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ASBMB TODAY

THE MEMBER MAGAZINE OF THE AMERICAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY

The evolution of cluster hiring

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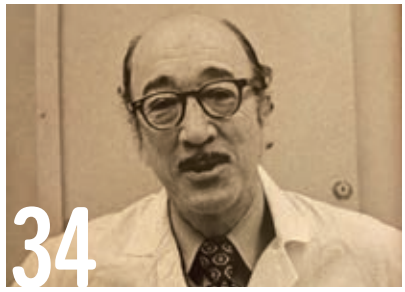

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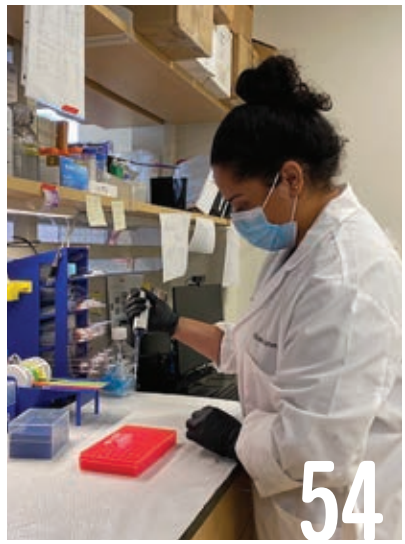

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Diversity matters

By Comfort Dorn

From preschool through third grade, my son's teachers were all women over the age of 50. This is not unusual. According to census data, more than 80% of elementary and middle school teachers are women, and their average age is mid-40s.

But then, in fourth grade, my son was assigned to a class taught by a young man in his late 20s or early 30s. And this was a huge deal. Mr. Schwartz was not only young — he was supercool. He gave each student a pizza box to store their classwork in, and these boxes were kept stacked in a corner of the room as though a big party were perpetually in progress. On the weekends, Mr. Schwartz and a friend of his (also a male elementary school teacher) did science shows. Parents could hire them to come to a kid's birthday party dressed in lab coats and do experiments that involved plenty of smoke and slime.

I don't know if my son's life trajectory was changed by fourth grade — he didn't become a teacher or a scientist — but I remember that he was sublimely enthusiastic about going to school that year. He never had disliked any of his previous teachers; he was quite fond of some of them. But this was different. Different in the same way it had been for me, about 10 years earlier, the first time I received communion from a (then still rare) woman Episcopal priest.

I recently read a Twitter thread by Preston Igwe, a Black doctor at a Veterans Affairs hospital, describing a Black patient's response on meeting him: "Brother, I've been coming to the VA since 1970. And I've NEVER seen a Black doctor." After his exam, the patient told an attending physician, "You need to keep him! He's the first doctor I've ever had that looks like me."

As we move through life, all of us need to see people who look like us doing work that we and our society value. We want to see that race, gender, ethnicity, nationality and all the other dividers in the world are not barriers. But they still are. And a hefty portion of the valued jobs in the world still go to white men.

Some employers, including universities, would like to break the ongoing cycle of discrimination and diversify their workforces. However, if they solicit or hire candidates based on race and ethnicity, they run into accusations of (you guessed it) discrimination.

To mix up a few metaphors, this is both a delicate dance and a tough nut to crack. In this month's issue, our science writer, Laurel Oldach, explores ways in which universities are working to diversify their faculties without overtly hiring for diversity.

And though it's critically important that members of historically marginalized groups see people who look like them in valued positions, it's just as important for those of us who don't live on the margins to see people who don't look like us in those positions. See them, get used to seeing them, value them and learn from them.

Comfort Dorn (cdorn@asbmb.org) is the managing editor of ASBMB Today. Follow her on Twitter: @cdorn56.

Women represented in statue exhibit

People strolling through the garden of a luxury mall in Dallas between May and October 2021 may have been surprised to encounter a party of life-size, bright orange statues of living women in science on its lawn.

The statues were 3D printed representations of the 125 ambassadors of the IF/THEN project, sponsored by Texas philanthropist and business owner Lyda Hill in partnership with the American Association for the Advancement of Science, 500 Women in STEM and other groups.

IF/THEN aims to increase representation of women in the sciences, technology, engineering and math. Two of the statues honor IF/THEN ambassadors who also are members of the American Society for Biochemistry and Molecular Biology: **Joyonna Gamble–George** and **Sylvie Garneau–Tsodikova**.

Gamble–George is a postdoctoral researcher at New York University's nursing college. She earned her Ph.D. in neuroscience at Vanderbilt University in 2016, studying stress signaling, and pursued postdoctoral research in neuroscience at the University of Florida before accepting an AAAS science and technology policy fellowship based at the National Institutes of Health.

GARNEAU-TSODIKOVA

She has been at NYU since 2020 studying behavioral health and recently published on how the pandemic has affected drinking behavior among New Yorkers. Gamble–George also is the co-founder and chief scientific officer of a Florida-based biotechnology company developing wearable technologies that aim to use artificial intelligence to predict events such as heart attacks.

Garneau–Tsodikova is a professor of pharmaceutical sciences and assistant vice president for research at the University of Kentucky. Her lab studies the biosynthesis of polyketides and other nonribosomal peptides, which can be used as anticancer and antibacterial agents. She also is interested in developing new antimicrobial agents that can overcome resistance in bacteria and fungi.

Garneau–Tsodikova earned her Ph.D. at the University of Alberta and pursued postdoctoral research at Harvard Medical School. Before joining the faculty at the University of Kentucky, she was an assistant professor at the University of Michigan.

COURTESY OF THE IF/THEN COLLECTION

Joyonna Gamble–George, a postdoc at New York University, stands with her statue in Dallas, part of the IF/THEN project. Take a virtual tour of the statues at ifthenexhibit.org.

Gokhale takes over as Indian biotech secretary

Rajesh Gokhale, who studies tuberculosis at India's National Institute of Immunology in New Delhi, has been appointed the secretary of the Indian Department of Biotechnology. He started in this new position Nov. 1.

GOKHALE

The Department of Biotechnology, part of the Ministry of Science and Technology, funds scholarships, research awards and scientific training efforts; coordinates large studies such as cataloging genetic variation in India; administers core facilities for advanced imaging, electron microscopy and mass spectrometry; and supports independent research institutes with a variety of focus areas. As the department's secretary, Gokhale will be second in command to biotechnology minister Jitendra Singh, who reports to the prime minister of India.

Gokhale's research focuses on Mycobacterium tuberculosis, the pathogen that causes tuberculosis, and its metabolism. He studies polyketide synthases, which generate a wide variety of metabolites that contribute to pathogenicity. He also has studied

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National Academy of Medicine names new members

The National Academy of Medicine has announced its new class of 100 members. National Academy of Medicine members are elected based on their professional achievements and commitment to service. Six of this year's new members are members of the American Society for Biochemistry and Molecular Biology: Ted Dawson, Hugh Hemmings, Charles Rice, Peter Tontonoz, JoAnn Trejo and Cynthia Wolberger.

Ted Dawson is a professor of neurology, neuroscience and pharmacology at the Johns Hopkins University School of Medicine; he also directs the university's institute for cell engineering. He was recognized for his studies of how neurons degenerate in Parkinson's disease and investigation of potential disease-modifying treatments. He also is known for his studies on how nitric oxide harms neurons after a stroke, which led to a better understanding of nitric oxide's role as a neurotransmitter and of caspase-independent forms of programmed neuronal cell death. Dawson earned his M.D. at the University of Utah School of Medicine and his Ph.D. at Utah State University. He continued clinical training at the University of Utah and the University of Pennsylvania and conducted both a clinical and a postdoctoral fellowship at Johns Hopkins before joining the faculty there.

DAWSON

Hugh Hemmings is a professor of pharmacology, chair of the department of anesthesiology and senior associate dean for research at Weill Cornell Medical College in New York. He was recognized for studies investigating synaptic transmission and the mechanisms of action of general anesthetics. Hemmings earned his M.D. and Ph.D. at Yale University and conducted further research and clinical training at the Rockefeller University, Massachusetts General Hospital and Weill Cornell. He joined the Weill Cornell faculty in 1991. His lab studies how anesthetic drugs affect the brain, focusing on their effects on synapses between neurons. Hemmings' lab found that, in addition to their known effects on how postsynaptic cells respond to neurotransmitters, anesthetics also can affect how presynaptic cells release neurotransmitters. His team continues to work on understanding how these drugs affect the brain to render patients unconscious, paralyzed and amnesic.

HEMMINGS

Charles Rice, a professor and head of the laboratory of virology and infectious disease at the Rockefeller University, was recognized for helping to characterize the proteins required for viral replication and developing antivirals. Rice earned his Ph.D. at the California Institute of Technology, where he studied arboviruses, including the flavivirus that causes yellow fever. He joined the faculty at Washington University in St. Louis in 1986. There, Rice and his colleagues completed the genome of the hepatitis C virus, linked it conclusively to transfusion-associated hepatitis and developed methods to grow the virus in culture, all of which were important advances toward the development of drugs that can cure hepatitis C in most patients. Rice shared the Nobel Prize for this work in 2020.

RICE

Peter Tontonoz is a professor of pathology and biological chemistry at the University of California, Los Angeles. He was recognized for pioneering work in lipid metabolism; his lab studies the role of nuclear receptors in the expression of lipid metabolism–related genes. He is known for sorting out how PPAR, the peroxisome proliferator-activated receptor family, and LXR, the liver X receptor family, contribute to fat cell development and atherosclerosis. The work illuminates crosstalk mechanisms between inflammation, metabolism and the immune system. Tontonoz earned his M.D. and Ph.D. at Harvard Medical School and did postdoctoral research at the Salk Institute before completing a medical residency in pathology at the University of California, San Diego.

TONTONOZ

JoAnn Trejo is a professor of pharmacology and assistant vice chancellor for health sciences faculty affairs at the University of California, San Diego. The academy recognized her discoveries of how G protein–coupled receptors regulate vascular inflammation and cancer progression. Trejo earned her Ph.D. at the University of California, San Diego, studying the effects of neurotransmitters on gene expression, and conducted postdoctoral research on thrombin signaling at the University of California, San Francisco. She began her faculty career at the University of North Carolina, Chapel Hill, before being recruited to UC San Diego in 2008. Trejo's lab studies protease-activated receptors that signal through G proteins and arrestin molecules. Her lab is interested in how receptor compartmentalization and ubiquitination regulate signaling activity in the context of endothelial dysfunction and breast cancer.

TREJO

Cynthia Wolberger is a professor and director of the department of biophysics and biophysical chemistry at the Johns Hopkins University School of Medicine, where she also is cross-appointed in the department of oncology. She was honored for her studies of the combinatorial regulation of transcription, ubiquitination and epigenetic modifications. Wolberger earned her Ph.D. in biophysics at Harvard University, studying the structure of the DNA-binding transcription repressor bacteriophage 434 Cro. After a postdoc at the University of California, San Francisco, she went to Hopkins for a second postdoc and then joined the faculty there. Wolberger's lab studies the molecular basis of gene regulation through post-translational modifications of histone proteins, such as ubiquitination and methylation. Her structural studies of transcription regulation and ubiquitin signaling have elucidated the molecular mechanisms underlying these processes.

WOLBERGER

Send us your news!

Have you recently been promoted or honored? Do you have good news to share with your fellow ASBMB members? Email it to us at asbmbtoday@asbmb.org and include a photo!

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skin pigmentation, contributing to scientific understanding of the autoimmune disorder vitiligo.

Gokhale is a past member of the editorial board of the Journal of Biological Chemistry and a former Howard Hughes Medical Institute international scholar. In addition to other honors, he is a fellow of the Indian National Science Academy, the National Academy of Sciences, India and the Indian Academy of Sciences.

Young alumni award for Wencewicz

Timothy Wencewicz, an associate professor at Washington University in St. Louis, received the Southeast Missouri State University Alumni Association's Distinguished Young Alumni Award in October.

WENCEWICZ

Wencewicz studies antimicrobial resistance, including investigations into the microbial enzymes that break down and inactivate currently available antibiotics. He has studied new potential antimicrobial delivery systems, such as conjugating an antimicrobial agent to a siderophore, a type of iron-conjugating molecule that many microbes use to scavenge iron from the environment, to sneak the antimicrobial molecule into the cell.

After he attended Southeast Missouri State University as an undergraduate, Wencewicz earned his Ph.D. in chemistry at the University of Notre Dame and trained as a postdoc at Harvard Medical School. He returned to Missouri in 2013 to join the faculty at Washington University.

Wencewicz serves on the editorial boards of the Journal of Biological Chemistry and the Journal of Antibiotics. In addition to this recent honor, he has received a Cottrell Scholar Award, a Camille Dreyfus Teacher–Scholar Award and a Sloan Research fellowship in chemistry.

Biophysical Society honors Dowhan

William Dowhan, a professor at the University of Texas–Houston Medical School, will receive the Biophysical Society's 2022 Anatrace Membrane Protein Award.

Dowhan studies how lipids regulate the topology of integral membrane proteins and how changes in a membrane's phospholipid composition can alter membrane protein structure and number of transmembrane domains. His lab also studies cardiolipin, a lipid found only in mitochondria, and how it contributes to the formation of the respiratory supercomplexes that enable efficient oxidative phosphorylation.

DOWHAN

Dowhan earned his Ph.D. in biochemistry at the University of California, Berkeley, and conducted postdoctoral research with lipid scientist Eugene Kennedy at Harvard. He joined the University of Texas faculty in 1972 and has held visiting professorships at the University of Basel and Stanford University. He's a fellow of the American Academy of Microbiology and a past recipient of the ASBMB's Avanti Award in Lipids, among other honors.

The Biophysical Society award is funded by the lipid reagent supply company Anatrace to recognize an investigator who has made a significant contribution to membrane protein research. It consists of a $3,000 prize and an honorary lecture.

Brixius–Anderko joins Pitt

Simone Brixius–Anderko was appointed as an assistant professor at the University of Pittsburgh this past fall. She started a lab at the pharmacy school to study the role of cytochrome P450 enzymes in cancer-related fatty acid metabolism and microbiome-mediated biotransformation of compounds in the human body.

BRIXIUS-ANDERKO

Brixius–Anderko earned her Ph.D. in biochemistry in Rita Bernhardt's lab at Saarland University in Germany. During that time, she collaborated with industry scientists to develop a sustainable process for generating steroids that exploit P450s. She stayed at the Bernhardt lab for a postdoctoral fellowship, during which time she focused on prostate cancer drugs' effects on P450-mediated steroid production. Next, as a postdoc in Emily Scott's lab at the University of Michigan, she pursued her interest in P450 structure–function relationships and trained in X-ray crystallography.

"In my lab, I intend to implement a diverse working environment for training and mentoring the next generation of scientists and to accelerate research for using cytochrome P450 enzymes as drug targets," Brixius–Anderko said.

Michael Waterman

By F. Peter Guengerich

Michael Roberts Waterman, who made seminal contributions to the field of cytochrome P450 research died Nov. 7 in Dallas, Texas. He was 81.

Born Nov. 23, 1939, Waterman grew up in Portland, Oregon. He earned a baccalaureate degree at Willamette University and completed his doctoral studies with Howard S. Mason at the University of Oregon Medical School. He did postdoctoral research with Takashi Yonetoni at the Johnson Foundation at the University of Pennsylvania, studying the properties of modified hemoglobins.

Waterman's first academic position was at the University of Texas Southwestern Medical School in Dallas, where he became a professor of biochemistry in 1982. He assumed chairmanship of the biochemistry department at Vanderbilt University School of Medicine in 1992. He retired as department chair in 2010 and left Vanderbilt in 2012. He spent his retirement in Dallas.

In his early research at the UT Health Science Center, following his training with Yonetani, Waterman studied the physical chemistry of hemoglobins, particularly hemoglobin S, whose mutations dictate sickle cell disease. He investigated ways to ameliorate the sickling disorder by modifying the structure of the heme protein.

Waterman then turned his attention to the molecular regulation of the cytochrome P450 enzymes. In addition to understanding steroidogenic P450s and related proteins, his group was one of the first to produce mammalian cytochrome P450 enzymes in bacteria, a seminal advance in this area.

For several decades, Waterman's laboratory addressed the structure and function of steroidogenic P450s in the adrenal gland, particularly the cholesterol side-chain cleavage P450, or CYP11A1, and the steroid aromatase CYP19A1, including the characterization of the cDNA and gene. His studies also focused on CYP17A1 and CYP21 to define the mechanisms of several CYP mutations. Waterman collaborated with myriad luminaries in the field to elucidate the structure and function of adrenal steroidogenic enzyme systems.

More recently, the Waterman lab studied the regulation and function of CYP51 genes from various organisms. His research led to a better understanding of processes underlying hormonal disturbances related to genetic defects and provided the basis for developing better antifungal drugs, defining the potential roles of steroid metabolism in the control of human parasites.

In his 42 years leading a federally funded research lab, Waterman mentored 12 Ph.D. candidates and more than 50 research fellows. He published 278 peer-reviewed articles, 79 symposium publications, 61 invited articles, and three book chapters and edited five books.

Waterman was a member of the ASBMB Finance Committee. He served on the editorial boards of the Journal of Biological Chemistry and numerous other journals. He served on the National Institutes of Health Physical Biochemistry Study Section as a peer reviewer of grant applications. He worked as a consultant for agencies and foundations, and he presented his research at international meetings and universities around the world. With other UT Southwestern Medical faculty, he established the company Oxygene LLC, providing molecular biological products related to cytochrome P450.

Waterman took a calm and thoughtful approach to the management of his department at Vanderbilt, which expanded significantly and thrived under his direction. He enjoyed the friendship of many colleagues and collaborators, as well as their scientific interactions, and he developed collegial relationships with fellow scientists throughout the world.

He is survived by his wife, Mimi, and two children, Peter Waterman and Amanda Guerra, all of Dallas, and his four grandchildren, Kennedy and Jack Waterman and Abigail and Andrew Guerra.

(Russell A. Prough and Bettie Sue S. Masters contributed to this article.)

F. Peter Guengerich (f.guengerich@vanderbilt.edu) is a professor of biochemistry at Vanderbilt University and deputy editor for the Journal of Biological Chemistry. In 2005, he received the ASBMB's William Rose Award.

