago Medical Center. What do you feel were your most important contributions to science during your time there?

Our most significant contribution was the expression cloning of Apobec-1, the catalytic subunit of the apoB mRNA editing enzyme. We used Xenopus oocytes to express cDNAs from rat enterocytes to identify Apobec-1, the enzyme responsible for C-to-U RNA editing of apoB and the production of apoB48. We subsequently generated a knockout to verify its requisite role in

vivo.

Q: You have been the division director of gastroenterology at Washington University in St. Louis since 1998 and have had professorships in medicine, pharmacology and molecular biology, and developmental biology. Can you tell us how all these different roles you have had connect to one another?

I am very fortunate to have had the opportunity to participate in a range of research activities, including basic bench science, but also to develop my interests in the genetics of hereditary and familial gastrointestinal cancers. With the emergence of new sequencing technologies and the explosion of interest in the microbiome in human disease, including GI diseases, my various roles and obligations in clinical and basic science departments frequently intersect over the course of each day.

Q: How have you managed to juggle running your lab and treating your patients?

I am very fortunate to have wonderful colleagues and trainees whose interests and motivations are entirely responsible for our successes. We have tried very hard to maintain a philosophy of advancing both the science and practice of medicine in digestive and liver disease, engaging our clinical faculty as well as the scientists who conduct more basic research.

Q: What direction do you see the field of gastroenterology going in the next five to 10 years?

In terms of academic gastroenterology, the science will continue to reflect advances in genetics and genomics, fueled by both technical sequencing developments and computational/bioinformatics methodology. In addition, the field of metagenomics and the role of the microbiome and virome in human disease will continue to expand and assume increasing significance.

Q: Similarly, what advancements in your field do you hope to see in your lifetime?

I hope to witness greater understanding of an integrated view of lipid homeostasis in signaling, inflammation and carcinogenesis.

Q: What kind of advice would you give to aspiring scientists and doctors?

The most important factors for me personally have been the availability and accessibility of mentors. Find a mentor and ask a lot of questions. Start with thinking through the attributes of a role model, someone whose career and daily activities seem interesting, and then try to engage him or her in understanding the challenges and obstacles they faced and how they navigated a path to their current position.

Q: When not in the lab or at the hospital, how do you spend your free time?

I spend time exercising and have a regular workout regimen several times a week. In addition, I am a huge fan of professional football … er, soccer … and spend time watching English Premier League and Champions League games with an international group of colleagues and friends.

Q: What is a fact about you that might surprise your peers or colleagues?

As a medical resident in England, I wrote, directed and played the leading role in a musical based on the life of Napoleon Bonaparte.

Q: Last question, for the soccer fans: Liverpool or Everton?

Liverpool.

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MOM AND iPOP

BY RAJENDRANI MUKHOPADHYAY

For the sake of science, Michael Snyder takes a good look at himself – and his mother.

At the age of 54, Michael Snyder at Stanford University had a project that required his mother's help. The project, which would catapult Snyder into the headlines of science media outlets, was the integrative personal -omics profile, iPOP. Snyder and his team were gathering genomic, transcriptomic, proteomic, metabolomic and autoantibody analyses from one person to see what kinds of information could be obtained by integrating the statuses of thousands of molecules at once. The project was the first of its kind, aiming to demonstrate that -omics technologies put together can reveal details about a person that a single type of technology can't accomplish.

The person being sampled was Snyder himself. And because of the choice of sample, Snyder knew his mother's genetic information could be useful. "She's a curious person by nature," says Snyder, so he described to her over the phone what he was attempting to do.

"Every mother likes to help out their child," says 84-year-old Phyllis Snyder. "I figured if Mike needs help, I'd be happy to help him. Plus, I was a chemistry major first before I became a teacher. I always think, 'anything for science!'"

THE ME-OME

The iPOP project had been mulling around in Mike Snyder's head since 2004, when his group was based at Yale University and working on genomics, transcriptomics and proteomics as individual areas of research. Snyder, like other molecular biologists, was keenly aware that genes, RNA transcripts, proteins and other molecules don't operate in isolation; much can be learned from the intricate connections between these different classes of molecules. Inevitably, the thought started to crop up in Snyder's head – what if all the different types of -omics could be analyzed at once?

In 2009, technologies and advances in molecular biology matured to a point that it was time to take a stab at the idea, says Snyder. The technology to sequence a person's genome already was in place, and Snyder's group had the expertise to tackle the transcriptomics, proteomics and metabolomics. Snyder got his whole genome sequenced through several different approaches. Over 14 months, Snyder had his transcriptomic, proteomic, metabolomic and autoantibody profiles collected.

His mother's genome was going to be useful to determine what Snyder had or hadn't inherited from her. Snyder asked his mother if she was willing to have her genome sequenced and explained the consequences and ethical considerations of genome sequencing. "I said, 'Sure! Anything you need!'" Phyllis Snyder recalls. "Then he said he would like some blood."

Her son sent her the consent forms and enrolled her in the study. Phyllis Snyder visited her doctor to have him draw her blood sample and take a buccal swab. She sent the materials to her son. "And that was it!" she says. Asked if she was worried about what her genome might reveal, Snyder says, "I am 84 years old. If something hadn't shown up before and it turns up now, well, what can you say? I've had a good life and I am very proud of all my children."

And so the mother-son duo appeared in a paper in Cell (1). The paper described details captured by Mike Snyder's iPOP that couldn't be seen with standard clinical diagnostics. For example, during those 14 months, Snyder began to develop the symptoms

Snyder reckons large-family dynamics taught him something about collaboration and competition.

of diabetes, high blood sugar and a particular form of glycosylated hemoglobin. Snyder didn't have any of the physical predispositions for diabetes: He wasn't overweight, didn't smoke and didn't have a family history of the illness. But as his iPOP began to display the telltale signs and he received the diagnosis for the disease, Snyder immediately took action to cut off the disease's progress. "No more junk food or desserts," he says. "Cake, ice cream, candy all gone." He doubled the amount of biking he does and started running again. With these changes, his iPOP later showed a drop in the diabetic biomarkers.

iPOP also demonstrated how one data set may not be sufficient for the whole picture. The genomic analyses revealed that both Snyders had a specific mutation that has been correlated with aplastic anemia, a condition in which the body doesn't produce enough new red blood cells. But neither of them has the disease, indicating that genetics alone isn't enough to kick off this particular disease.