Joel A. Dain

Joel A. Dain, a longtime professor at the University of Rhode Island and a member of the American Society for Biochemistry and Molecular Biology since 1970, died Aug. 21 in Kingston, Rhode Island. He was 89.

Born Oct. 26, 1931, in the Bronx, New York, Dain earned a bachelor's degree in chemistry from the University of Illinois Urbana–Champaign and a Ph.D. in biochemistry from Cornell University. He was a professor of biochemistry at URI for almost 60 years. Dain and his family traveled for his work, living in Germany, California and Japan while he collaborated with scientists at local universities. He gave invited lectures at conferences and universities around the world. He retired in 2015 and worked as an emeritus professor until his death.

Dain's lab studied complex glycated protein structures called advanced glycation end products, or AGEs, that are associated with complications in diabetes and other diseases. They researched the formation of AGEs with dietary sugars such as fructose, galactose, ribose and glyceraldehyde. Of particular interest was glucosamine, an analog of glucose in which an amine replaces the hydroxyl group on carbon-2, which is used widely as a dietary supplement to relieve osteoarthritis symptoms. The lab worked to develop capillary electrophoresis and high-performance liquid chromatography methods to describe the formation of previously undescribed AGEs.

From early on, Dain opened his lab to both female and male graduate students from all over the world and from diverse backgrounds. He mentored numerous grad students and postdocs with whom he maintained regular contact. In addition to the ASBMB, he belonged to the American Chemical Society and the American Association of University Professors.

Dain was a runner in high school and a basketball player from his teens into his eighties. He also loved tennis and was an avid reader of suspense and detective novels. A lifelong stamp collector, for many years he taught beginning stamp collecting to children through a local community center.

Dain is survived by his wife of 64 years, Eleanor; three sons, Peter, Jonathan and Leonard and their wives; and six grandchildren.

Henry Clement Pitot III

Henry Clement Pitot III, an emeritus professor of the McArdle Laboratory for Cancer Research at the University of Wisconsin–Madison, died June 9 at the age of 91.

Born May 12, 1930, to Henry and Bertha Pitot, he grew up in New Orleans. He attended Virginia Military Institute, where he imagined a career in the military but fell in love with research required for his bachelor's in chemistry.

Advised to get a medical degree to pursue additional biochemistry studies, Pitot went to Tulane University and worked in the labs of Emmanuel Farber and Ernest Kun before earning his M.D. in 1955. Having developed a keen interest in medical research and its relation to disease development, he went on to earn his Ph.D. in biochemistry and completed the requirements for work in pathology.

In 1959 at an American Cancer Society meeting, Pitot met Van R. Potter of the McArdle Laboratory in an elevator, and they discussed his research over coffee. Pitot moved with his growing family to Wisconsin to begin a postdoctoral fellowship with Potter. He spent more than 60 years in Madison as a research faculty member and administrator. Among his roles were chair of the pathology department, dean of the medical school and director of the McArdle Laboratory.

Pitot worked to better delineate the staging for development of liver cancer. He authored or co-authored more than 500 scientific works, including articles on the changes in gene expression of hepatocytes during the multistage carcinogenic development. His work led to the development of methods to identify and quantify precancerous lesions in liver tissue and identify and characterize the risk of potential carcinogens.

Pitot served on cancer panels of local and national impact, including the President's Cancer Panel from 1993 to 1995. He served on the editorial boards of more than a dozen scientific journals and mentored more than 100 grad students and postdoctoral fellows.

A tribute article from the McArdle Laboratory stated, "He epitomized collegiality, and his contributions to the cancer research community are everlasting."

He was preceded in death by his wife, Julie, in 2017 and eldest daughter, Beth, in 2004. He is survived by seven children, 16 grandchildren and eight great-grandchildren.

— Connor O'Hara

William Henry Welch Jr.

William Henry Welch Jr., an emeritus faculty member at the University of Nevada–Reno, died in hospice June 3 of Parkinson's disease and cancer. He was 80.

Welch, known to friends as Bill, was born in 1940 in Hollywood, California, to William Henry Sr. and Lola Ellsworth Welch. The family moved to Altadena, where Welch spent years enjoying the beauty of nature and the surrounding parks as well as the Pacific surf.

He attended the University of California, Berkeley, where he earned his bachelor's in biochemistry and met his future wife, Marcy Delaney. After graduation, Welch headed to the University of Kansas to earn his Ph.D. He and Marcy wed in 1965. The couple moved with their son William III to Boston for Welch's postdoctoral fellowship at Brandeis University.

Welch later was offered a tenure-track professorship in the University of Nevada–Reno's biochemistry department, which he took. At Reno, he conducted decades of research and served as a biochemistry adviser in the school of medicine's National Institutes of Health–sponsored undergraduate research program.

Welch is most noted for his use of computational techniques to study the molecular basis for the interaction of ryanoids with ryanodine receptors and their related biological function. His molecular modeling aided in efforts beyond this system to evaluate the structure–function relationship of other proteins, such as hormones and enzymes, including those found in the Mojave rattlesnake venom.

Welch had a sincere love for the beauty of the natural world, according to his family obituary, and often took his family on trips in the car or RV to national parks. He served as a skiing coach at the Sky Tavern just outside Reno and educated others as a member of the West Truckee Meadows Citizens Advisory Board, where he advocated for the development of West Reno to conserve and preserve access to those public lands.

He is survived by his wife, Marcy; children, Bill, Deborah, Emily and Gregory; grandsons, Colin, Gabriel and Tristan; and his brother, David.

— Connor O'Hara

John S. Blanchard

John S. Blanchard, an enzymologist committed to finding treatments for antibiotic-resistant bacterial infections, died Nov. 5. He was 67.

Blanchard was born Feb. 20, 1954. He grew up in Connecticut and enjoyed playing sports, including swimming, tennis, golf and hockey.

He earned his bachelor's degree from Lake Forest College in 1975 and his Ph.D. in biochemistry from the University of Wisconsin–Madison in 1978. Blanchard subsequently worked at Albert Einstein College of Medicine for 42 years, first as a postdoctoral fellow and later as a member of the faculty.

Blanchard's research focused on characterizing enzymes' mechanisms of action through a combination of structural, kinetic and chemical analyses. In the early portion of his career, Blanchard studied enzymes involved in biosynthesis and metabolism. Later, he turned his attention to enzymes found in bacterial pathogens such as tuberculosis.

In a particularly impactful 2009 Science paper, Blanchard demonstrated how the tuberculosis enzyme β-lactamase contributes to drug resistance and how a two-drug combination can circumvent this resistance.

In a memorial posted to Einstein's website, Executive Dean Edward R. Burns reflected on the aftermath of that report. "At John's request, Einstein elected not to patent his discovery because he didn't want to impede its use in Africa. . . . He was a pioneering enzymologist with a huge heart."

Over the course of his career, Blanchard published almost 200 peer-reviewed articles and received six full and four provisional patents. He was also a dedicated supporter of young scientists: He encouraged undergraduates to join his lab; served as adviser to Einstein's Student Journal Club and Summer Undergraduate Research Program; and advocated for retirement benefits on behalf of young faculty.

In recognition of his accomplishments inside and outside the lab, Blanchard received the American Chemical Society Texas A&M University Section's A.I. Scott Medal for Excellence in Biological Chemical Research in 2014 and Einstein's Marshall S. Horwitz Faculty Prize for Research Excellence in 2017. He donated his prize money for the latter award to biomedical science graduate programs at Einstein.

— Nuala Del Piccolo

Advocating for the well-being of students in STEM

The American Society for Biochemistry and Molecular Biology public affairs team has endorsed the Higher Education Mental Health Act of 2021 and continues to work with policymakers on Capitol Hill to gather support for it. If passed, this bill would establish a commission to study the mental health concerns of students and create a roadmap for universities to improve mental health services.

Unconscious bias webinar: Feb. 17

The ASBMB Women in Biochemistry and Molecular Biology Committee and Minority Affairs Committee will host a webinar on unconscious bias from 2:30 p.m. to 4 p.m. Eastern on Feb. 17. It will be led by Darin Latimore, deputy dean and chief diversity officer at the Yale School of Medicine. Register at asbmb.org/meetings-events.

New public affairs director

Benjamin Corb, who led the society's public affairs office for more than 12 years, took a new job in January at the consultancy Edelman. Sarina Neote, formerly the ASBMB's science policy manager, is the new director.

CORB

NEOTE

Haltiwanger and Martemyanov join JBC in 2022

Robert Haltiwanger and Kirill Martemyanov became associate editors for the Journal of Biological Chemistry in January. Haltiwanger, a professor specializing in glycobiology at the University of Georgia, is a past member of the ASBMB Publications Committee. His lab is particularly interested in O-linked glycosylation. Martemyanov, chair of the neuroscience department at Scripps Research in Florida, is an authority on G protein–coupled receptors. His lab is focused on the nervous system and transsynaptic and neuronal wiring.

HALTIWANGER

MARTEMYANOV

ASBMB receives funding for DEI training

The ASBMB is scaling up its efforts in support of diversity, equity and inclusion in the fields of biochemistry and molecular biology thanks, in part, to a $2,000 grant from the Amplifying the Alliance to Catalyze Change for Equity in STEM Success (ACCESS+) Initiative, of which the society is a part. The grant will be used to train staff and committee members.

ASBMB joins the Future of Scholarly Meetings project

The ASBMB is one of 16 societies participating in a study funded by the Alfred P. Sloan Foundation on the pandemic's effects on scholarly conferences and the future of meetings. The ASBMB, like other organizations serving various industries, has had to be flexible and creative, pivoting quickly to virtual offerings that extend our reach and that are accessible to a large number of researchers. However, in-person meetings offer spontaneous interactions and more prospects for finding collaborations. We look forward to sharing ideas with the cohort of participating societies. Key findings from this project will be published in late 2022. Learn more about the Future of Scholarly Meeting project at sr.ithaka.org/blog/charting-a-path-forward-for-academic-conferences/.

ASBMB STUDENT CHAPTERS

Deadline for Student Chapter Outreach Grant applications: March 1

Time to apply: ASBMB Student Chapter Outreach Grants support chapters doing outreach activities in their communities. Chapters are encouraged to begin planning outreach initiatives for the fall 2022 semester by applying for this grant, worth up to $500. Applications are due March 1. Visit asbmb.org/education/student-chapters/awards/outreach-grant.

Congratulations: Our hats are off to the chapters at Fairleigh Dickinson University, Stephen F. Austin State University, University of California, Santa Barbara and the University of Massachusetts Amherst, which won funding during the most recent application cycle. We look forward to following and supporting their outreach efforts this spring.

Give the gift of ASBMB membership

Give a colleague, student or friend a full year of exceptional resources and enriching experiences. Visit asbmb.org/gift-membership.

Women's History Month Twitter chat: March 8

The ASBMB Women in Biochemistry and Molecular Biology Committee is hosting a Twitter chat on March 8 in observance of Women's History Month and International Women's Day. Panelists will discuss navigating the BMB fields and science as a whole as women. Join the conversation by following @ASBMB and searching the hashtag #WomeninBMB.

Deadline for Sewer diversity scholarship applications: June 1

The ASBMB supports the advancement of diversity, equity and inclusion in science by offering the Marion B. Sewer undergraduate scholarship to students who show demonstrated interest in the fields of biochemistry and molecular biology, as well as enhance diversity in science. This award provides $2,000 of financial support toward undergraduate tuition costs for one academic year. Applications will be accepted until June 1. For more information, visit asbmb.org/diversity/undergraduate-scholarship.

CALL FOR SUBMISSIONS

The careers issue

What do you know now that you wish you'd known when you were starting out — or even just five years ago?

Share the hard-won knowledge from your career journey in the pages of our annual careers issue, published in August.

We're looking for:

- Practical how-to guidelines
- Personal stories of challenges and perseverance
- Career outlooks and overviews
- Targeted expertise

Or surprise us with something else you think ASBMB members need to know to move ahead in their careers.

Suggested length: 500–1,500 words

DEADLINE: April 15

Chapter leader values diversity, outreach and interaction

By Jessica Desamero

What started as a childhood interest in science led Nana Aikins to a love of research and his active pursuit of becoming a medical doctor.

Originally from Ghana, Aikins immigrated to the United States in 2016. When looking at colleges, he considered many factors, not just academics. "I needed somewhere I would feel safe, comfortable, be able to express myself, and explore," he said.

Aikins chose to attend the Rochester Institute of Technology. "They have a really good program for diversity, and they have a really good institution for the deaf and hard of hearing," he said. "That showcases their willingness to help others, especially those in need and those from a minority background."

At RIT, Aikins majored in biochemistry and joined Suzanne O'Handley's lab, which he considers "one of the best decisions I made in my college years." O'Handley's research focuses on finding new antibiotic targets to treat tuberculosis. One possible target is a group of proteins called Nudix hydrolases that cleave diphosphate bonds of compounds, such as nucleotide triphosphates and coenzymes.

In spring 2018, Aikins joined RIT's American Society for Biochemistry and Molecular Biology Student Chapter. Members of the chapter decided not to have officers with specific titles. Instead, student leaders were all members of the executive board, or e-board. As part of this e-board, Aikins helped other students become involved in research. He also helped plan outreach activities. Activities included hosting remote seminars with speakers who talked about their research, educating people about vaccines during an annual campuswide festival, and creating kid-friendly exhibits at the Rochester Museum of Science and Technology. In 2020, they started a biweekly COVID newsletter.

As an e-board member, Aikins said he learned that when organizing meetings and activities, it's important to accommodate students' busy schedules. "Try to work around them and be open to working in times that may not be necessarily favorable to you," he said. "Be open to suggestions from other people, and be willing to accept that not everybody is going to be able to participate, but everyone is, in their own way, doing their best. Being really mindful of that and being helpful in that situation really matters."

COURTESY OF NANA AIKINS

Nana Aikins chose to attend the Rochester Institute of Technology, drawn by "their willingness to help others, especially those in need and those from a minority background."

Aikins found the chapter's interaction and connections to be vital. During ASBMB get-togethers, members bond over their similar situations as RIT science students. Some engage in research and share their experiences, which has helped to get new students into research. He also loved how he and his fellow e-board members were able to work as a streamlined team and rely on each other for assistance when needed.

Outside of the ASBMB Student Chapter, Aikins was involved with the RIT Organization for African Students and Phi Delta Theta fraternity, which helped him get through the pandemic, as he was able to talk to these friends every week.

Aikins graduated from RIT in May and is now in the medical school application process. He is particularly interested in the field of oncology, especially after taking a class called The Biology of Cancer.

Jessica Desamero (jdesamero@gradcenter.cuny.edu) is a graduate student in the City University of New York's biochemistry Ph.D. program and volunteers with two science outreach organizations, BioBus and World Science Festival. Follow her on Twitter: @JessicaDesamero.

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cAMP: Mapping a second messenger

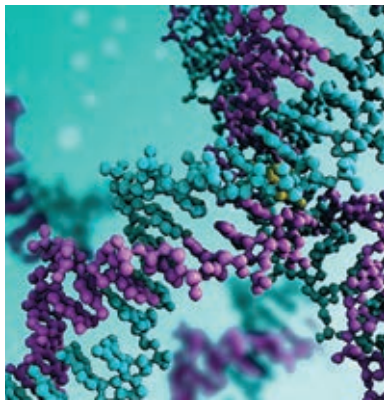
By Arti Dumbrepatil

Cyclic adenosine 3,5-monophosphate, known as cAMP, acts as what the Nobel prize–winning neuroscientist Paul Greengard called a "second messenger" in regulating cellular functions such as growth and specialization, protein expression, and gene transcription by relaying extracellular signals to the cell's interior.

In disease, intracellular pathways control cytokine secretion, resistance to toxins and pathological events by balancing the activity of enzymes, which adjust intracellular cAMP levels. Researchers recently have recognized that receptors can regulate cAMP production not only from the cell surface but also from intracellular membranes.

cAMP can diffuse rapidly, but under normal conditions, its concentration varies from place to place within a cell. It can cause highly localized downstream effects, suggesting that cellular compartmentalization underlines selective cellular responses. To investigate the impact of cAMP production when initiated from endocytic vesicles, a team led by Nikoleta Tsvetanova of Duke University and Mark von Zastrow of the University of California, San Francisco, used localized optical stimulation of cAMP synthesis and quantitative mass spectrometry to determine how compartmentalized cAMP production impacts downstream responses assessed through protein phosphorylation. Their study was published in the **Journal of Biological Chemistry**.

"We sought to determine the overall functional significance of generating cAMP from internal membranes relative to the plasma membrane," von



NIH FLICKR

Zastrow said.

The researchers seek to delineate the fundamental principles by which cells and tissues mount physiologically appropriate responses to a range of external and internal chemical inputs. They are also investigating the cellular basis of receptor-mediated drug action to identify paths for improving therapeutic efficacy.

"The main takeaway is that generating cAMP from endosomes has widespread downstream effects," von Zastrow said. "We initially thought we'd see only a small number of differences, but we identified many changes in the cellular phosphoproteome that result from endosome-generated cAMP relative to cAMP generated from the plasma membrane."

The authors shed light on a less understood cellular signaling aspect: Location-encoded signaling is not restricted to increased protein phosphorylation or to effects mediated by the activity of a cAMP-dependent protein kinase such as protein kinase A, or PKA, in the nucleus. cAMP binds with and activates PKA, which then phosphorylates the protein to elicit cellular reactions.

The study also identified proteins that are dephosphorylated selectively in response to endosome-localized cAMP production and in sequences that do not correspond to PKA consensus sites. "Broadly speaking, our results show that producing cAMP from endosomes has potential to fundamentally 're-wire' downstream cellular signaling by phosphorylation," von Zastrow said.

The researchers were fascinated to see how multiple proteins are phosphorylated preferentially in response to cAMP produced from endosomes and to see proteins that are dephosphorylated selectively on distinct sites relative to those phosphorylated by PKA. Their cell culture model had tightly controlled variables, so the team cautions against directly extending their results to physiological systems or therapeutics. However, there are potentially profound biomedical implications for future studies.