The iPOP experiment now has Mike Snyder interested in studying the -omics profiles of prediabetics and seeing what information can be gathered if they cross over into the realm of diabetes. His group now is working to get the requisite approvals in place to carry out iPOP analyses on 250 prediabetic patients. "One-third will convert to diabetics over the course of five years," says Snyder. "We hope to learn what triggers this conversion and what the final disease profile looks like. We also want to learn why some people respond to some drugs and others do not." He speculates that diabetes could be many diseases rolled into one; through iPOP, he hopes his team will be able to discern exactly how many metabolic pathways go awry and how people might be best treated.

Snyder aims to make iPOP a more readily accessible tool for health-care providers. He envisions a future when everyone can get an iPOP done for $100 or so, "the same cost as the blood test you do now," he says. The costs associated with an iPOP should come down over time, because researchers should become more adept at knowing which molecules should be tracked and which ones are not worth following, says Snyder. By picking out the most informative biomarkers, an iPOP should become more streamlined and cost effective.

Michael Snyder with his youngest child, Eve.

CATCHING THE SCIENCE BUG

Phyllis Snyder was the first person to get her son interested science. She was a stay-at-home mother of six children and went through college part time when Snyder was young and joined the work force to help support the family. She began to work as a substitute elementary school teacher when Snyder was in high school and became a full-time third-grade teacher when Snyder entered college. He credits her for bestowing an inquisitive mind in him and his siblings as well as a sunny outlook on life. "She is a positive person by nature," says Snyder, "and I like to think I am."

Snyder's father passed away in 2000. An accountant, Kermit Snyder was "extremely good with numbers and a great dad," says Snyder, adding that he and his siblings "got some of our quantitative aspects from him." Two of Mike Snyder's siblings also have Ph.D.s., one in organic chemistry and the other in psychology. As Phyllis Snyder quips, "Three doctors, but none of them can cure you of anything!"

Snyder is the fifth of three boys and three girls and reckons family dynamics taught him a thing

or two about collaboration and competition. “In a large family, you learn how to get along with others as well as stand up for yourself,” he says. “I remember at the dinner table that if you hesitated you would not get dessert because it would all be eaten.”

His mother describes Snyder as “energetic and a workaholic, like his father” as well as “very considerate and compassionate for others.” When Snyder was in elementary school, Phyllis Snyder says, the family called him “the absentminded professor.” “We would all go crazy looking for his shoes before he went to school, because he couldn’t remember where he had left them,” she recalls, laughing.

His childhood home was modest, says Snyder. His family lived just outside a town called Pottstown in Pennsylvania dairy land in a farmhouse that was more than 100 years old with sprawling grounds. “Most people are born, raised and die within a 15-mile radius,” he says. Local interests are geared more toward sports than academics.

A high school chemistry teacher, Mr. Darby (“I don’t know his first name,” says Snyder), also fed Mike Snyder’s interest in the scientific enterprise. Snyder remembers the freedom he was given in Darby’s advanced chemistry class to explore science through independent research projects. Snyder went on to win a Bausch & Lomb science award, which included a free application to the University of Rochester. Although Snyder applied to other schools, the University of Rochester offered him a scholarship. “We didn’t have a lot of money,” says Snyder, “so I went there.”

Snyder picked chemistry as his undergraduate major, but toward the end of college he developed an interest in biology. Although Snyder got accepted for graduate school in chemistry, “I decided to take a year off to learn biology and work in a biology research laboratory,” he says. Soon he was doing his graduate work from 1978 to 1982 with molecular biologist Norman Davidson at the California Institute of Technology and his postdoctoral training for four years with Ron Davis at Stanford University. Davis is now a colleague at Stanford and also trained under Davidson.

Snyder says Davidson and Davis served as mentors on how get science done. Davidson taught Snyder how to think independently and analytically. Davis showed Snyder the power of thinking outside the box. “Whatever I’ve learned from Norman and Ron, it’s been valuable,” notes Snyder.

Phyllis Snyder with her granddaughter Eve, the youngest of 11 grandchildren.

Davis recalls Snyder being a hard-core carnivore in his younger days. “He used to say, ‘I hate vegetables.’ I was a vegetarian at that time so I said, ‘We complement one another very well!’”

The complementarity extended beyond food. “I admire him a great deal,” says Davis. “We get along well partly because of our similar mindset.” The mindset, Davis says, is a legacy from Davidson, who firmly believed biology would always advance with novel and improved technologies.

Davis says that Snyder’s approach to science hasn’t changed since his postdoctoral days with him. Instead of copying what other researchers were pursuing, Davis says, Snyder always identified the next big question that wasn’t being explored and went after it. “That attitude represents his whole career path,” notes Davis.

Michael Snyder (second student from left) credits his advanced chemistry teacher, Mr. Darby (back row), with giving him the freedom to explore science through independent research projects.

BRIDGING CHEMISTRY AND BIOLOGY

The iPOP work showcases Snyder's longstanding interest in understanding what differs between people at the molecular level. "We're all really chemical reactions. Understanding the basic laws of chemistry will go a long way toward defining what we are," he says. He feels the mission of a molecular biologist is to understand how chemical reactions in our bodies differ in their responses to genetic and environmental stimuli. He hopes that researchers soon will become so good at interpreting molecular details that they can use those details to make predictions of how a person with a particular genomic variant will respond to a certain environmental event.

Before iPOP came along, Snyder's group at Yale University spent considerable effort learning about variation at the transcription level. Snyder cites one of the key findings his group made in yeast when they demonstrated that, contrary to popular belief, the regulatory sequences were not conserved. "There were extensive differences in transcription factor binding even amongst closely related species," says Snyder. "It took three years to get that paper published, because most people didn't believe it." (2) Snyder says that growing evidence "really hammers home the argument that we differ more at the level of regulation than simply coding sequences."

Snyder's group also has made inroads into functional genomics and proteomics. They demonstrated the power of using microarrays of transcripts and peptides to study gene expression patterns and protein phosphorylation. Snyder's laboratory was the first to perform a large-scale functional genomics project in any organism and also created the first proteome chip. They carried out the first high-resolution tiling array for the entire human genome and also spearheaded the use of high-throughput DNA sequencing technologies to study bacterial genomes. Snyder's laboratory at Stanford, to which he moved three years ago, continues to focus on a variety of projects in the areas of genomics and proteomics both in yeast and humans.

Snyder has donned other hats other than that of a scientist. Between 1998 and 2004, he was chairman of the department of molecular, cellular and developmental biology at Yale, during which time the department doubled in size and tripled its funds. He is the chairman of the genomics center at Stanford now, and Davis credits him with setting up a sophisticated sequencing center and working to introduce genome sequencing into clinical practice by partnering with the Stanford University Medical Center. Snyder is also an associate editor for Molecular & Cellular Proteomics (a publication of the American Society for Biochemistry and Molecular Biology). He has experience on the biotechnology side of science through service on various scientific advisory boards and as a founder of five companies.

Snyder's enthusiasm for science is unrestrained. "Every morning, I tell my kids, 'I'm going to fun!' They always tease me back and say, 'No, you're not. You're going to work!'" says Snyder. But he truly means it when he calls work fun. "That's why I do science. I love it."

As in every parent-child relationship, Phyllis Snyder gets the last word. "Every mother thinks her son is brilliant," she says. "And I am no different."

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‘I didn’t even know what skills I needed for a career in science policy’

BY CHRIS PICKETT

“I have absolutely no idea how to help you with that.” That was the response from my postdoc adviser after I told him I had decided to pursue a career in science policy. He was supportive, but he knew even less than I did when it came to finding a policy job. That’s about the time the excitement over all the career opportunities lying in front of me began to mix with the terror of trying to find a job-shaped needle buried in a very large and unfamiliar haystack.

Like most biology postdocs, I was well trained in the specialties of my lab – the genetics of C. elegans, high-power microscopy and the voodoo that is polymerase chain reaction. So when it came time to start looking for a job that required none of these skills, I was at a loss as to where to start. I thought crafting my résumé would jump-start my search, but I quickly became discouraged when I realized that even the most inventive descriptions of my lab experience (wearily trudging into lab on the weekends shows that I’m highly motivated, right?) weren’t enough to cover the gaping holes in my qualifications. Ever the optimist, I puffed out my chest and began to build my skill set. And that was when I realized something far more daunting: I didn’t even know what skills I needed for a career in science policy.

As a lifelong student, my first instinct was to find a class or program that would introduce me to policy work and teach me the skills needed to get a job in this field. I was looking for something geared toward a life sciences Ph.D. with aspirations beyond the bench, something between a one-hour seminar and a semester-long undergraduate class and something more interactive than a book. I was looking for a collaborative program between nonscience and science departments that would prepare newly minted Ph.D.s and postdocs for careers inside and outside of academia. Instead, what I found was that my postdoc institution, which has trained thousands of other professionals for nonscience careers, had no such training program.

Having to cobble together my own job training, I embarked on two years of extensive research, myriad mistakes and many failed job applications. There were some bright spots, though. I found a group on campus that helped Ph.D.s network their way to a new job. This team, led by university career counselors, gathered weekly to discuss job searches and share the contact information of experts in various fields. Thanks to this group, I was able to piece together a team of career mentors that assisted me in improving my résumé and finding organizations that fit my career goals.

Nevertheless, I remain confused as to why scientists constantly have to reinvent job training. On one hand, Ph.D. students and postdocs are becoming increasingly disenchanted with academia, while on the other hand career academicians bemoan the media, government and just about any other entity that “doesn’t get it” when it comes to understanding research. Collaborative job-training programs would address both problems by providing the training needed for young scientists to bridge the gulf between academia and the general public. For example, Ph.D.s trained in communications and journalism could engage the public online and through the media to rally public support for academic research. Collaborative job-training programs would allow young Ph.D.s to weave their science interests together with their interests in government, communications, education, and so forth. Such programs have the potential to strengthen academic research while saving young Ph.D.s like myself time, money and a whole lot of heartache.

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Editor’s note: Shortly after Pickett’s essay was accepted for publication, he was informed by the ASBMB public affairs staff that he had been chosen as the next ASBMB science policy fellow. He starts his new job in mid-July.

TGF-β regulated brown adipocyte induction in white adipose tissue

BY UMESH D. WANKHADE AND SUSHIL G. RANE

Recent identification of active brown fat in adult humans has stimulated research into the role of brown adipocytes in energy homeostasis. Brown fat exists in hibernating animals, rodents and human infants; however, until recently, it was considered irrelevant in adult humans. Recent findings that metabolically active brown fat exists in humans (1 – 4) have stimulated research into the therapeutic potential of brown fat to combat metabolic diseases (5, 6). Brown fat shares its developmental origin with muscle (7, 8), and the transcription factor PRDM16 determines the fate of $Myf5^{+}$-precursor cells toward brown fat lineage (9, 10). As reviewed recently (11), brown adipocytes are also found interspersed within the white adipose tissue in response to chemical or hormonal stimulation, environmental changes, cold exposure and various genetic manipulations (12 – 14). Transdifferentiation is considered a potential mechanism that leads to brown fat induction (14) along with the possibility that multilocular fat cells may derive from a precursor cell that gives rise to more typical brown adipocytes (15). Recently, a muscle-derived hormone, irisin (16), brain-derived neurotrophic factor (17) and neuropeptide Y (18) have been implicated in promoting brown fat features in white fat.

We recently elucidated the importance of TGF-β signaling in the appearance of brown adipocytes within the white adipose tissue and its implication in glucose and energy homeostasis (19, 20). White fat from $Smad3^{-/-}$ mice showed enrichment of genes that represent brown fat and mitochondrial and skeletal muscle biology (20). Our results using the anti-TGF-β antibody, combined with the findings of elevated TGF-β levels in obese subjects, strongly suggest that targeting the TGF-β pathway has potential utility in treatment of human obesity and diabetes. Elevated TGF-β levels are common in many disease conditions, and there is a push to develop TGF-β antagonist therapies (21). Anti-TGF-β regimens are being clinically evaluated for human diseases, such as cancer, fibrosis, scarring and diabetic nephropathy, in which elevated TGF-β levels are implicated (22 – 24). However, the TGF-β family proteins engage specific receptors in virtually every cell type, making neutralization of the pathway a challenging proposition (25). In addition to the canonical TGF-β/Smad signaling node, crosstalk with other signaling networks is a common feature of TGF-β signals (26), and inhibiting the TGF-β pathway at the ligand-receptor level may damage essential signaling networks that crosstalk with TGF-β.