This collaborative project involved researchers with various backgrounds, and each had different expectations, von Zastrow said. "Dr. Tsvetanova and I would frequently place bets on what results would be obtained. The data was so rich and clear that each one of us was surprised — to the degree that we generally forgot what the original bets were in the first place."

OI: 10.1016/j.jbc.2021.100907

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Lipid secrets of wound healing

By Elizabeth Stivison

We need the right kinds of sphingolipids in our bodies.

Sphingolipids are a class of lipids containing sphingosine, a long hydrocarbon chain attached to a head group derived from an amino acid — humble molecules that researchers are finding have many roles in the cell.

An example of the havoc incorrect sphingolipid metabolism can wreak is the rare disease hereditary sensory neuropathy type 1, or HSAN1, which is caused by altered sphingolipid synthesis. People with HSAN1 experience severe peripheral neuropathy, a progressive loss of sensation in the extremities.

Thorsten Hornemann at the University Hospital Zurich has been studying sphingolipids in the context of such diseases for more than a decade. Hornemann and colleagues discovered that people with HSAN1 have a mutation in the enzyme that catalyzes the first step of sphingolipid synthesis, greatly overproducing an atypical type of sphingolipid called 1-deoxy-sphingolipid, or 1-deoxy-SL, that uses glycine or alanine in its synthesis instead of the canonical serine. This work showed that 1-deoxy-SLs are neurotoxic, potentially explaining the mechanism of HSAN1 neuropathy.

HSAN1 is estimated to affect only about two in every million people, but Type 2 diabetes, which has been diagnosed in about half a billion people worldwide, can cause almost identical symptoms.

A missing puzzle piece of this coincidence slid into place when Hornemann's lab discovered that people with diabetes also have increased 1-deoxy-SLs, like HSAN1 patients. They then showed that lowering the levels of 1-deoxy-SLs improves neuropathy in diabetic rats.

There's more than neuropathy though.

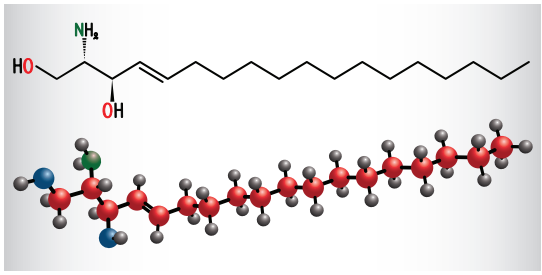
"HSAN1 patients frequently develop recurring and bad-healing wounds and ulcers," Hornemann wrote in an email. "Since the patients also have no feeling for pain, they often don't have proper wound protection or care, which makes the injuries progressively worse."

The most severe injuries sometimes require amputation, and the same thing can happen in diabetes.

Hornemann's group had observed that 1-deoxy-SLs alter the cytoskeleton, which gave them a new hypothesis: "We realized that (the cytoskeleton) might not only be important for neurons to maintain their structural integrity, but also for the wound healing process itself," he explained. "The healing of a skin wound requires a highly coordinated migration of cells."

This depends on the cytoskeleton and could be altered directly by 1-deoxy-SLs.

In their recent work published in the **Journal of Lipid Research,** Hornemann's lab investigated this hypothesis by modeling wound healing in cell culture. The team grew plates of cells and then scratched the surface of the cell-covered plate, leaving a gap where cells were scratched away. They then measured how well cells migrated over the gap and filled it back in. Cells that were exposed to a higher level of 1-deoxy-SLs had a harder time migrating and filling in the gap, providing an explanation for the wound healing defect seen in HSAN1 and diabetes.



Sphingosine is the hallmark component of sphingolipids.

The lab's work highlights two possible routes for treatment. In the current paper, it turned out that blocking the enzyme that interconverts different species of 1-deoxy-SL prevented the wound-healing defect. They also had shown previously that HSAN1 symptoms can be relieved by supplementation with serine, which pushes the cellular equilibrium away from 1-deoxy-SL toward canonical sphingolipids.

Since it appears that the same mechanism is behind the wound healing and neuropathy in diabetes, Hornemann suggests, "the same approach might also suppress 1-deoxySL formation in patients with diabetes and could be a therapeutic option."

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SUMO and stem cells

How protein modifications maintain pluripotency

By Courtney Chandler

Stem cells are like master cells — they can divide to create more stem cells and be triggered by signals within and outside of themselves to give rise to virtually any cell type in the body. In order to exist as precursors, in what is called the pluripotent state, stem cells must be tightly controlled by internal signals but also highly responsive to developmental cues. Researchers do not yet understand this balance completely.

A team from the University of Dundee in Scotland led by Barbara Mojsa recently investigated how stem cells are influenced by SUMOylation, a post-translational modification in which a small ubiquitinlike modifier called SUMO is attached to a lysine residue on target proteins. Their work recently was published in the journal **Molecular & Cellular Proteomics**.

The SUMOylation and deSUMOylation processes are reversible and dynamic and can affect cell fate by altering protein function, interactions or stability. The group previously was studying SUMOylation in cancer cells but decided they may not be the best model system due to the numerous mutations they contain.

"Stem cells are much more dynamic, require tighter control of all cellular processes and undergo dramatic changes during differentiation," Mojsa said, "making them ideal to study the biological role of SUMOylation."

The researchers started using human induced pluripotent stem cells instead. These hiPSCs are derived from terminally differentiated somatic cells such as blood or skin cells that have been reprogrammed back into a pluripotent state.

The group blocked SUMOylation in hiPSCs using an inhibitor called ML792 and found that key pluripotency markers were lost. They next engineered cells to express modified versions of two enzymes, SUMO1 and SUMO2, to identify which proteins were modified and where.

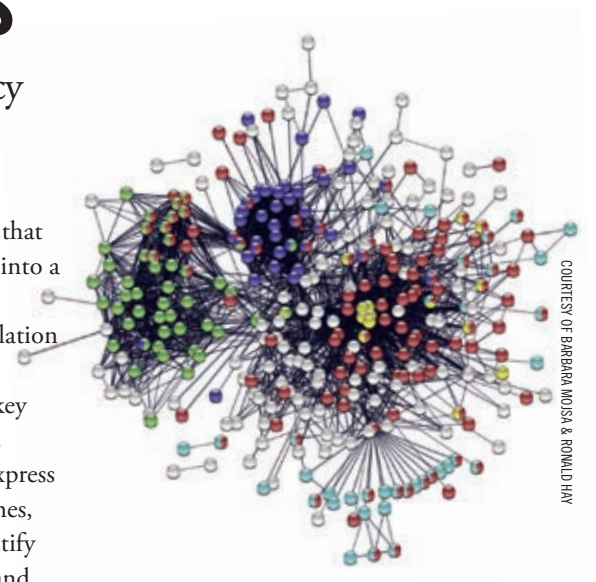
They identified 427 SUMO-modified proteins and 976 SUMO sites in hiPSCs and used bioinformatic tools to identify networks of proteins that were SUMOylated. They found that the majority of the protein targets were involved in regulating transcription and chromatin structure, both of which influence gene expression.

"Delicate balance of SUMO modification might be the key to maintenance of pluripotent state and control of various differentiation processes," Mojsa said.

The team's technique also allowed them to differentiate between SUMO1 and SUMO2 targets.

"We didn't expect to observe such a big difference between SUMO1 and SUMO2 targets," Mojsa said. "It was previously suggested that these two proteins are rather redundant in their functions."

This research has impacts beyond understanding what forces control the pluripotent state. The ML792 inhibitor recently entered clinical trials for cancer treatment —understanding its broader effect is informative. Furthermore, hiPSCs can be used to generate almost any human cell type and therefore could have therapeutic uses. However, the process to differentiate the cells can be lengthy.



COURTESY OF BARBARA MOJSA & RONALD HAY

Network analysis of SUMO substrates identified in human induced pluripotent stem cells. Sphere color indicates the biological process the protein is associated with: ribosome biogenesis (green), RNA splicing (purple), gene expression (red), zinc-finger proteins (light blue), and chromatin assembly (gray).

"If what we think is true and SUMOylation acts as a brake to cell differentiation, we could imagine using SUMOylation inhibitors to increase the efficiency or shorten the time required for differentiation, which would be a great advantage for regenerative medicine," Mojsa said.

In the future, the group is interested in understanding how SUMOylation affects differentiation pathways.

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From the journals

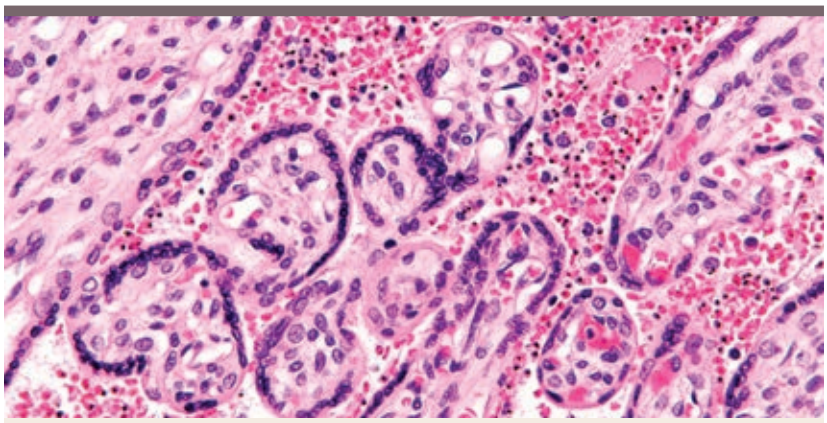
By Isabel Casas, Courtney Chandler & Nivedita Uday Hegdekar

We offer summaries of papers published recently in the **Journal of Biological Chemistry,** the **Journal of Lipid Research** and **Molecular & Cellular Proteomics**.

Light, dark and protein degradation

Light is essential for photosynthetic organisms. It provides energy and can regulate cellular processes including protein expression and degradation. Yet researchers lacked a global picture of which proteins are targeted for degradation by light and how they are targeted until a recent study by a team of researchers from China and the U.S. led by Weiyang Chen of the Chinese Academy of Sciences. In their work, published in the journal **Molecular & Cellular Proteomics**, the researchers studied light-regulated protein degradation events in the photosynthetic organism Synechocystis, a strain of single-cell cyanobacteria that resemble chloroplasts in plants. They used quantitative proteomics to identify proteins with degradation induced by light and also by dark.

The team found that the light-dependent degradation was regulated by the redox status of the intracellular environment. Light-dependent degradation favored a reducing environment that may serve as a more general mechanism underlying light-dependent protein degradation. Their results expand our knowledge of the light-regulated protein quality control mechanism in photosynthetic organisms, which is critical for maintaining intracellular homeostasis during day–night alternation.



NEPHRON/WIKIMEDIA COMMONS

Pregnant women are particularly susceptible to the parasite variant of malaria, shown within red blood cells in this stained high-magnification micrograph, that targets the placenta.

Chain length and malarial infection

Malaria kills hundreds of thousands of people every year; most of these deaths are caused by the parasite Plasmodium falciparum, which binds to blood cells, allowing it to remain in the vasculature and escape immune clearance in the spleen. Pregnant women are particularly susceptible to a serologically distinct parasite variant that targets the placenta. Placental malaria is mediated by the protein VAR2CSA interacting with the placental glycosaminoglycan chondroitin sulfate, or CS.

Previously, researchers had identified a shared type of oncofetal chondroitin sulfate, or ofCS, that is common to placenta and tumors, but scientists still lack a clear understanding of its structure and selectivity to VAR2CSA. In a study recently published in the **Journal of Biological Chemistry,** Charlotte B. Spliid of the University of California, San Diego, and Copenhagen University Hospital, Denmark, and an international team performed structural analysis of ofCS and found that both placenta- and tumor-derived ofCS had high N-acetylgalactosamine 4-O-sulfation levels.

The researchers showed that both tissues had more chondroitin sulfate moieties of higher molecular weight than other tissues, concurrent with chondroitin polymerization proteins being upregulated in most cancer types. CRISPR/Cas9 targeting of these proteins showed a reduction in cell-surface chondroitin molecular weight, which reduced the binding to recombinant VAR2, or rVAR2.

Finally, the researchers showed that rVAR2 binding is dependent on the length of the chondroitin sulfate chains. They concluded that the amount and accessibility of CS chains affect rVAR2 binding and, in doing so, malaria infection.

DOI: 10.1016/j.jbc.2021.101391

— Isabel Casas

Photosynthetic organisms are the dominant contributors of oxygen to Earth's atmosphere and provide much of the food humans consume, so understanding their quality control systems is important.
DOI: 10.1016/j.mcpro.2021.100162

The ABCs of a flippase

Glycosphingolipids, or GSLs, play pivotal roles in cell signaling, apoptosis, cell differentiation proliferation, cell adhesion and pathogen entry. Aberrant GSL metabolism is associated with GSL storage diseases, Type 2 diabetes, cancer, Alzheimer's, Parkinson's and other diseases. Better understanding of GSL synthesis is key to developing therapeutics that can correct GSL levels in disease.

Glucosylceramide, or GlcCer, is the precursor of most mammalian GSLs, which are synthesized by the sequential addition of monosaccharides to GlcCer in the lumen of the Golgi apparatus. Because GlcCer is synthesized on the cytoplasmic face of Golgi membranes, it must be flipped to the noncytoplasmic face by a lipid flippase to initiate GSL synthesis. Until recently, researchers did not understand this flipping mechanism.

In a recent paper in the **Journal of Lipid Research**, Monique Budani and researchers at the University of Toronto describe how they developed labeled probes to identify and track GlcCer flippases involved in GlcCer movement in the Golgi. They identified several transporters that could regulate GlcCer transport across the Golgi membrane, all belonging to the ATP-binding cassette, or ABC, family. The genetic knockdown of ABC transporters in various cell types yielded different effects on the overall synthesis of GSLs. This suggests the role of ABC transporters in GSL biosynthesis within the Golgi may depend on tissue and/or cell type.

These findings indicate that ABC transporters could be used to regulate GSL biosynthesis and serve as targets in diseases in which GSLs are dysregulated. Also, differential ABC flippase expression within the Golgi stack could regulate the biosynthesis of the different GSL series.
DOI: 10.1016/j.jlr.2021.100128

Diet supplements and fatty liver disease

Nonalcoholic fatty liver disease, or NAFLD, is a set of diseases involving fat accumulation and inflammation of the liver that affect almost a quarter of the U.S. population.

Low hepatic nicotinamide adenine dinucleotide, or NAD^+, levels previously have been associated with NAFLD. In a recent article in the **Journal of Biological Chemistry**, Morten Dall, Anna Hassing and a team at the University of Copenhagen describe how they determined that removing hepatic nicotinamide phosphoribosyltransferase, or NAMPT, the enzyme responsible for NAD^+ formation, increases susceptibility to liver injury in diet-induced metabolic stress.

Feeding experiments using specific formulations showed that mice genetically altered to lack the Nampt gene, called HNKO mice, had higher liver inflammation, necrosis and fibrosis than unmodified mice. They also presented decreased amounts of mitochondrial proteins involved in oxidoreductase activity, and liver sections showed a negative correlation between fibrosis and NAD^+ levels. The researchers used mass spectrometry–based proteomic analysis to determine that supplementation with the NAD^+ precursors nicotinamide riboside and nicotinic acid prevented liver injury and rescued hepatic levels of oxidoreductases. Finally, single nucleus RNAseq in HNKO mice liver determined transcriptional changes that were associated with necrosis.

The authors concluded that "HNKO livers have reduced respiratory capacity, decreased abundance of mitochondrial proteins, and are susceptible to fibrosis due to low NAD^+ levels." They suggest that NAD^+ precursor supplementation in the diet could prevent liver injury and NAFLD progression.
DOI: 10.1016/j.jbc.2021.101388d

IDing a cancer-promoting enzyme

Pancreatic ductal adenocarcinoma, or PDAC, is the most common type of pancreatic cancer and the third leading cause of cancer-related death in the U.S. Glycans, sugar-based polymers that coat cells and decorate proteins, are crucial for modulating biological processes and are emerging as important biomarkers of PDAC and other cancers. Recently, Emma Kurz, Shuhui Chen and a team of researchers from New York University analyzed the glycan content in a mouse modified to develop early-stage pancreatic cancer and in human PDAC patient samples to identify glycans involved in cancer formation.

In their study, recently published in the journal **Molecular & Cellular Proteomics**, the team found that an enzyme called ST6GAL1 that transfers sialic acid to glycans is overexpressed in human PDAC cells. They next tested the role of ST6GAL1 in the mouse model of pancreatic cancer by knocking out ST6GAL1 in the pancreas. With

ST6GAL1 deleted, the researchers observed delayed cancer formation and a decrease in the fibrosis that is a hallmark of pancreatic cancer, suggesting ST6GAL1 plays a role in promoting PDAC. This work highlights how systems-based approaches can be used to identify glycans of interest that subsequently can be tested in clinically relevant disease models. It also paves the way for future work to target glycosylation enzymes therapeutically in pancreatic cancer.

DOI: 10.1016/j.mcpro.2021.100160

How bile acid composition alters fat absorption

Nonalcoholic fatty liver disease, or NAFLD, is the collective term for various liver conditions affecting people who drink little to no alcohol; the main characteristic is excessive fat storage in liver cells. No cure exists, and some individuals with NAFLD can develop liver inflammation and may progress to advanced scarring, or cirrhosis, and liver failure.

A recent study found a positive correlation between plasma bile acid, or BA, levels and NAFLD severity in obese individuals. Animal models were needed for further study; however, the BA composition of mice and rats is fundamentally different from that of humans.

To address this, Rumei Li and researchers from the University of Groningen, Netherlands, generated mice that have a human-like BA composition and lack mouse-specific muricholic acids. The researchers then carried out a

Automated profiling of ubiquitination

Ubiquitylation is a post-translational protein modification that can regulate a variety of cellular functions including protein turnover through the ubiquitin–proteasome system. Dysregulation of ubiquitylation enzymes can lead to activation or deactivation of pathways implicated in diseases, including cancer and neurodegeneration. Some treatments targeting these pathways exist; however, to develop new therapeutics, researchers need a better understanding of how ubiquitin modification influences disease.