Although we propose that modulation of TGF-β/Smad3 signaling activates a brown adipocyte-like phenotype in rodent white fat, its implication in similarly browning human white fat is unclear. Further understanding of the mechanistic details of TGF-β/Smad3 signaling as it pertains to brown adipocyte induction in white fat is needed to translate the research observations to therapeutic benefit. Several questions remain to be answered. Does TGF-β signaling affect the transdifferentiation potential of white fat to brown fat or the precursor cell dynamics during brown fat induction? Which white fat depots are the primary targets of TGF-β signals? How do the TGF-β signals harmonize with other signaling pathways that also induce browning of white fat? Answers to these questions will allow greater mechanistic insights into TGF-β's role in browning of white fat while potentially yielding novel targets for the development of therapeutics to counter obesity and diabetes.

We apologize to authors whose contribution to this field of research have not been cited or have been cited only indirectly due to space limitations. Support for this work came from funds from the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health intramural program.

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Remembering Tuskegee

BY SQUIRE BOOKER

For many blacks, particularly those who grew up in the South and attended segregated schools and churches where black history week – and then later Black History Month – was a major event each year, the word "Tuskegee" evokes feelings of pride. It was in Tuskegee, Ala., that Booker T. Washington built a pillar of the black community, the Tuskegee Institute, which was founded to educate recently freed blacks in skills that would enable them to make a living. It was the Tuskegee Institute that lured the renowned black scientist George Washington Carver from Iowa State University to head its agricultural department, at which he did the majority of his acclaimed research. Tuskegee also evokes images of the famed all-black squadron of airmen – the "Red Tails" – who fought in World War II. However, despite the many prideful images that it brings to mind, the name "Tuskegee" is also a sobering reminder of racism and classism in science, the unethical treatment of research subjects and the need to ensure that "informed consent" means that research subjects are thoroughly apprised of the risks and consequences associated with participating in a study.

This month marks the 40th anniversary of the beginning of the end of one of the darkest periods in the history of American science. On July 26, 1972, an article written by Jean Heller of the Associated Press appeared on the front page of the New York Times and other major newspapers and shocked the moral fiber of this nation. The first sentence of the article read: "For 40 years the United States Public Health Service has conducted a study in which human beings with syphilis, who were induced to serve as guinea pigs, have gone without medical treatment for the disease and a few have died of its late effects, even though an effective therapy was eventually discovered." The article disclosed a 40-year study conducted in large part by the U.S. Public Health Service. This study, formally called the "Tuskegee Study of Untreated Syphilis in the Negro Male," followed the progression of untreated syphilis in black men in Macon County – of which Tuskegee is the county seat – from 1932 until 1972 and was halted primarily because of ensuing public outrage over the kind of treatment of people that evoked memories of atrocities in Nazi Germany.

Because of rampant racism at the time and the fact that many of these black participants were poor, uneducated, hungry and destitute, they were deftly taken advantage of for 40 years, standing little chance against the combined efforts of the U.S. PHS; state, county and local health services in Alabama; officials at Tuskegee University; the National Institutes of Health; the Centers of Disease Control; and, among others, several U.S. surgeon generals who were aware of the study. The PHS not only refused them treatment for syphilis, it also discouraged others from treating them. This tragic American story, now a classic in the emerging field of bioethics, is vividly told in a least three well-known books: "Bad Blood," by James H. Jones; "Examining Tuskegee: The Infamous Syphilis Study and Its Legacy," by Susan Reverby; and "The Tuskegee Syphilis Study," by Fred Gray.

THE NATIONAL ARCHIVES

Before the age of modern antibiotics, syphilis was a devastating disease that swept through Europe, the Americas and other parts of the world as early as the 16th century and was thought to be spread by invading armies during wartime and colonialism. Because the best means of transmission of the bacterium

THE NATIONAL ARCHIVES

responsible for the disease, Treponema palladium, is by sexual intercourse, it also carried – and still does – negative social connotations. At the turn of the century, significant international research efforts were focused on understanding the etiology and consequences of the disease, which exists in four stages of infection: primary, secondary, latent and tertiary. During the primary stage, in which infection is now easily cured by a single dose of penicillin, the infection is most contagious. As it passes through later stages, it becomes less infectious but more difficult to cure. At the tertiary stage, although no visible signatures of the disease are usually present, it can begin to attack vital organs, leading to blindness, cardiovascular disease and neurological decline. In the early 20th century, before penicillin had emerged as an effective treatment, the early stages of the disease typically were treated with various combinations of heavy metals, including mercury-based compounds and arsenicals, among others, with variable results. Not everyone infected became seriously ill, and heavy metal treatment, especially in the later stages of infection, often was believed to be worse than the disease itself.

Between 1891 and 1910, a pivotal study was conducted in Oslo, Norway, in which 2,000 patients with primary and secondary syphilis were hospitalized until their lesions healed. They were not treated for the disease, because it was believed that the body's own defense mechanisms could combat it better than the treatments at that time. This study was halted in 1910, however, when arsenic therapy for the disease was discovered. Later follow-up of some of the patients detailed the number of whom exhibited signs of heart disease and neurological complications.

During this time, which coincided with the rise of eugenics theory, there was a prevailing notion that the progression of the disease varied between racial groups. The finding from an earlier U.S. PHS study supported by the Rosenwald Fund, which indicated that the incidence of syphilis in blacks in Macon County, Ga., approached 40 percent, suggested to PHS officials an unprecedented opportunity to study the effects of untreated syphilis and to ascertain whether the disease progressed differently in blacks than whites. PHS officials enlisted the services of a very dedicated black nurse