A team led by Keith Rivera of the Broad Institute recently developed an automated adaptation of UbiFast — a method to identify protein ubiquitylation sites in a high-throughput and multiplexed manner — and this work was published in the journal **Molecular & Cellular Proteomics**.

With UbiFast, protein samples from cells or tissues are cleaved to peptide fragments, and an antibody is used to enrich for ubiquitin modification sites. Chemical tags are coupled with the antibody enrichment to label samples individually. Labeled peptides from multiple samples can be analyzed in one run using liquid chromatography coupled to mass spectrometry to identify the modified proteins.

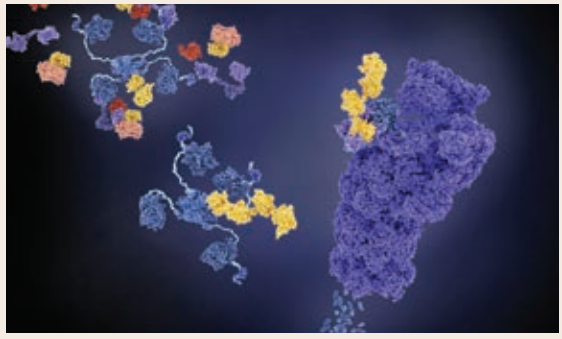
In their new method, magnetic beads coupled to the antibody allow sample processing steps, including washing and tagging, to be automated using a 96-well plate format in a robotic magnetic particle processor. This increased sample throughput and also decreased sample processing time and variability across experimental replicates.

To compare the manual and automated UbiFast methods, the group used patient-derived breast cancer xenograft tissue; they found that automation significantly increased depth of coverage of the ubiquitylome.

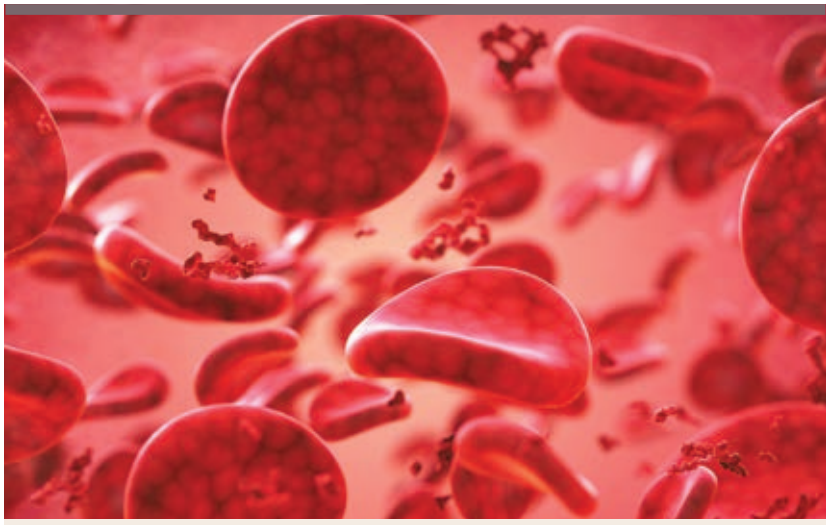
In addition to providing fast, high-throughput analysis of ubiquitylation, the protocol can be adapted to study other post-translational modifications to cellular processes, such as sumoylation or phosphorylation. Given the role post-translational modifications play in homeostasis and disease, higher-throughput experiments can advance understanding of cellular processes and better identify potential therapeutic targets.

DOI: 10.1016/j.mcpro.2021.100154

— Courtney Chandler



Ubiquitin (yellow) can modify proteins and target them for degradation by the proteosome (right, violet) and can regulate pathways implicated in disease formation.



A triglyceride link to metabolic health

The membranes of red blood cells, or RBCs, consist of a lipid bilayer that contains cholesterol and phospholipids. The phospholipid component is enriched with unsaturated fatty acids and a small amount of triglyceride, or TG. This TG expression is unexpected, because intracellular TGs generally are used for fatty acid oxidation (the process by which fatty acids are broken down to produce energy). However, because RBCs lack mitochondria, they cannot be expected to carry out fatty acid oxidation.

In a recent study to determine RBC-TG profiles in obese and lean people, Yilin Song and Michael Jensen at the Mayo Clinic found that obesity and lipid disorders drove increased levels of TG in the RBCs of participants. Moreover, they found that numerous free fatty acids (mostly saturated FFA) were incorporated in the RBC-TG.

To determine the source of the FFA, the researchers infused participants with a nonradioactive free fatty acid, (U-13C) palmitate. Using mass spectrometry, they found that this FFA directly incorporated itself from plasma into the RBC-TGs. This is consequential; the fatty acid composition of RBC membrane lipids affects the functional characteristics of RBCs, which in turn can predispose to diseases including a rupturing of the RBCs known as intravascular hemolysis.

The obese participants then underwent a comprehensive lifestyle intervention to lose about 10% of their body weight, following which they were reanalyzed as before. The researchers found that weight loss improved the metabolic status changes in RBC-TG fatty acid profiles. The study was documented in a paper recently published in the **Journal of Lipid Research**.

As obesity and weight loss affect the RBC-TG fatty acid profiles, this study also provides a sound rationale for using RBC-TG fatty acid profile to measure metabolic health. Further investigation into RBC-TG fatty acid metabolism could help us better understand RBC abnormalities in metabolic disorders.

DOI:10.1016/j.jlr.2021.100131

— Nivedita Uday Hegdekar

series of experiments on these mice and unaltered mice, both male and female, to assess the consequences of a humanlike BA pool on obesity induced by a high-fat Western-type diet, or WTD, and NAFLD development.

The researchers found that deficiency of the enzyme Cyp2c70 in the engineered mice altered the pool of BAs and resulted in a reduction of 12-alpha-hydroxylated BA levels. This reduced the mice's fat absorption and altered their gut microbiome composition. This deficiency thereby prevented WTD-induced obesity in female mice and NAFLD development in both genders, primarily because of impaired intestinal fat absorption. The findings, published as a paper in the **Journal of Lipid Research**, indicate a role for 12-alpha-hydroxylated BAs in the control of intestinal fat absorption and gut microbiome composition.

DOI: 10.1016/j.jlr.2021.100134

Effects of a lesser-known synuclein

Synucleins are a family of three proteins highly expressed in neurons involved in Parkinson's and certain other neurodegenerative diseases. While the role of alpha-synuclein as a modulator of various mechanisms implicated in chemical neurotransmission is well known, researchers know less about the other family members, beta-synuclein and gamma-synuclein.

In research recently published in the **Journal of Biological Chemistry**, Natalia Ninkina, Steven J. Millership and Owen M. Peters of Cardiff University and a team in the U.K. aimed to decipher the role β-synuclein plays in uptake of the neurotransmitter dopamine. They

first showed that the sole presence of this protein improves dopamine uptake in triple-negative striatal vesicles.

The authors also showed that the presence of β-synuclein increased resistance to subchronic administration of the Parkinson's disease–inducing prodrug 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine, or MPTP, in dopaminergic neurons of the substantia nigra pars compacta when one or both of the other synucleins are absent. Additional proteomics analyses showed different protein compositions in synuclein-deficient synaptic vesicles versus those containing only β-synuclein.

The authors suggest that the increase in dopamine uptake by β-synuclein may be due to a change in protein architecture of synaptic vesicles, which leads to increased resistance to an MPTP toxic metabolite in dopaminergic neurons.
DOI: 10.1016/j.jbc.2021.101375

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Upcoming ASBMB events and deadlines

FEBRUARY

1	DEUEL registration deadline
14	Annual meeting outstanding Student Chapters award deadline
14	Regional Meeting award deadline
17	Unconscious Bias webinar
25	PROLAB application deadline
28	ASBMB annual meeting early registration deadline

MARCH

1	Undergraduate Research Award deadline
1	Student Chapter Outreach Grant spring deadline
1–4	DEUEL conference on lipids
18	ASBMB annual meeting advance registration deadline

APRIL

	National Minority Health Month
	National Parkinson's Awareness Month
2–5	ASBMB annual meeting
25	*DNA Day*
26	O-GlcNAc conference abstract deadline

ASBMB

ESCRT biology

May 17–20 | Madison, Wis.

This multidisciplinary in-person conference will cover all key aspects of ESCRT biology. Attendees will hear (and present) the latest developments in our understanding of the mechanisms, evolution, biology and medical applications of ESCRT pathways in all three kingdoms of life.

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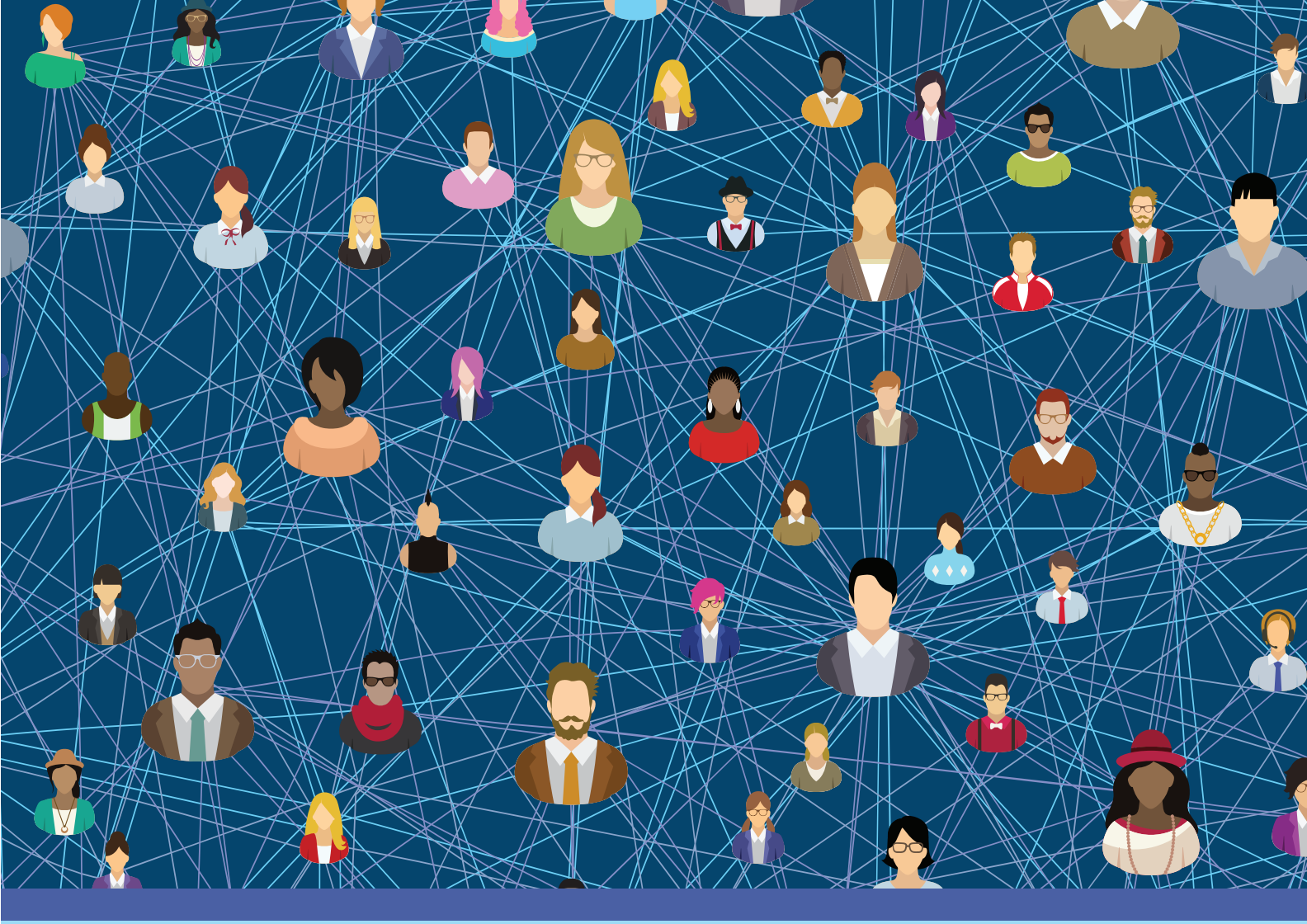

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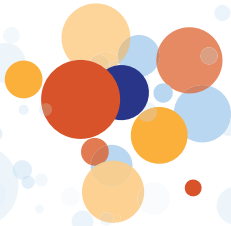
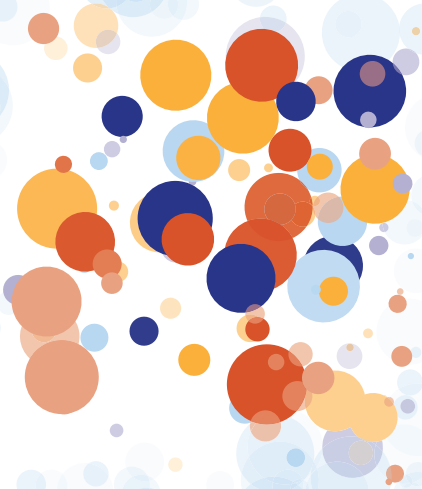




The evolution of cluster hiring

How a mechanism for assembling research teams became a tool for increasing diversity

By Laurel Oldach

It's the middle of the hiring season, and academia is facing a familiar problem. If this year goes as previous years have gone, the crop of newly minted assistant professors will be significantly less diverse than the people who earned degrees in the life sciences this year.

Historically excluded groups, sometimes called underrepresented minorities, earn a greater percentage of Ph.D.s in the biological sciences than ever before. But that progress is not filtering upward. According to a widely reported 2016 study, U.S. universities could close the diversity gap between Ph.D. earners and assistant professors in a single six-year tenure cycle, or with the hiring of only a few hundred professors into the national population of about 1,000 assistant professors in biomedicine.

However, making the change intentionally would raise questions of legality; federal law prohibits hiring on the basis of gender, race, ethnicity or underrepresented status. How can universities hire more historically excluded faculty without discriminating?

How can universities hire more historically excluded faculty without discriminating?

Administrators and funders at some universities across the country are testing out cluster hiring, which brings groups of professors from diverse academic backgrounds to work collaboratively on interdisciplinary problems, as a solution for underrepresentation and bias in faculty recruiting.

Topical clusters

When Adriana San Miguel accepted an offer to join the faculty at North Carolina State University in 2016, she said, becoming part of a topic-focused faculty cluster "was part of what was really attractive to me. … I thought being part of a cluster would help me meet other people and have a community that overlaps with my interests."

San Miguel is a member of the university's chemical engineering department, but she also belongs, along with two other assistant professors, to a cluster focused on synthetic and systems biology. The cluster doesn't operate quite like a department — it's a bit outside of the academic bureaucracy, with no students and fewer service requirements — but it does host journal clubs and other opportunities to meet colleagues both within and outside of the cluster who are interested in systems biology. San Miguel met her closest collaborator at a cluster seminar.

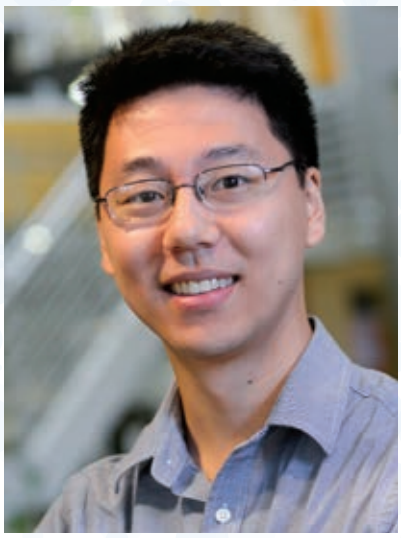
NC State has 20 clusters that include almost 70 of the university's 2,000 faculty. According to Albert Keung, who belongs to the same cluster as San

Adriana San Miguel

Miguel, clusters at their university serve the dual purpose of bringing in faculty who focus in specific areas and creating an intellectual community once they arrive.

Cluster hiring got its start in the 1990s at the University of Wisconsin–Madison, where the administration aimed to build nationally competitive research teams that would attract scholars studying buzzy interdisciplinary subjects. Twenty years ago, Madison's list included specialties such as vitamin D and genomics; a recent round included precision medicine and advanced biomanufacturing. A department has incentives to be somewhat conservative in hiring experts in established subdisciplines, Keung said — for example, to make sure that someone has the expertise to teach specific core courses the department is responsible for. A cluster can take greater risks, however, and hire professors who specialize in emerging research topics, as well as using expertise from across the university to evaluate candidates.

The idea spread from Madison across the country as universities that hoped to become competitive quickly in hot research areas sought to attract groups of scholars working in those areas. A 2017 study found some 84 mentions of cluster hires on university and college websites.



Albert Keung

Over time, administrators noticed that cluster communities can have benefits beyond fostering academic collaboration. A 2015 report by the Urban Universities for Health consortium noted that new faculty joining as part of clusters tended to be slightly more diverse than those who were one-off hires. At NC State, for example, after the cluster program was introduced, the proportion of faculty from underrepresented groups went from 16% to 18% university-wide. (The increase may have resulted from the unconscious bias training the search committees received, and which NC State later made part of its formal hiring process.) The observation made administrators wonder if cluster hiring could be a tool to reduce bias in faculty hiring.

Diversity-focused clusters

In a critical appraisal of a cluster hire written by several social sciences faculty at Colorado State University in Fort Collins, one member of a hiring committee wrote that other members "looked at me as if I had committed a crime when I let them know that I wondered about the racial makeup of one of the women we were considering for an on-campus interview. Everyone stopped and I was told, 'you cannot bring up a person's race as part of the discussion.'"

The professor found the moment alienating. But employers have a difficult line to walk when they aim to diversify their workforce. Title VII of the Civil Rights Act prohibits making hiring decisions on the basis of race except in short-term, tightly regulated affirmative action programs.

Universities recently have begun

to introduce clusters focused less on the new hires' field of study than on using hiring practices that prioritize diversity. Advertising a list of new professor openings all at once can encourage more people to apply.

Milagros Rosal, vice provost for health equity at the University of Massachusetts Chan Medical School, said, "The cluster hire is intended to expand our list of potential candidates and, in doing so, diversify it."