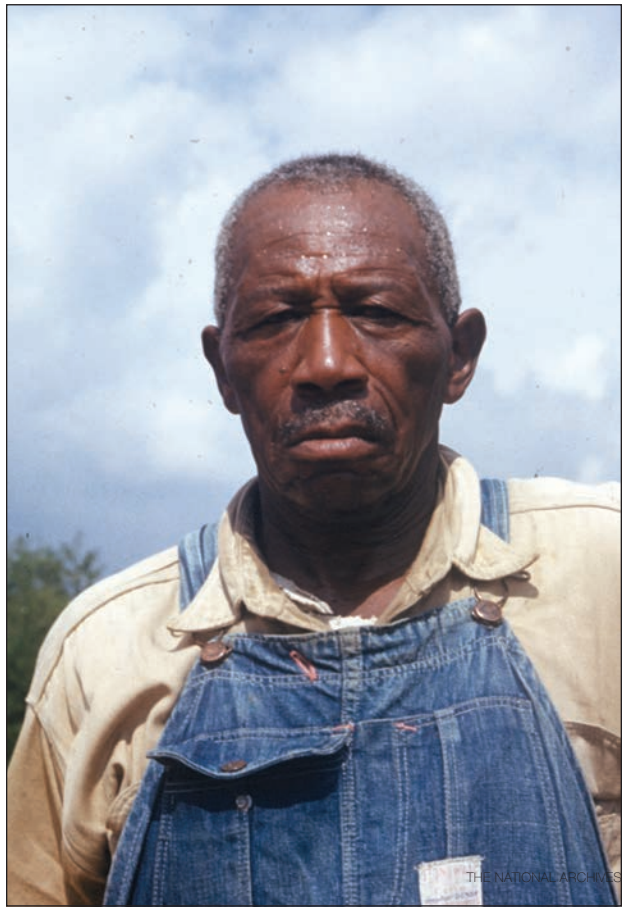
At the very least, the Tuskegee story is a tragic reminder that science is too powerful for any one racial or ethnic group not to be involved in scientific decision-making at the highest levels of government, private industry and professional societies

to help recruit about 600 participants, 399 of whom were serologically positive and 201 of whom served as controls.

These individuals were not explicitly told they had syphilis but rather that they were being treated for "bad blood," which was an ambiguous term for a number of ailments at that time within the black community. To entice them to participate, the men were given routine physical exams and free treatments for other minor ailments, burial stipends and, for some, minor financial compensation in the amount of $1 for every year one participated in the study. In exchange, participants provided consent for their bodies to be autopsied at the time of their deaths. They were never treated for their "bad blood" but instead were unknowingly given placebos. Sadly, the absence of treatment persisted beyond the mid-1940s, when penicillin became generally available in the U.S. for this medical indication. In fact, PHS officials believed that the most rigorous analysis of the progression of the disease could be brought about only by autopsy; therefore, from a scientific perspective, it was not in researchers best interests to try to cure these men. As excuses, PHS officials rationalized that these individuals never would have received treatment anyway and also suggested that administration of the drug to individuals in late stages of the disease could do more harm than good.

One of the myths related to the study is that PHS officials purposely infected black men in Macon County, Ala., with syphilis; however, there is no credible evidence to support this theory. Shockingly, while researching her book on the Tuskegee study, Reverby uncovered evidence that PHS doctors did deliberately infect almost 700 Guatemalan soldiers, prison inmates and mentally ill patients with venereal diseases in a separate study between 1946 and 1948 to test the efficacy of penicillin as a treatment.

Scholars still argue about the degree of wrongdoing in the Tuskegee syphilis study, and many of the major players involved died without ever admitting, or perhaps even believing, they had done wrong. At the very least, the Tuskegee story is a tragic reminder that science is too powerful for any one racial or ethnic group not to be involved in scientific decision-making at the highest levels of government, private industry and professional societies. Although collaboration with blacks was essential for a study of such magnitude to be conducted for such a long period of time, it could be argued that had a black PHS official of high rank who really understood the essence and consequences of what was transpiring been involved in decision making, someone would have uttered, at the very least, "I'm not sure this is a good idea."



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jbc THE JOURNAL OF BIOLOGICAL CHEMISTRY

Thematic minireview series highlights metals in biology

BY DANIELLE GUTIERREZ

This spring, the Journal of Biological Chemistry unveiled a thematic minireview series, "Metals in Biology 2012," the fourth installment of an ongoing series coordinated by JBC Associate Editor F. Peter Guengerich featuring the significant role of metals in biochemistry and human health. The first, "Metals in Biology," discussed iron, copper and selenium. The second, "Metals in Biology II," included reviews of iron, zinc, nickel, vanadium and arsenic; while the third, "Metals in Biology III: Iron Management by Eukaryotic Cells," illuminated iron homeostasis. The newest installment concentrates on metal transport and homeostasis. Understanding these elements of metal biology is important, given that metals are crucial to many biochemical reactions yet potentially detrimental when present in excess or misregulated.

To start, José M. Argüello and colleagues discuss the transport of transition metals across membranes for their delivery throughout the cell in "Metal transport across biomembranes: emerging models for a distinct chemistry." The authors review specific features of transition metal transporters, including protein-protein interactions at the site of metal transfer, metal coordination configurations and slow transport rates. To illustrate these aspects, they focus on recent structural and biochemical findings of four transporter families – P1B-ATPases, resistance-nodulation-cell division transporters, copper uptake transporters and cation diffusion facilitator transporters.

Caroline C. Philpott assesses recent findings in the field of iron chaperones in "Coming into view: eukaryotic iron chaperones and intracellular iron delivery." The review focuses on three types of eukaryotic iron chaperones and discusses the roles of each: 1) frataxin, which participates in the mitochondrial formation of iron-sulfur clusters; 2) poly(rC)-binding proteins, which deliver iron to ferritin and other iron-dependent proteins; and 3) Grx3-type monothiol glutaredoxins, which play a role in iron sensing in budding yeast and also affect iron-sulfur cluster formation. As a summary, the review presents a model to describe putative mechanisms for iron delivery in mammalian cells.

Next, Colin Correnti and Roland K. Strong cover the roles of siderophores – small, secreted compounds with a high affinity for ferric iron – and siderophore-binding proteins during bacterial infection of mammalian hosts in "Mammalian siderophores, siderophore-binding lipocalins and the labile iron pool." While much is known about these players and processes, the presence and roles of endogenous mammalian siderophores have been elusive. The authors discuss recent findings that provide evidence of mammalian siderophores and their roles in iron transport in the urinary tract and during tumorigenesis.

Yvain Nicolet and Juan C. Fontecilla-Camps focus on the proteins responsible for active-site maturation of the metalloenzyme [FeFe]-hydrogenase in "Structure-function relationships in [FeFe]-hydrogenase active site maturation." The authors present structural and biochemical data for three maturase proteins, HydF, HydG and HydE, reviewing their known (HydF, HydG) and probable (HydE) roles. Additionally, the article evaluates various proposals for the bridgehead atom of the dithiolate ligand within the [FeFe]-hydrogenase active site and discusses the perplexity of active [FeFe]-hydrogenase production upon expression of the structural gene in organisms lacking the maturase proteins.

J. Dafhne Aguirre and Valeria C. Culotta discuss the protective effects of manganese and the antagonistic role of iron during oxidative stress in "Battles with iron: manganese in oxidative stress protection." The review describes two ways in which manganese can protect cells from oxidative stress: as a cofactor of manganese/iron-superoxide dismutases and as nonproteinaceous manganese complexes. The authors examine mitochondrial mechanisms that ensure manganese as the cofactor for manganese-superoxide dismutase 2 despite the low levels of manganese compared to iron in mitochondria and review the composition and cellular regulation of antioxidant manganese complexes. Additionally, the review touches briefly upon the role of manganese during bacterial infection.

In the final review, "Copper homeostasis at the host-pathogen interface," Victoria Hodgkinson and Michael J. Petris cover three processes by which bacteria resist

high copper levels as a result of host defense – removal of copper out of the cytoplasm, capture of copper via copper binding proteins and reduction of copper toxicity by oxidation of Cu(I) to Cu(II). The authors also discuss the regulation of copper as a factor in the virulence of two highly analyzed pathogens, Mycobacterium tuberculosis and Salmonella typhimurium, and the management of host copper during infection.

These six reviews reveal the complexity of metalloproteins and metal transport and the importance of proper metal regulation during oxidative stress and pathogen infection. While they illuminate the processes of metal transport and homeostasis in eukaryotic cells and bacteria, there are still many unknowns. As suggested by Guengerich in the introduction to this installment, important areas of metal biology remain as future topics for this thematic series, and plans are under way for the next series.

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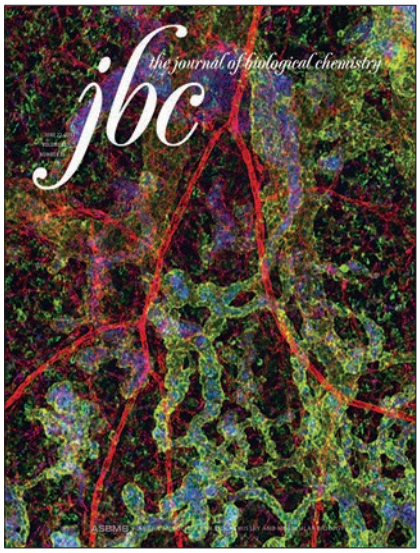
Crystal structure of bacterial enzyme reveals a potential target for new antibiotics

BY RAJENDRANI MUKHOPADHYAY



The rise of antibiotic resistance has researchers searching for new targets in pathogenic bacteria. One promising target is an enzyme called DXR that is essential for isoprenoid synthesis in most bacteria. DXR is inhibited by the antibiotic fosmidomycin, which is used to treat multidrug-resistant bacteria and the malaria parasite. However, a few pathogenic bacteria do not have DXR but have an unrelated enzyme called DRL instead.

In a recent Paper of the Week in the Journal of Biological Chemistry, a team led by Manuel Rodríguez-Concepción at the Centre for Research in Agricultural Genomics in Spain described the crystal structure of DRL from Brucella abortus, a bacterium that infects livestock. "Brucella strains usually infect cattle and other livestock but can also spread to humans," which makes the bacterial strain a major and growing global public health threat, says Rodríguez-Concepción. He also points out that Brucella can be used as a biological weapon, making the search for highly specific antibiotics against these organisms critical.

The investigators found that DXR and DRL differed structurally despite catalyzing the same biochemical reaction. They also found that the active-site residues and the interactions with fosmidomycin between the two enzymes were different.

The investigators inferred that drugs could be designed specifically against one of the two enzymes, including DRL-specific inhibitors that function as narrow-range antibiotics. "The current availability of structural data of high quality makes this quite a feasible goal in a relatively short term," says Rodríguez-Concepción, adding that his group's next goal is to develop DRL-specific inhibitors that also function as efficient antibiotics.

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JLR THE JOURNAL OF LIPID RESEARCH

Despite millions of years of evolution, function of lipid droplets remarkably has stayed the same

BY MARY L. CHANG

A thematic review series continues in the July issue of the Journal of Lipid Research with an article titled "The proteomics of lipid droplets: structure, dynamics and functions of the organelle conserved from bacteria to

humans." The manuscript is part of the series being coordinated by Karen Reue of the University of California, Los Angeles, an editorial board member of the journal.

In the July review, Li Yang and colleagues from the Chinese Academy of Sciences explore how proteomic studies on lipid droplets in a wide range of organisms – from one-celled bacteria to higher-order mammals – provide evidence that the function of some of the compounds contained in these droplets has been conserved, despite millions of years of evolution.

Several important functional groups of proteins seem to be consistently present and represented. These include enzymes that synthesize lipids, proteins involved in molecular trafficking across membranes, signaling proteins and proteins associated with protein degradation. Both proteomics and cell biology data suggest all organisms can hold neutral lipids in lipid droplets. But lipid droplets, once guessed to be inert lipid storage units in the simplest of organisms, now appear to be highly evolved and functional cellular organelles in more complex creatures.

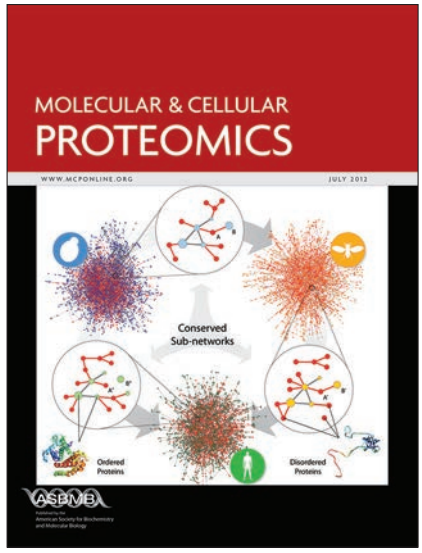
While structural proteins of lipid droplets may vary greatly from organism to organism, they all have in common certain properties that tag and target them for these specialized organelles. Further proteomic analyses certainly are warranted, as lipid droplets have been linked to the development of certain metabolic diseases. They also have great potential in the research into neutral lipid-derived products that could have energy (biofuel), food and medication applications.