Broader job openings attract more applications — and a larger number of applicants has a greater chance of including scholars from diverse backgrounds.

Life scientists at the University of California, Berkeley, ran a cluster hire open to researchers focusing on any topic in the life sciences, explicitly aiming to promote faculty diversity. They received almost 900 applications. Hiring committee co-chair Rebecca Heald said, "When you have a thousand applicants, you're going to have an amazing set of people to look at."

The larger pool, Heald said, enabled the committee to "identify amazing scientists … who care about (diversity, equity and inclusion)

Milagros Rosal

Anonymous hiring

Perhaps you've read that when an orchestra conducts its auditions behind a screen to conceal musicians' identities, it tends to hire more women.

It may be harder to anonymize a scientific finding than a musical performance. Junior researchers tend to work on named genes at named institutions, publishing their findings in numerically ranked journals with senior colleagues who have spent years building their reputations in specific niches. All those layers of reputation and pedigree, said Yale molecular biology and biophysics department chair Enrique De La Cruz, can get in the way of assessing a candidate's own contributions.

Enrique De La Cruz

De La Cruz's department recently conducted a faculty search requiring candidates to remove identifying information from their application materials. Tara Noel, De La Cruz's assistant, had to take care not to let so much as a pronoun slip until the first cut had been made, after which the committee looked at CVs and recommendation letters.

"This search was hard, because there's a lot of work and (diversity is) a sensitive topic," De La Cruz said. He wasn't on the hiring committee himself because he wanted to make sure "that people don't falsely attribute the significance and commitment to (equity) as something that was imposed by the chair because of my background. … We don't want someone saying, 'Oh, Enrique made everybody do this.' No, I didn't. They did it. And I feel very proud of that."

Noel was most impressed by the committee's considered construction of a rubric for assessing candidates, which she said helped members with "getting away from this idea of a gut feeling: 'I have a great gut feeling about this person based upon their CV.'"

Tara Noel

The committee succeeded in the sense that it made an offer to a candidate, a woman, who accepted the job. In addition, the committee considered a more than usually diverse pool of applicants; the share of applicants self-identifying as underrepresented minorities leapt from 3 of 169 during a search in 2020 to 22 of 194 in the anonymized search, and the number of women applicants doubled.

More than that, De La Cruz said, it succeeded in communicating to applicants that they were being evaluated for their work — and not to reach some diversity quota. As a first-generation scientist himself, he said, "We spend the rest of our lives questioning all the things that we were awarded or recognized for. … Even if you are the most qualified, you can't shake that."

Much like cluster hiring, the effect of anonymizing applications is not yet known. But De La Cruz's department plans to use a similar approach when it next hires, and it has shared these practices with some 40 other institutions.

"The goal now is for us to get enough data to find out, is the juice worth the squeeze?" De La Cruz said. "For us, it seemed to have a profound effect."

Rebecca Heald

issues." The committee began by reading candidates' statements about their commitment to diversity, which they used to reduce the pool to 200 applications that were distributed for review by their prospective home departments. Five eventually were hired; four of them were women and three were Americans from groups that demographers count as underrepresented minorities.

Cluster hires at universities often are planned centrally, with a college or provost's office providing funding and conducting the search. Tension can arise when one group provides the money and the short list of candidates but another provides the lab space and the graduate students. Carla Freeman is an executive associate dean at Emory University. During a recent webinar sponsored by the National Institutes of Health, Freeman described a cluster hire at Emory that was open to all ranks, did not specify a department or even a discipline within the sciences, and received over 1,000 applications for four positions. The search ended up encompassing 11 departments, and 50 professors invested time as part of discipline-specific search committees. This was necessary, Freeman said, to make sure that when cluster candidates visited campus, their prospective departmental colleagues would be invested in recruiting them.

The process also had its detractors.

"There were some doubters and skeptics … saying, 'let us just hire the best scientist and then we can worry about diversity,'" Freeman said. She and other proponents of cluster hiring counter that, in the past, focusing on the science has allowed biases to creep into hiring decisions. Equity proponents also point out that what applies for interdisciplinary hiring — the argument that having more perspectives on a problem can enrich the possible solutions — should go for differences of perspective that come from personal experience as well as academic specialty.

Exactly how to bring in more diverse professors is a difficult question, one that administrators take seriously — and not only because of the legal liability. Rosal emphasized that in reforming hiring practices, "We are trying to reduce bias, not increase bias."

Best practices for equitable hiring

As Freeman found at Emory, coordinating multiple departments and a cluster committee to hire multiple professors can be a daunting task. But many cluster hiring committees incorporate less intensive practices that also can be, and increasingly are, used for traditional single hires. These include considering statements that explain a candidate's commitment to diversifying higher education, anonymizing applications for the early rounds of a faculty search, and scrupulous use of quantitative evaluation tools, instead of fuzzy gut

Carla Freeman

feelings, to rank candidates.

Considering an applicant's race or ethnicity may be illegal, but considering their commitment to diversity is within bounds. Therefore, many hiring committees request a diversity statement that explains a candidate's commitment to a more inclusive academy and their track record of promoting such a future. A candidate doesn't have to be underrepresented to write a statement that makes clear their desire to promote a more diverse academy, but applicants with personal experience of structural racism tend to be more committed to changing the status quo.

Obscuring an applicant's identity is another intervention. Many factors that are considered in hiring are known to benefit scholars from well-represented groups disproportionately. Some hiring committees are trying to put off learning these traits until they've formed a first impression of a candidate based on anonymous research and diversity statements. (See "Anonymous hiring.")

A rubric, or a set of standards agreed on in advance and used to evaluate each application, also can help to reduce bias in evaluation. Writing a rubric forces a group to identify specific traits to assess in each candidate and then apply the same standard to everyone. It reduces the odds that a committee will rely on gut feelings, which can be influenced heavily by in-group biases that favor candidates who resemble the decider in some aspect such as demographic background, alumni status or membership in a shared community.

"The use of quantitative, standardized evaluation systems is critical," UMass's Rosal said. "There are a number of biases that are in most cases unconscious. ... People, with their best intentions, don't realize they're discriminating against people."

NIH FIRST and national clusters

Based on the results from faculty clusters across the country, and in answer to pressure about the NIH's slow progress in addressing well-documented inequality in funding and career transitions for scientists of color, NIH leaders decided in 2020 to invest $241 million in cluster hiring.

The NIH Faculty Recruitment for Sustainable Transformation, or FIRST, program made the first of three rounds of awards to universities this fall. Each of the six grantees is trying a new program aimed to increase faculty diversity sustainably, often including both recruiting components and professional development programs aimed to retain and promote new faculty.

NIH leaders emphasize that FIRST is an experiment. One of the first awards went to a center based at Morehouse School of Medicine that will evaluate whether it's working as intended.

Whether diversity-focused or topical, enthusiasm for cluster hiring is supported so far more by case studies than by rigorous research.

Sociologist Steven Brint conducted a study on the impacts of topical cluster hiring on faculty publishing. He said he is skeptical of what he called "rather hyperbolic claims … that (universities are) going to solve the major challenges facing the country or the world through concentrating hiring on these high priority areas."

In the study, he and two colleagues looked for evidence in

Steven Brint

Kenneth Gibbs

the literature that faculty hired as part of a cluster publish more and collaborate more than other new faculty. They found that new cluster faculty wrote more papers, with more coauthors, but found few cases of extensive collaboration within clusters.

"There's a boost to productivity once people are hired to a new institution," he said. "Whether that's because of cluster hiring or just the excitement of being in a new place and more advanced in one's career, we can't say."

The work does not demonstrate conclusively that cluster hiring is either effective or ineffective for pushing faculty to collaborate and making them more productive. Brint said that ambiguity causes him to doubt whether the practice can meet the transformative goals administrators set.

As at Berkeley, the NIH has a delicate line to walk in promoting diverse hiring. Several institutes and centers recently rescinded notices that invited underrepresented scientists in particular to apply for grants; in a written statement explaining the retractions, the NIH's deputy director for extramural research, Michael Lauer, and chief officer for scientific workforce diversity, Marie Bernard, explained that "while the spirit of the (notice of special interest) was laudable, it may have led to an impression that by linking demographic characteristics to grant proposals, applications supporting scientists from underrepresented groups would be automatically prioritized for funding."

Still, the FIRST program may have ripple effects. At UMass, which applied for but did not land NIH FIRST funding in the first cycle, Rosal said the university is starting a smaller-scale cluster hire anyway.

A group of North Carolina State University professors who work closely with faculty in the systems and synthetic biology cluster: from left, James Tuck, Joel Ducoste, Terri Long and Cranos Williams.

Retaining new hires

"It's one thing to bring in people," Berkeley's Heald said, "but … the other thing that we really fail at too often is retaining diverse faculty we hire."

Retention of historically excluded scientists is a problem at every career stage. Kenneth Gibbs, the first author of the study that showed that increasing representation among Ph.D. recipients has not led to increased faculty representation, also has published research showing that underrepresented graduate students are more likely to lose interest in a faculty career than their well-represented peers by the time they earn a degree. Likewise, unless new professors from historically excluded backgrounds experience academia as a good environment for a whole career, efforts to bring in young professors may fail to effect lasting change.

Cohort-based models such as

the celebrated Meyerhoff Scholars Program at the University of Maryland, Baltimore County, have shown that peer communities can encourage historically excluded scientists to stay in academia. Proponents of cluster hiring hope that a similar sense of community will result from the peer groups of new professors who start as part of clusters.

In addition, every program that NIH FIRST is supporting includes attention to professional development, retention and promotion. At UMass, new faculty who join as part of a cluster will be assigned both a mentor and a sponsor. These are different roles, Rosal explained. While "a mentor would be somebody that you go to for ideas, assistance, guidance … a sponsor is somebody that has a lot of power and influence, and would promote you when there are opportunities."

Because of the differences among cluster hiring models — their goals, the interventions they use and their funding support — it is difficult to compare these programs, and it may be impossible to quantify their overall impact on faculty diversity. Still, the popularity of cluster hiring to increase diversity represents a change that many academics welcome.

"The lack of representation impacts our ability to teach our students things that are relevant to the increasingly diverse population, as well as to notice and investigate knowledge gaps," Rosal said. The more representation among faculty in her field of clinical research, she said, the more relevant their research can be.

Laurel Oldach (loldach@asbmb.org) is a science writer for the ASBMB. Follow her on Twitter: @LaurelOld.

Diversity in topical clusters

Cynthia Wolberger, director of the biophysics and biophysical chemistry department at Johns Hopkins University School of Medicine, is juggling two concurrent cluster recruiting processes. One, funded by billionaire philanthropist–politician Michael Bloomberg, is focused on a scientific topic, as is traditional in cluster hiring. The second is aimed at recruiting more diverse scientists to the medical school.

Cynthia Wolberger

"They have in common the word 'cluster,'" Wolberger said. Otherwise, she added, the university-wide topical hire and the medical school diversity hire were planned separately to achieve different aims. "One group was not talking to the other at all."

The two recruiting efforts add up to a microcosm of what's going on with this popular practice for hiring new faculty. A cluster hire can be agnostic to research subject and focus on hiring excellent researchers from diverse backgrounds; this is what the effort to hire four assistant professors in the basic sciences seeks to do.

Or a hire can focus on researchers' area of study — in this case, epigenome sciences. Wolberger and colleagues including Carl Wu, a member of the medical school and also the school of arts and sciences at Hopkins, wrote a competitive proposal to launch one of nine clusters that will recruit a total of 88 new faculty.

Carl Wu

"What we really would like is to bring in people who come in with new ideas, new perspectives, new technologies, new techniques … that would complement what we're currently doing in a very productive way," Wu said.

Both models provide funding through extradepartmental channels to bring a group of new faculty to multiple departments in the same university at or around the same time. They also are based on a conviction that the connections within these cohorts are valuable, whether the commonality is in research focus or social ties.

Even in the topical hire, however, diversity is a goal. According to Denis Wirtz, Hopkins' vice provost for research, and Julie Messersmith, the university's executive director of research, equity has been a priority as they plan to distribute the large Bloomberg gift. The administrators plan to set benchmarks, determined field by field, for representation among the new faculty. Because committees hire several people, Messersmith said, "There's a lot more accountability you can have in cluster hiring."

Ernie Simms — a groundbreaking researcher and mentor in St. Louis

By Courtney Chandler

> "As a caring, conscientious man, he invited me and some of the other African–American students to stop by and chat in his office … In my first year I don't recall any professor saying 'let's talk afterwards' just for the sake of talking, and I remember thinking, wow, this guy really cares."
>
> WILL ROSS

After Stephen Beverley passed the position of molecular microbiology department chair at the Washington University School of Medicine to colleague Sean Whelan in 2018, he was asked by Dean David Perlmutter to name a new endowed professorship in the department.

"While there were many outstanding possibilities, Ernie Simms was a clear choice," said Beverley, citing Simms' "outstanding science, outstanding service to the university, and recognition of a St. Louis native at a time when this was something of great societal impact."

Simms assisted in Nobel Prize–winning research on DNA replication, but he also stood out on his own — he was the first Black man to hold a tenured academic appointment at Washington University School of Medicine. And he didn't have a college degree.

An aptitude for leadership

Simms was born in 1917 in New Orleans, and after some time in Virginia, his family moved to St. Louis when he was 12. He attended the University of Minnesota to pursue a degree in engineering. But after his father, a college professor, died in the mid-1930s, Simms returned home to help support his family. He had completed only two years of college, and he didn't return.

This life change brought Simms to Washington University at the age of 19 looking for work. He was hired as a laboratory technician in the surgery department but left four years later to work at the Homer G. Phillips Hospital, at the time the only public hospital for African Americans in St. Louis, as a serologist.

There he met his future wife, Virginia "Ginnie" Cayson, who worked as an office clerk across the hall from his lab. In 1942, with World War II well underway, the couple left the hospital and started working at a small arms plant in St. Louis making bullets.

During this time, the Black workers went on strike to protest their working conditions. The 5-foot-9-inch,150-pound Simms didn't have an imposing frame, but he became the strikers' spokesperson and successfully negotiated for better working conditions. After the strike ended, he was promoted to foreman.

In 1949, Simms returned to the Washington University surgery department. He would remain at Washington University for the rest of his professional life.

Contributing to historical science

Simms had established himself as an able technician during his first stint in the department, and his work spoke for itself. He got an opportunity to begin formal experimentation when Arthur Kornberg, head of the Washington University microbiology department, hired him as a research assistant in 1953.

To set the scientific stage, James Watson and Francis Crick just had identified DNA as the genetic building block essential to life. Kornberg and his group were looking for enzymes responsible for synthesizing this fascinating new molecule. They identified DNA polymerase I, the enzyme that joins small DNA fragments together to form a new DNA strand from an old template strand.

After 17 papers over six years, several of which Simms co-authored, Kornberg and Severo Ochoa were awarded the1959 Nobel Prize in physiology or medicine for this discovery. Their work laid the groundwork for what we now consider to be the fundamentals of DNA replication.

Kornberg relocated the entire microbiology department to Stanford University in the same year. Simms went to Palo Alto that summer to help Kornberg establish his lab and was asked to stay on, but he declined and returned to Washington University early in the fall.

Starting a new chapter

Simms next joined the lab of Herman Eisen in the university's dermatology division. In 1961, Eisen was made chair of the microbiology department and asked Simms to join him during the transition. Simms accepted and continued to demonstrate his aptitude for research in Eisen's lab, making seminal contributions to the field of immunology. He co-authored several publications on antibody structure and immunochemistry.

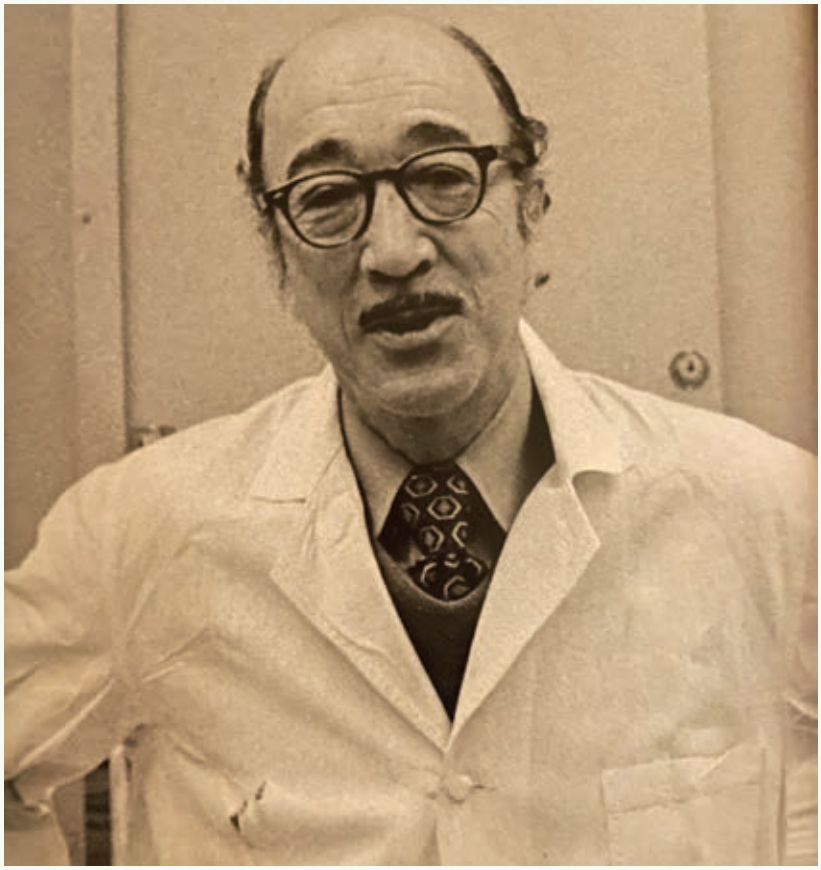
Eisen promoted Simms to research assistant professor in 1968, and Simms started teaching microbiology to medical students. He was tremendously popular. Will Ross, now the associate dean for diversity and alumni endowed professor of medicine in the Division of Nephrology at Washington University School of Medicine, was in his first year of medical school in 1980 and remembers Simms as being pleasant, matter-of-fact and completely humble.