Mary L. Chang (mchang@asbmb.org) is managing editor of the JLR and coordinating journal manager of MCP.

MCP MOLECULAR & CELLULAR PROTEOMICS

Testing drug toxicity earlier in the process

BY RAJENDRANI MUKHOPADHYAY



Having to withdraw a drug from the market because of unforeseen toxic side effects is every pharmaceutical executive's nightmare. Current procedures for evaluating the toxicity of drug candidates during development involve histopathological assessments of liver tissue and biochemical measurements of liver damage. The problem with these tissue and cellular approaches is that they are not sensitive enough. In a recent Molecular & Cellular Proteomics paper (1), a team led by Stephen R. Pennington at University College Dublin in Ireland described a sensitive molecular approach to tell if a potential drug will be toxic early in the development process. "The idea was to use transcriptomics, proteomics and metabolomics and combine the data to provide earlier markers of kidney or liver toxicity," says Pennington. The approach involved first feeding rats a drug candidate and then measuring the liver protein expression profiles by label-free liquid chromatography-mass spectrometry. The method generated a list of proteins that changed in response to the drug. The investigators also collected transcriptomic data from the same liver samples and compiled a list of transcript changes. From all that data, the investigators had a panel of potential biomarkers for liver toxicity that they pursued with a method called selective reaction monitoring by mass spectrometry, which accurately tracks changes in expression of a given set of proteins. Pennington says the investigators are now working to extend their approach to more readily accessible sample types, such as blood, and to apply it in other studies for diagnostics for chronic conditions, such as cancer, cardiovascular disease and arthritis.

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

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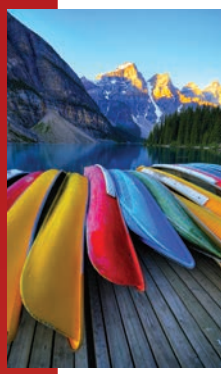

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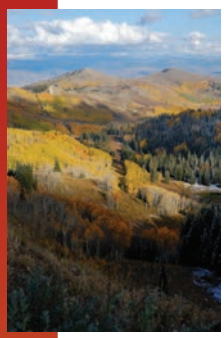

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What's up with accreditation: a progress report

BY PETER J. KENNELLY

Are we there yet?

"When is it going to happen?" The wording varies, but the question of when the accreditation program is going to be launched comes up at every meeting and workshop I attend as well as in periodic emails and phone calls. I can assure you that the working group drawn from the ranks of the American Society for Biochemistry and Molecular Biology's Education and Professional Committee and the Undergraduate Affiliate Network has worked hard to expedite the process. Since my last progress report in early 2011, the group has gathered together on three different occasions to learn about the complexities of student assessment, to discuss the goals and structure of the program, and to develop pilot versions of applications, assessment questions and so forth. The process has been fun, fulfilling and frustrating.

'We will sell no wine before its time'

Those of you who were watching TV during the 1970s probably still recall the deep, sonorous voice of Orson Wells as he uttered that tagline for Paul Masson Wines. Simply put, translating our enthusiasm and ideas into an effective and workable program and developing a practical assessment instrument while keeping up with our day jobs has proved to be a time- and effort-intensive enterprise. We intend, however, to begin piloting programmatic and assessment materials during the year to come. The outcomes of these trial efforts will determine how quickly we can move forward.

Issues and answers

In the way of a progress report, I would like to present a few of the key questions we face and our recommended responses:

1. Do we accredit or certify degree programs or individual student diplomas? It has been decided that the primary focus of the program will be to certify student performance – not programmatic structure or curriculum. Our ultimate objective as educators is to train students to be critical thinkers who are equipped with a foundation of skills and knowledge to be lifelong learners. Emphasizing outcomes rather than prescribing a curriculum also avoids the inadvertent tendency of many accreditation programs to hinder progress by freezing content and methodology in time.

2. Should the program be aspirational or confirmatory in nature? A secondary goal of the accreditation program is to stimulate program improvement. Therefore, for students to participate, the degree-granting program will have to apply to the ASBMB for recognition. To qualify, provision will have to be made for select items deemed to be of high priority to the ASBMB, such as a) professional development opportunities for faculty members; b) research or internship opportunities for undergraduates; c) substantial (400 contact hours) experiential learning in science, technology, engineering and math subject areas; and d) proactive efforts to improve student communications skills, provide a background in ethics and so forth.

3. How can something this big be made practical? Every year the members of the ASBMB submit tens of thousands of manuscripts and grant applications to scores of journals and dozens of funding agencies that must evaluate them by a process of peer review by qualified experts. Where do these experts come from? Those same members of the research community. For every manuscript we submit, most of us review multiple papers. Those serving on a National Institutes of Health study section will perform in-depth reviews on 150 or more grant applications during their terms. If the members of the educational community are sufficiently desirous of establishing their own accreditation program, a similar spirit of volunteerism will be needed. I, for one, believe we are up to the challenge.

The accreditation program continues to evolve as it develops. Keep an eye on ASBMB Today for updates.

Peter J. Kennelly (pjkennel@vt.edu) is a professor and head of the department of biochemistry at Virginia Tech.

Get up, get into it, get involved

BY GEOFF HUNT

Do friends and family members meet descriptions of your research with blank stares and empty nodding? Do you get frustrated by scientific misinformation in the media? Have you ever wished that everyone who is not a scientist would just get it but been at a loss about how to make it so? Well, now is your chance to do something about it. The American Society for Biochemistry and Molecular Biology has established a brand new Public Outreach Committee whose stated goal is to get ASBMB members involved in science literacy activities across the country.

Efforts to get scientists more involved in public outreach, though not new, traditionally have been seen as secondary, or even detrimental, to scientific research. Yet with scientific issues and topics making their way into political discussions, news stories and even daily conversations, this attitude is shifting. And the scientific enterprise has clearly taken note. At the National Science Foundation, the increased attention being paid to the broader impacts criteria for grant proposals, along with rapidly declining success rates for grant applications, ensure that outreach is a critical – and possibly deciding – factor in determining whether a proposal will be funded. Universities also are starting to incorporate extracurricular activities into performance reviews and tenure decisions. Even the National Academy of Sciences is getting into the act, recently hosting a two-day seminar called "The Science of Science Communication" that featured speakers who extolled the virtues of interacting with the public while exhorting attendees to become stronger communicators.