"As a caring, conscientious man, he invited me and some of the other African-American students to stop by and chat in his office," Ross said. "In my first year I don't recall any professor saying 'let's talk afterwards' just for the sake of talking, and I remember thinking, wow, this guy really cares. I thought he would be quite busy, but he was committed to mentoring and advocating for us."

Simms earned a reputation both for his ability as a scientist and for his success as a teacher and mentor. In

This illustration accompanied a commemorative article titled "Ernie Simms: Against the Odds" in the Fall 1985 issue of Outlook, a magazine published by the Washington University School of Medicine.

COURTESY OF STEPHEN BEVERLEY



COURTESY OF MARSHA SIMMS

Ernie Simms' daughter, Marsha, said of this photo, "The lab coat with holes is so typical of him."

Beverley hopes the professorship can be used to instill the values Simms upheld, namely those of diversity and inclusion.

recognition of his accomplishments, Eisen and others led a campaign to get Simms tenure. They contacted many of Simms' previous and current colleagues, and the response was immediate — they received more than 100 letters in support from scientists across the globe.

In 1972, Simms' application, including those letters, was taken before the executive faculty committee. His tenure appointment was approved unanimously. In addition to his teaching and lab work, he became involved in the medical school admissions process, where he advocated for the admission of Black students.

Establishing a legacy

Simms continued to teach and do research at Washington University until his death on September 11, 1983. His contributions and legacy left their mark on the university and continue to do so. Marsha Simms, Ernie Simms' daughter, remembers how much her father loved his job.

"He loved being there — he knew everybody, and everyone knew him, from the students to the ladies who cleaned the labs," Marsha said. "He looked after the Black students admitted to the school, and when they graduated he was so proud, that was a really big part of his life."

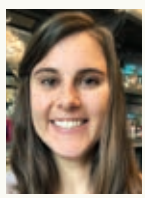
Simms' wife, friends, colleagues and students established the Ernie Simms Scholarship Fund in 1984 to support medical students. A painting of Simms hangs in the Ernie Simms Conference Room in the molecular microbiology department at the university. In 2016, the Ernie Simms Lecture also was established to recognize his impact on research, with an annual invited speaker.

Most recently, in 2020, Stephen Beverley became the inaugural recipient of the Ernest St. John Simms distinguished professorship. Naming the professorship was "a tremendous honor and of course an important responsibility," he said, adding, "Succinctly put, it felt awesome!"

Beverley hopes the professorship can be used to instill the values Simms upheld, namely those of diversity and inclusion.

"Along with the establishment of the Simms lectureship in his honor," Beverley said, "going forward, this chair gives us a continuing platform to both recognize and continue efforts in this direction, be it in the labs, department or university."

Courtney Chandler (courtneyec19@gmail.com) is a biochemist and microbiologist in Baltimore, Md., and a careers columnist for ASBMB Today. Follow her on Twitter @CourtneyCPhD.



MCP to host immunopeptidomics session

By Pierre Thibault

The editorial leadership team of the journal Molecular & Cellular Proteomics has chosen four investigators to present their current research during a symposium at the 2022 American Society for Biochemistry and Molecular Biology Annual Meeting in Philadelphia.

Al Burlingame, MCP editor-in-chief, said, "This symposium will feature remarkable scientists who through their investigations have leveraged tools in immunology and molecular proteomics to uncover tumor antigens for the development of cancer vaccines."

The session, titled "Discovery of Tumor Antigens Revealed by Immunopeptidomics," will be held at 3:15 p.m., Monday, April 4.

I will be chairing the session as well as giving a talk. I am a professor and principal investigator at the Institute for Research in Immunology and Cancer of Université de Montréal. My group employs mass spectrometry and proteogenomic approaches to identify tumor-specific antigens and to gain biological insights into their biogenesis.

I look forward to sharing the session with these three researchers:

Michal Bassani–Sternberg is an assistant professor at the department of oncology at the University of Lausanne. By leveraging high-sensitivity mass spectrometry, her group identifies clinically relevant cancer-specific major histocompatibility complex I ligands for personalized cancer immunotherapy.

Victor H. Engelhard is a professor of microbiology, immunology and cancer biology at the University of Virginia. His group made seminal contributions to the further understanding of immune responses to tumors and the identification of major histocompatibility complex–restricted tumor antigens.

Susan Klaeger is a research scientist in the proteomics platform at the Broad Institute of the Massachusetts Institute of Technology and Harvard University. Her work focuses on the application of proteomics to translational research and on the development of methods to study antigen presentation and prediction algorithms for human leukocyte antigen binding.

Read more about these speakers and their research in the following pages.

Pierre Thibault (pierre.thibault@umontreal.ca) is a professor and principal investigator at the Institute for Research in Immunology and Cancer of Université de Montréal.

Discovery of Tumor Antigens Revealed by Immunopeptidomics

Monday, April 4

3:15 p.m.

Pennsylvania Convention Center, Philadelphia

Bringing immunopeptidomics to the bedside

By Brian O'Flynn

Michal Bassani–Sternberg helps advance the study of cancer vaccines and adoptive T-cell therapies by developing methods to identify cancer biomarkers. This work largely is based on the proteins responsible for immune system regulation known as immunopeptides.

Her research crosses the threshold of benchtop research and clinical application, but Bassani–Sternberg's career path has not been linear; drawn by a general interest in all things biology, she holds a master's degree in plant physiology. She said she found this experience enriching, "but I wanted to study something more related to humans — diseases, cancer."

Her Ph.D. work with Arie Admon at the Technion – Israel Institute of Technology got her in on the ground floor in the field of immunopeptidomics using mass spectrometry. This and her subsequent postdoctoral work with Matthias Mann at the Max Planck Institute of Biochemistry helped pave the way for identifying and implementing novel human leukocyte antigen peptides as targets for immunotherapy.

George Coukos recruited Bassani–Sternberg to the Ludwig Institute for Cancer Research in Lausanne in 2015 to help start a new mass spectrometry lab with a specialty in immunopeptidomics — a testament to her impact on the field. She subsequently was awarded the Pfizer Research Prize in 2021.

Finding the needle in a haystack

The immunopeptidome consists of the thousands of peptides displayed by the human leukocyte antigen, or HLA, that enable lymphocytes to scrutinize the health of cells. It's an attractive target for developing personalized cancer immunotherapies. The HLA gene cluster, however, is the most polymorphic in the human genome, so detection levels of T cells specific for each antigen historically have been too low for clinical purposes.

Michal Bassani–Sternberg's lab uses mass spectrometry techniques combined with genomics and transcriptomics to identify HLA binding peptides accurately. This work has been used in Lausanne in both a cancer vaccine program and an adoptive T-cell therapy program. Bassani–Sternberg's team receives samples from cancer surgeries, analyzes them with proteogenomic approaches, and predicts targets that then are used to develop personalized cancer vaccines or to enrich antigen-specific T cells for T-cell therapies. Follow-up samples from patients are used to examine target efficacy. These bioinformatic techniques have broad implications for future treatment, including for melanoma and ovarian, colorectal and lung cancer.

MICHAL BASSANI–STERNBERG

Now a newly minted assistant professor and group leader at the Ludwig, and head of immunopeptidomics at the University Hospital of Lausanne, Bassani–Sternberg does not take for granted the team effort by postdocs and graduate students she mentors. "I learned a lot from being a student in both a small and a large lab," she said, "like how you want your PI to interact with you."

She advises early-career scientists to "choose a topic you are really passionate about — something you will still want to be doing years down the line."

And while it is easy to compare ourselves to others, Bassani–Sternberg sees no value in this. "There will always be people who appear to be technically better, but if you have dedication and motivation, there is no real comparison."

Brian O'Flynn (Brian.OFlynn@stjude.org) is a postdoctoral research fellow at St. Jude Children's Research Hospital in Memphis.

It's what's on the outside that counts

By Heather Masson–Forsythe

How people dress can help us identify or recognize them. In the same way, what cells wear on the outside allows our immune response to recognize them as cancerous or not.

Victor H. Engelhard, a professor of microbiology, immunology and cancer biology at the University of Virginia School of Medicine, is working toward understanding what cancer cell antigens are recognized naturally by T cells.

Engelhard was one of Rice University's first graduates in biochemistry, a brand-new major in the 1970s. Although he started off as an undergraduate interested in computer science, when he "hit a wall with mathematics," his interest in chemistry ultimately won out. The head of the biochemistry department at Rice encouraged him to attend the University of Illinois for graduate school, where he focused on adenylate cyclase. He then completed a postdoctoral fellowship focused on major histocompatibility complex, or MHC, molecules at Harvard. These molecules display proteolyzed bits of intracellular proteins on the surface of cells for T-cell recognition, and they have been central to Engelhard's research ever since his postdoc.

Engelhard's journey into and through scientific research is "not so much focused on the 'ah-ha' moments," he said, but instead is about "always looking out for opportunities and taking the interesting ones."

And it's not enough to identify intriguing questions and opportunities, he said. "My view of science is to follow what's interesting, but also you have to look for people you can work with who bring a distinct perspective."

Diversity of expertise and experience promotes a culture of collaborators who learn from each other and push projects in new and exciting ways, he said.

With this mindset, Engelhard has established essential collaborations that have resulted in the development of technology that allows researchers to sift through complex peptide mixtures using mass spectrometry and has demonstrated that there are T cells in melanoma patients that can recognize melanoma cells.

VICTOR H. ENGELHARD

Identifying unique cancer cell antigens

Cells can display hundreds of thousands of different antigens produced from breaking down proteins inside the cell, about 8-15 amino acids long, that are presented by MHC molecules. Because cancer cells frequently dysregulate kinases and phosphatases, specific post-translational modifications like phosphorylation could provide a marker for our immune system to recognize a tumor, which could lead to new therapeutics such as a vaccine or recombinantly expressed T cells. Recently, Victor Engelhard's team has found that some antigens displayed on cancer cells are phosphorylated, but the same antigens in noncancerous cells are not as commonly phosphorylated.

Given the breakthrough of being able to identify cancer-specific antigens, the biggest challenges include understanding which are most important for tumor survival and understanding how these phosphorylations are utilized by cancerous cells. Further complications arise from the fact that although these modifications are more present in tumors, they also may be present in lower concentrations in healthy cells, which could result in immune-related adverse effects. Engelhard and collaborators hope to work toward overcoming these challenges to achieve the goal of developing PTM-based cancer therapies.

Heather Masson–Forsythe (heather.forsythe1@gmail.com) completed her Ph.D. in biochemistry and biophysics at Oregon State University. She is passionate about communicating science through writing and dance. Follow her on Twitter and TikTok: @heycurlytop.

Improving disease detection for personalized vaccines

By Nicole Lynn

Susan Klaeger's introduction to science began with her father, who is also a scientist. Her interest in research, however, began at school, where she saw a video of the motor protein kinesin walking along a microtubule.

"I found the molecular biology aspect of this process to be so cool," she said, "so I looked further into what I could study and found molecular biotechnology."

When she was an undergraduate at the Technical University of Munich, or TUM, Klaeger's internships with Roche Diagnostics in Germany inspired her to continue to graduate studies. While working on her master's at TUM, she was introduced to mass spectrometry and proteomics, and she has stayed in this field ever since. As a Ph.D. student at TUM, which is part of the German Cancer Consortium, Klaeger investigated inhibitors of multiple kinases, or signaling proteins. Using chemical proteomic screening techniques, she determined broad and specific targets as well as the off-target effects on cells.

Klaeger's postdoc at the Broad Institute of MIT and Harvard led to her current position as a research scientist. She is working to develop personalized vaccines that target individual cancers. The institute has provided Klaeger many opportunities to collaborate across disciplines.

"There's a lot of knowledge in these labs, and it's amazing to partner and learn from each of them," Klaeger said. "I am happy to have had the opportunity to collaborate with experts in many fields."

Developing personalized vaccines

SUSAN KLAEGER

As children, many of us are vaccinated to boost our immune systems' ability to recognize and combat common illnesses such as mumps, measles or chicken pox.

Vaccines similarly can be used to boost the immune system's ability to locate and destroy cancerous cells. One example is the human papillomavirus, or HPV, vaccine, which protects against a viral infection that can cause cancer. Researchers now are working to develop personalized vaccines that will boost an individual immune system's ability to find tumor-specific proteins, called antigens, on the surface of cancer cells and destroy them.

Susan Klaeger and her colleagues are developing tools to detect endogenously presented, mutated antigens in cancer cells using ultrasensitive mass spectrometry. In doing so, Klaeger hopes to improve the specificity of cancer vaccines. In a study published in the journal Molecular & Cellular Proteomics, the team was able to increase the depth of coverage and sensitivity of antigen detection for the human leukocyte antigen, or HLA-1, though the available input was modest. These data further can improve HLA-1 binding prediction models for engineering immunotherapies.

In a separate study, the researchers used the same techniques to report the first HLA-1 immunopeptidome of SARS-CoV-2, the virus that causes COVID-19. In infected cells, viral proteins are processed and presented on host cells by HLA-1. This allows our immune cells to recognize the foreign peptides and signal for cellular destruction. Klaeger and colleagues hope that this list of SARS-CoV-2 HLA-1 peptides can provide insights on the viral signatures required for immune cell activation and aid in data-driven vaccine selection and therapy development.

Nicole Lynn (nalynn@g.ucla.edu) is a graduate student at the University of California, Los Angeles in the chemistry and biochemistry department.

Three JLR junior AEs to speak at annual meeting

By George M. Carman

The Journal of Lipid Research junior associate editors program facilitates knowledge of peer-review processes and trains the next generation of journal editors. Each junior AE is mentored by a JLR associate editor.

The inaugural class of junior associate editors — which included Raymond Blind of the Vanderbilt University School of Medicine, Gissette Reyes–Soffer of the Columbia University Irving Medical Center, Brandon Davies of the University of Iowa Carver College of Medicine and Rotonya Carr of the University of Washington — recently concluded their two-year appointment. As part of their editorial training, each organized a virtual issue highlighting cutting-edge research published by the journal, and they also presented their research at the 2021 American Society for Biochemistry and Molecular Biology annual meeting, which was held virtually. All four subsequently were appointed to regular membership to the JLR editorial board.

The second class of JLR junior associate editors includes six outstanding early-career investigators: Michael Airola of the State University of New York at Stony Brook, Luke Engelking of the University of Texas Southwestern Medical Center, Scott Gordon of the University of Kentucky, Rebecca Haeusler of Columbia University, Renate Schreiber of the University of Graz and Judi Simcox of the University of Wisconsin–Madison.

I am pleased to announce that three of these newly appointed junior associate editors — **Scott Gordon, Rebecca Haeusler and Judi Simcox** — will present their research at the 2022 ASBMB annual meeting in April during a session titled "Lipid Diversity and Disease: Spotlight on the Journal of Lipid Research Junior Associate Editors." Please read the following articles about these three scientists and the exciting research they will present at the session.

Michael Airola also will speak at the annual meeting in April as the recipient of the 2022 Walter A. Shaw Young Investigator Award in Lipid Research.

And looking ahead — Airola, Luke Engelking and Renae Schreiber all are scheduled to present their work at the 2023 ASBMB annual meeting's Journal of Lipid Research session.

Lipid Diversity and Disease: Spotlight on the Journal of Lipid Research Junior Associate Editors

Tuesday, April 5

2:45–3:45 pm

Pennsylvania Convention Center, Philadelphia

George M. Carman (gcarman@rutgers.edu) is the founding director of the Rutgers Center for Lipid Research, a Journal of Lipid Research associate editor and co-director of the ASBMB Lipid Research Division.

Using lipoproteins to study heart disease

By Nivedita Uday Hegdekar

Scott Gordon was passionate about science from a young age but undecided about a research career when he started college. The New York native attended the State University of New York College at Brockport, where he worked part time in Adam Rich's lab, focused on studying gastrointestinal motility in zebra fish models.

"I absolutely loved every moment of working in the lab, be it after classes or on weekends," Gordon said. "It helped me better understand the scientific research process."

This inspired him to apply to graduate school, and he traveled to the University of Cincinnati College of Medicine for his Ph.D. in pathobiology and molecular medicine. Under the mentorship of W. Sean Davidson, Gordon studied high-density lipoproteins, or HDLs, which carry cholesterol from the body's tissues to the liver.

For his Ph.D. work, Gordon developed new techniques using mass spectrometry to study HDL isolated from human plasma and carried out elegant studies characterizing how these subspecies are protective against cardiovascular diseases.

"I had a productive four and half years at graduate school," he said. "During this time, I also met my future wife, who was also a graduate student."

At a research conference, Gordon was introduced to Alan T. Remaley. The two hit it off, and Gordon ended up doing a postdoc in Remaley's lab at the National Institutes of Health.

"My postdoctoral research got me involved with the clinical aspect of HDLs in diseases," he said. "I worked on numerous collaborative projects ranging from basic biology to translational research."

After six years at the NIH, he moved to the University of Kentucky as an assistant professor; there, he continues to explore the uncharted avenues of lipoproteins in cardiovascular development, particularly atherosclerosis.

Gordon is now father to three young children and describes his life as "super busy but exciting." He serves as an ad hoc reviewer for many scientific journals and recently was appointed a Journal of Lipid Research junior associate editor.

"It's been wonderful to build the lab and expand our skill set," he said. "Despite a few setbacks due to COVID-19, the lab has reached a very good and productive groove. I am excited to see how our research work develops over the next few years."

SCOTT GORDON

Two ways to look at lipids

Scott Gordon's lab focuses on two main themes, studying lipids in disease and in dietary absorption.

First, they do research on the roles of lipoproteins in atherosclerosis, studying how high-density lipoproteins are transported through the arterial wall and how the proteins they carry suppress inflammation that contributes to arterial plaque buildup.

Second, for the past five years, the lab has been looking at the role of the gene DENND5B in dietary lipid absorption. Little was known about this gene previously. Gordon's lab genetically altered a mouse line to remove DENND5B and found that this caused numerous changes. Not only did these knockout mice have a 30% reduction in HDL cholesterol in blood, but they also had defects in the absorption of dietary lipids. The lab now is investigating the molecular role of DENND5B in the dietary absorption process.