Take our outreach survey at **http://tinyurl.com/7bwwsvy**

So where do professional societies such as the ASBMB fit in? Beyond spreading the message about the importance of outreach through our various communication outlets, the ASBMB is synthesizing the expertise of the members of the Public Outreach Committee, who are all seasoned science outreach experts, into a highly visible program that can be shared with and used by the entire ASBMB community. The committee is working hard to provide exciting opportunities for our members to get involved by establishing partnerships with existing outreach organizations across the country. For example, the Science and Entertainment Exchange, a program run by the NAS, pairs Hollywood screenwriters working on scientifically themed treatments with expert scientists to ensure technical accuracy in movies and television shows.

Moreover, we are working on several outlets and activities that will help scientists develop their outreach and science communication skills. We will host a workshop during the 2013 Experimental Biology meeting that will expose attendees to different forms of outreach and facilitate their participation in these activities. We also will be developing a website containing how-to guides for outreach, case studies from outreach experts and a detailed list of outreach activities in your area.

But ultimately, the success of this endeavor lies with you, dear reader. It is your participation and energy that will drive our efforts. We need you as volunteers, as organizers and as participants in our efforts. So tell us what issues you want to address. Let us know if a particular group or activity strikes your fancy. Share your outreach experiences with us. If we can harness the enthusiasm and creativity of every ASBMB member, we will be that much closer to the day when scientists and nonscientists can speak the same language.

Geoff Hunt (ghunt@asbmb.org) is ASBMB's outreach coordinator.

Outreach committee members

Lee Gehrke, chairman
Harvard University

Thomas Baldwin
University of California, Riverside

John Kyriakis
Mercury Pharma

Billy Hudson
Vanderbilt University

Mike Klymkowsky
University of Colorado

Jonathan Dattelbaum
University of Richmond

Ed Eisenstein
University of Maryland, Universities at Shady Grove

Robert E. Palazzo
Rensselaer Polytechnic Institute

Hannah Alexander
University of Missouri

Michael Bradley
Yale University

Morgan Thompson
Harvard University

America needs more deep innovation, January 2012

Dear Ken,
This is a very important and timely article. If the U.S. does not raise basic research budgets, it may soon fall behind other countries such as China, where basic research budgets are only increasing; risks throwing away the large investments it has made in training graduate students and postdocs, who face a continually narrowing job market; and risks losing our best minds to other countries.

– CHRIS McCLENDON, POSTDOCTORAL FELLOW,
UNIVERSITY OF CALIFORNIA, SAN DIEGO

Credos for challenging times, May 2012

My thought on this is: Science is competing with nature, and nature doesn't care whether we succeed or not. So pat yourself on the back for being brave enough to compete with nature, and remember, when nature/science gives you surprises (good or bad), it's nothing personal!

– ELIZABETH C. THEIL, PROFESSOR AND SENIOR SCIENTIST,
CHILDREN'S HOSPITAL OAKLAND RESEARCH INSTITUTE

Living through art and science: a profile of Robert Schimke, May 2012

I have been a close friend and colleague of Bob Schimke for many years. He is an exceptionally dedicated individual, whatever he does. I have enjoyed our frequent visits together in recent years. I greatly enjoyed reading this article in ASBMB Today. Schimke is a wonderful person; it has been wonderful knowing him and interacting with him.

– CHARLES YANOFSKY, PROFESSOR EMERITUS,
STANFORD UNIVERSITY

Life without appreciation of at least some form of art, be it literature, music, painting, sculpture or others, is not worth living. A person who can be creative in both science and art is doubly blessed. We hope that (Professor) Schimke will go on shining in his present creative phase for a long time to come and will produce many more of those beautiful paintings for us to admire. I especially liked his "Four Seasons" and "Orange Red."

– ANONYMOUS

It is wonderful to see such an inspiring article about a great scientist who has contributed so much to the biological sciences and to learn that, despite adversity, he has a second career as an artist. Keep it up, Bob! All the best.

– DICK HANSON,
PROFESSOR, CASE WESTERN RESERVE UNIVERSITY

My undergrad bio mentor, the late J. Fred "Paulo" Dice, did his Ph.D. work with Schimke at Stanford, and I thus have a lineage connection with Bob, although I never met him. However, I read many of his papers, and I still have in my file cabinet a classic paper of his on measuring protein turnover and calculating the fractional catabolic rate and half-life. I am pleased to hear about his life after science and his artwork. I particularly liked his painting "Genetics."

– JONATHAN D. SMITH, STAFF SCIENTIST, CLEVELAND CLINIC

I had the great privilege of a personal tour of Robert's studio and home about five years ago while visiting Palo Alto. I was very impressed with the level of dedication he shows in all his artistic endeavors. Hundreds of wonderful necklaces line the hallway. The sheer volume of work is impressive by itself. His painting studio is one to be envied by any artist frustrated with a lack of production space. The visual energy he creates is all about the place, as many canvases hang on the walls in view while others lie about on the floor in mid-production. Paint is literally everywhere. His growth as an artist can be traced through the many paintings, and each new one seems to be more impressive than the one before. As an artist myself, I understand the creative carrot on a stick that his process and artistic journey represents. It boils down to: "If you think that one was good, wait till you get a look at my next one."

– PROUD NEPHEW MATT BAZEMORE

PROMOTING RESEARCH OPPORUNITIES FOR LATIN AMERICAN BIOCHEMISTS

Together with PABMB, ASBMB and IUBMB recently launched a new program (called PROLAB) and committed funds to foster interactions between U.S. laboratories and graduate students, postdoctoral fellows and/or new faculty members from countries belonging to the Pan American Association for Biochemistry and Molecular Biology (including Latin American countries, Spain and Portugal).

Take advantage of the short-term research experiences in the USA for postdoctoral researchers, graduate students and tenure-track faculty members within five years of their training from countries that are members of PABMB.

LEARN MORE AT www.asbmb.org/pabmb

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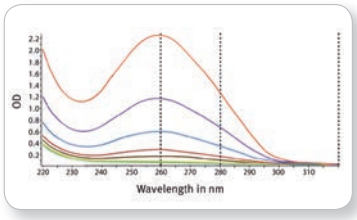

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