Nivedita Uday Hegdekar (nivedita.hegdekar@gmail.com) is a graduate student at the University of Maryland working toward a Ph.D. in biochemistry and molecular biology and an M.S. in patent law. Follow her on Twitter: @NiveditaHegdek1.

Shifting gears to find the right path

By Himanshi Bhatia

Rebecca Haeusler is an expert in metabolic diseases and an associate professor at Columbia University Irving Medical Center, but her career trajectory has been far from straightforward.

Growing up in Michigan, Haeusler decided on engineering as a career prospect. While pursuing her undergraduate degree at the Massachusetts Institute of Technology, however, she had a change of heart.

"I attended MIT thinking I would go into engineering," she said, "but I changed my mind when I got bit by the biological sciences bug."

Haeusler worked as a research associate before starting her Ph.D. in biological chemistry at the University of Michigan. There, she learned to think critically, she said, and to work as part of a research team studying transfer RNAs in yeast. Although basic research was exciting, her thesis topic was far removed from any real-world application. "I felt compelled to move into a topic more closely related to human health and disease," she said.

Her aspirations soared when Haeusler worked on a grant where trainees designed a semester-long course, choosing the topic, inviting outside speakers and leading weekly journal clubs and discussions. "I ended up reading articles on insulin and leptin signaling that strongly sparked my interest," she said.

She became interested in metabolic diseases and changed research topics when she entered her postdoctoral training period in Domenico Accili's lab at Columbia University.

This change came with challenges. Haeusler had to learn new techniques and change her entire thought process to encompass multiple organs instead of individual cells — all while trying to prove her mettle in a new lab. One-on-one mentoring with her PI and support of her colleagues helped her succeed and excel, she said.

Looking back, she said that being honest to yourself and letting go of pride and ego are the keys to success. "When I was working as a technician before graduate school, my boss called me out for not asking for help when I needed it," she said. "The lesson sticks with me, and I still strive to apply it every day."

A focus on lipoproteins and bile acids

When a person becomes obese or insulin resistant or is diagnosed with Type 2 diabetes, their body's ability to metabolize lipids and cholesterol changes. As many people become hyperfocused on healthy living and body weight, understanding the root causes of metabolic disease progression assumes a special role.

Rebecca Haeusler's lab aims to increase that understanding by focusing on lipoproteins and bile acids. Lipoproteins are complexes that transport cholesterol through the blood stream, while bile acids are involved in the digestion of fat. Both are dysregulated in insulin resistance, diabetes and obesity.

Bile acid composition is altered by numerous physiological and pathophysiological states, interventions and medications, leading to metabolic consequences that are particularly difficult to tease apart in humans. To learn about these consequences, Haeusler's lab uses mice that have humanized bile acid composition. Recent work has shown that, contrary to expectations, the presence of muricholic acids (abundant in mice and rats but not humans) does not protect against high fat diet–induced obesity, glucose intolerance and liver fat accumulation, suggesting that additional research is needed to understand the effects of bile acid composition on the body and molecular mechanisms.

REBECCA HAEUSLER

Himanshi Bhatia (himanshi.b@gmail.com) is a postdoctoral research associate at the Washington University in St. Louis and is passionate about science communication. Follow her on Twitter: @Himanshi16b

Science informed by personal experiences

By Nuala Del Piccolo

Judith Simcox's interest in science began with a high school assignment: a research paper on a topic of her choice. Inspired by her sister Jan, Simcox asked why people with Down syndrome have higher rates of Type I diabetes. She found that the relationship is well established, but scientists "had no idea what causes these high rates, which was really shocking to me," she said. "It was the first time I asked a question about the world around me that had no answer. I knew I wanted to tackle these types of questions."

Simcox studied biology at Carroll College, where she joined a research lab focused on how environmental pressures shape the genetic code of black fly populations. "I went into college and didn't really know what being a scientist was at that point," she said, "but I started to realize that you could bring your perspective into science."

Simcox's mother, a nurse who worked night shifts so she could care for Jan, was diagnosed with breast cancer at age 40. Like her high school assignment, this event inspired Simcox to ask why — and the latter question ultimately formed the basis of her Ph.D. research.

Simcox learned that asynchronous tissue-specific circadian rhythms — which are set by light and diet — in night shift workers increase rates of metabolic diseases like breast cancer. "What we were really exploring was how different dietary elements impact circadian rhythms," she said. "We found that, at the molecular level, dietary iron resets the circadian clock in the liver."

Now an assistant professor of biochemistry at the University of Wisconsin–Madison, Simcox continues to draw inspiration from her life experiences. "In my research and in the way I think about science I bring that urgency, because I know what it's like to live with these diseases."

JUDITH SIMCOX

Investigating the origin and function of lipid metabolites

Judith Simcox's research focuses on the production of and intertissue communication by lipid metabolites. "I am really fascinated by how organisms communicate with their environment through nutrition," she said. "The questions I'm really trying to get at are: What are these many different lipid species in our plasma and what are they doing? Can we figure out where they're coming from, how they're regulated, or what they are functionally communicating?"

To address these questions, Simcox performs mass spectrometry on plasma samples. The resulting data include around 4,000 spectral signals that could come from lipids, only about 1,000 of which have been identified. In a collaboration with Agilent, Simcox is pushing the capability of current technology to bridge this gap.

Simcox also characterizes the function of identified lipids — especially their role as signaling molecules — following exposure to environmental pressures in mice and humans. "Fundamentally," she said, "what we have to understand is what these lipids are doing in normal physiology and how have these diseases hijacked our normal biology."

Simcox is also interested in plasma lipids as diagnostics. "We've known since the 90s that things like high- and low-density lipoproteins and triglycerides are really poor markers of metabolic health in African Americans and Native Americans, so we're working to find more equitable biomarkers."

Nuala Del Piccolo (nualadp.phd@gmail.com) is a scientific writer in the biomedical engineering department at the University of California, Davis. She earned her Ph.D. in materials science and engineering at Johns Hopkins University.

Tips for mentors headed to the undergrad poster competition

Here is some advice to build your confidence and help you set up your students for success at this special event at the ASBMB annual meeting.

By Kirsten Fertuck

One of the many fantastic events of the American Society for Biochemistry and Molecular Biology annual meeting happens quite early: the undergraduate poster competition. Alive with youthful energy and ideas, it also can be a crowded and intimidating place!

If you are a faculty member bringing one or more undergrads to compete, how can you help them to get the most out of it? Here are five things that you may want to convey to them.

1. Help them to understand how the event fits into the overall scheme of the annual meeting.

Take the time to describe the distinctions between what it will be like to present at an undergrad-only poster competition and what it will be like in the full meeting later. These two experiences are very different!

Emphasize how positive it is for them to participate in an event that is designed especially for them and their peers and how well it will prepare them to present to a wider audience later in the meeting.

2. Help them to understand the timeline that leads up to the event.

Many undergrads never have participated in a meeting like this before. The abstract-submission process, the separate registration for competition, and then the separate registration for the meeting itself (not to mention booking the travel and accommodations) — it can all seem a little daunting. Creating a checklist with deadlines can help to keep everything on track.

Also, students frequently have questions about how and when to have their posters printed and how to transport them to the meeting, so your recommendations are useful to include here as well.

3. Help them to understand the progression for the day of the event.

Students arrive from all over but need to be in attendance at the late-morning Saturday orientation for the poster session. Since many students likely are traveling either the night before or the morning of the event, this makes it difficult for them to be well rested. Help them to arrange for travel that will get them to the orientation in as relaxed a manner as possible.

Students also frequently have questions about the dress code. A good guideline might be to dress as if for an interview if it will increase your confidence, but otherwise nice casual clothing will work well and might be easier to pack.

Finally, make sure that they are aware of instructions regarding when and for how long to be physically attending their poster.

4. Help them to understand the judging and scoring process.

It can help if your students are aware of some of the typical features of the judging process. Although judges have individual styles (for example, some like to start by reading the poster quietly to themselves, while others begin right away with a "Please take me through your poster" request), there are a few general features to expect.

First, you can reassure your students that judges should be clearly identifiable with labeled nametags and that they should be introducing themselves at the beginning. Students shouldn't fear that they won't realize they were presenting to a judge.

Second, it can be helpful for your students to know that judges overwhelmingly love undergraduate research! There were a wide variety of other things that the many

2022 ASBMB Undergraduate Poster Competition

Saturday, April 2

10:30 a.m. to 4 p.m.

Pennsylvania Convention Center, Philadelphia

Applications for the competition will open in January.

Participation is required for Student Chapters Travel Award recipients but is open to all undergraduate members of the ASBMB.

To qualify for the competition, a student must have submitted an abstract, as a first author, to an ASBMB topic by Nov. 30, 2021.

participating judges could have been doing that day, but they chose to volunteer to try to help the event to run smoothly with the aim of helping students with their professional development.

In other words, judges want undergrads to succeed and to become ever more confident and practiced in presenting their work, so when a student begins their presentation, it can be helpful to imagine that they are speaking to a supportive and interested colleague.

Finally, it can be helpful to know that judges are working from a rubric — the details might change from year to year, but in general an excellent poster presentation will score highly across a range of criteria that you can speak to your students about ahead of time (clear verbal and written explanation of hypothesis, methods, results, conclusions and future work, and additionally addressing follow-up questions during or after the presentation).

5. Help them to understand how the experience can fit into their professional development.

Think about the kinds of skills that you have developed over time at scientific conferences: assimilating novel information, making new connections with peers and other professionals, becoming less nervous and more concise as you explain your personal area of expertise, and so much more.

Your students can, of course, practice this throughout the duration of the meeting, but it's worth highlighting to them how great the early gains can be during this particular undergraduate-focused event.

Still, no matter how much you encourage your students to be proactive and meet other people, it's helpful if you facilitate this for them at least on this first day of the meeting — particularly if you are bringing only one student. If you and your student don't know any other students who are attending, you could try reaching out to your Student Chapters regional directors to see if they can connect you with other attendees from your area.

Bonus tip: Don't forget to take a photo of your student with their poster. The time moves quickly, and later you will want to remember how proud you all were to be able to participate in this dynamic knowledge exchange!

Kirsten Fertuck (k.fertuck@northeastern.edu) directs the biochemistry program at Northeastern University and is an associate teaching professor.

A year of open access

It's been just over a year since the journals published by the American Society for Biochemistry and Molecular Biology became fully open access. We asked the editors of the ASBMB's journals how the transition has gone and what they're planning for the future. Here's what they told us.

A great year for JLR

By Nicholas O. Davidson and Kerry-Anne Rye

The move to open access in early 2021 went very smoothly thanks to the great work of ASBMB staff, our associate editors and our editorial board members.

Our seminal accomplishment in 2021 was the 32% increase in the journal impact factor to 5.922, the highest in a decade. Our associate editors and editorial board members have underpinned this terrific outcome by setting a high bar for article acceptance and reducing the average time to a first decision to just 14 days. Raising the journal impact factor and reducing the review time are two of our highest priorities, and we will continue to work on improving them even further in 2022.

We are delighted to note that two-thirds of the 20 most-cited articles were original research articles and perspectives. Compare this with the top 20 from the previous period, two-thirds of which were reviews. We interpret this shift to indicate that higher quality, original scientific research is the major driver of the improved impact factor. This is important because we want the journal to be seen as a destination for the best, most impactful original work in lipid research.

In other positive developments, the amazing work of staff has given us the opportunity to establish a WeChat community in China. The staff also has assisted us in reaching out to leaders in lipid research in China through a special edition, "Focus on China."

We will continue to build links with the lipid research community in China in 2022 in acknowledgement of its emerging strengths in key lipid research areas. Authors from China accounted for 22% of submissions to the journal in 2020, and we predict continued growth in 2022 and beyond.

ASBMB staff also have coordinated our Twitter and social media presence, including four very popular Twitter takeovers by graduate students and postdoctoral fellows from across the globe.

In conclusion, 2021 was a landmark year for the journal, and we are grateful to the lipid research community for their continued support. We look forward to working with you all in 2022.

At JBC, can open science follow open access?

By Alex Toker

One of the reasons I agreed to become editor-in-chief of JBC was our collective decision to make the journal gold open access.

2021 was the right time to make the transition, given the ever-changing face of the publication industry, the implementation of Plan S and the requirement by many funding agencies that their sponsored research be published in open-access journals.

To achieve gold open access, we partnered with commercial publisher Elsevier; however, it is important to recognize that JBC remains, at its core, a journal "for scientists, run by scientists." Full editorial control of all manuscripts remains with the editors at JBC. In addition, JBC is one of the few journals that performs data-integrity analysis on the papers it publishes.

But what does the future hold? The implementation of open access raises an equally important aspect of science publishing in 2021 and beyond: open science.

The open-science movement has gained significant traction over the past decade. The basic tenets are that manuscripts and primary data, both negative and positive, should be deposited in publicly accessible repositories, free to all.

At JBC, large data sets — such as proteomics, RNA-seq, functional genomics and structural data — already must be deposited into one of many public repositories as a condition of manuscript acceptance. But current JBC policy states that all primary data should be made available by authors only upon request.

If the journal's primary goal is to disseminate science and foster a community of scientists working in all areas of cell and molecular biology and biochemistry, and in my opinion that is its primary goal, then our associate editors and editorial board members must confront the ideals of open science and determine the steps for making them a reality.

I am looking forward to discussing these matters with the JBC community in 2022.

This was adapted from Toker's first editorial as JBC's top editor.

Nicholas O. Davidson (nod@wustl.edu) is the division chief of gastroenterology at Washington University School of Medicine in St. Louis and has been co-editor-in-chief of the Journal of Lipid Research since January 2019. Follow him on Twitter: @NODGastro.

Kerry-Anne Rye (k.rye@unsw.edu.aua) is a research professor and deputy head of the School of Medical Sciences in the Faculty of Medicine at the University of New South Wales, Sydney, Australia. She has been co-editor-in-chief of the Journal of Lipid Research since January 2019. Follow her on Twitter: @KerryRye.

Alex Toker (atoker@bidmc.harvard.edu) is a professor in the department of pathology and chief of the division of signal transduction in the departments of medicine and pathology and the cancer center at Beth Israel Deaconess Medical Center at Harvard Medical School. He has been editor-in-chief of the Journal of Biological Chemistry since Oct. 1. Follow him on Twitter: @ChiefEditorJBC.

It's time for post-pub review

By Ken Hallenbeck

Writing a manuscript is a familiar process: draft, submit, revise, resubmit and proof. Publication is the primary way we communicate our research and build our scientific careers. The process can take months to years, and though it is far from perfect, publication remains the gold standard of academic quality control.

But what happens next? Occasionally, publication is accompanied by a university press release, social media discussion or even news reporting. Most of the time, however, the answer is nothing.

Post-publication dialog about lab research is difficult. An author might take a report that an experiment isn't reproducible as a personal attack; the publishing journal could see it as a shot at its editors. Most likely, the differences are details that were lost in translation from lab to manuscript and back to lab. How can the scientific community work together to translate those details more effectively?

Several platforms now exist for constructive post-publication conversations. Some succeed in addressing a few of these challenges, but none have been adopted widely. For example, PubPeer has gained traction as a place where researchers can post criticisms of poor-quality papers. Sites such as ScienceOpen, SciBase and PreReview aim to be repositories of crowdsourced manuscript reviews. A growing list of post-pub platforms is hosted at Reimagine Review. Increasingly, authors can post insights about their own work on social media, and readers will ask questions and provide feedback.

If the conversation about post-publication review has been ongoing for many years, and the platforms exist and are ready to use, there must be larger reasons why scientists rarely engage with papers — their own or their colleagues' — once the final version goes up online.

I see three main challenges to post-publication peer review:

Incentives. Scientists want issues of reproducibility and post-publication dialogue to be addressed but have no incentive to engage. They rightfully ask, "Will this help me get a postdoc position? How about a promotion? Will this increase my standing in the scientific community?" Any platform that seeks to be effective must align self-interest and nobler motives.

Political realities. Science positions itself as an objective pursuit of truth, but research scientists know that's not always how it works. How likely is a graduate student to criticize publicly their professor's work, even when their point is valid? A failure to recognize the prominent role these dynamics play in human behavior will limit any solution's effectiveness.

Access. Reviewing a paper requires being able to read that paper, but most scientific knowledge is published in subscription-based journals whose business model is built on limited access. While the proliferation of preprint servers and open-access journals is a tremendous step in the right direction, the research community has a long way to go before publishing a paper means everyone can read it.

Fortunately, scrutinizing the power dynamics of the academic hierarchy and accelerating the adoption of open access and data sharing are areas of active advocacy throughout the scientific research community.

However, we can and should create new incentives for post-publication review. What if post-publication platforms were as fast and easy to use as social media but quality contributions carried the career gravitas of a first-author manuscript? While this might require an expansion of what is considered peer review and academic contribution, such an expansion is long overdue.

If we want researchers to invest time and energy in scientific dialogue — not just scientific publication — we need to take the scientific manuscript off its centuries-old career pedestal. Serving as an associate editor, moderating online discussion forums and a record of writing public reviews should fall in an expanded curriculum vitae category: academic contributions. Researchers could have online repositories for their public manuscript reviews. Think of a GitHub or ORCiD — a public record of your contributions — but for peer review.

The next time you enjoy reading a paper, write a public review. That's all it takes to join the post-publication conversation.

Ken Hallenbeck (k.hallenbeck@gmail.com) earned a Ph.D. in pharmaceutical sciences from the University of California, San Francisco, and now is an early drug-discovery researcher. He serves on the board of directors of ReImagine Science and is the life sciences lead at TerraPrime. Follow him on Twitter: @kenkhallenback.

The birth of genetics

By Steve Caplan

This article is an excerpt from Steve Caplan's new book, "Today's Curiosity Is Tomorrow's Cure: The Case for Basic Biomedical Research," published by CRC Press. It has been edited for ASBMB Today.

In 1854, a monk with remarkable intellectual curiosity by the name of Gregor Mendel began to grow peas in the greenhouse of the St. Thomas Monastery in what is now the Czech Republic. By 1865, Mendel had made a series of observations that ultimately changed the fundamental understanding of how traits are inherited by living organisms. He presented his key findings about what he termed "certain laws of inheritance" in 1865, and subsequently his studies were largely ignored by the scientific community for the next 35 years. Why?

Consistent with the idea that the timing of scientific discoveries needs to be appropriate for those findings to be properly appreciated, Mendel's laws of inheritance preceded the large-scale acceptance of Darwin's theory of evolution. Indeed, it was not until the early1900s that widespread knowledge of Mendel's laws was propagated, and it took even longer until his ideas were fully accepted.

At the turn of the 20th century, three new papers were published, each of which rediscovered Mendel's laws of inheritance. In the prolog of her 2000 book "The Monk in the Garden," Robin Marantz Henig noted, "The explanation usually given for this curious turn of events is that the world wasn't ready for Mendel's laws in 1865, and that by 1900, it was."

Whether Mendel was a genius or simply a seasoned plant breeder who happened to be in the right place at the right time — an issue debated by some scholars and historians — is, for the most part, irrelevant. What is significant is that he was clearly among the first researchers to observe and publish findings that showed that traits are inherited, and he outlined predictable and strict mathematical rules that govern the passing of individual traits from parent to offspring as discrete particulate units that exist in pairs in all individuals.

A raging battle

Perhaps one of the main reasons why Mendel's work remained relatively obscure until the early 1900s was that the entity known as a gene remained so nebulous in the absence of a molecular understanding of what that entity entailed. The lack of a firm understanding of how genetic material is passed from generation to generation — or more accurately, what comprises that genetic material — made it extremely difficult for contemporary scientists to accept Mendelian genetics.

Indeed, a great debate erupted following the publication of Cambridge researcher William Bateson's 1894 book "Materials for the Study of Variation: Treated with Especial Regard to Discontinuity in the Origin of Species," in which he outlined 886 examples of discontinuous variation in heredity. Bateson, who, upon reading Mendel's studies on the genetics of peas years earlier,

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In addition to his work in genetics, Gregor Mendel (1822–1884) was a meteorologist, a mathematician and an Augustinian friar.

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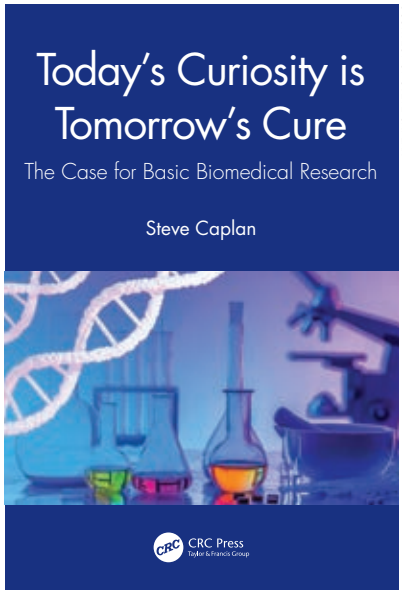

Steve Caplan's new book, "Today's Curiosity Is Tomorrow's Cure: The Case for Basic Biomedical Research," was published in November by CRC Press.

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William Bateson (1961–1926) was the first person to use the term genetics to describe the study of heredity.

reportedly felt that he had been scooped by Mendel, became one of the biggest advocates of Mendelian genetics. The idea that genetic traits could skip generations as a result of being recessive — meaning that the trait is only passed on to offspring if it is inherited from both parents — was somewhat revolutionary in that it seemingly opposed some of the new ideas that had been emerging from modern statistics.

Around the time of Mendel, in the late 1800s, Francis Galton discovered the statistical concept of regression to the mean; simply put, if a sample point is extreme when observing random variables, then additional points observed in the future will more likely be closer to the mean and are less likely to be outliers. Galton calculated that Darwin's evolution must occur by larger, discontinuous steps rather than by small, incremental ones to prevent regression back to the mean.

The scientists who favored the notion that evolution was a smooth and continuous occurrence were known as biometricians. Bateson and those who supported the Mendelian model were convinced that only discontinuity could explain inheritance of many traits, and thus a raging battle was fought in a series of letters and counterletters published in the journal Nature.

A chromosome theory

By the early 1900s, however, more evidence in support of Mendel's ideas was coming from a different direction. In particular, two scientists, Walter Sutton and Theodor Boveri, contributed greatly to this enterprise.

Sutton did significant research under the tutelage of the famous Edmund B. Wilson at Columbia University in New York, publishing "The Chromosomes in Heredity" in 1903 with the conclusion that chromosomes (which were now visible under the microscope by new cytological techniques) carry Mendel's hereditary material.

The German cytologist, cell biologist and zoologist Boveri had a remarkable career during which he made great discoveries, often relying on his zoological experience to make use of interesting systems to study. For example, he took advantage of fertilized sea urchin eggs and later the nematode Ascaris megalocephala, a parasite of the horse gut that later in his life infected him and may have caused his death. Boveri studied the centrosome or what he termed the "centrosoma" and documented its significance for cell division. He also found that the centrosome itself divides and organizes the surrounding cytoplasm in such a manner that the spindle fibers radiate from it and contact the chromosomes. Presciently, Boveri also published a lesser known study in which he proposed that aberrant chromosomes might even be respon-

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Walter Sutton (1862–1915) and Theodor Boveri (1877–1916) developed the theory that Mendelian laws of inheritance could be applied to chromosomes.

sible for the generation of cancers in his 1914 book "Concerning the Origin of Malignant Tumors."

The work of these two scientists advanced the idea of Mendelian genetics greatly and led to what is known as the Boveri–Sutton chromosome theory.

A hereditary twist

Further support for Mendelian genetics came from the work of Nettie Stevens, who had to be an extraordinarily brilliant scientist to overcome the rampant misogyny of her era. Stevens was a geneticist who trained in the laboratory of Thomas Hunt Morgan, a famous fly geneticist and Nobel laureate for his contributions to chromosomes and genetics at Bryn Mawr, where Edmund Wilson was also a faculty member. In the course of her doctoral studies, Stevens received a fellowship to travel to Germany and train with Boveri before completing her Ph.D.

Upon returning to the U.S., Stevens worked on mealworms (Tenebrio molitor) and observed that somatic cells of female mealworms contained 20 large chromosomes, whereas those of the male mealworm had 19 large chromosomes and one small one. She also found that exactly half the spermatozoa cells from the males contained nine large chromosomes and one small chromosome, whereas the other half had 10 large chromosomes. Her conclusion was that the eggs fertilized by the sperm with the 10 large chromosomes gave rise to female mealworms, and therefore the small chromosome dictated the generation of male mealworms. Her discoveries were further validated by Wilson when he looked at chromosome numbers in numerous species of the insect Hemiptera, thus supporting Mendelian genetics and providing a new twist to the mechanisms of heredity.

With support from the findings of great cytologists and cell biologists, Mendelian genetics won the day. However, Mendelian genetics were ultimately combined with Galton's mathematical advances to yield new statistical methods and give birth to the modern field of genetics. All that was missing was an understanding of what constituted the particulate hereditary element within cells and chromosomes that allowed for the passage of traits from one generation to the next. Thus, the field of genetics was born through observations and careful experimentation, but without understanding the role of DNA in this process, scientists were still looking at the tip of the iceberg.

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In her studies of the sperm produced by male mealworms, Nettie Stevens (1861–1912) discovered sex chromosomes.

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Gregor Mendel investigated these monogenic traits in his pea experiments.

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American stranger: Thoughts on identity and inclusion

By Elizabeth Yeh

I am a first-generation, American-born woman of Asian descent, and as such, I have never experienced being part of the majority in the room. I have worked in academic science since the age of 19. In every laboratory, there has been only one of me — the American-born Asian — even when there are Asians born in Asia but training in the United States. I am different from the Asian-born, and I am different from non-Asian Americans.

As a result of policies designed to keep Asian immigrants out of the U.S., such as the Chinese Exclusion Act of 1882 and the Immigration Act of 1924, sometimes I feel like a stranger in my home country. Thanks to the Immigration and Nationality Act of 1965, designed to allow immigration of Asian doctors and engineers preferentially, Asian Americans are overrepresented within these professions. Therefore, Asians are not considered a minority in fields related to science, technology, engineering and mathematics, including academic science. But we Asians — American born or not — still are viewed as different from other Americans.

I am an associate professor and the director of trainee recruitment, development and diversity in pharmacology and toxicology at the Indiana University School of Medicine. I am fortunate to be part of a system that values diversity, equity and inclusion.

In my roles as an educator and mentor, I spend a lot of time considering the question of best practices for DEI in academic sciences because I want to improve the graduate education experience. My goal is to make it less awkward for my students than it was for me.

I have encountered countless clichéd microaggressions. People ask me where I am from or speak to me in one of a variety of Asian languages. They may be trying to be friendly, but I have no idea what to say in response. People have asked me, "What's the strangest thing you've ever eaten?" Sometimes Asian-born peers muttered under their breath in their native language, assuming I had no idea what they were saying, "That's the American. She's got it so easy," because I could apply for federal grants during my Ph.D. and postdoc years but my peers who were not U.S. citizens could not.

Another island

I want my graduate students to have a better cultural experience during their Ph.D. training. Right now, my research group happens to be entirely composed of women. I am proud of each member for their strong, independent character. One student in particular comes to mind. She is from Puerto Rico, and her native language is Spanish.

Following the Spanish–American War, Puerto Rico became a territory of the United States. Puerto Ricans are U.S. citizens and are subject to U.S. laws, but they lack voting representation in Congress and cannot vote in U.S. presidential elections. I am surprised at how many people don't know these facts.

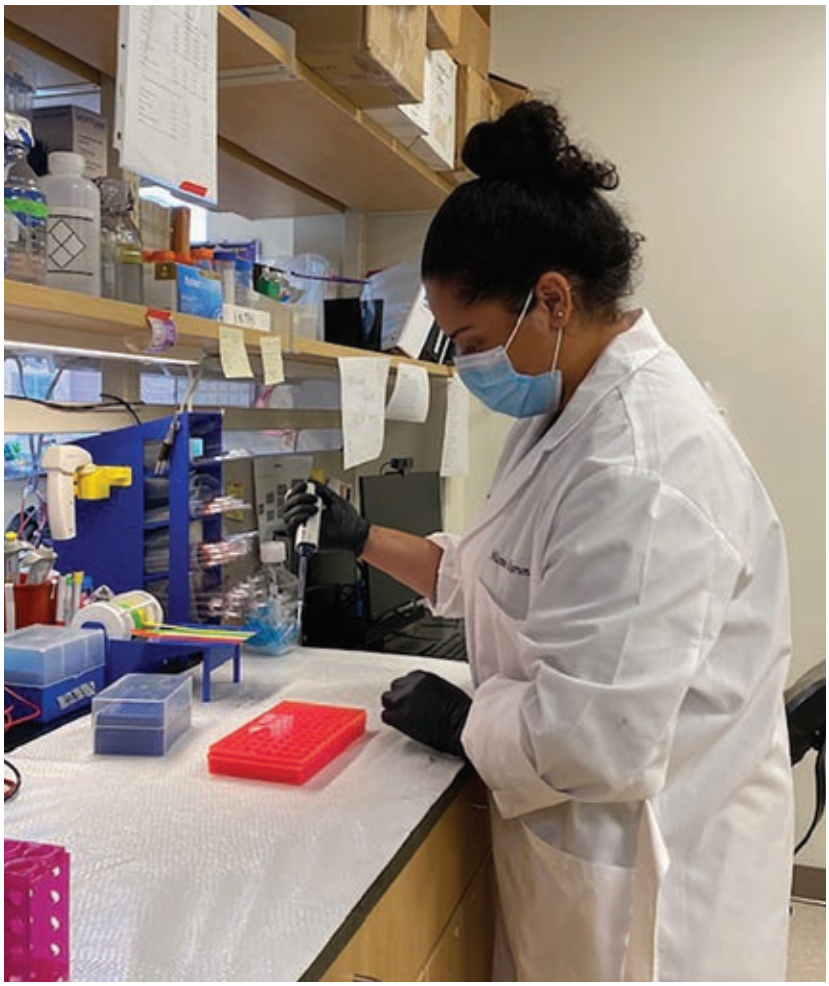
Like me, my student exists on her own island, and her situation provides a mixed message —you are kind of one of us, yet different. As a U.S. citizen, my student is eligible for federal grants, unlike Latinx students who are not from U.S. territories. However, Spanish is her native language, and unknowing individuals assume she is foreign.

I see how others interact with my student and how they react to her pronunciation of English words. I see when she has to stop and think an extra minute to convert a Spanish word to English in her head. She struggled with written English when she started out in graduate school but has worked very hard with me to overcome these difficulties.

Taking action

The other members of the lab, all native English speakers, pitch in and help review her written documents. I explained to them the biases others may have when they see mistakes in this student's written English. I told my other students that I did not want people to disregard her intelligence when they see small issues like spell-

ELIZABETH YEH



A graduate student works in Elizabeth Yeh's lab at Indiana University.

ing errors, because in my opinion, she is a highly capable scientist. I wondered, What is the best thing to do to help her succeed?

We worked out a plan to use both Spanish and English in the lab. Members of the lab now label reagents, write orders and leave notes in Spanish and English. We practice saying scientific terminology in Spanish and try to have basic conversations. My student uses Spanish and explains to me the nuances of her language (each Spanish-speaking country or community is slightly different); we discuss how its grammar is different from English grammar.

In addition to these changes in the lab, my student was able to include a faculty member on her dissertation committee who is also from Puerto Rico.

My student has come a long way, and I have learned a little bit of Spanish. I believe this scenario benefits both of us, even if my pronunciation of Spanish phrases does not sound quite right or I accidentally write on the message board that the lab meeting will be in my bedroom instead of the conference room.

This article began as an idea to discuss best practices for DEI in biomedical sciences. As I began writing, I realized the word "best" projects finality, and in the realm of DEI, there is no standard set of practices that works for everyone.

I believe a unifying factor underlies many of the anxieties we all feel toward things that are different: the desire to be included and belong. As my teaching methods evolve, I plan to work on cultivating inclusive practices because everyone deserves to be provided with a path to their individually defined success.

Relevant reading

"The US biological sciences faculty gap in Asian representation" by James Meixiong and Sherita Hill Golden, the Journal of Clinical Investigation, July 1, 2021.

"Asian Americans: The overrepresented minority?: Dispelling the 'model minority' myth" by Corinna J. Yu, ASA Monitor, July 2020.

Elizabeth Yeh (esyeh@iu.edu) is an associate professor and director of trainee recruitment, development and diversity in the pharmacology and toxicology department at the Indiana University School of Medicine. Her research focuses on protein kinase signaling, breast cancer biology and experimental therapeutics.

'A holistic view'

By Laurel Oldach

After hunting for natural products in Pretoria and helping users plan experiments near Walla Walla, Heino Heyman now works for Metabolon. He took a break from talking with potential customers to tell ASBMB Today about being a metabolomics application specialist.

1 What does an application specialist do?

We sell metabolomics analysis as a service. I join our sales team to give technical insights into our platform, consult and discuss study design. Later, I help the customer engage with their data. I talk metabolomics every day with many different people and hear about projects that they're working on: clinical trials, population health studies, process engineering for bioprocessing plants.

2 What skills do you need that you didn't need in academia?

I'm a principal research associate in the platform automation center of excellence, finding automated solutions for manual assays. I lead collaborations with the infectious disease team to transfer enzyme-linked immunosorbent assays to an automated platform to increase sample capacity to help us evaluate our preclinical vaccines and understand the underlying science.

I was proud to be a part of the COVID-19 vaccine team. It's a great feeling. But we still have a long way to go. We have a crazy pipeline and many programs, with many people working tirelessly to make a difference.

Heino Heyman

CURRENT POSITION
Field application specialist, Metabolon

CAREER PATH
Ph.D., University of Pretoria, medicinal plant sciences
Postdoctoral research: University of Johannesburg, Pacific Northwest National Lab
First job outside of academia: Application scientist, Bruker

FAVORITE MOLECULE OR PROTEIN
Tricaffeoylquinic acid will always be close to my heart. It was a major component of my Ph.D., and a lot of sweat and tears went in. They've now discovered how it fits into the integrase enzyme of HIV.

3 What got you into metabolomics?

My first love in science was finding active ingredients within plants that can be used to treat diseases. Natural product discovery is notorious for being very long; we used metabolomics to look at different species to find an active fingerprint and speed up our isolation of a compound. That really got me excited about metabolomics.

My first postdoc took me to crop biotechnology at the University of Johannesburg. After that I went to Pacific Northwest National Laboratory for a second postdoc.

4 You worked on many projects at PNNL. Does this job feel similar?

That was actually my first exposure to many different types of metabolomics interests. PNNL has a user facility; people from all over the world can apply to run metabolomics, genomics or proteomics. I enjoyed that client-collaborative environment.

I liked being in the lab. But now where I get my energy is engaging with customers and getting them excited about metabolomics — or when we have all of these data points and those aha moments appear.

5 What's most exciting about metabolomics?

Metabolomics at its core is a comprehensive measurement of all the metabolites in a sample. It gives you a holistic, real-time view of the system that other omics do not give you. If it's in your genes, it wasn't necessarily ever transcribed. If the proteins are there, that doesn't necessarily mean they're switched on. But metabolites can give you that readout. I think it's set to become mainstream in the next five to 10 years.

(This interview has been edited and condensed. Read a longer version at asbmb.org/asbmbtoday.)

Laurel Oldach (loldach@asbmb.org) is a science writer for the ASBMB. Follow her on Twitter: @LaurelOld.

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https://careers.asbmb.org/job/polymer-chemist-materials-scientist-staff-fellow/60767742/

Research Specialist, Tissue Culture Operations — Tjian Lab
Howard Hughes Medical Institute (HHMI)

HHMI is currently looking for an experienced Research Specialist, Tissue Culture Operations to work in the lab of Dr. Robert Tjian on-site at the University of California, Berkeley. As the Research Specialist, you will be an adaptable, talented professional who can work well both independently and as part of larger lab teams, has good training skills and communication skills, is competent in all aspects of tissue/cell culture operations, and has experience with mouse/animal work.

https://careers.asbmb.org/jobs/view/research-specialist-tissue-culture-operations-tjian-lab/60806185/

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